

Book "H"

4-679

BOOK 3868

FIELD NOTES

OF THE SURVEY OF

Part of the Boundary of

GRAND CANYON NATIONAL PARK

along the hydrographic divide

between South Canyon and Thompson Canyon

from

44.40 ch. station on subdivision line
bet. secs. 14 and 23, T. 34 N., R. 3 E.

to

a point near right bank of Colorado River
at mouth of Little Nankoweap Canyon

in

Township 34 North, Range 3 East

Township 34 North, Range 4 East

Township 34 North, Range 5 East

Of the Gila and Salt River Base and Meridian,

In the State of Arizona

and of the Survey of the Intersection of the Park Bdy. with the Gila
and Salt River Meridian in T. 34 N.

EXECUTED BY

Benjamin J. Kinsey, U.S. Surveyor

In the capacity of U. S. Surveyor, under ^{Supplemental} Special Instructions dated February 3, 1928, issued by the District Cadastral Engineer to govern surveys included in Group No. 146 Arizona, which were approved by the Commissioner of the General Land Office, February 15, 1928, and Assignment Instructions dated April 21, 1928.

Survey commenced July 12, 1928.

Survey completed August 14, 1928

Survey of Park Bdy. Intersection with the Gila and Salt River
Meridian in T. 34 N. executed on August 20, 1928.

INDEX DIAGRAM.

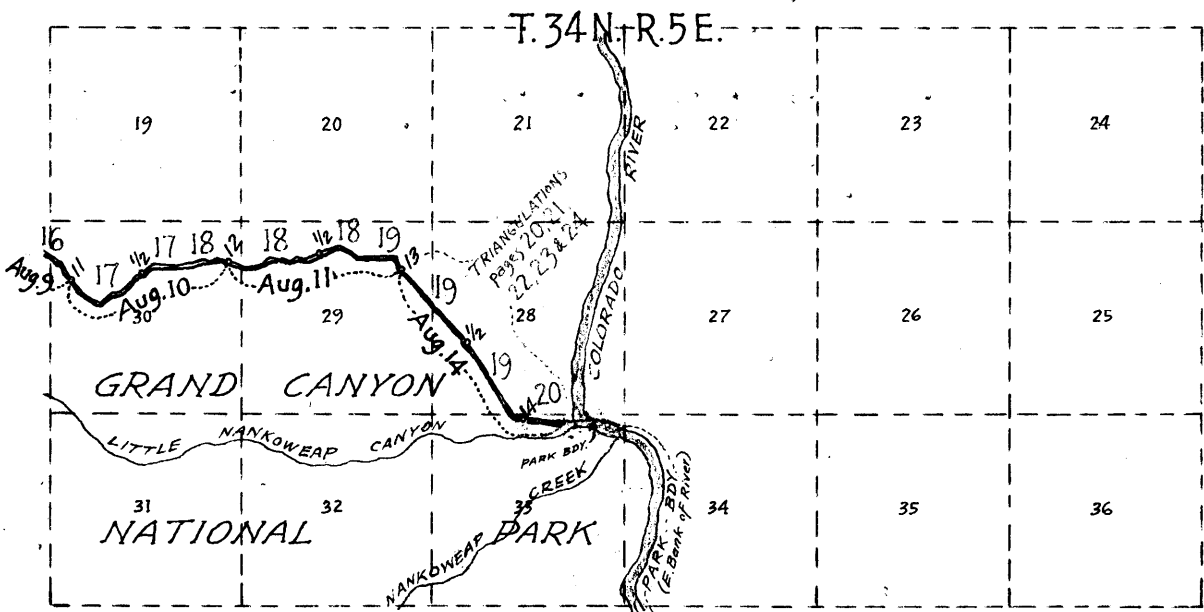
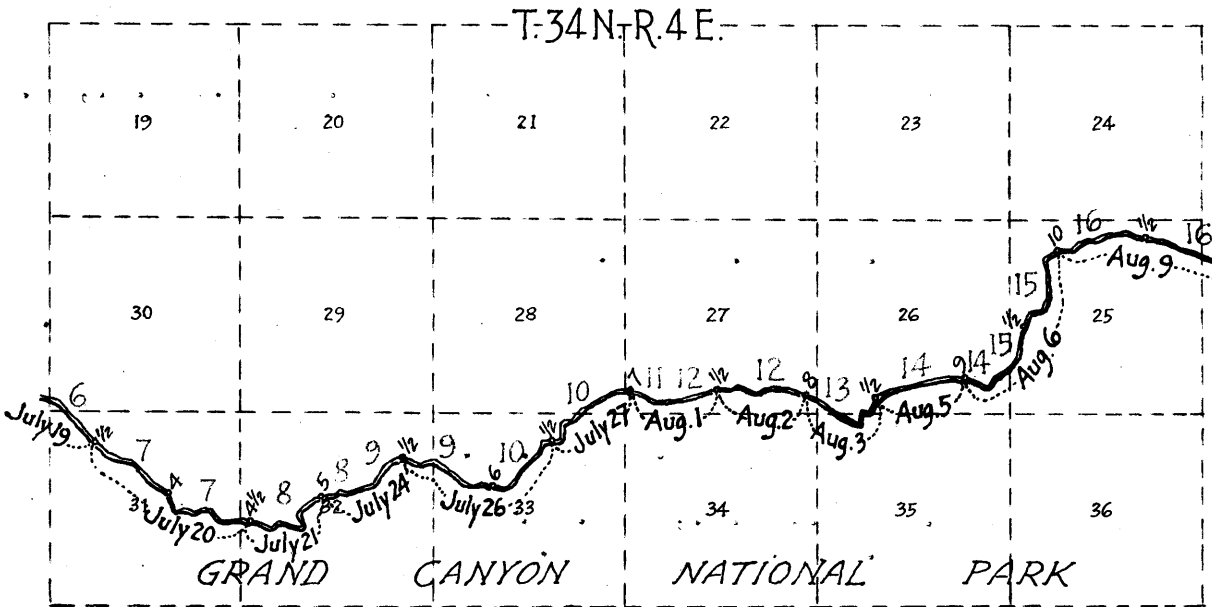
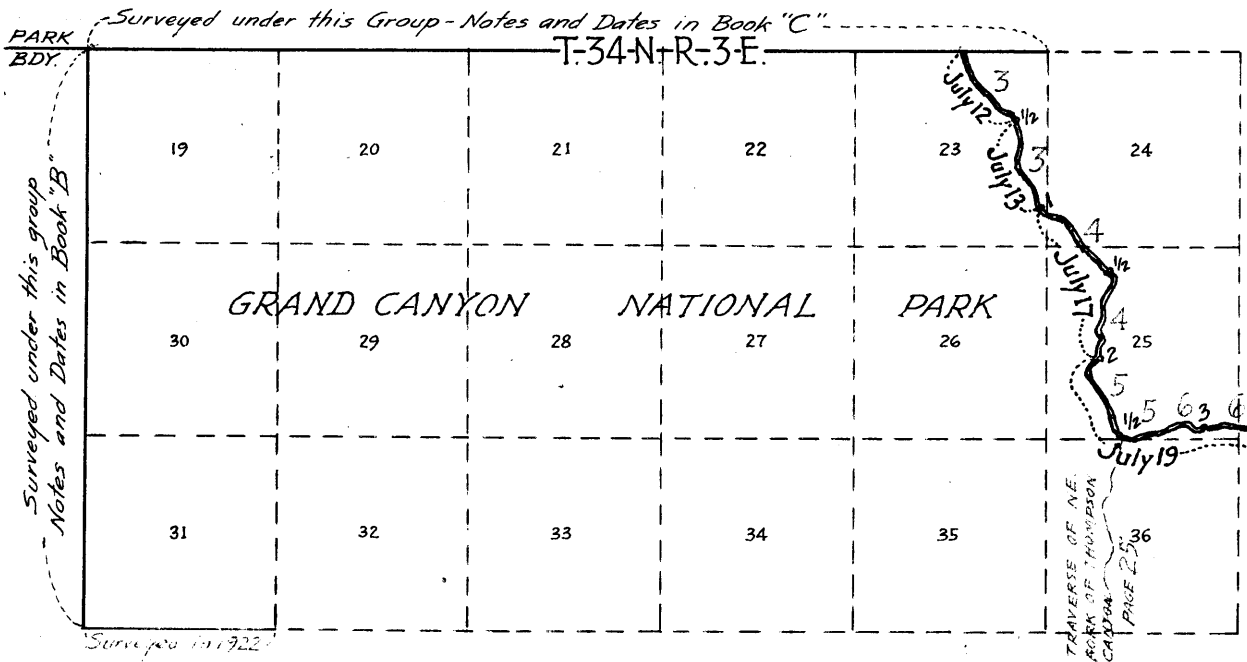
Township _____, Range _____

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
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Book "H" Group 146-Ariz.
 INDEX and DATE DIAGRAM-1928

BOOK 3868

1A



NOTES OF G.C. PARK BDY. INTERSECTION WITH THE GILA & SALT RIVER MERIDIAN IN T.34 N. AS SURVEYED BY B. J. KINSEY U.S. AUGUST 20, 1928, ARE TRANSCRIBED ON PAGES 27, 28, 29 & 30 HEREOF.

Boundary of Grand Canyon National Park surveyed by Benj. J. Kinsey, U.S. Surveyor as described in this book. Dates of survey shown in red. Page numbers in green.

The surveys herein described were executed by Benjamin J. Kinsey, U. S. Surveyor, on dates shown on diagram on page 1 hereof, using Buff transit No. 18,000, with U-shaped standards, $4\frac{1}{2}$ inch horizontal circle, 4 inch vertical circle and improved Smith solar attachment.

All azimuth determinations are accomplished with the solar attachment except the special observations upon Polaris upon which to test the solar apparatus as stated in the field notes.

PRELIMINARY FIELD TEST
of
Buff Transit No.10,000

July 3, 1928, at camp, at Upper Thompson Springs, in section 14, T. 33 N., R. 3 E., Gila and Salt River Base and Meridian, Arizona, latitude $36^{\circ} 15\frac{1}{2}'$ N., longitude $112^{\circ} 03\frac{1}{2}'$ W., examine the adjustments of the transit and find no existing errors; then to test the workings of the solar apparatus proceed as follows:

July 4, 1928, at same station, at 0 h. 54 m., a.m., l.m.t. observe Polaris at eastern elongation, making four observations, two each with the telescope in direct and reversed positions, and marking the mean point in the line thus determined by a tack driven in top of a stake about 5.00 chs. North.

Azimuth of Polaris at eastern elongation: $1^{\circ} 20' 50''$.

Lay off the azimuth of Polaris $1^{\circ} 21'$ to the west and mark the meridian thus determined by a tack set in top of a stake about 8.00 chs. N.

At 9 h. 00 m., a.m., app. t., set off $36^{\circ} 15\frac{1}{2}'$ N., on the lat. arc, $22^{\circ} 52\frac{1}{2}'$ N. on the decl. arc and determine a meridian with the solar which agrees with the true meridian.

At 12 h. 00 m., app. noon, with the lat. arc unchanged, observe the sun on the meridian; the resultant reading of the decl. arc is $22^{\circ} 51\frac{1}{2}'$ N. which agrees with the computed decl. of the sun.

At 3 h. 00 m., p.m., app. t., with the lat. arc unchanged, set off $22^{\circ} 51'$ N., on the decl. arc and determine a meridian with the solar which agrees with the true meridian.

As all of the observations taken within the usual hours of solar work agree within $1'$ of the true meridian conclude that the adjustments of the solar apparatus are satisfactory.

Unless otherwise specified all measurements are made on the slope, the vertical angle determined and the slope measurements properly reduced to horizontal values.

Measurements are made with a Lufkin steel tape 5 chs. in length, compared with a Lufkin standard one chain tape and found correct.

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

Chains

The following notes describe the survey of that part of the Grand Canyon National Park Boundary which follows the hydrographic divide between the drainage areas of South Canyon to the NE. and N., and Thompson Canyon, Bright Angel Creek, Nankoweap and Little Nankoweap Creeks to the SW. and S. The initial corner of this survey is situated on the subdivision line bet. secs. 14 and 23, T.34 N., R.3 E., from which point the Park Bdy. is surveyed easterly to the Colorado River in sec.33, T.34 N., R.5 E. Unsurv. The mile points are monumented with 3 in. iron posts, numbered consecutively from the initial cor., and the half mile points are monumented with 1 in. iron posts. All angle points are monumented by mounds of stone averaging 2 ft. base 1 ft. high in size.

The initial cor., 4.40 chs. E. from the 1/4 sec.cor.of secs. 14 and 23, T.34 N., R.3 E., described in book "C" of this group, is an aspen tree, 8 ins.in diam., cut off at 4 ft.above ground, and marked IP on W. face, PARK on SW. face, and NATIONAL FOREST on N. face, from which,

- an aspen, 4 ins.in diam., brs. N.47 1/2° E., 10 lks.
dist., mkd. PL INITIAL POINT BT
- an aspen, 6 ins.in diam., brs. S.10° E., 19 lks.
dist., mkd. GCNP INITIAL POINT BT
- an aspen, 6 ins.in diam., brs. S.46 1/2° W., 9 lks.
dist., mkd. GCNP INITIAL POINT BT
- an aspen, 6 ins.in diam., brs. N.52° W., 15 lks.
dist., mkd. PL INITIAL POINT BT

Thence along 1st mile of Park Bdy.

Over mountainous land, thru dense timber and scattering undergrowth. Over level top of divide about 3 chs. wide.

- S.25° E., 4.00 chs. to A.P. No.1
- S. 9° E., 7.00 " " " " 2
- S.46 1/4° E., 13.60 " " " " 3
- S.35 1/4° E., 4.00 " " " " 4, from which the head of one fork of Thompson Canyon brs. West about 4 chs. dist.
- S.76° E., 7.60 chs. to A.P. No.5
- S.19 3/4° E., 3.80 " " " " "

40.00

Set an iron post, 3 ft.long, 1 in.in diam., 26 ins.in the ground, for 1/2 mile monument, with brass cap mkd.,

GCNP / PL
M

1928

from which,

- an aspen, 6 ins.diam., brs.N.30° E., 35 lks.dist.,
mkd. PL M BT
- an aspen, 8 ins.diam., brs.S.70 1/2° E., 23 lks.dist.,
mkd. PL M BT
- an aspen, 10 ins.diam., brs.S.42 3/4° W., 36 lks.dist.,
mkd. GCNP M BT
- an aspen, 8 ins.diam., brs.N.30° W., 17 lks.dist.,
mkd. GCNP M BT

Head of a branch of Thompson Canyon, course SW., bears NW. about 10 chs.dist. from this cor.

Continue along top of divide about 6 chs. wide.

- S. 19 3/8° E., 3.60 chs. to A.P. No.1
- S. 4 3/4° E., 5.50 " " " " 2
- S. 30 1/4° W., 4.10 " " " " 3
- S. 2 3/8° E., 3.20 " " " " 4
- S. 34 3/8° E., 7.10 " " " " 5
- S. 38 3/8° E., 3.80 " " " " 6
- S. 30 1/4° E., 3.20 " " " " 7
- S. 14° E., 8.60 " " " " 8
- S. 52 1/2° E., 0.90 " to

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

4

Chains
80.00

Set an iron post, 3 ft. long, 3 ins. in diam., 24 ins. in the ground, for 1st mile mon. on Park Bdy., with brass cap mkd.,

PL

LM

GCNP

1928

from which,

an aspen, 8 ins. diam., brs. N. 68° E., 26 lks.

dist., mkd. PL LM BT

an aspen, 8 ins. diam., brs. S. 7½° E., 26 lks.

dist., mkd. GCNP LM BT

a fir, 16 ins. diam., brs. S. 60° W., 18 lks.

dist., mkd. GCNP LM BT

a fir, 24 ins. diam., brs. N. 13° E., 22 lks.

dist., mkd. PL LM BT

Land, nearly level on divide. Slopes gradually to the west, and abruptly to the east from divide.

Soil, rocky, 4th rate, about 2 ft. down to bedrock.

Timber, aspen, fir, spruce and yellow pine. Much fallen dead timber in the 2nd half mile.

Undergrowth, thorn and oakbrush.

Along 2nd mile of Park Boundary,

Over mountainous land, thru dense timber and scattering undergrowth. Along top of divide, about 7 chs. wide.

S. 52½° E., 3.80 chs. to A.P. No. 1, from which head of a branch of Thompson Canyon brs. South about 6 chs. dist.

S. 76¾° E., 6.40 chs. to A.P. No. 2

S. 45° E., 5.00 " " " " 3

S. 33¾° E., 7.30 " " " " 4

S. 56° E., 5.20 " " " " 5

S. 47¼° E., 11.20 " " " " 6

S. 43¼° E., 1.10 " to

40.00

Set an iron post, 3 ft. long, 1 in. in diam., 26 ins. in the ground, for 1½ mile mon. on Park Bdy., with brass cap mkd.,

GCNP

PL

LM

1928

from which

a fir, 6 ins. diam., brs. N. 87° E., 10 lks.

dist., mkd. PL LM BT

an aspen, 8 ins. diam., brs. S. 10¾° W., 26 lks.

dist., mkd. GCNP LM BT

a fir, 12 ins. diam., brs. S. 68° W., 14 lks. dist.,

mkd. GCNP LM BT

a fir, 10 ins. diam., brs. N. 42½° W., 21 lks.

dist., mkd. PL LM BT

Continue along top of divide, about 9 chs. wide.

S. 43¼° E., 4.40 chs. to A.P. No. 1 from which a broad level topped ridge slopes gradually to the East.

S. 27° W., 9.50 chs. to A.P. No. 2

S. 5½° W., 7.10 " " " " 3

S. 31¾° W., 3.73 " " " " 4

S. 4¾° E., 6.88 " " " " 5

S. 32° W., 3.88 " " " " 6

S. 0¼° E., 4.51 " to

80.00

Set an iron post, 3 ft. long, 3 ins. in diam., 24 ins. in the ground, for 2nd mile mon. on Park Bdy., with brass cap mkd.,

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK.

1968

5

Chains

2M GCNP | PL

1928

from which,

- an aspen, 8 ins. in diam., brs. N.20°E., 12 lks. dist., mkd. PL 2M BT
- an aspen, 8 ins. in diam., brs. S.48½°E., 5 lks. dist., mkd. PL 2M BT
- an aspen, 8 ins. in diam., brs. S.76°W., 21 lks. dist., mkd. GCNP 2M BT
- an aspen, 14 ins. in diam., brs. N.3½°W., 55 lks. dist., mkd. GCNP 2M BT

Land, mtns. and gently rolling on divide top.
 Soil, rocky 3rd. rate. About 2 ft. deep to bedrock.
 Timber, aspen, fir, spruce and yellow pine.
 Undergrowth, oak and thorn brush and manzanita.
 The average width of the divide for the 1st. half mile is 8 chs. and about 10 chs. for the last half.
 Dead, fallen timber covers both halves.

Along the 3rd. mile of Park Bdy., over mountainous land, thru dense heavy timber and scattering undergrowth.

- S.0°15'E., .19 chs. to A.P. No.1.
- S.52¼°W., 7.56 " " " " " 2.
- S.11°E., 6.27 " " " " " 3.
- S.42¼°E., 7.15 " " " " " 4.
- S.56°E., 4.03 " " " " " 5.
- S.34½°E., 6.94 " " " " " 6.
- S.14°E., 7.86 " " " " " "

40.00 Set an iron post 3 ft. long, 1 in. in diam: 26 ins. in the ground for the 2½ mile mark on Park Bdy. with brass cap mkd.

GCNP | PL
2½M

1928

from which,

- a fir, 30 ins. in diam., brs. S.65°E., 17 lks. dist., mkd. PL 2½M BT
- a fir, 24 ins. in diam., brs. S.26°E., 26 lks. dist., mkd. PL 2½M BT
- a fir, 18 ins. in diam., brs. S.32°W., 36 lks. dist., mkd. GCNP 2½M BT
- a yellow pine, 36 ins. in diam., brs. S.60°W., 14 lks. dist., mkd. GCNP 2½M BT

Continue along 3rd. mile.

- S.14°E., .55 chs. to A.P. No. 1.
- S.60°45'E., 5.25 " " " " " 2. A tree marking end of reconnaissance traverse of the NE fork of Thompson Canyon, leading south-westerly to Upper Thompson springs, brs. S.60°E., 15 lks * Thence, along road cut out during progress of survey.
- N.78°45'E., 9.40 chs. to A.P. No.3.
- N.63°E., 4.02 " " " " " 4. Desc. 32 ft. over E. Saddle, brs. N. and S.
- N.51¼°E., 2.90 " " " " " 5. slope to AP 5.

In this vicinity the watershed is not plainly apparent due to the broadening of the surface lands to such an extent that two sunken areas with an acreage of about 20 acres are enclosed within its confines. In order to accurately

* See page 25 of this book for notes of this traverse.

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK.

Chains

determine the proper position of the divide, traverses are projected to the south about 20 chs., covering the questionable areas and determining the relative elevations of all points involved. The results of this investigation proves conclusively that the drainage of this sunken area is into Bright Angel Creek and leaves unquestioned the proper position of the divide. To assist in the proper determination of the watershed, compass and pace traverses were conducted up all branches of Thompson and Bright Angel Creek Canyons leading to the portion of the divide involved. From A.P.No.5 the N.W. branch of Bright Angel Creek, heads about 7 chs. S.E. Fuller Canyon heads about 1/2 mile South. A large branch of Thompson Canyon heads SW about 1/2 mile.

From A.P. No.5, asc. gradually over W. slope.

- N.60 1/2° E., 1.34 chs. to A.P.No.6.
- N.77 1/2° E., 7.24 " " A.P. " 7.
- S.56 1/2° E., 5.00 " " " " 8.
- N.80 1/4° E., 4.30 " " " " " "

80.00

Set an iron post 3 ft. long, 3 ins. in diam., 24 ins. in the ground for the 3rd. mile monument on the park bdy., with brass cap mkd.

PL

3 M
GCNP
1928

from which,

- a fir, 12 ins. in diam., brs. N.78° E., 69 lks. dist., mkd. PL 3M BT
- an aspen, 6 ins. in diam., brs. S.86 1/2° E., 58 lks. dist., mkd. GCNP 3M BT
- a fir, 24 ins. in diam., brs. S.72 1/2° W., 56 lks. dist., mkd. GCNP 3M BT
- a yellow pine, 18 ins. in diam., brs. N.65° W., 21 lks. dist., mkd. PL 3M BT

Land, rolling and mountainous.

Soil, rocky 3rd. and 4th. rate. About 2 ft. to bedrock.

Timber, aspen, fir, spruce and yellow pine.

Undergrowth, oak, manzanita and thorn brush.

Along 4th. mile of Park Bdy.

Over mountainous land, thru dense, heavy timber and scattering undergrowth.

N.82° E., 6.60 chs. to A.P. No. 1.

S.79° 45' E., 7.20 " " " " 2. From which, a dry sunken area about 4 chs. in diam., brs S. about 5 chs. distant.

This area drains into one fork of Bright Angel Canyon over a saddle which is 20 ft. lower than the divide.

S.66° 45' E., 3.30 chs. to A.P. No. 3.

S.23 1/2° E., 3.00 " " " " 4.

S.45 1/2° E., 2.60 " " " " 5.

S.40° E., 4.60 " " " " 6.

S.56° E., 5.40 " " " " 7.

S.38° 45' E., .40 " " " " "

40.00

Set an iron post 3 ft. long, 1 in. in diam., 26 ins. in the ground for the 3 1/2 mile monument, with brass cap

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK.

BOOK 2008

Chains

mkd.

3 1/2 M PL

GCNP

1928 from which,
 a fir, 18 ins. in diam., brs. N.43 1/2°E., 30 lks.
 dist., mkd. PL 3 1/2 M BT
 a fir, 24 ins. in diam., brs. S. 26°E., 20 lks.
 dist., mkd. PL 3 1/2 M BT
 an aspen, 8 ins. in diam., brs. N.53 1/2°W., 35 lks.
 dist., mkd. GCNP 3 1/2 M BT
 an aspen, 12 ins. in diam., brs. N.22 1/4°W., 28 lks.
 dist., mkd. GCNP 3 1/2 M BT

Continue along 4th. mile. Divide is about 6 chs. wide.

S.38 1/4°E., 5.48 chs. to A.P. No. 1.
 S.60 1/2°E., 4.30 chs. " " " " 2.
 S.80 1/2°E., 7.80 " " " " 3.
 S.53°E., 4.40 " " " " 4.
 S.44 1/4°E., 9.00 " " " " 5.
 S.56°E., 7.30 " " " " 6.
 S.30°E., 1.72 " " " " "

80.00

Set an iron post 3 ft. long, 3 ins. in diam., 20 ins. in the ground to bedrock, supported by a md. of stone, for the 4 Mile monument on Park Bdy, with brass cap mkd.

4 M PL

GCNP.

1928. from which,
 an aspen, 8 ins. in diam., brs. N.47°E., 30 lks.
 dist., mkd. PL 4M BT
 a fir, 14 ins. in diam., brs. S.86°W., 17 lks.
 dist., mkd. GCNP 4M BT
 a fir, 8 ins. in diam., brs. S.33°W., 18 lks.
 dist., mkd. GCNP 4M BT
 an aspen, 8 ins. in diam., brs. N.19 1/4°W., 30 lks.
 dist., mkd. PL 4M BT

Land, rolling and mountainous.
 Soil, rocky 3rd. and 4th. rate.
 Timber, aspen, fir, spruce and yellow pine.
 Undergrowth, oak, thorn and manzanita brush.

Along the 5th. mile of Park Bdy.
 Over mountainous land, thru dense, heavy timber and scattering undergrowth.

S.30°E., 7.76 chs. to A.P. No.1.
 N.79 1/4°E., 4.00 " " " " " 2.
 S.64°E., 4.50 " " " " " 3. Saddle, brs. N.-S. Canyons head N. and S. about 2 chs. distant the one to S. being a fork of Bright Angel Creek.
 N.69 1/4°E., 5.50 chs. to A.P.No. 4.
 S.89 1/2°E., 3.20 " " " " " 5.
 S.46 1/2°E., 7.10 " " " " " 6.
 N.87 1/4°E., 5.60 " " " " " 7.
 S.80°E., 2.34 " " " " " "

40.00

Set an iron post 3 ft. long, 1 in. in diam., 26 ins. in the ground for the 4 1/2 mile monument, with brass cap mkd.

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK.

Chains

PL

4 1/2 M GCNP

1928

from which,

- a fir, 10 ins. in diam., brs. S. 85° E., 24 lks. dist., mkd. PL 4 1/2 M BT
- a fir, 10 ins. in diam., brs. S. 70° E., 18 lks. dist., mkd. GCNP 4 1/2 M BT
- a fir, 12 ins. in diam., brs. N. 87° W., 28 lks. dist., mkd. GCNP 4 1/2 M BT
- a fir, 12 ins. in diam., brs. N. 75° W., 22 lks. dist., mkd. PL 4 1/2 M BT

Continue along 5th. mile.

- S. 80° E., 6.80 chs. to A.P. No. 1. Over dense fallen aspen.
- S. 61 1/2° E., 3.45 " " " " "
- N. 43 1/2° E., 4.60 " " " " "
- S. 81 1/2° E., 3.00 " " " " "

4. Head of the N.E. fork of Bright Angel Creek, brs. S. about 5 chs. distant.

- S. 76 1/2° E., 7.00 chs. to A.P. No. 5. Intersect the true point for the Hydrographic divide along the upper rim of the Grand Canyon of the Colorado River at junction of Boundary ridge with the Kaibab Plateau. The rim of the canyon brs. S. about 1 ch. dist. At a point 1.10 chs. S. 54° E., set a flag "A" for back check, on edge of upper rim.

N. 18° E., 2.30 chs. to A.P. No. 6. At 10 lks. cross blazed trail, brs. N. and S.

- N. 18° 25' W., 2.70 chs. to A.P. No. 7. Cross trail Brs. NE-SW.
- N. 30 1/2° E., 6.20 " " " " "
- N. 44 1/2° E., 3.20 " " " " "
- S. 83 1/2° E., 2.85 " " " " "

80.00 Set an iron post 3 ft. long, 3 ins. in diam., 24 ins. in the ground for the 5-mile monomer Park Bdy, with brass cap mkd.

PL

5 M

GCNP

1928

from which,

- an aspen, 6 ins. in diam., brs. N. 61° E., 24 lks. dist., mkd. PL 5 M BT
- an aspen, 6 ins. in diam., brs. S. 21 1/2° E., 52 lks. dist., mkd. GCNP 5 M BT
- a fir, 6 ins. in diam., brs. S. 23° W., 63 lks. dist., mkd. GCNP 5 M BT
- a fir, 6 ins. in diam., brs. N. 10 1/2° W., 33 lks. dist., mkd. PL 5 M BT

Land, rolling and level.

Soil, rocky 3rd. & 4th. rate.

Timber, aspen, fir, spruce and yellow pine.

Undergrowth, oak, thorn and manzanita brush.

Along the 6th. mile of Park Bdy.

Over mountainous land, thru dense, heavy timber and thick undergrowth.

Desc. gradually over east slope.

- S. 83 1/2° E., 1.60 chs. to A.P. No. 1.
- N. 57° 53' E., 2.62 " " " " " 2. Desc. 158 ft. over east slope to saddle. At 1.85 same trail brs. NE-SW. Along trail.

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

Chains	N. 82° 09' E.,	3.40 chs.	to A.P. No. 3,	descending gradual
				E. slope to saddle at heads
				of canyons, course N. and S.
	N. 39° E.,	1.10 chs.	to A.P. No. 4	
	S. 71° 40' E.,	2.07 "	" " " "	5 on rocky knoll.
	N. 75¼° E.,	3.14 "	" " " "	6 descending 189 ft.
				over broken E. slope.
	N. 77½° E.,	4.73 "	" " " "	7 in saddle.
	N. 74° 02' E.,	6.02 "	" " " "	8, ascending 250 ft.
				over SW. slope to
				5½ mile mon.

40.00 Set an iron post, 3 ft. long, 1 in. in diam., 18 ins. in the ground to bedrock, supported in a mound of stone, for 5½ mile mon. on Park Bdy., with brass cap mkd.,

PL
GCNP 5M

1928

- from which
- an aspen, 8 ins. diam., brs. N. 13° E., 59 lks.
dist., mkd. PL 5M BT
- a yellow pine, 14 ins. diam., brs. S. 57¾° E., 42 lks.
dist., mkd. GCNP 5M BT
- a fir, 24 ins. diam., brs. S. 58° W., 65 lks.
dist. mkd. GCNP 5M BT
- a fir, 12 ins. diam., brs. N. 7° W., 43 lks.
dist., mkd. PL 5M BT

S. 70° 17' E., 1.94 chs. to A.P. No. 1, ascending gradually.
 S. 56° 24' E., 1.36 chs. " " " 2, on top of a high
 knoll, elevation about 8,750 ft.
 above sea level. Upper rim of
 canyon brs. S. 20 lks. dist.
 From this A.P. the flag "A" near
 A.P. No. 5 of 2nd ½ of 5th mile
 brs. S. 58° 58' W.

S. 72° E., 3.95 chs. to A.P. No. 3, descending gradually.
 N. 58½° E., 2.26 " " " " 4
 N. 75° E., 1.98 " " " " 5
 S. 87¼° E., 2.25 " " " " 6
 S. 57° 05' E., 15.94 " " " " 7, descending 250 ft.
 over SE. slope. At 13.00 chs. cross
 head of ravine, course NE.
 At 14.00 chs. enter level bench,
 which has a width ranging from
 5 chs. at this point to 20 chs.
 farther east.

N. 77½° E., 4.60 chs. to A.P. No. 8 across level bench.
 S. 82° E., 4.30 " " " " 9
 S. 83½° E., 1.42 " to

80.00 Set an iron post, 3 ft. long, 1 in. in diam., 24 ins. in the ground, for 6th mile mon. on Park Bdy., with brass cap mkd.

PL
GCNP 6M

1928

- from which
- an aspen, 6 ins. diam., brs. N. 63¼° E., 37 lks.
dist. mkd. PL 6M BT

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

10

Chains

a fir, 18 ins. diam., brs. S. 51° E., 75 lks.
dist., mkd. GCNP 6M BT
a yellow pine, 30 ins. diam., brs. S. 13° W., 98 lks.
dist., mkd. GCNP 6M BT
a yellow pine, 30 ins. diam., brs. N. 19½° W., 116 lks.
dist., mkd. PL 6M BT

Land, mountainous and level.
Soil, rocky, 3rd and 4th rate.
Timber, aspen, fir and yellow pine.
Undergrowth, oak, thorn and manzanita brush.

Along 7th mile of Park Boundary,
Over mountainous land, thru dense timber and undergrowth.
Across level bench.

S. 83½° E.,	5.30 chs.	to A.P. No. 1
N. 52¾° E.,	5.90 "	" " " 2
N. 29¾° E.,	11.40 "	" " " 3
N. 36° 51' E.,	7.10 "	" " " 4
N. 17¾° E.,	4.10 "	" " " 5
S. 86° E.,	4.80 "	to " " 6, from which the N. edge of the top of a crater about 8 chs. diam., and 50 ft. deep, brs. south 2 chs. dist.

East 1.40 chs. to

40.00

Set an iron post, 3 ft. long, 1 in. in diam., 10 ins. in
the ground to bedrock, supported in a mound of stone,
for 6½ mile mon. on Park Bdy., with brass cap mkd.,

PL

6½M GCNP

1928

from which

a yellow pine, 12 ins. diam., brs. N. 75½° E., 63 lks.
dist., mkd. PL 6½M BT
a yellow pine, 14 ins. diam., brs. S. 70¾° E., 108 lks.
dist., mkd. GCNP 6½M BT
a yellow pine, 14 ins. diam., brs. S. 34½° W., 42 lks.
dist., mkd. GCNP 6½M BT
a yellow pine, 12 ins. diam., brs. N. 56¾° W., 59 lks.
dist., mkd. PL 6½M BT

East 5.52 chs. to A.P. No. 1. In a tree top 35 lks
N. 54° E. from this A.P., set a flag
"B" for a back check.

N. 20¼° E., 2.46 chs. to A.P. No. 2 At 30 lks. descend
over steep brushy NE. slope into
big saddle. Trail follows line
closely, to west.

N. 1° E., 4.33 chs. to A.P. No. 3

N. 45¼° E., 1.88 " " " " 4, on trail bearing
NE. and S. 50° W.

N. 88¾° E., 4.02 " " " " 5

N. 38¾° E., 4.28 " " " " 6, Total descent 540 ft.

N. 65¾° E., 5.49 " " " " 7. At 4.40 chs. cross
saddle bearing N. and S. and trail
bearing NW. and SE. Asc. 15 ft.
over broken SW. slope. At 5.00 chs.
rim of bench, brs. NW.-SE. Thence
over level bench thru dense brush.

N. 56° E., 9.24 chs. to A.P. No. 8

S. 89¼° E., 1.85 " " " " 9

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK

Chains
80.00

S. 77° E., 0.93 chs. to
Set an iron post, 3 ft. long, 3 ins. in diam., 12 ins. in the ground to bedrock, deposit a stone marked with a cross (X) at base of post, and raise a mound of stone around post, for 7th mile mon. on Park Bdy., with brass cap mkd.,

PL
GCNP 7M

1928

No bearing trees available.

Land, mountainous and level.
Soil, rocky, 4th rate.
Timber, yellow pine and pinion.
Undergrowth, manzanita, oak and thorn brush.

Along 8th mile of Park Boundary,
Over mountainous land, thru scattering timber and dense undergrowth.

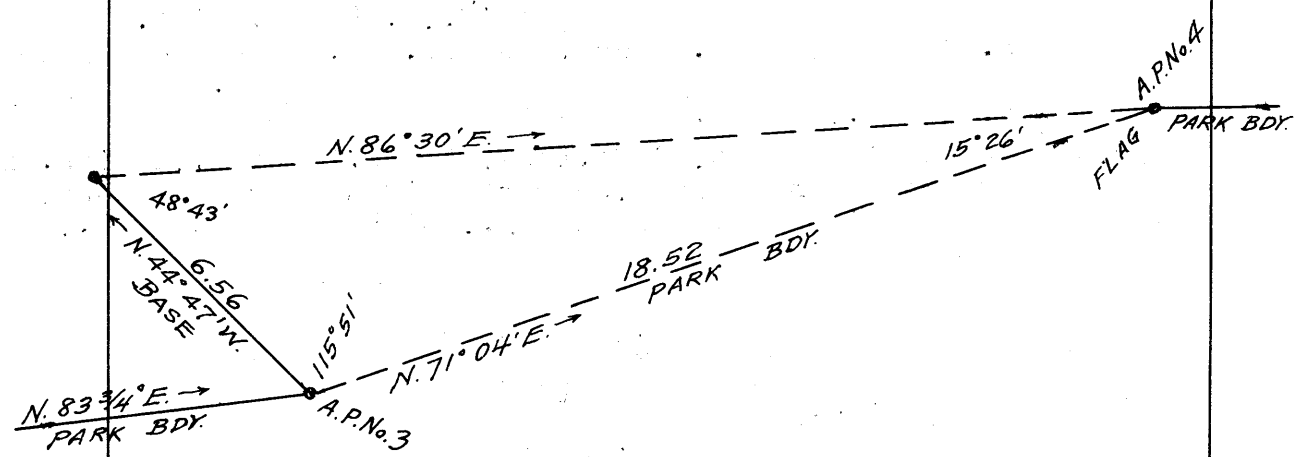
Across level bench.

S. 77° E., 0.98 chs. to A.P. No.1
S. 61 3/4° E., 9.86 " " " " 2. At 20 lks. pass over rim of bench, bearing E.-W. Leave bench and desc. 136 ft. thru dense timber. At 9.50 chs. cross trail bearing E.-W. A.P. No.2 is located about 1.00 ch. from upper rim of canyon, where there is a sheer drop of several hundred feet.

N. 83 3/4° E., 8.35 chs. to A.P. No.3. Desc. about 20 ft. to 7.15 ch. station on this course where a trail crosses line in a saddle. This trail leads over a precipitous wall of rock, several hundred feet high, to the south, and eventually ends in Rankowear Canyon, some 4 miles distant. Asc. about 20 ft. over ledges and boulders to A.P. No.3.

Beyond A.P. No.3, precipitous ascent over cliffs renders chaining impracticable, therefore triangulate to A.P. No.4 as described as follows:

From A.P. No.3 measure a Base, N.44°47'W., 6.56 chs. Set a flag at A.P. No.4.
From A.P. No.3 the flag brs. N.71°04'E.
From NW. end of Base the flag brs. N.86°30'E.
Vertical angle from A.P. No.3 to flag is + 25 3/4°



Dist. triangulated = 18.52 chs. N.71°04'E.

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK

Chains

From A.P. No.3 N.71°04'E., 18.52 chs. to A.P. No.4 at top of bluff and at SW. end of Saddle Mountain, about 600 ft. above A.P. No.3., on a narrow rock point extending from the east, with sheer descent of several hundred feet on either side. At 15.00 chs. (Approx.) on this course is the foot of an almost vertical bluff, about 300 ft. high bearing NW.-SE., facing SW.

N.88°06'E., 2.29 chs. to

40.00

Set an iron post, 3 ft. long, 1 in. in diam., in crack in surface rock, 2 ft. wide, deposit a stone marked with a cross (X) at base of post, and raise a mound of stone around post, for 7 1/2 mile mon. on Park Bdy., with brass cap mkd.,

PL

7 1/2 M

GCNP

1928

No bearing trees available. This mon. is on rock point about 20 ft. wide

N.88°06'E., 4.34 chs. to A.P. No.1 on rock point about 10 ft. square, 76 ft. above 7 1/2 mile mon.

S. 80 1/4° E., 3.47 chs. to A.P. NO.2 descending 20 ft. over vertical slope. At 1.00 ch. asc. 96 ft. over broken SW. slope. From A.P. No.2 the flag "B" near A.P. No.1 of 2nd 1/4 of 7th mile brs. S.73°53'W.

N.50 1/2° E., 2.33 chs. to A.P. No.3 descending 40 ft. over NE. slope.

S.74°40'E., 10.08 " " " " 4 ascending 130 ft. over broken W. slope

N. 47° E., 3.50 " " " " 5 descending 64 ft. over E. slope.

S. 85° E., 5.77 " " " " 6 . At 2.00 chs. head of canyon, course NW. Asc. 103 ft. over W. slope.

S. 80 1/4° E., 5.26 chs. to A.P. No.7 on top of Saddle Mt., elev. 8,420 ft. above sea level. The mountain top has a level area of about 3 acres. From A.P. No.7, USGS B.M. 8420, which is a circular md. of rock 6 ft. base, 8 ft. high, brs. N.27° 40'E., 3.85 chs. dist.

S. 37 3/4° E., 2.30 chs. to A.P. No.8 over nearly level top.

S. 63° E., 2.95 " to

80.00

Set an iron post, 3 ft. long, 3 ins. in diam., 12 ins. in the ground to bedrock, supported in a mound of stone, for 8th mile mon. on Park Bdy., with brass cap mkd.,

PL

GCNP 8M

1928

from which a yellow pine, 6 ins. diam., brs. N.11°E., 30 lks. dist. mkd. PL 8M BT a yellow pine, 10 ins. diam., brs. N.32°E., 20 lks. dist., mkd. PL 8M BT

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

EGO 1928

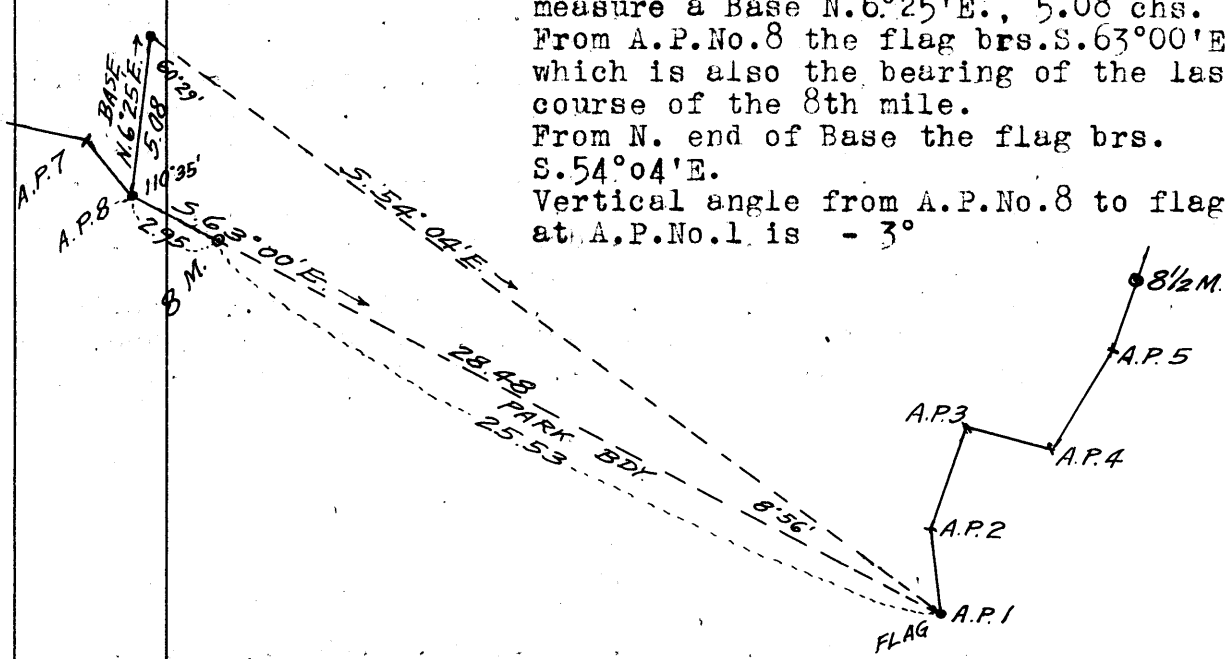
Chains

a yellow pine, 8 ins.diam.,brs. S.24¹/₂°E., 36 lks.
dist., mkd. GCNP 8M BT
a yellow pine,12 ins.diam.,brs. S.26°W., 56 lks.
dist., mkd., GCNP 8M BT
Upper rim of canyon brs. South about 3 chs. dist.

Land, mountainous and level.
Soil, rocky, 4th rate.
Timber, fir,yellow pine,spruce and pinion.
Undergrowth, oak,manzanita,thorn brush and cacti.

Along 9th mile of Park Bdy.,
Over mountainous land,thru dense timber and undergrowth.
It being impracticable to chain measurement over broken
precipitous slopes, triangulate the measurement from
8th mile mon. to A.P.No.1 of 1st half of 9th mile
as described as follows:

Set a flag ahead at A.P. No.1
From A.P.No.8 of 2nd half of 8th mile
measure a Base N.6°25'E., 5.08 chs.
From A.P.No.8 the flag brs.S.63°00'E.
which is also the bearing of the last
course of the 8th mile.
From N. end of Base the flag brs.
S.54°04'E.
Vertical angle from A.P.No.8 to flag
at A.P.No.1 is - 3°



Dist. triangulated = 28.48 chs.S.63°00'E.
A.P.No.8 to 8th mile mon. = 2.95 " S.63°00'E.
Dist.-8mile mon.to A.P.No.1 = 25.53 chs.S.63°00'E.

S. 63° E., 25.53 chs. to A.P. No.1 descending about
350 ft.over NE.slope. At 15.00
(approx.)cross saddle at head of
canyon course NE. Upper rim of
Nankowep canyon brs. S. about
2 chs. dist. Asc. about 200 ft.
over cliffs to A.P.No.1 on high
point in divide,from which the
upper rim of Nankowep Canyon
brs. SE.20 lks.dist.
From A.P.No.1 the flag "A"near
A.P.No.5 of 2nd ¹/₄ of 5th mile
brs. S.83°49'W.,and flag "B"near
A.P.No.1 of 2nd ¹/₄ of 7th mile
brs.S:87°32'W.
Set flag "C"at A.P.No.1 for back
check.

N. 8° W., 2.59 chs.to A.P.No.2,desc.23 ft.along divide.
N. 18° E., 3.23 " " " " 3,desc.30 ft. " "
S. 75° E., 2.80 " " " " 4,asc.38 ft. " "
N.30¹/₂° E., 3.57 " " " " 5
N.19¹/₂° E., 2.28 " to

40.00 Set an iron post, 3 ft.long,1 in.in diam.,on surface rock
supported in a mound of stone,for 8¹/₂ mile mon.on Park
Bdy., with brass cap mkd.,

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

14

Chains

PL / 8³/₄M
GCNP

1928

from which

a pinion, 8 ins. diam., brs. N. 61° E., 49 lks. dist.,
mkd. GCNP 8³/₄M BT

a cedar, 8 ins. diam., brs. S. 24° E., 11 lks. dist.,
mkd. GCNP 8³/₄M BT

a pinion, 24 ins. diam., brs. S. 56° W., 31 lks. dist.,
mkd. PL 8³/₄M BT

a spruce, 40 ins. diam., brs. N. 6° W., 8 lks. dist.,
mkd. PL 8³/₄M BT

N. 19¹/₄° E., 1.22 chs. to A.P. No. 1

N. 46¹/₄° E., 4.10 " " " " 2

N. 68° E., 9.40 " " " " 3, descending 137 ft.
over huge boulders. At 5.00 chs.

cross saddle 50 lks. N. from rim
of Nankowep Canyon. Asc. 60 ft.

over broken W. slope to AP. No. 3.

N. 77° E., 13.14 chs. to A.P. No. 4, ascending 147 ft.

over broken land to AP. No. 4

N. 81³/₄° E., 9.22 chs. to A.P. No. 5, descending 74 ft. over
E. slope. At 8.00 chs. cross saddle

at head of draw, course NE.

S. 67³/₄° E., 1.22 chs. to A.P. No. 6, ascending 30 ft. over
NW. slope to A.P. No. 6.

S. 76¹/₄° E., 1.70 chs. descending 32 ft. over NW.
slope to

80.00

Set an iron post, 3 ft. long, 3 ins. in diam., 8 ins. in the
ground to bedrock, supported in a mound of stone, for
9 mile mon. on Park Bdy., with brass cap mkd.,

PL

9M

GCNP

1928

from which

a yellow pine, 16 ins. diam., brs. N. 29° E., 62 lks.
dist., mkd. PL 9M BT

a yellow pine, 6 ins. diam., brs. N. 86° E., 14 lks.
dist., mkd. PL 9M BT

a fir, 6 ins. diam., brs. S. 38° E., 80 lks.
dist., mkd. GCNP 9M BT

a yellow pine, 14 ins. diam., brs. S. 44° E., 100 lks.
dist., mkd. GCNP 9M BT

Land, mountainous.

Soil, rocky, 4th rate.

Timber, yellow pine and fir.

Undergrowth, manzanita, cacti and catclaw.

Along 10th mile of Park Bdy.,

Over mountainous land, thru dense timber and undergrowth,
along divide, about 1 ch. N. from canyon rim, vertical
wall about 800-ft. high.

S. 76¹/₄° E., 4.53 chs. to A.P. No. 1, descending 15 ft. over
SE. slope. At 1.00 ch. cross saddle
brs. N.-S. Asc. 30 ft. over W. slope.

S. 81° E., 3.16 chs. to A.P. No. 2, over level top.

S. 61³/₄° E., 4.65 " " " " 3 on rocky point, project-
ing over canyon, vertical walls
about 800 ft. high. At this A.P.
raise a md. of stone, 4 ft. base,
3 ft. high, around a wooden post, 4
ins. square. From a point 1.85 chs.
S. 69° 58' W. from this A.P. the flag
"C" at A.P. No. 1 of 1st 1/2 of 9th
mile brs. S. 72° 22' W.

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK

Chains

From A.P.No.3 measure S.54 1/2°W. 46 lks.to a white fir tree, in top of which set flag"D" for back check.

- N. 36° E., 5.10 chs.to A.P.No.4. Desc.23 ft.,N.slope.
- N. 59 3/4° E., 5.50 " " " " 5. Desc.29 ft.,N.slope.
- N. 13° E., 4.77 " " " " 6. Desc.34 ft.,N.slope.
- N. 3° W., 3.32 " " " " 7. Desc.38 ft.,N.slope.
- N. 17 1/4° E., 4.12 " " " " 8. Desc.42 ft.,NE.slope.
- N. 29° E., 2.70 " " " " 9. Desc.15 ft.,NE.slope.

From A.P.No.9; Top of cliff,500 ft.high,bearing N.-S.(upper canyon rim) brs. East 6 lks.dist. Navajo Mt. brs. N.49 1/2°E. Mouth of Nankowep Creek brs. S.82 1/2°E.

40.00

N. 27 1/4° E., 2.15 chs. to Set an iron post,3 ft.long,1 in.in diam.,8 ins.in ground to bedrock,supported in a mound of stone,for 9 1/4 mile mon. on Park Bdy., with brass cap mkd.,

PL / 9 1/4 M GCNP 1928

- from which
- a pinion,8 ins.diam.,brs. N.44°E., 43 lks. dist., mkd. GCNP 9 1/4 M BT
- a pinion,12 ins.diam.,brs. S.23°E., 16 lks. dist., mkd. GCNP 9 1/4 M BT
- a fir, 14 ins. diam., brs. S.60 1/2°W., 41 lks. dist., mkd. PL 9 1/4 M BT
- a pinion,12 ins.diam.,brs. N.72°W., 20 lks. dist., mkd. PL 9 1/4 M BT

Continue along divide,average width 50 lks.

- N. 27 1/4° E., 2.05 chs.to A.P.No.1, Desc.14 ft.,N.slope.
- N. 11 1/4° E., 2.39 " " " " 2, Desc.47 ft.,N.slope.
- N. 40° E., 2.82 " " " " 3, Desc.31 ft.,N.slope.
- S. 89 1/4° E., 2.90 " " " " 4, Asc. 45 ft.,SW.slope.
- N. 15 1/2° E., 2.50 " " " " 5, Desc.42 ft.,NE.slope.
- N. 87° E., 1.22 " " " " 6, Asc. 27 ft.,SW.slope.
- N. 10 3/4° E., 15.95 " " " " 7, Desc.252 ft.,NW.slope.
- N. 12 1/2° W., 4.42 " " " " 8, Desc.85 ft.,N. slope.
- N. 59° E., 3.25 " " " " 9, Desc.53 ft.,NE.slope.
- N. 52 1/4° E., 2.50 " to

80.00

Set an iron post, 3 ft.long, 3 ins.in diam.,8 ins.in the ground to bedrock,supported in a mound of stone, for 10th mile mon. on Park Bdy.,with brass cap mkd.,

PL / GCNP 10M 1928

- from which
- a pinion, 6 ins.diam.,brs. N.73°E., 93 lks. dist., mkd. PL 10M BT
- a pinion, 8 ins.diam.,brs. S.72°E., 70 lks. dist., mkd. GCNP 10M BT
- a pinion,16 ins.diam.,brs. South, 36 lks. dist., mkd. GCNP 10M BT
- a pinion, 6 ins.diam.,brs. N.11 3/4°W., 45 lks. dist., mkd. PL 10M BT

Land, mountainous. Soil, rocky, 4th rate. Timber, pinion,yellow pine,fir and spruce. Undergrowth, oak,manzanita and thorn brush.

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

Chains

Along the 11th mile of Park Bdy.,
Over mountainous land, thru dense timber and undergrowth.
along divide, average width, 50 lks.
N. 52 $\frac{1}{2}$ ° E., 0.15 chs. to A.P.No.1, Desc.3 ft., NE.slope
S. 85 $\frac{1}{2}$ ° E., 4.28 " " " " 2, Desc.gradual NE.
slope. At 2.00 chs.cross saddle
brs.N.-S. Asc.51 ft.over SW.slope
N. 27 $\frac{1}{2}$ ° E., 3.08 chs. to A.P.No.3, Desc.42 ft., NE.slope
N. 50 $\frac{1}{2}$ ° E., 3.94 " " " " 4,
S. 76 $\frac{1}{2}$ ° E., 2.29 " " " " 5, Desc.7 ft., E.slope.
N. 44 $\frac{3}{4}$ ° E., 2.91 " " " " 6, Desc.48 ft.NE.slope
N. 53 $\frac{3}{4}$ ° E., 1.24 " " " " 7, Desc.34 ft.NE.slope
S. 76° E., 1.65 " " " " 8
N. 83 $\frac{1}{2}$ ° E., 6.80 " " " " 9, descending 20 ft.
over E. slope. At 4.90 chs.
cross saddle bearing N.-S.
Asc.18 ft.over W. slope
N. 70 $\frac{1}{2}$ ° E., 1.73 chs. to A.P.No.10, Desc.11 ft.over
E. slope.
S. 82 $\frac{1}{2}$ ° E., 3.17 chs. to A.P.No.11, Desc.25 ft. over
E. slope.
S. 76° E., 5.79 chs. to A.P.No.12, Desc.55 ft. over
E. slope. At 2.60 chs.asc.21
ft. over W. slope.
N. 80 $\frac{1}{2}$ ° E., 2.97 chs. descending 42 ft. over E.
slope to

40.00

Set an iron post, 3 ft.long, 1 in.in diam., 10 ins.in
the ground to bedrock, supported in a mound of stone,
for 10 $\frac{1}{2}$ mile mon. on Park Bdy., with brass cap mkd.,

PL

10 $\frac{1}{2}$ M

GCNP.

from which
a pinion, 10 ins.diam., brs. N.63°E., 27 lks.
dist., mkd. PL 10 $\frac{1}{2}$ M BT
a cedar limb, 8 ins.diam., brs. S.65°E., 25 lks.
dist., mkd. GCNP 10 $\frac{1}{2}$ M BT
a pinion, 14 ins.diam., brs. S.75°E., 39 lks.
dist., mkd. GCNP 10 $\frac{1}{2}$ M BT
a cedar, 8 ins.diam., brs. N.78°W., 16 lks.
dist., mkd. PL 10 $\frac{1}{2}$ M BT

Continue along 11th mile on divide.

N. 80 $\frac{1}{2}$ ° E., 0.35 chs. to A.P.No.1
S. 59 $\frac{1}{2}$ ° E., 1.72 " " " " 2, Asc.33 ft., SW.slope.
N. 74 $\frac{1}{2}$ ° E., 1.32 " " " " 3, Desc.13 ft., NE.slope
S. 78° E., 2.91 " " " " 4, Asc.31 ft., SW.slope.
S. 72 $\frac{1}{2}$ ° E., 9.63 " " " " 5, Asc.133 ft., NW.slope
to A.P.No.5 on top of
high, white rock point.
S. 48 $\frac{1}{2}$ ° E., 12.74 " " " " 6, descending 60 ft.
S. 62°08'E., 14.38 " " " " 7, descending 155 ft.
At 4.60 chs.cross saddle, and asc.
168 ft. At 13.25 chs.top of knoll
on spur, sloping NE.
S. 52 $\frac{1}{2}$ ° E., 1.12 chs. to A.P.No.8, descending 224 ft.
over SE. slope.
S. 18°43'E., 5.83 chs. to

80.00

Set an iron post, 3 ft.long, 3 ins.in diam., on surface
rock, supported in a mound of stone, for 11th mile
mon. on Park Bdy., with brass cap mkd.,

GCNP 11M PL

1928

SURVEY OF PART OF THE BOUNDARY OF THE GRAND CANYON NATIONAL PARK

BOOK 8868

Chains

from which

- a pinion, 14 ins.diam., brs. N.52 $\frac{1}{2}$ °E., 45 lks.
dist., mkd. PL 11M BT
- a pinion, 6 ins.diam., brs. S.62°E., 15 lks.
dist., mkd. PL 11M BT
- a cedar limb, 6 ins.diam., brs. N.44°W., 37 lks.
dist., mkd. GCNP 11M BT
- a pinion, 6 ins.diam., brs. N.40°W., 38 lks.
dist., mkd. GCNP 11M BT

Land, mountainous.
Soil, rocky, 4th rate.
Timber, pinion and cedar.
Undergrowth, oak, manzanita and thorn brush.

Along the 12th mile of Park Bdy.,
Over mountainous land, thru dense timber and undergrowth.
along top of divide, average width, 30 lks.

- S.18°43'E., 5.06 chs.to A.P.No.1, desc.63 ft.over SE. slope.
- S. 57 $\frac{3}{4}$ ° E., 11.27 " " " " 2, ascending 90 ft.over NW. slope to A.P.No.2 on red butte from which flag"C"at A.P.No.1 of 1st half of 9th mile brs.S.73 $\frac{1}{4}$ °W.
- N. 51 $\frac{1}{2}$ ° E., 6.39 chs.to A.P.No.3, descending 100 ft. over NE. slope.
- N. 89 $\frac{1}{4}$ ° E., 4.42 chs.to A.P.No.4, descending 56 ft. over E. slope.
- N. 39 $\frac{1}{2}$ ° E., 1.50 chs.to A.P.No.5, descending 24 ft. over NE. slope.
- N. 47 $\frac{1}{4}$ ° E., 11.36 chs. descending 225 ft.over NE. slope to

40.00 Set an iron post, 3 ft. long, 1 in.in diam., 8 ins.in the ground to bedrock, supported in a mound of stone, for 1 $\frac{1}{2}$ mile mon. on Park Bdy.,with brass cap mkd.,

PL
11 $\frac{1}{2}$ M
GCNP

1928

from which

- a pinion, 8 ins.diam., brs. S.45°E., 18 lks.
dist., mkd. GCNP 11 $\frac{1}{2}$ M BT
- a pinion, 10 ins.diam., brs. South 3 lks.
dist., mkd. GCNP 11 $\frac{1}{2}$ M BT
- a pinion, 10 ins.diam., brs. S.83°W., 37 lks.
dist., mkd. PL 11 $\frac{1}{2}$ M BT
- a pinion, 8 ins.diam., brs. N.20°W., 40 lks.
dist., mkd. PL 11 $\frac{1}{2}$ M BT
- a rocky wash, course N., brs. West about 3 chs.dist.

Continue along divide, about 20 lks. dist.from upper rim of Nankoweap Canyon, 1200 ft. high.

- N. 47 $\frac{3}{4}$ ° E., 6.41 chs.to A.P.No.1, descending 60 ft. over NE. slope.
- S. 81° E., 11.11 " " " " 2, ascending 58 ft.over SW.slope. At 6.20 chs. desc.113 ft.over NW. slope.
- N.72°55'E., 9.85 chs.to A.P.No.3, descending 214 ft. over NE. slope.
- S.78°50'E., 3.51 " " " " 4, descending 23 ft.over SE. slope.
- N. 68 $\frac{1}{4}$ ° E., 4.87 " " " " 5, descending 74 ft.over NE. slope.

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

Chains

S. $79\frac{1}{2}^{\circ}$ E., 2.14 chs. to A.P.No.6, over level top
S. $76\frac{1}{2}^{\circ}$ E., 2.11 " to

80.00

Set an iron post, 3 ft. long, 3 ins. in diam., on surface rock, deposit a stone marked with a cross (X) at base of post, and raise a mound of stone around post, for 12th mile mon. on Park Bdy., with brass cap mkd.,

PL

GCNP 12M

1928

No bearing trees available.

Land, mountainous.

Soil, rocky, 4th rate.

Timber, pinion and cedar.

Undergrowth, oak and thorn brush.

Along the 13th mile of Park Bdy.,
Over mountainous land, thru dense timber and undergrowth.
along divide, near upper rim of Hankowep Canyon.

S. $76\frac{1}{2}^{\circ}$ E.,	2.23 chs. to A.P.No.1,	descending	23 ft.
S. $54\frac{1}{2}^{\circ}$ E.,	2.47 " " " "	2,	17 ft.
S. $88\frac{1}{2}^{\circ}$ E.,	4.87 " " " "	3,	57 ft.
N. $81\frac{1}{2}^{\circ}$ E.,	5.77 " " " "	4,	74 ft.
N. $27\frac{1}{2}^{\circ}$ E.,	1.77 " " " "	5,	19 ft.
N. $36\frac{1}{2}^{\circ}$ E.,	1.93 " " " "	6,	30 ft.
S. 77° E.,	3.24 " " " "	7, ascending	75 ft.
S. $74\frac{1}{4}^{\circ}$ E.,	4.21 " " " "	8, descending	30 ft.
N. $64\frac{1}{4}^{\circ}$ E.,	2.75 " " " "	9,	18 ft.
S. $86\frac{1}{4}^{\circ}$ E.,	3.58 " " " "	10,	24 ft.
N. $69^{\circ}22'$ E.,	7.18 chs.,	ascending 23 ft. to	

40.00

Set an iron post, 3 ft. long, 1 in. in diam., on surface rock, deposit a stone marked with a cross (X) at base of post, and raise a mound of stone around post, for 12 $\frac{1}{2}$ mile mon. on Park Bdy., with brass cap mkd.,

PL

GCNP 12 $\frac{1}{2}$ M

1928

No bearing trees available.

N. $69^{\circ}22'$ E.,	0.45 chs. to A.P.No.1,	over level, stony top.
N. $70^{\circ}25'$ E.,	9.60 " " " "	2
S. $53\frac{3}{4}^{\circ}$ E.,	9.14 " " " "	3, ascending 68 ft. over West slope. At 6.00 chs. rim of mesa, thence across mesa.
N. $88^{\circ}55'$ E.,	14.61 chs. to A.P.No.4,	from which the flag "D" near A.P.No.3 of 1st half of 10th mile prs. S. $76^{\circ}46'$ W.
S. 75° E.,	1.08 chs. to	

34.88

Set an iron post, 3 ft. long, 3 ins. in diam., on surface rock, deposit a stone marked with a cross (X) at base of post, and raise a mound of stone around post, for witness cor. to 13 mile point, and for A.P.No.5 of 2nd half of 13th mile of Park Bdy., with brass cap mkd.,

PL

GCNP 13M

WC

from which

1928

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

CHAINS

a cedar, 12 ins. in diam., brs. N.1°E., 415 lks.
dist., mkd., EL 13M WC BT
a cedar limb, 18 ins. in diam., brs. S.86½°W., 115 lks.
dist., mkd., GCNP-13M WC BT

This W.C. and A.P. is 10 lks. West from the upper right rim of the Marble Canyon of the Colorado River.

Thence,
S. 13½°E., 2.60 chs. to A.P. No.6 of 2nd half of the 13th mile of Park Bdy.
Along narrow point of rock about 20 ft. wide. Desc. 48 ft. to AP No.6.

Beyond A.P.No.6 of 2nd half of 13th mile chaining is impracticable owing to cliffs and precipitous broken slopes in canyon, therefore triangulate measurement of the remainder of the Park Bdy. as hereinafter described and illustrated by diagram.

80.00 S.39°07'E., 2.52 chs. to
The 13 mile point which is inaccessible and cannot be monumented. Witness cor. hereto established at 4.99 chs. N.26°03'W. as hereinbefore described.

Land, mountainous.
Soil, rocky, 4th rate.
Timber, cedar and pinion.
Undergrowth, manzanita, scrub oak and sagebrush.

From 13 mile point,
Along the 14th mile of Park Bdy. (triangulated measurement)
Over mountainous land in Marble Canyon of the Colorado River at mouth of Little Nankoweap Canyon, thru scattering undergrowth.

40.00 S.39°07'E., descending about 1450 ft. to
The 13½ mile point and A.P. of 14th mile is inaccessible and cannot be monumented, therefore establish witness cor. at 74 lks. S.39°24'E. as hereinafter described.

40.74 From 13½ mile point,
S.39°24'E., 0.74 chs. to
Triangulation flag point "D" Set a stone, 12x18x24 ins., 12 ins. in the ground, marked WC 13½M on N. face, and raise a mound of stone around stone, for witness cor. to 13½ mile point. No bearing trees available.

57.98 Thence
S.39°24'E., 17.24 chs. to A.P. No.1 of 2nd half of 14th mile.
76.95 Triangulation flag point "E" and angle point No.1 of the 2nd half of 14th mile of Park Bdy., about 1400 ft. below W.C. to 13 mile point.

76.95 From A.P. No.1,
S.29°07'E., 18.97 chs. to
Triangulation flag point "F". Set a stone, 12x14x20 ins., 10 ins. in the ground, marked WC 14M on N. face, and raise a mound of stone around stone, for witness cor. to 14 mile point, and angle point No.2 of 2nd half of 14th mile of Park Bdy., No bearing trees available.

This W.C. and A.P. is about 1800 ft. below the W.C. to 13 mile point.

80.00 From W.C. to 14 mile point,
S.85°34'E., 3.05 chs. to
The 14 mile point which is inaccessible and cannot be monumented. Witness cor. hereto established at 3.05 chs. N.85°34'W. as hereinbefore described.

Land, mountainous.
Soil, rocky, 4th rate.
Timber, none. Undergrowth, cacti.

SURVEY OF PART OF THE BOUNDARY
OF
THE GRAND CANYON NATIONAL PARK

chains
15.71

From the 14 mile point,
Along part of the 1st half of the 15th mile of Park Bdy. (triangulated measurement)
Over mountainous land, in Marble Canyon of the Colorado River, at mouth of Little Nankoweap Canyon, thru scattering undergrowth.
S. $85^{\circ}34'E.$, descending about 700 ft. to
Angle point No. 1 of 1st half of 15th mile of Park Bdy. On top of a projecting boulder exposed about 6x6x3 ft. above ground, chisel A.P. 15M. GCNP and raise a mound of stone, 1 ft. base, 3 ft. high, alongside. This A.P. is about 900 ft. below W.C. to 14 mile point. The Little Nankoweap Creek enters the Colorado River at about 3.00 chs. S. $70^{\circ}E.$ from A.P. No. 1.

The survey of that portion of the Bdy. of the Grand Canyon National Park in Ts. 34 N., Rs. 3, 4, and 5 E., unsurveyed, which is formed by the hydrographic divide between the drainage areas of South Canyon to the NE. and N., and Thompson Canyon, Bright Angel Creek, Nankoweap and Little Nankoweap Creeks to the SW. and S., terminates at the above described A.P. No. 1 of 15th mile.

From said A.P. the Park Bdy., unsurveyed, extends due East to point of intersection with the East or left bank of the Colorado River, thence southeasterly along said E. bank of Colo. River to its junction with the N. or right bank of the Little Colorado River near the NW. cor. of T. 32 N., R. 6 E. unsurv., thence easterly along the N. bank of the Little Colo. River to point of intersection with the unsurveyed 4th meridional subdivision line of T. 33 N., R. 6 E., thence S. $0^{\circ}3'E.$ along said sub. line to point for std. cor. of secs. 32 and 33, T. 33 N., R. 6 E., thence due West along the unsurveyed 8th Std. Parallel N. to point of intersection with the 4th meridional sub. line of T. 32 N., R. 6 E., thence S. $0^{\circ}3'E.$, to the $\frac{1}{4}$ sec. cor. of secs. 4 and 5, T. 32 N., R. 6 E., established and monumented by Benj. J. Kinsey, U.S.S. in November 1927 at the terminus of the survey of a portion of the Park Bdy. thru Ts. 30 N., Rs. 4, 5 and 6 E., and Ts. 31 and 32 N., R. 6 E., under instructions for Group No. 145, Ariz.

Description of
Triangulations and Traverse

used in obtaining bearings and measurement of
G.C. Park Bdy. from A.P. No. 6 of 2nd half of 13th
mile to A.P. No. 1 of 1st half of 15th mile.

The following notes describe, and the accompanying diagram illustrates, the triangulations and traverse employed to obtain the bearings and measurements of the last 98.23 chs. of that portion of the Park Bdy. which was surveyed as described in the foregoing notes. On the diagram the triangles are designated by Roman numerals I, II, III, IV, V, VI and VII and the triangulation and traverse points are designated by letters A, B, C, D, E, F, G, H, I and J.

Triangle I

To obtain Base (A-B) for triangles II, III, IV and V.
From A.P. No. 4 of 2nd half of 13th mile, designated as point "C", chain a Base N. $36^{\circ}25'E.$, 14.55 chs. to flag "B".
From W.C. to 13 mile point and A.P. No. 5 of 2nd half of 13th mile designated as point "A" the flag "B" bears N. $32^{\circ}24'E.$

Triangle I continued.

Vertical angle from "A" to "B" = 0°
Chained measurement of "A-C" = 1.08 chs., N. 75° W.
Included angles: "A" 107° 24', "B" 4° 01', "C" 68° 35'.
Triangulated measurement "A-B" = 14.35 chs. N. 32° 24' E.

Triangle II

To obtain bearings and measurements of Park Bdy. from A.P. No. 6 of 2nd half of 13th mile to Witness cor. to 13½ mile point (D).

Use "A-B" of triangle I as a Base.

Set a flag on the witness cor. to 13½ mile point, designated "D", which bears S. 37° 42' E. from "A" and S. 22° 44' E. from "B".

Vertical angle from "A" to "D" = -26° 20'

Included angles: "A" 109° 53½', "B" 55° 08½', "D" 14° 58'.

Triangulated measurement of "A-D" = 45.60 chs. S. 37° 42½' E., the latitude and departure of which are 36.09 chs. South and 27.90 chs. East, respectively.

The resulting bearings and measurements of the Park Bdy. between points "A" and "D" are; S. 13¼° E., 2.60 chs., S. 39° 07' E., 42.52 chs., and S. 39° 24' E., 0.74 chs., the combined latitude and departure of which are 36.09 chs. South and 27.90 chs. East, respectively.

The last noted bearing and measurement is determined from the results of Triangle III, and the bearing S. 39° 07' E. is also computed by a combination of the results of Triangles II and III.

Triangle III

To obtain bearing and measurement of Park Bdy. between witness cor. to 13½ mile point (D) and Angle point No. 1 of 2nd half of 14th mile (E).

Use "A-B" of triangle I as a Base.

Set a flag on Angle point No. 1 of 2nd half of 14th mile designated "E", which bears S. 38° 10' E. from "A" and S. 26° 51' E. from "B".

Vertical angle from "A" to "E" = -19° 23½'

Included angles: "A" 109° 26', "B" 59° 15', "E" 11° 19'

Triangulated measurement of "A-E" = 62.85 chs. S. 38° 10' E., the latitude and departure of which are 49.41 chs. South and 38.84 chs. East, respectively.

Lat. and dep. "A-E"	=	49.41 chs. S.	38.84 chs. E.
Lat. and dep. "A-D"	=	39.09 " S.	27.90 " E.
Lat. and dep. "D-E"	=	13.32 " S.	10.94 " E.

The resulting bearing and measurement of "D-E" are therefore, S. 39° 24' E., 17.24 chs.

TRIANGULATIONS and TRAVERSE
14th mile and Parts of 13th and 15th miles
BOUNDARY of GRAND CANYON NATIONAL PARK

Triangle IV

To obtain bearing and measurement of Park Bdy. between Angle point No.1 of 2nd half of 14th mile (E) and witness cor. to 14 mile point (F).

Use "A-B" of triangle I as a Base.

Set a flag on W.C. to 14 mile point and Angle point No.2 of 2nd half of 14th mile, designated "F", which bears S.36°04'E. from "A" and S.27°20'E. from "B".

Vertical angle from "A" to "F" = -20°

Included angles: "A" 111°32', "B" 59°44', "F" 8°44'

Triangulated measurement of "A-F" = 81.63 chs. S.36°04'E., the latitude and departure of which are 65.98 chs. South and 48.06 chs. East, respectively.

Lat. and dep. "A-F"	=	65.98 chs. S.	48.06 chs. E.
Lat. and dep. "A-E"	=	49.41 " S.	38.84 " E.
Lat. and dep. "E-F"	=	16.57 " S.	9.22 " E.

The resulting bearing and measurement of "E-F" are therefore, S.29°07'E., 18.97 chs.

Triangle V

To obtain bearing and measurement from a point on west or right bank of Colorado River (G) to the witness cor. to 14 mile point (F).

Use "A-B" of triangle I as a Base.

Set a flag in bottom of Marble Canyon at right bank of Colorado River, designated "G", which bears S.48°41'E. from "A" and S.41°55'E. from "B".

Vertical angle from "A" to "G" = -23°10'

Included angles: "A" 98°55', "B" 74°19', "G" 6°46'.

Triangulated measurement of "A-G" = 117.27 chs. S.48°41'E., the latitude and departure of which are 77.42 chs. South and 88.08 chs. East, respectively.

Lat. and dep. "A-G"	=	77.42 chs. S.	88.08 chs. E.
Lat. and dep. "A-F"	=	65.98 " S.	48.06 " E.
Lat. and dep. "F-G"	=	11.44 " S.	40.02 " E.

The resulting bearing and measurement of "G-F" are therefore, N.74°03'W., 41.62 chs.

Triangle VI

To obtain bearing and measurement of a part of a traverse from point on right bank of Colo. River (G) to traverse point (I).

From point "G" chain a Base S.51°25'W. 7.20 chs. to point "H".

Set a flag near right bank of Colo. River, designated "I", which bears N.68°16'W. from "G" and N.37°39'W. from "H".

Vertical angle from "G" to "I" = 0°

Included angles: "G" 60°19', "H" 89°04', "I" 30°37'

TRIANGULATIONS and TRAVERSE
14th mile and Parts of 13th and 15th miles
BOUNDARY of the GRAND CANYON NATIONAL PARK

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Triangle VI, Continued

Triangulated measurement of "G-I" = 14.14 chs. N. 68° 16' W., the latitude and departure of which are 5.24 chs. North and 13.13 chs. West, respectively.

Triangle VII.

To check the bearing and measurement of line "G-F" determined by latitudes and departures of "A-F" and "A-G" as hereinbefore described in notes of triangle V.

Use "G-H" of triangle VI as a Base.

Flag "F" bears N. 74° 03' W. from "G" and N. 65° 09' W. from "H"

Included angles: "G" 54° 32', "H" 116° 34', "F" 8° 54'.

The resulting bearing and measurement of "G-F" are N. 74° 03' W., 41.62 chs., which agrees with the bearing and measurement of same line determined by triangles IV and V as hereinbefore described in notes of triangle V.

The resulting bearing and measurement of "H-F" are N. 65° 09' W., 37.90 chs.

Traverse "G-I-J-F"

To obtain bearing and measurement from witness cor. to 14 mile point (F) to Angle point No. 1 of 1st half of 15th mile (J).

From triangulation flag point "I" of triangle VI chain measurement 9.47 chs. N. 59° 50' W. to traverse point "J" at Angle point No. 1 of 1st half of 15th mile of Park Bdy.

Lat. and dep. of "G-F"	11.44 chs. N.	40.02 chs. W.
Lat. and dep. of "G-I-J"	9.99 " N.	21.32 " W.
Lat. and dep. of "J-F"	1.45 " N.	18.70 " W.

The resulting bearing and measurement of "J-F" of the traverse "G-I-J-F" are N. 85° 34' W., 18.76 chs.

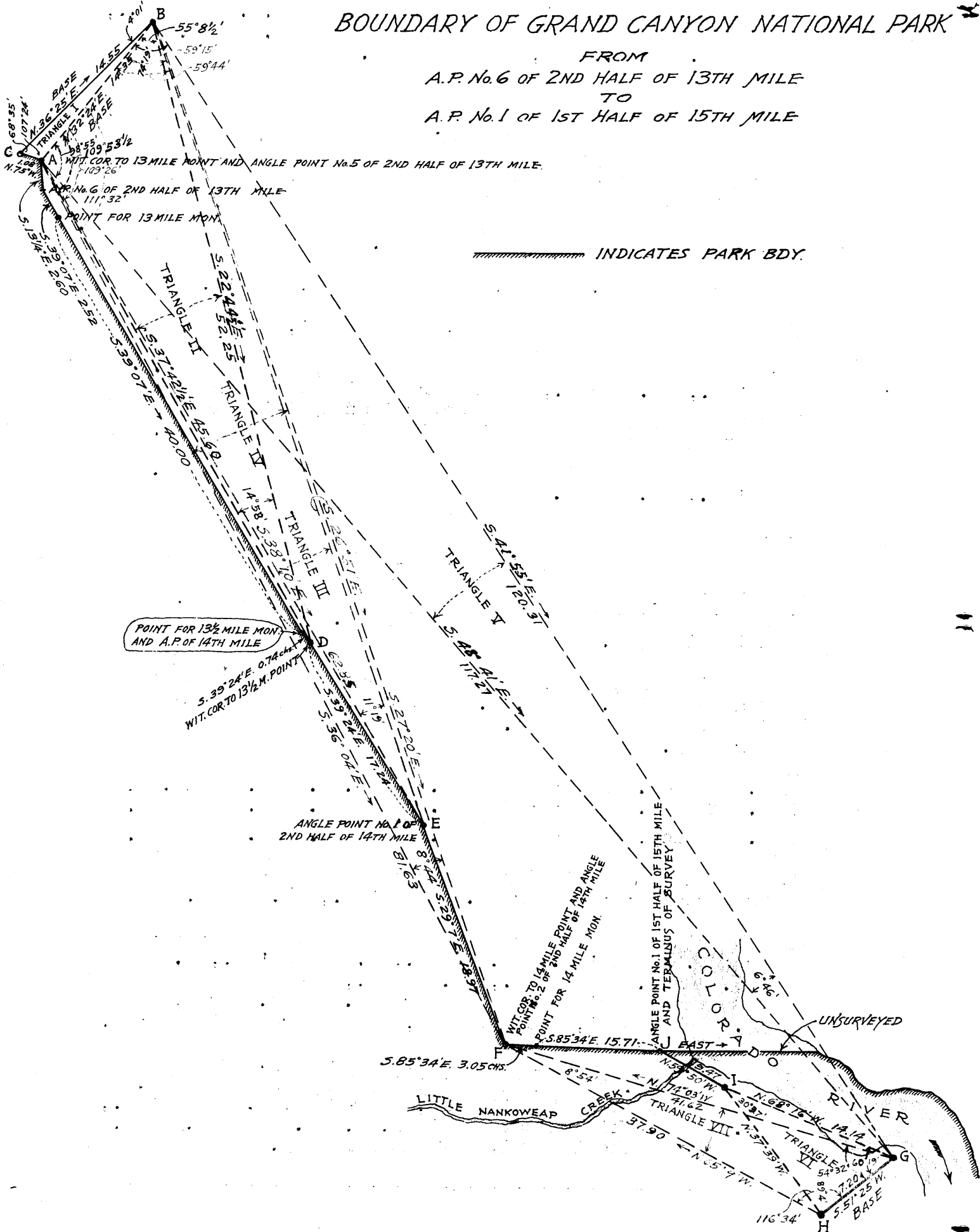
The bearings and measurements of the traverse "G-I-J-F" are; N. 68° 16' W., 14.14 chs., N. 59° 50' W., 9.47 chs. and N. 85° 34' W., 18.76 chs., the combined latitude and departure of which are 11.44 chs. North, and 40.02 chs. West, respectively, which agrees with "G-F".

The bearing and measurement of the Park Bdy. from the witness cor. to 14 mile point (F) to Angle point No. 1 of 1st half of 15th mile are, therefore, S. 85° 34' E., 18.76 chs. which locates said A. P. No. 1 at 15.71 ch. station of the 15th mile of the Park Bdy.

(See next page for DIAGRAM illustrating the
Triangulations and Traverse described in the
foregoing notes.)

DIAGRAM
 SHOWING TRIANGULATION & TRAVERSE
 USED IN MEASUREMENT OF
 BOUNDARY OF GRAND CANYON NATIONAL PARK

FROM
 A.P. No. 6 OF 2ND HALF OF 13TH MILE
 TO
 A.P. No. 1 OF 1ST HALF OF 15TH MILE



The following notes describe a traverse of the eastern-most fork of the branches of Thompson Canyon, for the purpose of assisting in the location of the divide between the waters of Thompson and South Canyons and also to check the accuracy of the survey of the Grand Canyon National Park Bdy. traverse along said divide.

From the original $\frac{1}{4}$ sec. cor. of secs. 11 and 12, T.33 N. R.3 E., G. & S.R.B. and M., Arizona, established under Gp. 122, which is an iron post 1 in. in diam., projecting 12 ins. above ground, with brass cap mkd. properly and witnessed by two properly mkd. bearing trees.

North,	8.47	chs.	to	A.P.	No.1.
N.47°E.,	5.83	"	"	"	" 2.
N.34°E.,	3.48	"	"	"	" 3.
N.21 $\frac{1}{4}$ °E.,	4.40	"	"	"	" 4.
N.36 $\frac{1}{2}$ °E.,	4.24	"	"	"	" 5.
N.8°E.,	4.65	"	"	"	" 6.
N.8°W.,	7.97	"	"	"	" 7.
N.19 $\frac{1}{2}$ °E.,	6.19	"	"	"	" 8.
N.59 $\frac{1}{4}$ °E.,	4.34	"	"	"	" 9.
N.31 $\frac{1}{2}$ °E.,	6.00	"	"	"	"10.
N.7°E.,	6.12	"	"	"	"11.
N.22°E.,	3.50	"	"	"	"12.
N.3°30'W.,	4.09	"	"	"	"13.
N.10°E.,	3.63	"	"	"	"14.
N.11 $\frac{1}{2}$ °E.,	6.61	"	"	"	"15.
N.17 $\frac{1}{2}$ °E.,	4.17	"	"	"	"16.
N.15 $\frac{1}{2}$ °E.,	4.99	"	"	"	"17.
N.13°E.,	4.47	"	"	"	"18.
N.15°E.,	5.02	"	"	"	"19.
N.0°30'E.,	4.26	"	"	"	"20.
N.33°E.,	4.76	"	"	"	"21.
N.14 $\frac{1}{2}$ °E.,	3.36	"	"	"	"22.
N.4°W.,	4.41	"	"	"	"23.
North	2.72	"	"	"	"24.
N.19°W.,	3.29	"	"	"	"25.
N.14°E.,	3.09	"	"	"	"26.
N.11°E.,	2.36	"	"	"	"27.
N.4°15'W.,	7.12	"	"	"	"28.
N.23 $\frac{1}{4}$ °W.,	5.05	"	"	"	"29.
N.16 $\frac{1}{2}$ °W.,	5.79	"	"	"	"30.
N.8 $\frac{1}{4}$ °E.,	5.68	"	"	"	"31.
N.8 $\frac{1}{4}$ °E.,	6.19	"	"	"	"32.
S.75 $\frac{1}{2}$ °E.,	4.64	"	"	"	"33.
S.77°E.,	2.73	"	"	"	"34.
S.83 $\frac{1}{4}$ °E.,	2.76	"	"	"	"35.
N.16 $\frac{1}{4}$ °E.,	3.40	"	"	"	"36.
N.11°W.,	2.88	"	"	"	"37.
N.59 $\frac{1}{2}$ °W.,	4.66	"	"	"	"38.
N.35°W.,	4.39	"	"	"	"39.
N.35 $\frac{1}{2}$ °E.,	2.94	"	"	"	"40.
N.37°E.,	2.36	"	"	"	"41.
N.46 $\frac{1}{4}$ °E.,	3.72	"	"	"	"42.
N.19°W.,	3.53	"	"	"	"43.
N.38 $\frac{1}{2}$ °W.,	3.33	"	"	"	"44.
N.14 $\frac{1}{2}$ °E.,	4.90	"	"	"	"45.
N.17°E.,	4.48	"	"	"	"46.
N.1 $\frac{1}{2}$ °E.,	5.75	"	"	"	"47.
N.9°W.,	2.64	"	"	"	"48.
N.19°W.,	1.03	"	"	"	"49.
N.38 $\frac{1}{4}$ °W.,	2.87	"	"	"	"50,

which is coincident with A.P.No.2 of last half of 3rd. mile of Park Boundary.

Boundaries of area in T. 34 N., R. 2 E., and Ts. 33 and 34 N., R. 3 E. between Park Bdy. as surveyed in 1922, the revised Park Bdy. surveyed in 1928, and the Traverse of easternmost fork of Thompson Canyon.

Latitudes, departures and closing errors.

Lines designated	True course	Distance	Latitudes			Departures	
			N.	S.	E.	W.	
Sub. lines T33N R3E (1922 Park Bdy. survey)	S. 0° 01' E. West N. 0° 03' W.	120.00 320.00 240.00	240.00	120.00	.04	320.00 .21	
N. Bdy T33NR3E (1922 Park Bdy survey.)	West	79.47				79.47	
S. Bdy. T34NR2E (1922 Park Bdy. survey.)	West	400.00				400.00	
Sub. lines T34NR2E (1922 Park Bdy. survey.)	N. 0° 03' W.	320.00	320.00			.28	
Sub. lines T34NR 2E (revised Park Bdy, 1928 survey)	East S. 0° 01' E. East	320.00 80.00 80.00		80.00	320.00 .02 80.00		
Sub. lines T34N R3E (revised Park Bdy. 1928 survey)	East	363.60			363.60		
Park Bdy. (1928 survey) along Hydrographic divide. in T34N R3E	Various	Various	160.90	160.90	89.79	17.04	
Traverse of easternmost fork of Thompson Canyon in T33N and T34N R3E	Various	Various	2.15	201.33	22.94	56.53	
Convergency					.84		
Totals			562.15	562.23	877.23	873.53	
Error in latitudes			.08	562.15	873.53		
Error in latitudes			562.23	0.08		177.10	
Error in departure					3.70		

Survey of the Intersection of Grand Canyon National Park Boundary with the Gila and Salt River Meridian in Township 34 North.

BOOK 2868

The intersection of the Grand Canyon National Park Bdy., with the Gila and Salt River Meridian in T.34 N., By the survey of 1922 was defined as the crossing of Spring or Stina Creek, on the meridian bet. secs. 1 and 6, Ts. 34 N., Rs. 1 W. and 1 E. at 67.10 chs. S. from the cor. of Ts. 34 and 35 N., Rs. 1 W. and 1 E. and was monumented in said survey by a md. of stone on the N. bank of Stina Creek. From this point the park Bdy. extended South along the G. & S.R.Meridian to the cor. of secs. 7, 12, 13 and 18, Ts. 34 N., Rs. 1 E. and 1 W., thence East thru T.34 N., R.1 E., identical with the fourth latitudinal subdivision line of said Tp. including within the park the south four tiers of secs. of said T.34 N., R.1 E.

The following notes describe the survey of the intersection of the Grand Canyon National Park Bdy. with the G. & S.R.Meridian as revised by Act of Congress of February, 25, 1927 which proclaims the Park Bdy. immediately west of its point of intersection with the G. and S.R.Meridian, as a ledge of cross-bedded sandstone, generally known as the Coconino sandstone. This ledge is designated in the following notes as the "White Ledge", and its intersection with the meridian on both North and South sides of Stina Creek Canyon are described in these notes. The Park Bdy. extends South along the meridian from the most northerly intersection, to the cor. of secs. 7, 12, 13 and 18, Ts. 34 N., Rs. 1 E. and 1 W., thence East, the same as described in the 1922 survey.

Owing to cliffs and precipitous slopes it is impracticable to chain measurement to the points of intersection of the "White Ledge" with the G. & S.R.Meridian, therefore triangulate as described as follows:

From point on G. & S.R.Mer., at the S. rim of Stina Canyon, 20.00 chs. S. from cor. of secs. 1, 6, 7 and 12, Ts. 34 N., Rs. 1 E. and 1 W., chain measurement S. 2.46 chs. to a point on the meridian at 22.46 chs. South from said sec. cor. and designated on the diagram as "A".

Set a flag on the meridian at the most northerly point of intersection of the "White Ledge" which is the angle point of the Park Bdy. and is designated on the diagram as "B".

Set another flag on the meridian at a bend in the "White Ledge" from NE to S. located between points "A" and "B" and designated on diagram as "C".

Set another flag on the meridian at the most southerly point of intersection of the "White Ledge" located on S. wall of Stina Canyon, between points "A" and "C" and designated on diagram as "D".

From point "A" chain measure a Base N.89°20'W., 21.65 chs. to point designated on diagram as "E".

From point "A" chain measure a Base N.64°W., 5.68 chs. to point on S. Rim of Stina Canyon designated on diagram as "F".

From point "E" at west end of base "A"+"E" flags "B" and "C" on the meridian br. N.14°E., and N.18°E., respectively.

From point "F" at NW end of base "A"+"F" the flag "D" on meridian brs. N.26½°E.

Doc. 30

Survey of intersection of Grand Canyon National Park Bdy. with the Gila and Salt River Meridian in Township 34 North.

Chains

Based upon the field notes of the 1922 survey of the G. & S.R. Mer. in T. 34 N., the points of intersection of the "White Ledge" with the meridian, determined by the triangulations hereinbefore described, are presented in the following notes of the G. & S.R. Meridian bet. secs. 1 and 6, and the North halves of secs. 7 and 12.

- 8.94 From cor. of Ts. 34 and 35 N., Rs. 1 E. and 1 W. South, on G. and S.R. Meridian, bet. secs. 1 and 6. Over mountainous land, thru dense timber and undergrowth. Desc. 45 ft. over S. slope to Rim of Stina Canyon, brs. E-W. Enter canyon.
- 15.38 Desc. about 750 ft. over precipitous S. slope to Triangulation flag point "B" at top of "White Ledge" bearing NE-SW and angle point in the boundary of the Grand Canyon National Park. Park Bdy. extends SW from this point along the top of "White Ledge" and South along the meridian. Continue line and measurement bet. Grand Canyon Park to the west and the Grand Canyon National Game Preserve and Kaibab National Forest to the east. Desc. 300 ft. over precipitous SE slope.
- 25.00 (Approximate) Bottom of side canyon, course SW. Ascend about 300 ft. over precipitous NW slope to
- 35.58 Triangulation flag point "C" at top of "White Ledge" bearing NE and S. Thence along the top of "White Ledge".
- 40.00 True point for $\frac{1}{4}$ sec. cor. of secs. 1 and 6 falls on the W. face of the "White ledge," where it is inaccessible and cannot be monumented. Witness cor. is established at 10.00 chs. S.
- 47.50 (Approx.) Top of "White Ledge" brs. N. and SE. Desc. 300 ft. over broken cliffs to
- 50.00 Witness cor. to $\frac{1}{4}$ sec. cor. secs. 1 and 6, which is an iron post 1 in. in diam., set partly in ground and partly in md. of stone, properly mkd. on brass cap and witnessed by one properly mkd. bearing tree (pinion) SW of cor. and a cross (X) cut on a ledge NE of cor. with S6 under the cross.
- 50.35 Spur, slopes W. Desc. 474 ft. over S. slope.
- 67.10 Spring or Stina Creek, 60 lks. wide, course W., in bottom of Stina Canyon. A mound of stone 4 ft. base and 2 ft. high on line on N. bank of this creek. Asc. 347 ft. over N. slope to
- 80.00 The cor. of secs. 1, 6, 7 and 12, which is an iron post 2 ins. in diam., set partly in ground and partly in md. of stone., properly mkd. on brass cap and witnessed by a md. of stone W. of cor. No bearing trees.

Land, mountainous.
Soil, rocky 4th. rate.
Timber, pine, spruce, oak and aspen.
Undergrowth, scruboak, buckbrush and manzanita.

- South, on G. & S.R. Meridian, bet. secs. 7 and 12. ($N\frac{1}{2}$). Between Grand Canyon Natl. Park to the west and the Kaibab National Forest and Grand Canyon National Game Preserve to the East. Over mountainous land, in Stina Canyon. Asc. about 750 ft. over precipitous N. slope. to
- 8.73 (Approx.) Foot of "White Ledge" bearing E-W. facing N. Asc. about 300 ft. to
- 9.73 Triangulation flag point "D" at top of "White Ledge" bearing E-W.

Survey of intersection of Grand Canyon National Park Bdy. with the Gila and Salt River Meridian in Township 34 North.

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Chains

20.00 Asc. about 560 ft. over steep, broken N. slope to South rim of Stina Canyon, hrs. E-W.
 Leave canyon and enter nearly level land.

22.46 Triangulation point "A".

40.00 The $\frac{1}{4}$ sec. cor. of secs. 7 and 12, which is an iron post 1 in. in diam., projecting 10 ins. above ground, properly mkd. on brass cap and witnessed by two properly mkd. yellow pine bearing trees one each SE and SW of cor.

Land, mountainous and nearly level.
 Soil, rocky 4th. rate.
 Timber, pine, spruce, aspen, oak and juniper.
 Undergrowth, scruboak, buckbrush, and manzanita.



CERTIFICATE OF UNITED STATES SURVEYOR.

I, Benjamin J. Kinsey, U. S. Surveyor, hereby certify upon honor that, in pursuance of supplemental special instructions received from the District Cadastral Engineer, for Group 146, Arizona bearing date of the 3rd day of February, 1928, I have well, faithfully, and truly in my own proper person, and in strict conformity with said instructions, the Manual of Surveying Instructions, and the laws of the United States, surveyed all those parts or portions of

the Boundary of the Grand Canyon National Park

in

Township 34 North, Range 3 East

Township 34 North, Range 4 East

and Township 34 North, Range 5 East

of the Gila and Salt River Base and Meridian, in the State of Arizona, and the intersection of said Park Bdy. with said Meridian in T. 34 N.

and by diagram on page 1 hereof the foregoing field notes as having been executed by me, and under my direction; and that all the corners of said survey have been established and perpetuated in strict accordance with the Manual of Surveying Instructions, and the special written instructions of the District Cadastral Engineer, for Group 146, Arizona and in the specific manner described in the field notes, and that the foregoing are the original field notes of such survey.

Place: Phoenix, Arizona.

Benjamin J. Kinsey, U.S. Surveyor.

Date: JUN 27, 1929.

APPROVAL.

OFFICE OF U. S. SUPERVISOR OF SURVEYS,

Denver, Colo., November 8, 1929.

The foregoing field notes of the survey of the portion of the Boundary of the Grand Canyon National Park situated on the hydrographic divide bet. South and Thompson Canyons, from 44.40 ch. sta. on subdivision line bet. secs. 14 & 23, T. 34 N., R. 3 E. to a point near right bank of Colorado River at mouth of Little Nankoweap Canyon; in T. 34 N., R. 3 E., T. 34 N., R. 4 E., and T. 34 N., R. 5 E.

of the Gila and Salt River Base and Meridian, in the State of Arizona and of the survey of the intersection of said Park Bdy. with said Meridian in T. 34 N. executed by Benjamin J. Kinsey, U.S. Surveyor

under supplemental special instructions dated Feb. 3, 1928, for Group 146, Arizona, having been critically examined, and the necessary corrections and explanations made, the said field notes, and the surveys they describe, are hereby approved.

U. S. Supervisor of Surveys.

I certify that the foregoing transcript of the field notes of the above described surveys in

has been correctly copied from the original notes on file in this office.

U. S. Supervisor of Surveys.