

2.A

*Inteprovincial Boundary  
between  
Alberta and B.C.*

*Crowsnest Pass*

*Mont. 39.F - Bolt 83.F*

*R.W. Gaultley D.L.S.*

*No. 2.*

*1914*

14707

SURVEYS  
BRANCH  
JUL  
12  
1915  
INTERIOR  
DEPT

77  
FIELD NOTES

—OF—

*final survey of*  
*Interprovincial Boundary*  
*between*  
*Alberta and British Columbia*  
*in*  
*Crowsnest Pass*

*Book No 2*

*From Monument 39.F to Bolt 83.F*

*Surveyed by R. W. Cautley.....D.L.S.*

*Commenced : 11<sup>th</sup> July..... Ended : 11<sup>th</sup> August.....*

**1914.**



NAMES AND DUTIES OF PARTY EMPLOYED

|                             |                              |
|-----------------------------|------------------------------|
| <i>W. M. Carthew D.L.S.</i> | <i>Assistant</i>             |
| <i>Percy Burton</i>         | <i>Chairman</i>              |
| <i>Robert Burns</i>         | <i>Monument Builder</i>      |
| <i>Charles Schultz</i>      | <i>Axeman</i>                |
| <i>John Schultz</i>         | <i>"</i>                     |
| <i>George Rider</i>         | <i>"</i>                     |
| <i>Jos. Thompson</i>        | <i>Cook</i>                  |
| <i>Sam Hanin</i>            | <i>Packer</i>                |
| <i>Jacob Koller</i>         | <i>2<sup>nd</sup> Packer</i> |

Final survey of line from Monument 79.F to Bolt 81.F  
on Boundary between Alberta and British Columbia,  
in Crowsnest Pass.

| Temp. 60°F  | Course    | 142° 31' 02"  |
|---|-----------|---|
|   | x 26.799  | Bolt 81.F with cairn over it  |
| 0.7605 @ 17° 16' E (to Instr. 5.31 ft. above Bolt 81.F)<br>+ 0.0017 temp. corr. | x 26.0707 | Note. This course, from Monument 79.F to Bolt 81.F, is the last straight line boundary at this part of the Pass. From 81.F, the survey is carried on as a traverse, from which the natural watershed is defined by offset, and the natural watershed is thus established as the Boundary. |
| 2.00 @ 24° 11' E  | x 24.2462 |   |
| 3.00 @ 31° 44' E  | x 21.8947 |   |
| 4.00 @ 29° 02' E  | x 18.1973 |   |
| 5.00 @ 27° 55' E  | x 13.7793 |   |
| 5.00 @ 27° 27' E  | x 9.3422  |   |
| 5.00 @ 24° 49' E  | x 4.8039  |   |
| 5.00 @ 16° 06' E (from Instr. 1.89 ft. above top of 79.F)                       | x 0.00    | Monument 79.F   |

10<sup>th</sup> day of August 1914.

Vernier readings at Bolt 81.F

|          | On Station 82.F | On Bolt 83.F |
|----------|-----------------|--------------|
| C.R. { A | 360° 00' 00"    | 21° 04' 00"  |
| B        | 00 00           | 05 00        |
| C.L. { A | 00 00           | 07 00        |
| B        | 00 00           | 07 30        |
| Mean     | 360° 00' 00"    | 21° 05' 53"  |
| Bearing  | 159° 46' 25"    | 180° 52' 18" |

Vertical circle readings at Bolt 81.F

H.I. = 5.31 ft. above top of Bolt.

|                           | On target 3.80 ft. above Bolt 83.F | On target at Station 82.F |
|---------------------------|------------------------------------|---------------------------|
| C.R. (mean of 2 verniers) | 15° 00' 00" E                      | 4° 36' 45" E              |
| C.L. " " " "              | 14 59 15                           | 4 35 45                   |
| Mean                      | 14° 59' 37" E                      | 4° 36' 15" E              |

Vernier readings at Station 82.F

|               | On Bolt 83.F | On Bolt 81.F |
|---------------|--------------|--------------|
| C.R. { A      | 360° 00' 00" | 152° 54' 30" |
| B             | 00 00        | 54 00        |
| C.L. { A      | 00 00        | 54 30        |
| B             | 00 00        | 54 00        |
| Mean          | 360° 00' 00" | 152° 54' 15" |
| Taken as mean | 360° 00' 00" | 152° 54' 53" |
| Bearing       | 186° 51' 32" | 339° 46' 25" |

Vertical circle readings at Station 82.F, H.I. = 153 ft. above top of target.

|                           | On target 3.30 ft. above Bolt at 81.F | On target 3.80 ft. above Bolt at 83.F |
|---------------------------|---------------------------------------|---------------------------------------|
| C.R. (mean of 2 verniers) | 5° 24' 00" D                          | 17° 27' 45" E                         |
| C.L. " " " "              | 5 24 45                               | 17 28 15                              |
| Mean                      | 5° 24' 22" D                          | 17° 28' 00" E                         |

10<sup>th</sup> day of August 1914.

Traverse of watershed of Rocky Mountains between Bolts 81.F and 83.F on Boundary between Alberta and British Columbia in Crowsnest Pass.

|            |  |                  |  |                                  |
|------------|--|------------------|--|----------------------------------|
| Temp. 60°F | <p>The dotted line represents the natural watershed, which follows a rough, sharp, irregular rock ridge, covered with scrub timber, and which constitutes the Boundary between Bolt 81.F and Bolt 83.F</p> | (83.F)           | 13.869                                       | Bolt and cairn 83.F              |
|            |  | 13.40            | 2.697 @ 24° 50' 30" E<br>+0.0009 Temp. corr. |                                  |
|            |  | Saddle .33       | 12.60  |                                  |
|            |  | 11.4207          | x 0.489 @ 16° 27' E                          |                                  |
|            |  | 10.9517          | x  |                                  |
|            |  | 20               | 10.25  | 1.00 @ 36° 58' E                 |
|            |  | 10.1527          | x  |                                  |
|            |  | 25               | 9.35   | 4.63 @ 18° 27' E                 |
|            |  | 75               | 6.80   |                                  |
|            |  | 30               | 5.7607                                       | x                                |
| 25         | 4.90   | 3.10 @ 10° 13' E |  |                                  |
| 15         | 3.70   |                  |  |                                  |
|            | 2.7099   | x                |  |                                  |
|            | 2.50   | 2.75 @ 9° 48' E  |  |                                  |
|            | 1.50   |                  |  |                                  |
| From 82.F  |  | 0.00             | Station 82.F                                 |                                  |
|            |  | 186° 51' 32"     |  |                                  |
| Temp. 50°F |  | (82.F)           | 4.019  | Station 82.F (picket in rock M.) |
|            |  | 2.70             | 4.0365 @ 5° 22' E                            |                                  |
|            |  | 20               | 2.00   |                                  |
|            |  | From 81.F        | 0.00   | Bolt and cairn 81.F              |
|            |  | 159° 46' 25"     |  |                                  |

11<sup>th</sup> day of August 1914.

Vernier readings at Bolt 83.F (Tent Mtn.)

|               |              |              |              |              |              |             |
|---------------|--------------|--------------|--------------|--------------|--------------|-------------|
|               | On 67.F      | On 45.F      | On 57.F      | On 79.F      | On 39.F      |             |
| C.R.          | A            | 360° 00' 35" | 5° 52' 16"   | 9° 07' 33"   | 12° 26' 29"  | 13° 05' 12" |
|               | B            | 00.00        | 51.52        | 07.05        | 26.03        | 04.43       |
| C.L.          | A            | 00.20        | 51.37        | 07.06        | 26.41        | 04.30       |
|               | B            | 00.00        | 51.22        | 06.49        | 26.20        | 04.04       |
| Mean          | 360° 00' 14" | 5° 51' 47"   | 9° 07' 08"   | 12° 26' 23"  | 13° 04' 37"  |             |
| Taken as mean | 360° 00' 13" | 5° 51' 59"   | " " "        | " " "        | " " "        |             |
| Bearing       | 325° 07' 00" | 330° 58' 46" | 334° 13' 55" | 337° 33' 10" | 338° 11' 24" |             |

Vernier readings at 83.F continued.

|               |             |             |             |                        |              |              |
|---------------|-------------|-------------|-------------|------------------------|--------------|--------------|
|               | On 81.F     | On 5.F      | On 82.F     | On cairn (Wilson Mtn.) | Repeat       |              |
| C.R.          | A           | 35° 45' 44" | 41° 04' 10" | 41° 44' 50"            | 53° 10' 21"  | 360° 00' 13" |
|               | B           | 45.15       | 03.38       | 44.25                  | 09.57        | 59.50        |
| C.L.          | A           | 45.46       | 03.28       | 45.00                  | 09.45        | 00.33        |
|               | B           | 45.18       | 03.03       | 44.45                  | 09.21        | 00.10        |
| Mean          | 35° 45' 31" | 41° 03' 35" | 41° 44' 45" | 53° 09' 51"            | 360° 00' 12" |              |
| Taken as mean | " " "       | " " "       | " " "       | " " "                  | " " "        |              |
| Bearing       | 0° 52' 18"  | 6° 10' 22"  | 6° 51' 32"  | 18° 16' 38"            |              |              |

Vertical circle readings at Bolt 83.F

Hi. = 3.80 ft above top of Bolt.

|                           |              |              |               |                           |                        |
|---------------------------|--------------|--------------|---------------|---------------------------|------------------------|
|                           | On top 5.F   | On top 39.F  | On top 79.F   | On target 3.30 above 81.F | On target at Sta. 82.F |
| C.R. (mean of 2 verniers) | 5° 09' 30" D | 1° 13' 30" D | 22° 31' 15" D | 15° 05' 45" D             | 17° 30' 45" D          |
| C.L. " " " "              | 5.10.15      | 1.14.15      | 22.32.37      | 15.07.00                  | 17.32.30               |
| Mean                      | 5° 09' 52" D | 1° 13' 52" D | 22° 31' 58" D | 15° 06' 22" D             | 17° 31' 37" D          |

10<sup>th</sup> day of August 1914.

| Course      | Bearing          | Distance | Latitudes |            | Departures |           |
|-------------|------------------|----------|-----------|------------|------------|-----------|
|             |                  |          | N.        | S.         | E.         | W.        |
| 39.F - 41.F | S. 10° 26' 59" E | 8.693    |           | 8.5488     | 1.5767     |           |
| 41.F - 43.F | S. 8° 36' 42" W  | 22.139   |           | 21.8894    |            | 3.3150    |
| 43.F - 45.F | S. 39° 36' 02" W | 31.159   |           | 24.0082 ✓  |            | 19.8617 ✓ |
| 45.F - 47.F | S. 61° 12' 49" E | 27.874   |           | 13.4226 ✓  | 24.4293 ✓  |           |
| 47.F - 49.F | S. 5° 34' 05" E  | 20.048   |           | 19.9534 ✓  | 1.9452 ✓   |           |
| 49.F - 51.F | S. 24° 08' 45" W | 9.890    |           | 9.0247 ✓   |            | 4.0456 ✓  |
| 51.F - 53.F | S. 28° 03' 06" E | 11.486   |           | 10.1367 ✓  | 5.4015 ✓   |           |
| 53.F - 55.F | S. 55° 33' 17" E | 35.716   |           | 20.2016 ✓  | 29.4538 ✓  |           |
| 55.F - 57.F | S. 17° 20' 55" E | 11.270   |           | 10.7573 ✓  | 3.3605 ✓   |           |
| 57.F - 59.F | S. 6° 10' 47" E  | 31.084   |           | 30.9034 ✓  | 3.3461 ✓   |           |
| 59.F - 61.F | S. 5° 39' 04" E  | 22.978   |           | 22.8663 ✓  | 2.2627 ✓   |           |
| 61.F - 63.F | S. 0° 27' 37" E  | 24.449   |           | 24.4482 ✓  | 0.1964 ✓   |           |
| 63.F - 65.F | S. 20° 20' 54" E | 22.373   |           | 20.9768 ✓  | 7.7797 ✓   |           |
| 65.F - 67.F | N. 77° 38' 06" E | 11.865   | 2.5408 ✓  |            | 11.5898 ✓  |           |
| 67.F - 69.F | S. 71° 40' 18" E | 21.940   |           | 6.8993 ✓   | 20.8270 ✓  |           |
| 69.F - 71.F | S. 16° 20' 50" W | 13.884   |           | 13.3227 ✓  |            | 3.9078 ✓  |
| 71.F - 73.F | S. 14° 21' 36" W | 10.124   |           | 9.8077 ✓   |            | 2.5109 ✓  |
| 73.F - 75.F | S. 57° 49' 20" E | 12.743   |           | 6.7863 ✓   | 10.7857 ✓  |           |
| 75.F - 77.F | S. 32° 14' 18" E | 16.230   |           | 13.7279 ✓  | 8.6578 ✓   |           |
| 77.F - 79.F | S. 61° 26' 02" E | 22.780   |           | 10.8928 ✓  | 20.0069 ✓  |           |
| 79.F - 81.F | S. 37° 28' 58" E | 26.799   |           | 21.2660 ✓  | 16.3078 ✓  |           |
| 81.F - 82.F | S. 20° 13' 35" E | 4.019    |           | 3.7712 ✓   | 1.3895 ✓   |           |
| 82.F - 83.F | S. 6° 51' 32" W  | 13.869   |           | 13.7697 ✓  |            | 1.6563 ✓  |
|             |                  |          | 2.5408    | 337.3810 ✓ | 169.3164   | 35.2973   |
|             |                  |          |           | 2.5408     | 35.2973    |           |
|             |                  |          |           | 334.8402   | 134.0191   |           |

Then L. cot. bearing (S.E) 39.F - 83.F =  $\log 334.8402 - \log 134.0191 + 10$   
 = 10.3976709 ✓  
 and bearing = S. 21° 48' 49" E or 158° 11' 11"  
 Taken as correct (see p.1) = 158° 11' 24"  
 and distance from 39.F to 83.F =  $\sqrt{334.8402^2 + 134.0191^2}$   
 = 360.665 ✓

Also L. cot. bearing (S.E)  
 from 45.F to 83.F =  $\log 280.3938 - \log 155.6191 + 10$   
 = 10.2557055  
 and bearing = S. 29° 01' 49" E or 150° 58' 11" ✓  
 but bearing has been taken (p.7) = S. 29° 01' 14" E " 150° 58' 46"  
 and distance from 45.F - 83.F =  $\sqrt{280.3938^2 + 155.6191^2}$   
 = 320.684 ✓

## Calculations of elevations of Monuments 77.F and 79.F

Elevation of top of 77.F above Instr. at 75.F =  $\tan 8^\circ 52' 52'' \times 16.230$ 

= 2.5361 Page 35

= 167.38 Ft. ✓

= 2.47 "

H.I. at 75.F

Elevation of top of 77.F above top of 75.F = 169.85 Ft.

Depression of top of 75.F below Instr. at 77.F =  $\tan 9^\circ 10' 07'' \times 16.230$ 

= 2.6196 Page 37

= 172.89 Ft. ✓

= 2.60 "

H.I. at 77.F

Depression of top of 75.F below top of 77.F = 170.29 "

Mean elevation of top of 77.F above top of 75.F = 170.07 "

Elevation of top of 75.F (page 57) = 5187.44 "

Elevation of top of Monument 77.F = 5357.51 "

Elevation of target at 79.F above Instr. at 77.F =  $\tan 23^\circ 59' 26'' \times 22.780$ 

= 10.1378 Page 37

= 669.09 Ft. ✓

= 2.60 "

H.I. at 77.F

Elevation of target at 79.F above top of 77.F = 671.69 "

Height of target above 79.F = 1.55 "

Elevation of top of 79.F above top of 77.F = 670.14 Ft.

Depression of top of 77.F below Instr. at 79.F =  $\tan 24^\circ 04' 22'' \times 22.780$ 

= 10.1770 Page 39

= 671.68 Ft. ✓

= 1.89 "

H.I. at 79.F

Depression of top of 77.F below top of 79.F = 669.79 "

Mean elevation of top of 79.F above top of 77.F = 669.96 "

Elevation of top of 77.F (see above) = 5357.51 "

Elevation of top of Monument 79.F = 6027.47 "

## Calculations of distance from Monument 79.F to Bolt 83.F and from Bolt 81.F to Bolt 83.F

In  $\Delta$  79.F - 81.F - 83.F, we have

L at 79.F =  $15^\circ 02' 08''$  (Page 39) ✓

L " 81.F =  $141^\circ 38' 44''$  ✓

L " 83.F =  $23^\circ 19' 08''$  (" 43)

and distance 79.F to 81.F = 26.799 (" 40)

$$\therefore \log \text{ distance } 79.F - 83.F = \log 26.799 + L \sin 141^\circ 38' 44'' + L \operatorname{cosec} 23^\circ 19' 08'' - 20$$

$$= 1.6233484$$

and distance 79.F - 83.F = 42.0096 ✓

$$\text{also } \log \text{ distance } 81.F - 83.F = \log 26.799 + L \sin 15^\circ 02' 08'' + L \operatorname{cosec} 23^\circ 19' 08'' - 20$$

$$= 1.2445902$$

and distance 81.F - 83.F = 17.5627 ✓

## Calculation of elevation of Bolt 83.F

|  |   |                       |
|--|---|-----------------------|
| Elevation of target at 83.F above Instr. at 79.F | = $\tan 22^\circ 30' 30'' \times 42.0096$ |                       |
|  | = 17.4081                                 |                       |
|  | = 1148.93 ft.                             | Pages 39 & 59         |
| H.I. at 79.F                                     | = 1.89 "                                  |                       |
| Elevation of target at 83.F above top of 79.F    | = 1150.82 "                               |                       |
| Height of target above 83.F                      | = 3.80 "                                  |                       |
| Elevation of top of Bolt 83.F above top of 79.F  | =   | 1147.02 ft.           |
| Depression of top of 79.F below Instr. at 83.F   | = $\tan 22^\circ 31' 56'' \times 42.0096$ |                       |
|  | = 17.4386                                 |                       |
|  | = 1150.29 ft.                             | Page <del>42</del> 43 |
| H.I. at 83.F                                     | = 3.80 "                                  |                       |
| Depression of top of 79.F below top of Bolt 83.F | =   | 1146.49 "             |
| Mean elevation of top of Bolt 83.F above 79.F    | =   | 1146.75 "             |
| Elevation of top of 79.F                         | =   | 6027.47 "             |
| Elevation of top of Bolt 83.F                    | =   | 7174.22 "             |

## Calculation of elevation of Bolt 81.F

|  |   |               |
|--|---|---------------|
| Dep. of target at 81.F below Instr. at 83.F      | = $\tan 15^\circ 06' 22'' \times 17.5627$ |               |
|  | = 4.7408                                  | Pages 43 & 59 |
|  | = 312.89 ft.                              |               |
| H.I. at 83.F                                     | = 3.80 "                                  |               |
| Dep. of target at 81.F below top of 83.F         | = 309.09 "                                |               |
| Height of target at 81.F above top of bolt       | = 3.30 "                                  |               |
| Depression of top of 81.F below top of 83.F      | =   | 312.39 ft.    |
| Elevation of target at 83.F above Instr. at 81.F | = $\tan 14^\circ 59' 37'' \times 17.5627$ |               |
|  | = 4.7038                                  | Page 41       |
|  | = 310.45 ft.                              |               |
| H.I. at 81.F                                     | = 5.31 "                                  |               |
| Elevation of target at 83.F above top of 81.F    | = 315.76 "                                |               |
| Height of target at 83.F above top of bolt       | = 3.80 "                                  |               |
| Elevation of top of 83.F above top of 81.F       | =   | 311.96 "      |
| Mean depression of top of 81.F below top of 83.F | =   | 312.17 "      |
| Elevation of top of 83.F                         | =   | 7174.22 "     |
| Elevation of top of Bolt 81.F                    | =   | 6862.05 "     |

## ASTRONOMICAL OBSERVATION FOR AZIMUTH

Date .....

Place .....

Reference line .....

| Face. | H.C.R. on Reference line. | H.C.R. on Polaris | Watch Time. |
|-------|---------------------------|-------------------|-------------|
| Right |                           |                   |             |
| Left  |                           |                   |             |
| Mean  |                           |                   |             |

Watch correction .....

Sidereal time .....

Tabular azimuth for ..... h. .... m. and Tp .....

Difference for ..... m. .... s. ....

Difference for ..... townships .....

Convergence for ..... sections .....

Bearing of Polaris .....

H.C.R. on Polaris .....

Correction to H.C.R. ....

H.C.R. on Reference line .....

Bearing of Reference line .....

NOTE.—The Reference line must be a section line or a line between two stations of a lake or river traverse.

3434  
Edmonton

NOTE.—This affidavit is to be filled in before the book is forwarded to the Department of the Interior.

## AFFIDAVIT

— • —

I, *Richard W<sup>m</sup> Cautley* of the *City* of  
*Edmonton, in Alberta* ..... Dominion

Land Surveyor, make oath and say that I have, in my own proper person, according to law and the instructions of the Surveyor General, faithfully and correctly executed the survey shown by the foregoing field notes and accompanying plan ; and that the said field notes and plan are correct and true to the best of my knowledge and belief. So

HELP ME GOD.

Sworn before me at *Edmonton*

this *20<sup>th</sup>* day of *May* 19*15*

*R. W. Cautley D.S.S.*  
D. L. S.

*Robert Miller*  
A Commissioner for taking affidavits  
in and for the Province of Alberta.

3. A

*Interprovincial Boundary  
between  
Alberta and B.C.  
Crowsnest Pass  
Bolt 83.F - B. 101.F  
R. W. Cautley D.L.S.*

*No. 3. 1914*

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# FIELD NOTES

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*final survey of*  
*Interprovincial Boundary*  
*between*  
*Alberta and British Columbia*  
*in*  
*Crowsnest Pass*  
*Book N<sup>o</sup> 3*  
*From Bolt 83.F to Bolt 101.F.*

Surveyed by.....*R. W. Cautley*.....D.L.S.

Commenced : *10<sup>th</sup> August*..... Ended : *24<sup>th</sup> August*.....

**1914.**

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|  |              |
|  |              |
|  |              |

*Number of tracings attached to this book* None

NAMES AND DUTIES OF PARTY EMPLOYED

|                        |                              |
|------------------------|------------------------------|
| <i>W. M. Carthew</i>   | <i>Assistant</i>             |
| <i>Percy Burton</i>    | <i>Chainman</i>              |
| <i>Robert Burns</i>    | <i>Monument Builder</i>      |
| <i>Charles Schultz</i> | <i>Axeman</i>                |
| <i>John Schultz</i>    | <i>"</i>                     |
| <i>George Rider</i>    | <i>"</i>                     |
| <i>Jos. Thompson</i>   | <i>Cook</i>                  |
| <i>Sam Hanin</i>       | <i>Packer</i>                |
| <i>Jacob Koller</i>    | <i>2<sup>nd</sup> Packer</i> |

## Vernier readings at Bolt 83.F

|               | On 67.F      | On 39.F      | On 81.F     | On 5.F      | On 82.F     |             |
|---------------|--------------|--------------|-------------|-------------|-------------|-------------|
| C.R. {        | A            | 360° 00' 35" | 13° 05' 12" | 35° 45' 44" | 41° 04' 10" | 41° 44' 50" |
|               | B            | 00.00        | 04.43       | 45.15       | 03.38       | 44.25       |
| C.L. {        | A            | 00.20        | 04.30       | 45.46       | 03.28       | 45.00       |
|               | B            | 00.00        | 04.04       | 45.18       | 03.03       | 44.45       |
| Mean          | 360° 00' 14" | 13° 04' 37"  | 35° 45' 31" | 41° 03' 35" | 41° 44' 45" |             |
| Taken as mean | 360° 00' 13" | " " "        | " " "       | " " "       | " " "       |             |
| Bearing       | 325° 07' 00" | 338° 11' 24" | 0° 52' 18"  | 6° 10' 22"  | 6° 51' 32"  |             |

## Vernier readings at 83.F continued

|               | On 107.F<br>(Ptolemy Mtn) | On 100.F     | On 85.F      | On 84.F      | Repeat       |              |
|---------------|---------------------------|--------------|--------------|--------------|--------------|--------------|
| C.R. {        | A                         | 135° 48' 10" | 137° 33' 10" | 174° 16' 40" | 198° 39' 55" | 360° 00' 13" |
|               | B                         | 47.50        | 33.37        | 16.20        | 39.35        | 59.50        |
| C.L. {        | A                         | 47.04        | 32.50        | 16.28        | 39.47        | 00.33        |
|               | B                         | 47.00        | 32.52        | 16.15        | 39.29        | 00.10        |
| Mean          | 135° 47' 31"              | 137° 33' 07" | 174° 16' 26" | 198° 39' 41" | 360° 00' 12" |              |
| Taken as mean | " " "                     | " " "        | " " "        | " " "        |              |              |
| Bearing       | 100° 54' 18"              | 102° 39' 54" | 139° 23' 13" | 163° 46' 28" |              |              |

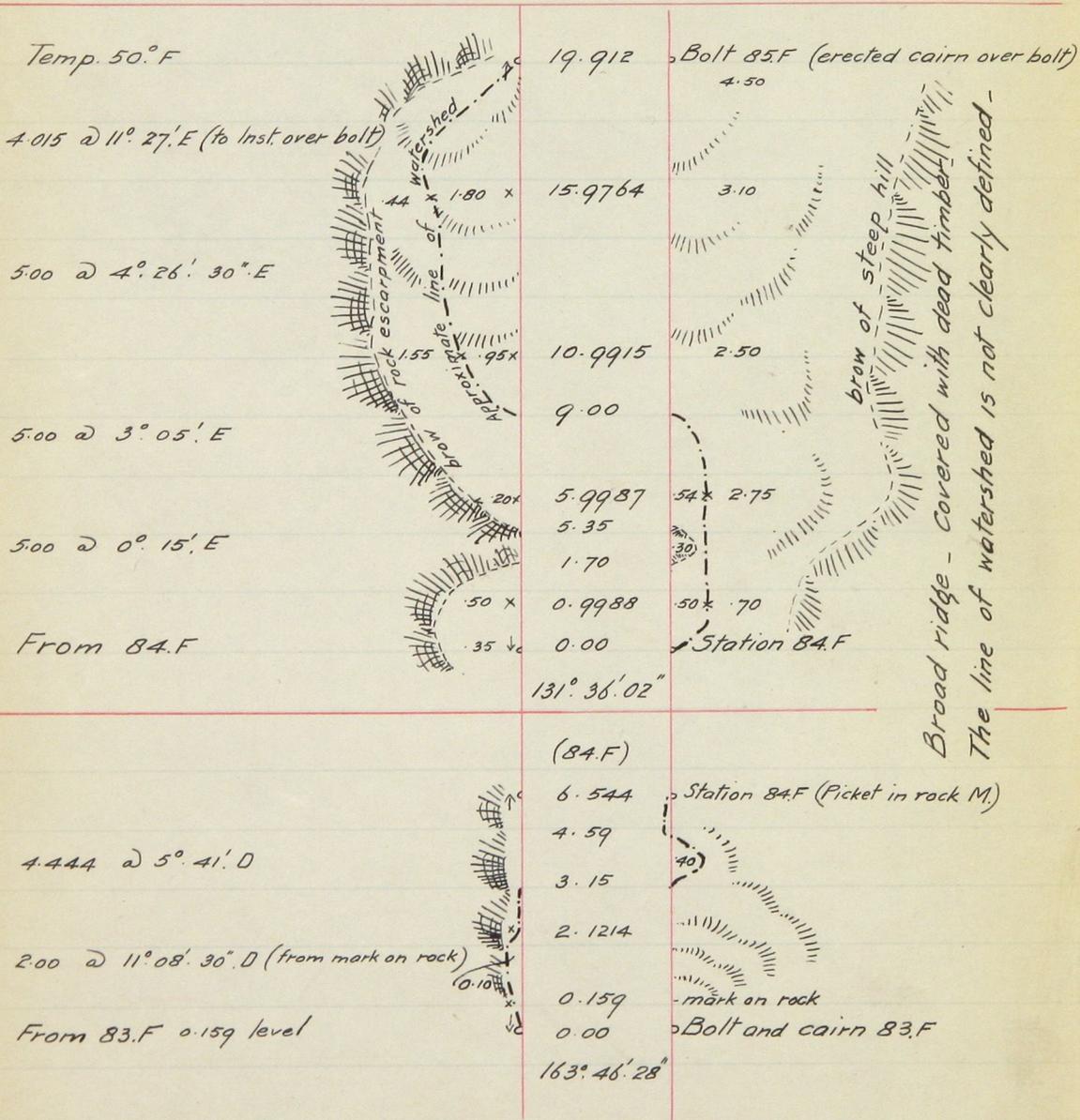
## Vertical circle readings at Bolt 83.F

H.I. = 3.80 ft. above top of bolt. Elevation of top of Bolt 83.F = 7192.13 ft.

|                           | On target 3.17 ft.<br>above Bolt 85.F | On top cairn at 107.F<br>(Ptolemy Mtn) |
|---------------------------|---------------------------------------|--|
| C.R. (mean of 2 verniers) | 1° 08' 15" E                          | 6° 06' 37" E                           |
| C.L. " " "                | 1° 06' 45"                            | 6° 05' 45"                             |
| Mean                      | 1° 07' 30" E                          | 6° 06' 11" E                           |

10<sup>th</sup> day of August 1914.

2 Traverse of watershed of Rocky Mountains between Bolts 83.F and 85.F on Boundary between Alberta and British Columbia in Crowsnest Pass.



11<sup>th</sup> day of August 1914.

3 Vernier readings at Bolt 85.F, and at intermediate Station 84.F

|                                       |   | At 84.F  |              | At 85.F                               |              |              |
|---------------------------------------|---|--|--------------|---------------------------------------|--------------|--------------|
|                                       |   | On 83.F  |              | On 85.F                               |              |              |
| C.R.                                  | A | 360° 00' 40"   | 147° 50' 20" |                                       |              |              |
|                                       | B | 00 00  | 50 10        |                                       |              |              |
| C.L.                                  | A | 00 20  | 50 40        |                                       |              |              |
|                                       | B | 00 00  | 50 25        |                                       |              |              |
| Mean                                  |   | 360° 00' 15"   | 147° 50' 24" |                                       |              |              |
| Taken as mean                         |   | " " "  | 147° 49' 49" |                                       |              |              |
| Bearing                               |   | 343° 46' 28"   | 131° 36' 02" |                                       |              |              |
| At 85.F                               |   |  |              |                                       |              |              |
|                                       |   | On 84.F  | On 83.F      | On 87.F                               | On 86.F      | Repeat       |
| C.R.                                  | A | 360° 00' 30"   | 7° 47' 46"   | 186° 47' 05"                          | 214° 48' 15" | 360° 00' 26" |
|                                       | B | 00 00  | 47 20        | 46 50                                 | 48 00        | 00 00        |
| C.L.                                  | A | 00 26  | 47 20        | 46 32                                 | 47 33        | 00 10        |
|                                       | B | 00 00  | 46 52        | 46 22                                 | 47 20        | 59 40        |
| Mean                                  |   | 360° 00' 14"   | 7° 47' 20"   | 186° 46' 42"                          | 214° 47' 47" | 360° 00' 04" |
| Taken as mean                         |   | 360° 00' 09"   | " " "        | " " "                                 | " " "        | " " "        |
| Bearing                               |   | 311° 36' 02"   | 319° 23' 13" | 138° 22' 35"                          | 166° 23' 40" |              |
| Vertical circle readings at Bolt 85.F |   |  |              |                                       |              |              |
| H.I. = 4.39 ft. above bolt.           |   |  |              |                                       |              |              |
|                                       |   | On top bolt 83.F<br>(hub outside cairn set at level) |              | On target 1.89 ft.<br>above Bolt 87.F |              |              |
| C.R. (mean of 2 verniers)             |   | 1° 21' 00" D   |              | 1° 03' 45" D                          |              |              |
| C.L. " " "                            |   | 1. 22. 00  |              | 1. 05. 30                             |              |              |
| Mean                                  |   | 1° 21' 30" D   |              | 1° 04' 37" D                          |              |              |

11<sup>th</sup> day of August 1914.

4 Traverse of watershed of Rocky Mountains between Bolt's 85.F and 87.F on Boundary between Alberta and British Columbia in Crowsnest Pass.

|                   |              |                                     |
|-------------------|--------------|-------------------------------------|
| Temp. 50° F       | 12.696       | Bolt 87.F (erected cairn)           |
| 1.7815 @ 5° 50' E | 11.35        |                                     |
| 2.00 @ 9° 22' E   | 10.9233      |                                     |
|                   | 8.9500       |                                     |
|                   | 8.20         |                                     |
| 5.00 @ 5° 35' D   | 6.65         |                                     |
|                   | 3.9738       |                                     |
| low saddle →      | 3.25         |                                     |
| 4.00 @ 6° 34' D   | 1.30         |                                     |
| From 86.F         | 0.00         |                                     |
|                   | 116° 29' 04" |                                     |
|                   | 86.F         |                                     |
| 0.102 level       | 10.076       | Station 86.F (Picket in rock mound) |
|                   | 9.9737       |                                     |
| 5.00 @ 4° 39' E   | 7.77         |                                     |
|                   | 7.50         |                                     |
|                   | 4.9902       |                                     |
|                   | 3.00         |                                     |
|                   | 2.00         |                                     |
|                   | 1.50         |                                     |
|                   | 1.00         |                                     |
| 5.00 @ 3° 35' D   | 0.00         |                                     |
| From 85.F         | 0.00         |                                     |
|                   | 166° 23' 40" |                                     |

11<sup>th</sup> day of August, 1914.

Vernier readings at Bolt 87.F and at intermediate station 86.F

|               |   | At 86.F      |              |
|---------------|---|--------------|--------------|
|               |   | On 85.F      | On 87.F      |
| C.R.          | A | 360° 00' 38" | 130° 05' 35" |
|               | B | 00 00        | 05 25        |
| C.L.          | A | 00 13        | 05 55        |
|               | B | 00 00        | 05 22        |
| Mean          |   | 360° 00' 13" | 130° 05' 34" |
| Taken as mean |   | " " "        | 130° 05' 37" |
| Bearing       |   | 346° 23' 40" | 116° 29' 04" |

|               |   | At 87.F      |              |              |              |
|---------------|---|--------------|--------------|--------------|--------------|
|               |   | On 86.F      | On 85.F      | On 89.F      | Repeat       |
| C.R.          | A | 360° 00' 25" | 21° 53' 50"  | 203° 28' 35" | 360° 00' 15" |
|               | B | 00 00        | 53 30        | 28 30        | 59 50        |
| C.L.          | A | 00 15        | 53 43        | 28 42        | 00 08        |
|               | B | 59 50        | 53 15        | 28 30        | 59 45        |
| Mean          |   | 360° 00' 07" | 21° 53' 35"  | 203° 28' 34" | 360° 00' 00" |
| Taken as mean |   | 360° 00' 04" | " " "        | " " "        |              |
| Bearing       |   | 296° 29' 04" | 318° 22' 35" | 139° 55' 34" |              |

Vertical circle readings at Bolt 87.F

H.I. = 5.05 ft. above top of Bolt.

|                           | On target at 3.17 ft. above 85.F | On target 2.90 ft. above 89.F |
|---------------------------|----------------------------------|-------------------------------|
| C.R. (mean of 2 verniers) | 0° 52' 30" E                     | 3° 26' 30" D                  |
| C.L. " " "                | 0 52 30                          | 3 29 30                       |
| Mean                      | 0° 52' 30" E                     | 3° 28' 00" D                  |

11<sup>th</sup> day of August 1914.

6 Traverse of watershed of Rocky Mountains between Bolts 87.F and 89.F on Boundary between Alberta and British Columbia in Crowsnest Pass.

Temp. 50° F

0.7905 @ 11° 48' E (to target 2.90 ft. above bolt)

1.2045 @ 21° 54' E

5.00 @ 17° 38' E

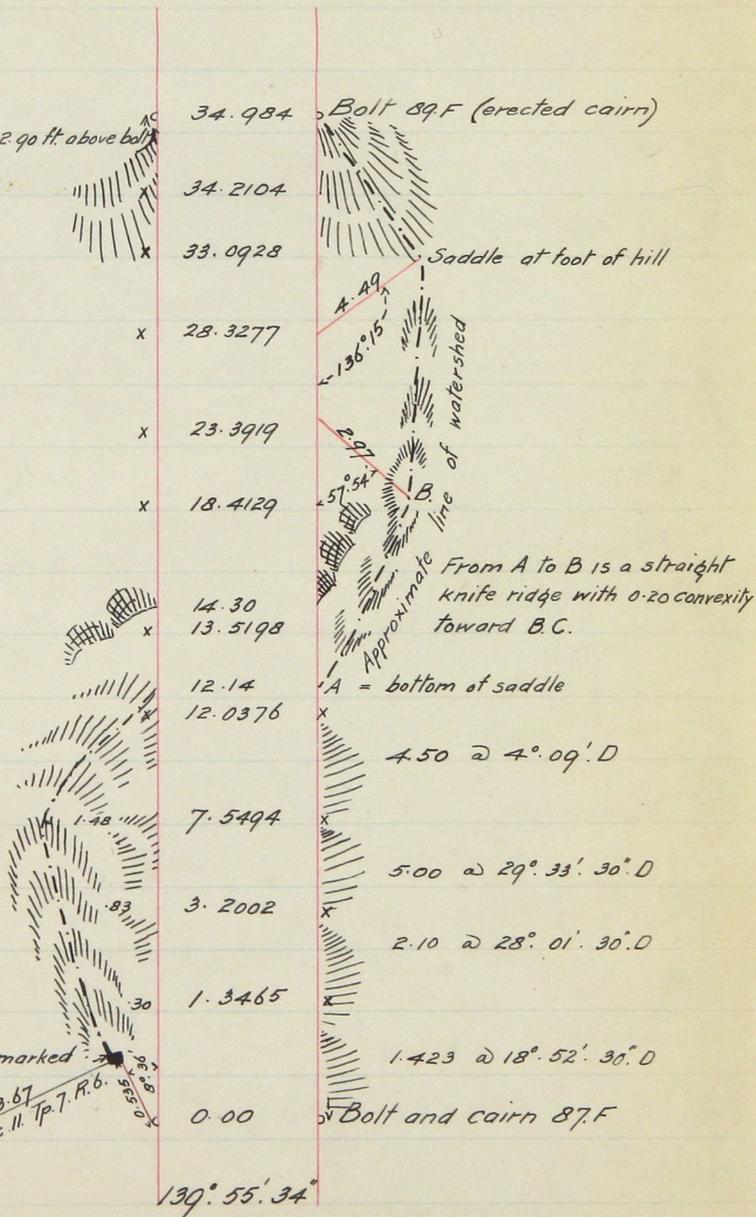
5.00 @ 9° 11' 30" E

5.00 @ 5° 15' E

5.00 @ 11° 52' D

1.50 @ 8° 50' D

Watershed is sharply defined along narrow ridge - Partly open, with small scrub and dead timber-



Planted W.P. in rock M. marked "Alta" and "B.C."

South 3.67 E. bay Sec. 11. Tp. 7. R. 6.

Found I.P. Stone M. marked XI, VII, VI

13<sup>th</sup> day of August. 1914.

Vernier readings at Bolt 89.F

|               | On 87.F        | On 91.F<br>(picket at 4.7746) | On 95.F     |
|---------------|----------------|-------------------------------|-------------|
| C.R. {        | A 360° 00' 20" | 66° 32' 10"                   | 77° 15' 29" |
|               | B 00. 00       | 32. 00                        | 15. 12      |
| C.L. {        | A 00. 10       | 32. 50                        | 15. 55      |
|               | B 00. 00       | 32. 40                        | 15. 35      |
| Mean          | 360° 00' 08"   | 66° 32' 25"                   | 77° 15' 33" |
| Taken as mean | 360° 00' 09"   | " " "                         | " " "       |
| Bearing       | 319° 55' 34"   | 26° 27' 50"                   | 37° 10' 58" |

Vernier readings at 89.F continued

|               | On 101.F       | On 107.F<br>(Ptolemy Mtn.) | On 103.F     | Repeat       |
|---------------|----------------|----------------------------|--------------|--------------|
| C.R. {        | A 118° 24' 30" | 128° 21' 58"               | 137° 22' 45" | 360° 00' 25" |
|               | B 24. 20       | 22. 03                     | 22. 37       | 00. 03       |
| C.L. {        | A 24. 40       | 21. 19                     | 22. 50       | 00. 10       |
|               | B 24. 23       | 21. 07                     | 22. 34       | 00. 04       |
| Mean          | 118° 24' 28"   | 128° 21' 37"               | 137° 22' 42" | 360° 00' 10" |
| Taken as mean | " " "          | " " "                      | " " "        | " " "        |
| Bearing       | 78° 19' 53"    | 88° 17' 02"                | 97° 18' 07"  |              |

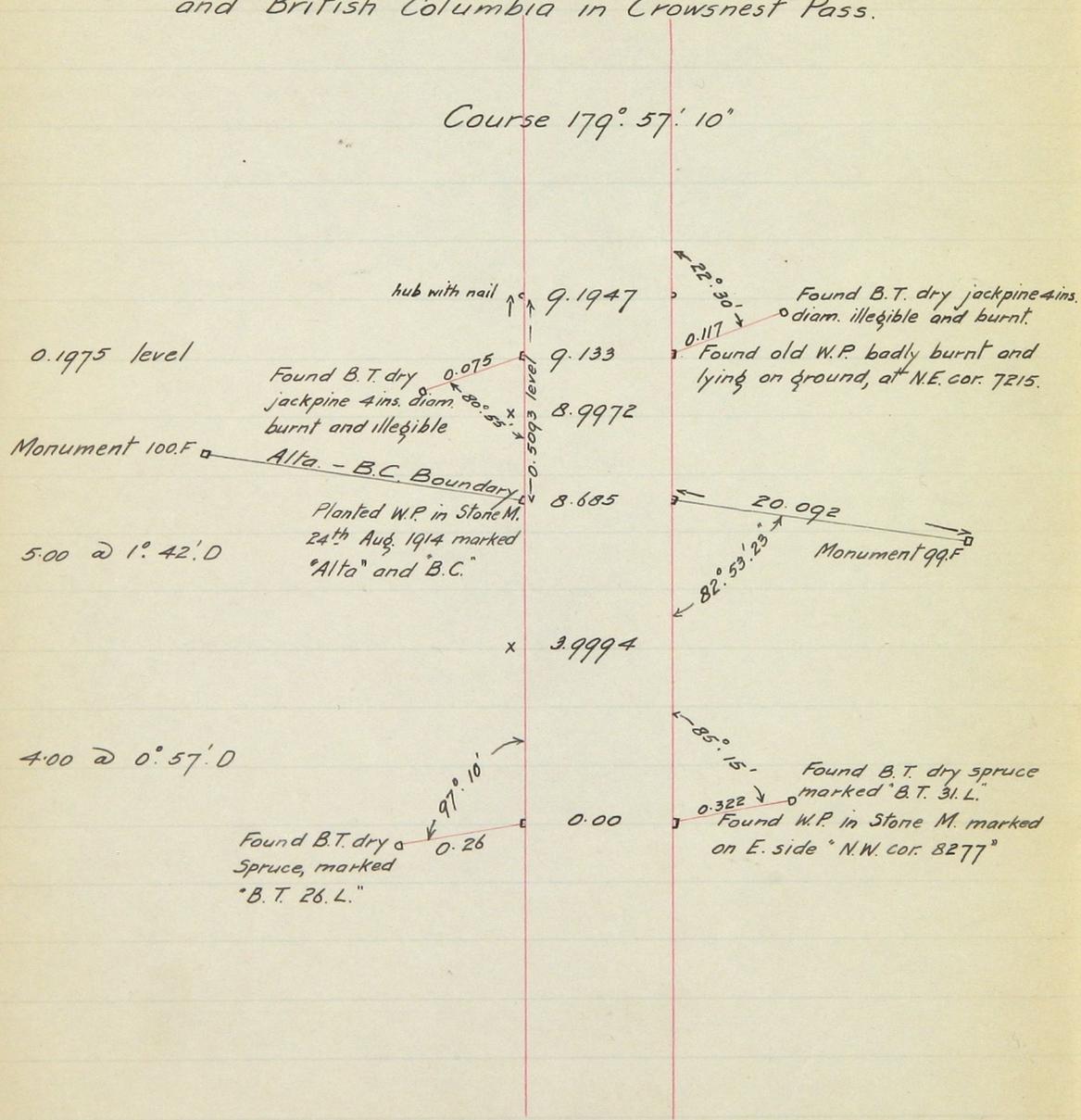
Vertical circle readings at 89.F

H.I. = 4.82 ft. above top of bolt.

|                           | On target<br>8.78 ft. above<br>Bolt 87.F | On Instr. at<br>4.7746 towards<br>91.F | On 107.F<br>(top of cairn) | On 101.F<br>(top of cairn) |
|---------------------------|--|--|----------------------------|----------------------------|
| C.R. (mean of 2 verniers) | 3° 30' 00" E                             | 18° 22' 15" D                          | 8° 06' 00" E               | 3° 35' 00" D               |
| C.L. " " " "              | 3. 29. 45                                | 18. 22. 45                             | 8. 05. 45                  | 3. 35. 00                  |
| Mean                      | 3° 29' 52" E                             | 18° 22' 30" D                          | 8° 05' 52" E               | 3° 35' 00" D               |

19<sup>th</sup> day of August 1914.

Survey of part of E. bdy. M.L. 7215 and W. bdy M.L. 8277  
 showing connection with Boundary between Alberta.  
 and British Columbia in Crowsnest Pass.



22<sup>nd</sup> and 24<sup>th</sup> days of August 1914.

Calculation of distance and bearing from  
 Bolt 83.F to Bolt 89.F

| Course       | Bearing         | Distance | Latitudes |         | Departures |    |
|--------------|-----------------|----------|-----------|---------|------------|----|
|              |                 |          | N.        | S.      | E.         | W. |
| 83.F to 84.F | S 16° 13' 32" E | 6.544    |           | 6.2834  | 1.8285     | ✓  |
| 84.F - 85.F  | S 48° 23' 58" E | 19.912   |           | 13.2203 | 14.8900    | ✓  |
| 85.F - 86.F  | S 13° 36' 20" E | 10.076   |           | 9.7933  | 2.3702     | ✓  |
| 86.F - 87.F  | S 63° 30' 56" E | 12.696   |           | 5.6619  | 11.3636    | ✓  |
| 87.F - 89.F  | S 40° 04' 26" E | 34.984   |           | 26.7703 | 22.5218    | ✓  |
| 83.F - 89.F  |                 |          |           | 61.7292 | 52.9741    |    |

Then L cot bea. (S.E) from 83.F to 89.F =  $\log 61.7292 - \log 52.9741 + 10$   
 = 10.0664270

and bea. from 83.F to 89.F = S 40° 38' 07" E or 139° 21' 53"  
 and dist. . . . . =  $\sqrt{61.7292^2 + 52.9741^2}$   
 = 81.343

also distance from 83.F to 85.F =  $\sqrt{19.5037^2 + 16.7185^2}$   
 = 25.689

also distance from 85.F to 87.F =  $\sqrt{15.4552^2 + 13.7338^2}$   
 = 20.676

## Calculation of elevation of Bolt 85.F

|   |   |   |               |
|---|---|---|---------------|
| Elevation of target at 85.F above Inst. at 83.F | = | $\tan 1^{\circ} 07' 30'' \times 25.689$ |               |
|   | = | 0.5045                                  | Pages 1 & 23  |
|   | = | 33.30 ft                                |               |
| H.I. at 83.F                                    | = | 3.80 "                                  |               |
| Elevation of target at 85.F above top of 83.F   | = | 37.10 "                                 |               |
| Height of target above 85.F                     | = | 3.17 "                                  |               |
| Elevation of top of 85.F above top of 83.F      | = |   | 33.93 ft      |
| Depression of top of 83.F below Inst. at 85.F   | = | $\tan 1^{\circ} 21' 30'' \times 25.689$ |               |
|   | = | 0.6091                                  | Pages 3 & 23. |
|   | = | 40.20 ft                                |               |
| H.I. at 85.F                                    | = | 4.39 "                                  |               |
| Depression of top of 83.F below top of 85.F     | = |   | 35.81 "       |
| Mean elevation of top of 85.F above top of 83.F | = |   | 34.87 "       |
| Elevation of top of 83.F (see p 60 Book 2)      | = |   | 7174.22 "     |
| Elevation of top of Bolt 85.F                   | = |   | 7209.09 "     |

## Calculation of elevation of Bolt 87.F

|  |   |   |              |
|--|---|---|--------------|
| Depression of target at 87.F below Inst. at 85.F | = | $\tan 1^{\circ} 04' 37'' \times 20.676$ |              |
|  | = | 0.3887                                  | Pages 3 & 23 |
|  | = | 25.65 ft                                |              |
| H.I. at 85.F                                     | = | 4.39 "                                  |              |
| Depression of target at 87.F below top of 85.F   | = | 21.26 "                                 |              |
| Height of target above 87.F                      | = | 1.89 "                                  |              |
| Depression of top of 87.F below top of 85.F      | = |   | 23.15 ft     |
| Elevation of target at 85.F above Inst. at 87.F  | = | $\tan 0^{\circ} 52' 30'' \times 20.676$ |              |
|  | = | 0.3158                                  | Pages 5 & 23 |
|  | = | 20.84 ft                                |              |
|  | = | 5.05 "                                  |              |
| Elevation of target at 85.F above top of 87.F    | = | 25.89 "                                 |              |
| Height of target above 85.F                      | = | 3.17 "                                  |              |
| Elevation of top of 85.F above top of 87.F       | = |   | 22.72 "      |
| Mean depression of top of 87.F below top of 85.F | = |   | 22.93 "      |
| Elevation of top of 85.F (P. 28)                 | = |   | 7209.09 "    |
| Elevation of top of Bolt 87.F                    | = |   | 7186.16 "    |

## Calculation of elevation of Bolt 89.F

|  |   |            |
|--|---|------------|
| Depression of target at 89.F below Inst. at 87.F | = $\tan 3^{\circ} 28' 00'' \times 34.984$ |            |
|  | = 2.1193                                  |            |
|  | = 139.87 ft.                              | Page 5     |
| H.I. at 87.F                                     | = 5.05 "                                  |            |
| Depression of target at 89.F below top of 87.F   | = 134.82 "                                |            |
| Height of target above 89.F                      | = 2.90 "                                  |            |
| Depression of top of 89.F below top of 87.F      | =   | 137.72 ft. |
| Elevation of target at 87.F above Inst. at 89.F  | = $\tan 3^{\circ} 29' 52'' \times 34.984$ |            |
|  | = 2.1383                                  | Page 7     |
|  | = 141.13 ft.                              |            |
| H.I. at 89.F                                     | = 4.82 "                                  |            |
| Elevation of target at 87.F above top of 89.F    | = 145.95 "                                |            |
| Height of target above 87.F                      | = 8.78 "                                  |            |
| Elevation of top of 87.F above top of 89.F       | =   | 137.17 "   |
| Mean depression of top of 89.F below top of 87.F | =   | 137.44 "   |
| Elevation of top of 87.F (p. 29)                 | =   | 7186.16 "  |
| Elevation of top of Bolt 89.F                    | =   | 7048.72 "  |

## Calculation of elevation of Monument 91.F

|  |   |             |
|--|---|-------------|
| Dep. of Inst. at 4.7746 towards 91.F below Inst. at 89.F | = $\tan 18^{\circ} 22' 30'' \times 4.7746$  |             |
|  | = 1.5860                                    | Page 7      |
|  | = 104.68 ft.                                |             |
| H.I. at 89.F   | = 4.82 "                                    | ✓           |
| Dep. of Inst. at 4.7746 below top of 89.F                | = 99.86 "                                   |             |
| Elevation of target at 89.F above Inst. at 4.7746        | = $\tan 18^{\circ} 12' 37'' \times 4.7746$  |             |
|  | = 1.5707                                    |             |
|  | = 103.67 ft.                                | Page 9      |
|  | = 3.83 "                                    |             |
|  | = 99.84 "                                   |             |
| Mean depression of Inst. at 4.7746 below top of 89.F     | =   | 99.85 ft. ✓ |
| Depression of top of 91.F below Inst. at 4.7746          | = $\tan 25^{\circ} 22' 45'' \times 32.0304$ |             |
|  | = 15.1949                                   | Page 9.     |
|  | = 1002.86 ft.                               |             |
| Elevation of Inst. at 4.7746 above Inst. at 91.F         | = $\tan 25^{\circ} 19' 30'' \times 32.0304$ |             |
|  | = 15.1578                                   | Page 9.     |
|  | = 1000.41 ft.                               |             |
| H.I. at 91.F   | = 2.28 "                                    |             |
| Elevation of Inst. at 4.7746 above top of 91.F           | = 1002.69 "                                 |             |
| Mean depression of top of 91.F below Inst. at 4.7746     | =   | 1002.77 "   |
| Depression of top of 91.F below top of 89.F              | =   | 1102.62 "   |
| Elevation of top of 89.F                                 | =   | 7048.72 "   |
| Elevation of top of Monument 91.F                        | =   | 5946.10 "   |

## ASTRONOMICAL OBSERVATION FOR AZIMUTH

Date .....

Place .....

Reference line .....

| Face. | H.C.R. on Reference line. | H.C.R. on Polaris | Watch Time. |
|-------|---------------------------|-------------------|-------------|
| Right | .....                     | .....             | .....       |
| Left  | .....                     | .....             | .....       |
| Mean  | .....                     | .....             | .....       |

Watch correction.....

Sidereal time.....

Tabular azimuth for..... h..... m. and Tp.....

Difference for..... m..... s.....

Difference for..... townships.....

Convergence for..... sections.....

Bearing of Polaris.....

H.C.R. on Polaris.....

Correction to H.C.R.....

H.C.R. on Reference line.....

Bearing of Reference line.....

NOTE.—The Reference line must be a section line or a line between two stations of a lake or river traverse.

NOTE.—This affidavit is to be filled in before the book is forwarded to the Department of the Interior.

## AFFIDAVIT

—•—

I, *Richard Wm. Cautley* of the *City* of  
*Edmonton in Alberta*..... Dominion

Land Surveyor, make oath and say that I have, in my own proper person, according to law and the instructions of the Surveyor General, faithfully and correctly executed the survey shown by the foregoing field notes and accompanying plan; and that the said field notes and plan are correct and true to the best of my knowledge and belief. So

HELP ME GOD.

Sworn before me at *Edmonton* }  
this *20<sup>th</sup>* day of *May* 19*15* } *R. W. Cautley D.L.S.*  
D. L. S.

*Rowd Mills*  
A Commissioner for taking affidavits  
in and for The Province of Alberta.