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# ANNUAL REPORT

OF THE

# CHIEF OF ENGINEERS,

UNITED STATES ARMY,

TO THE

# SECRETARY OF WAR,

FOR

THE YEAR 1891.

IN SIX PARTS.

## PART VI.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1891.

TABLE VI.—*Tabulated results of secondary triangulation, etc.*—Continued.

| Station. | Observed angle. | Adjusted angle. | Azimuth. | Distance. | | Latitude. | Longitude. |
|---|---|---|---|---|---|---|---|
| | ° ′ ″ | ′ ″ | ° ′ ″ | *Feet.* | *Metres.* | ° ′ ″ | ° ′ ″ |
| Chamberlain | 85 26 55.68 | 53.44 | 87 05 26.87 | 34,340.02 | 10,466.74 | | |
| Brulé | 59 26 37.25 | 35.82 | 326 26 39.37 | 59,520.25 | 18,141.60 | | |
| Willrodt | 35 06 32.13 | 30.74 | 181 38 19.43 | 51,416.62 | 15,671.64 | 43 38 56.08 | 99 19 37.74 |
| Brulé | 47 22 10.18 | 09.01 | 326 26 39.37 | 59,520.25 | 18,141.60 | | |
| Willrodt | 64 40 38.54 | 39.12 | 81 51 09.24 | 47,245.52 | 14,400.30 | | |
| Indian | 67 57 11.76 | 11.87 | 193 46 38.40 | 58,045.63 | 17,692.15 | 43 37 49.46 | 99 30 13.57 |
| Willrodt | 54 51 53.30 | 53.47 | 81 51 09.24 | 47,245.52 | 14,400.30 | | |
| Indian | 64 14 19.36 | 20.10 | 325 58 10.73 | 44,220.51 | 13,478.29 | | |
| Rosebud | 60 53 46.26 | 46.43 | 206 55 48.84 | 48,098.67 | 14,843.22 | 43 31 47.39 | 99 24 37.69 |
| Rosebud | 70 55 36.99 | 37.26 | 206 55 48.84 | 48,098.67 | 14,843.22 | | |
| Willrodt | 47 40 01.20 | 00.56 | 339 19 14.92 | 52,418.52 | 15,977.02 | | |
| Bijou | 61 24 22.62 | 22.18 | 97 57 45.74 | 41,000.60 | 12,496.87 | 43 30 51.66 | 99 15 26.56 |
| Rosebud | 41 00 55.82 | 54.75 | 277 51 26.24 | 41,000.60 | 12,496.87 | | |
| Bijou | 50 14 46.58 | 46.40 | 47 42 59.26 | 26,913.55 | 8,203.17 | | |
| Durex | 88 44 19.24 | 18.85 | 138 55 34.57 | 31,528.89 | 9,609.92 | 43 27 52.74 | 99 19 56.52 |
| Bijou | 62 46 06.97 | 07.87 | 47 42 59.26 | 26,913.55 | 8,203.17 | | |
| Durex | 80 37 14.04 | 14.62 | 308 17 08.20 | 40,127.15 | 12,230.64 | | |
| Brickkiln | 36 36 35.33 | 37.51 | 104 58 39.02 | 44,525.41 | 13,571.22 | 43 23 46.97 | 99 12 49.96 |
| Bijou | 39 03 46.70 | 45.48 | 344 56 51.32 | 44,525.41 | 13,571.22 | | |
| Brickkiln | 66 14 01.20 | 00.36 | 231 12 39.48 | 29,089.02 | 8,866.25 | | |
| Heaton | 74 42 14.82 | 14.16 | 125 58 24.95 | 42,245.97 | 12,876.45 | 43 26 46.83 | 99 07 42.65 |
| Brickkiln | 83 38 03.50 | 02.87 | 231 12 39.48 | 29,089.02 | 8,866.25 | | |
| Heaton | 45 48 02.45 | 01.85 | 5 28 08.78 | 37,430.67 | 11,408.76 | | |
| Cologne | 50 33 56.55 | 55.28 | 134 53 40.28 | 27,001.26 | 8,229.91 | 43 20 38.83 | 99 08 30.92 |
| Heaton | 58 30 01.01 | 01.26 | 5 28 08.78 | 37,430.67 | 11,408.76 | | |
| Cologne | 56 21 31.15 | 31.29 | 241 49 06.99 | 35,174.07 | 10,720.96 | | |
| Boland | 65 08 27.91 | 27.45 | 127 02 22.80 | 34,344.01 | 10,467.96 | 43 23 22.68 | 99 01 31.08 |
| Cologne | 71 07 33.13 | 34.74 | 241 49 06.99 | 35,174.07 | 10,720.96 | | |
| Boland | 57 10 40.20 | 39.32 | 4 43 15.85 | 42,412.83 | 12,927.31 | | |
| Hamilton | 51 41 44.88 | 45.94 | 133 00 57.43 | 37,667.15 | 11,480.84 | 43 16 25.20 | 99 02 18.26 |
| Boland | 57 18 54.16 | 56.06 | 4 43 15.85 | 42,412.83 | 12,927.31 | | |
| Hamilton | 73 05 07.08 | 07.18 | 257 47 50.81 | 46,875.60 | 14,287.55 | | |
| Kyle | 49 35 54.99 | 56.76 | 127 30 52.46 | 53,284.98 | 16,241.11 | 43 18 02.59 | 98 51 58.75 |
| Hamilton | 46 16 13.80 | 12.87 | 257 47 50.81 | 46,875.60 | 14,287.55 | | |
| Kyle | 45 18 08.84 | 10.10 | 32 36 45.36 | 33,885.34 | 10,328.16 | | |
| Mule Head | 88 25 36.59 | 37.03 | 124 08 19.23 | 33,333.32 | 10,159.90 | 43 13 20.61 | 98 56 05.37 |
| Mule Head | 67 31 11.64 | 10.60 | 212 33 56.35 | 33,885.34 | 10,328.16 | | |
| Kyle | 57 02 46.58 | 46.14 | 335 33 59.13 | 38,022.27 | 11,589.08 | | |
| Wheeler | 55 26 05.23 | 03.26 | 100 10 21.26 | 34,528.65 | 10,524.24 | 43 12 20.63 | 98 48 26.42 |
| Wheeler | 88 25 07.67 | 08.42 | 100 10 21.26 | 34,528.65 | 10,524.24 | | |
| Mule Head | 46 43 48.02 | 47.31 | 326 48 54.44 | 48,939.56 | 14,916.64 | | |
| Whetstone | 44 51 04.24 | 04.27 | 191 44 05.81 | 35,647.79 | 10,865.35 | 43 06 35.91 | 98 50 04.30 |
| Whetstone | 65 00 48.88 | 46.71 | 191 44 05.81 | 35,647.79 | 10,865.35 | | |
| Wheeler | 77 12 33.15 | 31.72 | 294 32 40.90 | 52,743.93 | 16,076.20 | | |
| Leonard | 37 46 39.81 | 41.57 | 76 53 21.91 | 56,746.25 | 17,296.10 | 43 08 43.72 | 98 37 39.33 |
| Leonard | 50 22 57.74 | 57.87 | 76 53 21.91 | 56,746.25 | 17,296.10 | | |
| Whetstone | 42 36 13.00 | 12.97 | 299 21 05.76 | 43,772.29 | 13,341.67 | | |
| Chicot | 87 00 50.25 | 49.16 | 206 27 45.96 | 38,464.91 | 11,724.00 | 43 03 03.67 | 98 41 30.51 |
| Chicot | 58 15 17.57 | 15.55 | 206 27 45.96 | 38,464.91 | 11,724.00 | | |
| Leonard | 77 57 20.19 | 18.64 | 308 33 05.12 | 47,267.53 | 14,407.01 | | |
| White Swan | 43 47 24.97 | 25.81 | 84 51 19.38 | 54,359.56 | 16,568.64 | 43 03 52.46 | 98 29 21.42 |
| White Swan | 54 01 06.46 | 05.54 | 84 51 19.38 | 54,359.56 | 16,568.64 | | |
| Chicot | 55 15 03.42 | 03.89 | 319 58 05.70 | 46,598.51 | 14,203.09 | | |
| Harrison | 70 43 51.82 | 50.57 | 210 46 31.27 | 47,315.51 | 14,421.63 | 42 57 11.06 | 98 34 47.52 |
| White Swan | 49 48 26.45 | 25.98 | 30 50 13.68 | 47,315.51 | 14,421.63 | | |
| Harrison | 83 50 54.76 | 54.76 | 294 37 26.22 | 49,956.08 | 15,226.48 | | |
| Bruce | 46 20 39.92 | 39.26 | 161 05 01.08 | 65,021.49 | 19,818.37 | 42 53 45.01 | 98 24 37.50 |
| Bruce | 94 15 26.58 | 27.67 | 161 05 01.08 | 65,021.49 | 19,818.37 | | |
| White Swan | 36 09 59.28 | 59.07 | 304 51 48.20 | 85,176.65 | 25,961.60 | | |
| Conger | 49 34 32.19 | 33.26 | 75 27 55.22 | 50,404.43 | 15,363.13 | 42 55 50.48 | 98 13 42.09 |
| Conger | 81 07 26.63 | 29.12 | 75 27 55.22 | 50,404.43 | 15,363.13 | | |
| Bruce | 52 29 40.15 | 42.80 | 307 50 11.98 | 68,792.32 | 20,967.70 | | |
| Ponca | 46 22 47.83 | 48.08 | 174 21 15.53 | 55,234.46 | 16,835.31 | 42 46 47.56 | 98 12 29.06 |
| Conger | 40 42 50.51 | 46.86 | 354 20 25.86 | 55,234.46 | 16,835.31 | | |
| Ponca | 32 55 35.68 | 36.00 | 207 16 51.62 | 37,548.03 | 11,444.54 | | |
| Chouteau | 106 21 39.49 | 37.14 | 133 41 05.93 | 31,290.50 | 9,537.26 | 42 52 17.12 | 98 08 37.97 |
| Ponca | 83 13 52.82 | 51.66 | 207 16 51.62 | 37,548.03 | 11,444.54 | | |
| Chouteau | 40 08 54.64 | 53.42 | 347 10 35.20 | 44,651.70 | 13,609.71 | | |
| Ward | 56 37 14.84 | 14.92 | 110 34 50.45 | 28,992.01 | 8,836.69 | 42 45 07.05 | 98 06 25.15 |
| Chouteau | 35 13 10.91 | 10.32 | 347 10 35.20 | 44,651.70 | 13,609.71 | | |
| Ward | 50 19 05.26 | 04.44 | 217 31 09.96 | 25,829.34 | 7,872.71 | | |
| Arneson | 94 27 46.66 | 45.24 | 132 01 18.58 | 34,408.40 | 10,505.87 | 42 48 29.35 | 98 02 54.14 |
| Ward | 62 13 02.81 | 03.20 | 217 31 09.96 | 25,829.34 | 7,872.71 | | |
| Arneson | 77 34 16.48 | 16.85 | 319 59 16.34 | 38,395.97 | 10,788.59 | | |
| Niobrara | 40 12 39.79 | 39.95 | 99 50 03.35 | 39,070.33 | 11,908.53 | 42 44 01.46 | 97 57 49.24 |
| Arneson | 66 41 32.71 | 32.40 | 319 59 16.34 | 35,395.97 | 10,788.59 | | |
| Niobrara | 49 12 51.76 | 51.73 | 189 15 35.18 | 36,139.06 | 11,015.68 | | |
| Covell | 64 05 35.83 | 35.87 | 73 22 04.13 | 29,794.52 | 9,081.29 | 42 49 53.77 | 97 56 31.20 |

TABLE VII.—*Tabulated results of secondary triangulation from Running Water Base, South Dakota, to Blair, Nebraska.*

[Azimuths and distances are in the order of stations, first to second, second to third, and third to first, in each triangle.]

| Station. | Observed angle. | Adjusted angle. | Azimuth. | Distance. | | Latitude. | Longitude. |
|---|---|---|---|---|---|---|---|
| | ° ′ ″ | ′ ″ | ° ′ ″ | *Feet.* | *Metres.* | ° ′ ″ | ° ′ ″ |
| North Base | 84 47 40 48 | 39.86 | 36 04 26.16 | 14,101.53 | 4,298.11 | | |
| South Base | 33 33 18.40 | 18.37 | 249 36 28.94 | 15,957.15 | 4,863.70 | | |
| Lost Creek | 61 39 02.44 | 01.77 | 131 17 46.91 | 8,556.66 | 2,609.49 | 42 46 56.68 | 97 54 03.94 |
| Kelly | 91 32 54.36 | 55.39 | 267 38 14.45 | 8,463.33 | 2,579.60 | | |
| North Base | 51 35 04.49 | 05.34 | 36 04 26.16 | 14,101.53 | 4,298.11 | 42 47 54.41 | 97 55 33.18 |
| South Base | 36 51 58.72 | 59.27 | 179 11 11.29 | 11,052.99 | 3,368.92 | 42 46 01.81 | 97 57 24.49 |
| Kelley | 91 35 58.40 | 59.08 | 289 58 06.34 | 16,080.87 | 4,901.40 | | |
| Lost Creek | 38 31 31.01 | 30.56 | 148 31 54.57 | 21,022.40 | 6,407.57 | | |
| Covell | 49 52 30.38 | 30.36 | 18 22 44.91 | 13,099.08 | 3,992.56 | 42 49 53.77 | 97 56 31.20 |
| Niobrara | 39 16 51.47 | 52.25 | 184 09 19.47 | 23,297.40 | 7,100.98 | | |
| Kelley | 74 11 27.90 | 28.47 | 289 58 06.34 | 16,080.87 | 4,901.40 | 42 47 50.98 | 97 57 26.60 |
| Lost Creek | 66 31 39.72 | 39.28 | 43 28 44.69 | 24,438.45 | 7,448.77 | | |
| Covell | 83 40 25.13 | 25.43 | 9 16 28.18 | 36,139.06 | 11,015.08 | | |
| Niobrara | 53 58 56.84 | 58.52 | 243 14 33.70 | 53,326.23 | 16,253.69 | | |
| Santee | 42 20 34.76 | 36.05 | 105 42 23.59 | 43,396.74 | 13,227.20 | 42 47 58.11 | 97 47 10.61 |
| Santee | 48 26 25.62 | 25.66 | 105 42 23.59 | 43,396.74 | 13,227.20 | | |
| Crovell | 52 01 06.45 | 06.75 | 233 34 53.78 | 33,021.05 | 10,064.72 | | |
| Springfield | 79 32 24.99 | 25.59 | 334 06 30.83 | 34,784.06 | 10,602.09 | 42 53 07.24 | 97 50 34.33 |
| Springfield | 58 15 38.72 | 38.81 | 334 06 30.83 | 34,784.06 | 10,602.09 | | |
| Santee | 74 53 21.65 | 22.32 | 229 02 11.76 | 40,547.90 | 12,358.89 | | |
| Bon Homme | 46 51 00.82 | 50 58.87 | 95 57 50.15 | 46,029.62 | 14,029.70 | 42 52 20.47 | 97 40 19.47 |
| Santee | 40 37 18.51 | 16.68 | 229 02 11.76 | 40,547.90 | 12,358.89 | | |
| Bon Homme | 60 05 54.26 | 53.11 | 349 00 58.09 | 26,867.86 | 8,189.25 | | |
| Herrick | 79 16 51.74 | 50.21 | 89 44 54.49 | 35,774.44 | 10,903.95 | 42 47 59.94 | 97 39 10.81 |
| Bon Homme | 80 44 11.84 | 13.34 | 349 00 58.09 | 26,867.86 | 8,189.25 | | |
| Herrick | 50 42 31.72 | 31.91 | 219 44 16.74 | 42,191.18 | 12,859.75 | | |
| Lakeport | 39 33 13.58 | 14.75 | 79 21 37.82 | 32,653.71 | 9,952.76 | 42 53 20.24 | 97 33 08.55 |
| Herrick | 51 45 14.28 | 13.77 | 219 44 16.74 | 42,191.18 | 12,859.75 | | |
| Lakeport | 55 28 49.05 | 50.67 | 344 19 32.31 | 34,692.98 | 10,574.33 | | |
| Pit | 72 45 54.28 | 55.56 | 91 35 02.12 | 36,397.07 | 11,093.72 | 42 47 50.29 | 97 31 02.84 |
| Lakeport | 47 02 25.67 | 23.85 | 344 19 32.31 | 34,692.98 | 10,574.33 | | |
| Pit | 102 41 47.12 | 45.51 | 267 02 43.29 | 50,377.16 | 15,354.82 | | |
| Schmidt | 30 15 49.36 | 50.64 | 117 26 12.66 | 67,154.25 | 20,468.43 | 42 48 15.38 | 97 19 48.03 |
| Pit | 39 37 53.91 | 53.05 | 267 02 43.29 | 50,377.16 | 15,354.82 | | |
| Schmidt | 97 09 33.39 | 34.29 | 184 19 56.53 | 46,932.51 | 14,304.90 | | |
| Welby | 43 12 31.95 | 32.66 | 47 33 01.02 | 73,005.71 | 22,251.93 | 42 55 57.63 | 97 19 00.38 |
| Schmidt | 99 15 17.78 | 17.73 | 184 19 56.53 | 46,932.51 | 14,304.90 | | |
| Welby | 44 49 55.91 | 56.55 | 319 20 32.20 | 78,972.82 | 24,070.69 | | |
| Bow Creek | 35 54 48.55 | 45.72 | 103 43 33.92 | 56,412.95 | 17,194.51 | 42 46 03.82 | 97 07 32.98 |
| Welby | 37 03 49.92 | 48.76 | 319 30 32.20 | 78,972.82 | 24,070.69 | | |
| Bow Creek | 89 27 24.67 | 24.18 | 229 05 44.21 | 59,226.33 | 18,052.02 | | |
| Spirit Mound | 53 28 47.26 | 47.06 | 102 41 20.16 | 98,263.70 | 29,950.50 | 42 52 26.44 | 96 57 31.90 |
| Bow Creek | 60 30 29.40 | 29.25 | 229 05 44.21 | 59,226.33 | 18,052.02 | | |
| Spirit Mound | 67 10 47.02 | 47.09 | 342 01 45.37 | 65,144.39 | 19,855.83 | | |
| Ryan | 52 18 43.67 | 43.66 | 109 46 04.53 | 68,983.83 | 21,026.08 | 42 42 14.28 | 96 53 02.74 |
| Spirit Mound | 55 59 48.89 | 48.85 | 342 01 45.37 | 65,144.39 | 19,855.83 | | |
| Ryan | 67 47 40.30 | 39.30 | 229 52 27.79 | 64,982.78 | 19,806.57 | | |
| Johnson | 56 12 33.18 | 31.85 | 106 12 32.52 | 72,572.43 | 22,119.88 | 42 49 07.40 | 96 41 56.12 |
| Ryan | 69 26 14.98 | 14.81 | 229 52 27.79 | 64,982.78 | 19,806.57 | | |
| Johnson | 32 49 01.51 | 00.78 | 17 10 59.41 | 62,261.43 | 18,977.11 | | |
| Ionia | 77 44 44.05 | 44.41 | 119 23 27.98 | 36,039.02 | 10,984.59 | 42 39 19.78 | 96 46 02.25 |
| Johnson | 55 52 41.77 | 40.93 | 17 10 59.41 | 62,261.43 | 18,977.11 | | |
| Ionia | 61 21 24.28 | 21.98 | 258 29 34.62 | 57,969.17 | 17,668.84 | | |
| Westfield | 62 45 58.02 | 57.09 | 141 24 07.37 | 61,454.21 | 18,731.07 | 42 41 13.31 | 96 33 21.77 |
| Ionia | 64 12 11.08 | 10.72 | 258 29 34.62 | 57,969.17 | 17,668.84 | | |
| Westfield | 46 00 52.71 | 52.87 | 32 37 16.97 | 55,619.03 | 16,952.53 | | |
| Triloba | 69 46 57.14 | 56.41 | 142 45 49.32 | 44,448.57 | 13,547.80 | 42 33 30.39 | 96 40 02.36 |
| Westfield | 58 19 09.77 | 11.81 | 32 37 16.97 | 55,619.03 | 16,952.53 | | |
| Triloba | 33 09 11.12 | 11.79 | 245 41 57.63 | 47,347.19 | 14,431.29 | | |
| Hall | 88 31 33.51 | 36.40 | 154 20 04.58 | 30,427.03 | 9,274.07 | 42 36 42.45 | 96 30 25.34 |
| Triloba | 75 36 34.44 | 32.72 | 245 41 57.63 | 47,347.19 | 14,431.29 | | |
| Hall | 37 54 40.35 | 39.27 | 27 53 48.68 | 50,017.01 | 15,245.05 | | |
| Round Cap | 66 28 48.74 | 48.01 | 141 21 29.48 | 31,727.75 | 9,670.53 | 42 29 25 68 | 96 35 37.66 |
| Hall | 42 21 09.87 | 11.08 | 27 53 48.68 | 50,017.01 | 15,245.05 | | |
| Round Cap | 55 24 29.56 | 28.26 | 263 14 45.86 | 34,007.90 | 10,365.51 | | |
| Emerson | 82 14 20.13 | 20.06 | 165 34 11.13 | 41,555.36 | 12,665.96 | 42 30 04.95 | 96 28 06.87 |
| Round Cap | 71 23 22.40 | 21.35 | 263 14 45.86 | 34,007.90 | 10,365.51 | | |
| Emerson | 73 30 48.22 | 48.32 | 9 49 01.89 | 56,054.77 | 17,085.34 | | |
| Baird | 35 05 51.18 | 50.33 | 154 41 45.71 | 56,715.90 | 17,286.85 | 42 20 59.31 | 96 30 14.14 |
| Emerson | 53 00 30.94 | 32.47 | 9 49 01.89 | 56,054.77 | 17,085.34 | | |
| Baird | 52 38 25.43 | 24.48 | 242 26 00.69 | 46,496.27 | 14,171.94 | | |
| Sargeants | 74 21 03.25 | 03.05 | 136 53 14.16 | 46,269.71 | 14,102.88 | 42 24 31.50 | 96 21 04.78 |
| Baird | 68 31 34.56 | 34.57 | 242 26 00.69 | 46,496.27 | 14,171.94 | | |
| Sargeants | 55 44 24.62 | 24.99 | 6 47 45.80 | 52,358.49 | 15,958.11 | | |
| Winnebago | 55 44 00.82 | 00.44 | 131 02 49.87 | 46,500.12 | 14,173.11 | 42 15 57.93 | 96 22 27.17 |

TABLE VII.—*Tabulated results of secondary triangulation, etc.*—Continued.

| Station. | Observed angle. | Adjusted angle. | Azimuth. | Distance | | Latitude. | Longitude. |
|---|---|---|---|---|---|---|---|
| | ° ′ ″ | ′ ″ | ° ′ ″ | *Feet.* | *Metres.* | ° ′ ″ | ° ′ ″ |
| Sargeants | 67 36 08.41 | 09.46 | 6 47 45.80 | 52,356.49 | 15,958.11 | | |
| Winnebago | 66 32 32.27 | 31.89 | 253 19 22.47 | 67,458.50 | 20,561.17 | | |
| Hedges | 45 51 18.05 | 18.65 | 119 20 20.08 | 66,932.32 | 20,400.78 | 42 19 08.27 | 96 08 07.10 |
| Hedges | 46 33 03.55 | 02.24 | 73 29 01.18 | 67,458.50 | 20,561.17 | | |
| Winnebago | 89 52 31.09 | 31.48 | 343 11 53.95 | 71,049.52 | 21,655.70 | | |
| Blackbird | 43 34 25.37 | 26.28 | 206 49 23.79 | 97,866.53 | 29,829.45 | 42 04 45.93 | 96 17 54.86 |
| Hedges | 60 07 58.10 | 59.11 | 26 55 58.56 | 97,866.53 | 29,829.45 | | |
| Blackbird | 39 01 23.90 | 22.31 | 245 50 46.52 | 85,963.78 | 26,201.52 | | |
| Grant | 80 50 38.55 | 38.58 | 146 53 04.15 | 62,414.99 | 19,023.92 | 42 10 32.11 | 96 00 33.26 |
| Blackbird | 97 01 38.24 | 39.85 | 245 50 46.52 | 85,963.78 | 26,201.52 | | |
| Grant | 29 18 03.39 | 04.02 | 36 44 20.78 | 105,902.20 | 32,278.70 | | |
| Sandig | 53 40 14.95 | 16.13 | 162 54 43.11 | 52,220.87 | 15,916.78 | 41 56 32.87 | 96 14 31.41 |
| Blackbird | 69 54 18.34 | 19.60 | 342 52 26.95 | 52,220.87 | 15,916.78 | | |
| Sandig | 73 47 49.64 | 51.62 | 236 42 35.05 | 82,845.71 | 25,251.14 | | |
| Kennebec | 36 17 48.30 | 48.78 | 93 10 38.45 | 84,711.80 | 25,819.92 | 42 04 01.07 | 95 59 13.37 |
| Kennebec | 55 26 37.79 | 35.74 | 56 52 49.34 | 82,845.71 | 25,251.14 | | |
| Sandig | 67 59 23.24 | 20.96 | 304 41 56.50 | 81,756.72 | 24,919.22 | | |
| Mormon | 56 34 03.15 | 03.30 | 181 25 52.25 | 92,036.10 | 28,052.35 | 41 48 52.12 | 95 59 43.85 |
| Mormon | 48 51 07.02 | 07.92 | 124 51 48.95 | 81,756.72 | 24,919.22 | | |
| Sandig | 51 22 55.01 | 55.13 | 356 04 51.95 | 62,559.35 | 19,067.92 | | |
| Tekamah | 79 45 57.14 | 56.95 | 255 51 26.85 | 64,911.37 | 19,784.81 | 41 46 16.27 | 96 13 34.99 |
| Mormon | 93 27 13.63 | 12.76 | 76 00 40.72 | 64,911.37 | 19 784.81 | | |
| Tekamah | 35 37 15.76 | 13.46 | 291 28 40.56 | 83,461.10 | 25,438.71 | | |
| Taylor | 50 55 33.21 | 33.78 | 162 35 35.54 | 48,697.22 | 14,842.78 | 41 41 13.10 | 95 56 31.48 |
| Tekamah | 62 20 36.90 | 36.36 | 291 28 40.56 | 83,461.10 | 25,438.71 | | |
| Taylor | 36 21 07.82 | 07.70 | 75 18 53.77 | 74,785.07 | 22,794.28 | | |
| Herman | 81 18 15.75 | 15.94 | 173 50 04.39 | 50,046.51 | 15,254.04 | 41 38 04 70 | 96 12 24.06 |

TABLE VIII.—*Tabulated results of secondary triangulation from Blair, Nebr., to Fort Leavenworth, Kans.*

[Azimuths and distances are in the order of stations, first to second, second to third, and third to first in each triangle.]

| Station. | Observed angle. | Adjusted angle. | Azimuth. | Distance. | | Latitude. | Longitude. |
|---|---|---|---|---|---|---|---|
| | ° ′ ″ | ′ ″ | ° ′ ″ | *Feet.* | *Metres.* | ° ′ ″ | ° ′ ″ |
| Bench | 32 16 43.97 | 43.04 | 190 45 20.59 | 22,490.54 | 6,855.06 | 41 33 11.12 | 96 07 45.58 |
| East Base | 79 08 57.94 | 55.26 | 89 54 52.56 | 12,902.60 | 3,932.68 | 41 36 49.41 | 96 06 50.33 |
| West Base | 68 34 23.34 | 21.70 | 338 27 21.47 | 23,728.48 | 7,232.38 | 41 36 49.19 | 96 09 40.18 |
| East Base | 95 59 12.82 | 10.75 | 10 45 57.25 | 22,490.54 | 6,855.06 | | |
| Bench | 46 11 27.90 | 27.35 | 144 33 53.24 | 36,476.09 | 11,117.81 | | |
| Herman | 37 49 19.28 | 21.90 | 286 41 26.36 | 26,467.31 | 8,067.16 | 41 38 04.65 | 96 12 24.07 |
| East Base | 104 54 19.74 | 20.14 | 106 45 08.05 | 26,467.31 | 8,067.16 | | |
| Herman | 43 32 38.43 | 36.83 | 330 14 03.26 | 48,879.98 | 14,898.48 | | |
| Blair | 31 33 04.58 | 03.03 | 181 50 37.97 | 34,846.27 | 10,621.05 | 41 31 05.32 | 96 07 05.09 |
| Herman | 75 06 15.84 | 13.94 | 330 14 03.26 | 48,879.98 | 14,898.48 | | |
| Blair | 67 41 26.56 | 24.08 | 217 59 00.21 | 78,119.35 | 23,810.56 | | |
| Taylor | 37 12 21.13 | 21.08 | 75 18 22.26 | 74,785.07 | 22,794.28 | 41 41 13.15 | 95 56 31.47 |
| Blair | 57 08 19.85 | 20.93 | 217 59 00.21 | 78,119.35 | 23,810.56 | | |
| Taylor | 50 31 27.92 | 27.63 | 347 34 33.27 | 68,866.22 | 20,990.24 | | |
| Loveland | 72 20 11.75 | 11.44 | 95 16 30.43 | 63,283.34 | 19,288.50 | 41 30 08.67 | 95 53 16.76 |
| Blair | 44 34 26.73 | 27.80 | 275 07 21.46 | 63,283.34 | 19,288.50 | | |
| Loveland | 64 18 25.35 | 25.04 | 30 58 05.18 | 46,940.21 | 14,307.24 | | |
| Douglas | 71 07 06.80 | 07.16 | 139 47 28.28 | 60,269.49 | 18,369.97 | 41 23 30.89 | 95 58 33.65 |
| Loveland | 35 45 53.75 | 52.80 | 30 58 05.18 | 46,940.21 | 14,307.24 | | |
| Douglas | 85 30 50.20 | 50.35 | 296 25 25.89 | 32,100.22 | 9,784.06 | | |
| Crescent | 58 43 17.90 | 16.85 | 175 12 51.86 | 54,754.90 | 16,689.14 | 41 21 09.58 | 95 52 16.73 |
| Douglas | 57 05 14.91 | 15.14 | 296 25 25.89 | 32,100.22 | 9,784.06 | | |
| Crescent | 73 49 06.02 | 06.68 | 42 40 28.24 | 35,655.89 | 10,867.82 | | |
| Omaha | 49 05 38.62 | 38.18 | 173 31 20.09 | 40,790.08 | 12,432.71 | 41 16 50.46 | 95 57 33.27 |
| Omaha | 50 51 08.93 | 08.53 | 222 36 50.25 | 35,655.89 | 10,867.82 | | |
| Crescent | 52 59 45.92 | 44.30 | 349 40 43.94 | 28,479.72 | 8,680.54 | | |
| Council | 76 09 08.44 | 07.17 | 93 32 20.76 | 29,326.81 | 8,938.73 | 41 16 32.75 | 95 51 09.91 |
| Omaha | 65 23 32.84 | 30.81 | 273 28 07.85 | 29,326.81 | 8,938.73 | | |
| Council | 76 12 48.29 | 49.14 | 16 19 31.52 | 42,930.99 | 13,085.25 | | |
| Bellevue | 38 23 42.58 | 40.05 | 158 54 01.35 | 45,859.26 | 13,977.78 | 41 09 47.79 | 95 53 57.06 |
| Omaha | 45 15 31.80 | 30.38 | 338 51 38.66 | 45,859.26 | 13,977.78 | | |
| Bellevue | 49 13 41.21 | 39.06 | 208 07 40.41 | 32,673.40 | 9,958.76 | | |
| Bluffs | 85 30 52.78 | 50.56 | 113 40 43.87 | 34,836.35 | 10,618.02 | 41 14 32.44 | 95 50 35.43 |
| Bellevue | 106 43 06.69 | 05.66 | 208 07 40.41 | 32,673.40 | 9,958.76 | | |
| Bluffs | 36 11 17.43 | 16.05 | 351 58 37.11 | 51,883.67 | 15,814.00 | | |
| Henton | 37 05 38.82 | 38.29 | 134 54 01.00 | 31,985.87 | 9,749.21 | 41 06 04.82 | 95 49 00.85 |
| Bellevue | 44 59 59.20 | 58.60 | 314 50 46.15 | 31,985.87 | 9,749.21 | | |
| Henton | 91 32 01.71 | 01.91 | 43 21 59.01 | 32,877.22 | 10,020.89 | | |
| Platte | 43 27 59.24 | 59.49 | 179 50 45.99 | 46,479.12 | 14,166.71 | 41 02 08.56 | 95 53 55.42 |

TABLE VIII.—*Tabulated results of secondary triangulation, etc.*—Continued.

| Station. | Observed angle. | Adjusted angle. | Azimuth. | Distance. | | Latitude. | Longitude. |
|---|---|---|---|---|---|---|---|
| | ° ′ ″ | ′ ″ | ° ′ ″ | *Feet.* | *Metres.* | ° ′ ″ | ° ′ ″ |
| Henton | 51 35 04.99 | 03.02 | 43 21 59.01 | 32,877.22 | 10,020.89 | | |
| Platte | 94 41 36.31 | 36.34 | 318 00 21.94 | 46,400.28 | 14,142.66 | | |
| Quarry | 33 43 20.96 | 20.64 | 171 48 08.02 | 59,021.51 | 17,989.59 | 40 56 27.62 | 95 47 10.92 |
| Platte | 39 02 59.74 | 03 01.97 | 318 00 21.94 | 46,400.23 | 14,142.66 | | |
| Quarry | 78 45 50.30 | 49.90 | 59 18 57.23 | 33,050.97 | 10,073.85 | | |
| Calumet | 62 11 08.82 | 08.13 | 177 03 46.70 | 51,455.88 | 15,683.61 | 40 53 40.80 | 95 53 21.02 |
| Quarry | 71 44 44.28 | 44.08 | 59 18 57.23 | 33,050.97 | 10,073.85 | | |
| Calumet | 55 47 13.14 | 13.56 | 295 02 08.47 | 39,580.58 | 12,064.05 | | |
| Thurman | 52 28 02.87 | 02.36 | 167 35 16.26 | 34,465.82 | 10,505.09 | 40 50 55.04 | 95 45 34.40 |
| Calumet | 53 08 11.45 | 11.87 | 295 02 08.47 | 39,580.58 | 12,064.05 | | |
| Thurman | 45 03 29.60 | 30.44 | 70 03 43.30 | 31,993.85 | 9,751.64 | | |
| Jones | 81 48 16.44 | 17.69 | 168 11 09.85 | 28,305.27 | 8,627.37 | 40 49 07.05 | 95 52 05.56 |
| Thurman | 81 49 25.07 | 23.47 | 70 03 43.30 | 31,993.85 | 9,751.64 | | |
| Jones | 43 34 45.18 | 44.20 | 293 34 11.81 | 38,852.07 | 11,842.00 | | |
| Pugh | 54 35 53.45 | 52.33 | 168 15 06.62 | 27,057.88 | 8,247.17 | 40 46 33.28 | 95 44 22.71 |
| Jones | 53 40 08.92 | 08.70 | 293 34 11.81 | 38,852.07 | 11,842.00 | | |
| Pugh | 87 00 44.77 | 45.48 | 26 38 28.59 | 49,397.36 | 15,056.18 | | |
| Otoe | 39 19 05.95 | 05.82 | 167 16 15.31 | 61,233.55 | 18,663.82 | 40 39 16.90 | 95 49 10 08 |
| Pugh | 41 25 43.63 | 42.77 | 26 38 28.59 | 49,397.36 | 15,056.18 | | |
| Otoe | 52 38 51.38 | 50.89 | 259 14 12.12 | 32,768.36 | 9,987.71 | | |
| McCracken | 85 55 26.65 | 26.84 | 165 14 10.78 | 39,366.35 | 11,998.75 | 40 40 17.16 | 95 42 12.33 |
| Pugh | 30 07 45.65 | 45.36 | 345 12 45 71 | 39,366.35 | 11,998.75 | | |
| McCracken | 115 38 31.53 | 31.09 | 49 35 39.54 | 35,128.99 | 10,707.22 | | |
| City | 34 13 43.72 | 43.55 | 195 18 10.00 | 63,092.73 | 19,230.44 | 40 36 32.01 | 95 47 59.14 |
| McCracken | 76 00 11.28 | 11.66 | 49 35 39.54 | 35,128.99 | 10,707.22 | | |
| City | 62 34 00.54 | 01.08 | 292 05 54.87 | 51,512.57 | 15,700.89 | | |
| Hamburg | 41 25 47.52 | 47.26 | 153 38 24.49 | 47,118.96 | 14,361.73 | 40 33 20.06 | 95 37 40.83 |
| City | 39 58 02.04 | 02 18 | 292 05 54.87 | 51,512.57 | 15,700.89 | | |
| Hamburg | 78 26 13.19 | 12.69 | 33 46 24.27 | 37,617.70 | 11,465.77 | | |
| Peru | 61 35 45.42 | 45.13 | 152 07 43.37 | 57,374.13 | 17,487.48 | 40 28 10.98 | 95 42 11.39 |
| Hamburg | 56 51 59.28 | 58.71 | 33 46 24.27 | 37,617.70 | 11,465.77 | | |
| Peru | 67 26 52.80 | 52.27 | 281 10 20.88 | 38,138.61 | 11,624.54 | | |
| Phelps | 55 41 09.04 | 09.02 | 156 56 44.04 | 42,061.50 | 12,820.30 | 40 26 57.68 | 95 34 07.44 |
| Peru | 52 43 15.05 | 14.76 | 281 10 20.88 | 38,138.61 | 11,624.54 | | |
| Phelps | 42 42 26.50 | 26.80 | 58 33 08.06 | 30,483.31 | 9,291.23 | | |
| Brownville | 84 34 18.43 | 18.44 | 153 55 11.63 | 25,984.24 | 7,919.92 | 40 24 20.99 | 95 39 43.59 |
| Phelps | 79 04 21.06 | 19.70 | 58 33 08.06 | 30,483.31 | 9,291.23 | | |
| Brownville | 48 43 45.46 | 45.15 | 287 13 15.29 | 37,879.98 | 11,545.71 | | |
| Langdon | 52 11 56.10 | 55.15 | 159 30 13.43 | 28,996.41 | 8,838.03 | 40 22 29.30 | 95 31 56.12 |
| Brownville | 44 08 55.92 | 56.51 | 287 13 15.29 | 37,879.98 | 11,545.71 | | |
| Langdon | 89 43 47.90 | 47.69 | 17 34 30.40 | 56,604.05 | 11,156.81 | | |
| St. Deroin | 46 07 15.38 | 15.80 | 151 25 42.32 | 52,551.70 | 16,017.61 | 40 16 44.45 | 95 34 18.72 |
| Langdon | 50 08 10 48 | 09.51 | 17 34 30.40 | 36,604.05 | 11,156.81 | | |
| St. Deroin | 58 49 00.75 | 01.33 | 256 21 59.53 | 29,706.59 | 9,054.48 | | |
| Nishne | 71 02 50.00 | 49.16 | 147 28 49.68 | 33,110.47 | 10,091.98 | 40 17 53.47 | 95 28 06.15 |
| St. Deroin | 55 52 36.25 | 35.60 | 256 21 59.53 | 29,706.59 | 9,054.48 | | |
| Nishne | 39 52 11.38 | 11.36 | 36 33 49.05 | 24,716.21 | 7,533.43 | | |
| Devoir | 84 15 14.18 | 13.04 | 132 16 33.29 | 19,139.45 | 5,833.65 | 40 14 37.26 | 95 31 16.01 |
| Nishne | 76 43 51.89 | 51.61 | 36 33 49.05 | 24,716.21 | 7,533.43 | | |
| Devoir | 67 18 57.25 | 57.16 | 283 50 43.55 | 40,973.25 | 12,488.53 | | |
| Craig | 35 57 11.71 | 11.23 | 139 53 26.05 | 38,840.69 | 11,838.53 | 40 13 00.05 | 95 22 43.21 |
| Devoir | 47 11 00.57 | 00.42 | 283 50 43.55 | 40,973.25 | 12,488.53 | | |
| Craig | 71 34 08.70 | 08.80 | 32 22 05.84 | 34,282.02 | 10,449.07 | | |
| Arago | 61 14 50.46 | 50.78 | 151 04 42.61 | 44,338.24 | 13,514.17 | 40 08 13.84 | 95 26 39.51 |
| Craig | 63 39 02.14 | 02.30 | 32 22 05.84 | 34,282.02 | 10,449.07 | | |
| Arago | 88 15 21.45 | 21 33 | 300 34 54.90 | 65,235.80 | 19,883.69 | | |
| Napier | 28 05 37.34 | 36.37 | 148 48 16.49 | 72,765.62 | 22,178.76 | 40 02 45.22 | 95 14 37.39 |
| Arago | 27 48 21.04 | 19.70 | 300 34 54.90 | 65,235.80 | 19,883.69 | | |
| Napier | 48 55 24.20 | 24.13 | 71 47 15.70 | 31,265.55 | 9,529.65 | | |
| Nemeha | 103 16 16 25 | 16.17 | 148 26 54.00 | 50,526.13 | 15,400.22 | 40 01 08.48 | 95 20 59.11 |
| Napier | 56 36 22 82 | 22.63 | 71 47 15.70 | 31,265.55 | 9,529.65 | | |
| Nemeha | 62 56 06.56 | 06 05 | 314 39 16.28 | 30,004.40 | 9,145.26 | | |
| White Cloud | 60 27 31.44 | 31.32 | 195 09 43.82 | 32,001.89 | 9,754.09 | 39 57 39.99 | 95 16 25.02 |
| Napier | 48 53 28.57 | 29.27 | 15 10 53.00 | 32,001.89 | 9,754.09 | | |
| White Cloud | 64 09 01.10 | 01.12 | 259 18 44.99 | 26,202.76 | 7,986.53 | | |
| Forest City | 66 57 28.88 | 29.61 | 146 19 47 04 | 31,296.66 | 9,539.14 | 39 58 27.88 | 95 10 54.30 |
| White Cloud | 51 31 52.19 | 51.79 | 259 18 44.99 | 26,202.76 | 7,986.53 | | |
| Forest City | 86 33 49.65 | 49.19 | 352 48 28.18 | 30,716.09 | 9,362.18 | | |
| Lookout | 41 54 17 89 | 19.02 | 130 54 40.76 | 39,160.91 | 11,936.14 | 39 53 26.71 | 95 10 04.96 |
| Forest City | 32 03 23.57 | 24.26 | 352 48 28.18 | 30,716.09 | 9,362.18 | | |
| Lookout | 53 27 31.06 | 31.23 | 226 16 31.10 | 16,352.89 | 4,984.31 | | |
| Payne | 94 29 04.84 | 04.51 | 140 47 12 92 | 24,753.94 | 7,544.93 | 39 55 18.39 | 95 07 33.29 |
| Lookout | 71 29 03.12 | 02.04 | 226 16 31.10 | 16,352.89 | 4,984.31 | | |
| Payne | 71 27 03.59 | 03.67 | 334 51 04.71 | 25,727.23 | 7,841.59 | | |
| Meers | 37 03 54.48 | 54.29 | 117 48 40.29 | 25,722.28 | 7,840.08 | 39 51 28.21 | 95 05 13.09 |
| Payne | 60 15 59.90 | 59.25 | 334 51 04.71 | 25,727.23 | 7,841.59 | | |
| Meers | 64 54 07 81 | 07.35 | 219 46 42.02 | 27,328.50 | 8,329.65 | | |
| Nodaway | 54 49 55.53 | 53.40 | 94 38 59.36 | 28,500.59 | 8,686.90 | 39 54 56.71 | 95 01 28.70 |