The Public Land Survey.

J. B. Dorman.
Contents.

Origin of public domain - - - - - - 1
" " " system of surveying U.S. lands 1
Outline of system 3
Principal meridian 4
Base line 6
Standard parallels 6
Guide meridians 6
Division into townships 6
" " " sections and quarters 7
Perpetuation of common township 8
" " " " section 9
" " " " quarter 10
Bibliography 11
The Public Land Survey.

In the treaty of peace signed by Great Britain and the United States in 1783 a great quantity of land beside that contained in the colony of Vermont was ceded to the United States. This together with that ceded by the individual colonies constituted a public domain of 79,693.35 square miles or 207,171,787 acres which at that time was simply wild, undivided territory.

In order that this great mass of land might be properly located and disposed of, Congress appointed a committee of five to draft some plans on which the work should be done; and accordingly on May 7th, 1787 the committee submitted the following plan. — The public lands shall be divided into square mile squares, and then again into mile square townships from 01-10, beginning at the north west land running from west to east and from east to west alternately throughout the square.

On April 26th, 1785 this was amended and submitted again, and organizing the country to be divided into townships, townships...
miles square by lines running due north and south and thirty east and west.
These now to be again divided into one-mile squares (640 acres) consisting of two sections of 320 acres each. This land again distributed May 20th, 1785, reducing the township to six miles square comprised of thirty-six sections one mile square and numbered from one to thirty-six beginning at the southeast corner and running from south to north in each tier of sections. It was under this system that the original survey of the United States was made, the United States Deseret Survey managing the work.

In 1796 Congress passed an act authorizing the appointment of a surveyor general. Also a different numbering of the sections of the townships in future surveys. The numbering should be from one to thirty-six beginning with the north west section and running from west to east and from north to south ultimately through the township. Later it was decided to divide the sections into quarters. This system is still in use.
The general process at present for laying out new territory is as follows:

First. Through some convenient and suitable point in the territory, a principal meridian is established conforming to the true meridian.

Second. At right angles to this a base line is established extending east and west to the limits of the territory.

Third. Standard parallels of latitude are established ten, twenty, four, and four miles north of the north lines of Kansas and every thirty miles south of said line and initiated from the principal meridian.

Fourth. Inside meridians conforming to the principal meridian are initiated at intervals of ten, twenty, four, and four miles along the base line and standard parallels.

Fifth. Those twenty-four (or thirty) mile squares are divided as nearly as possible into townships of thirty square miles each.

Sixth. Those townships are again divided into sections and quarter-sections.

Throughout the entire process proper care must be taken to plainly and securely mark all lines and corners.
Establishment of Principal Meridian.

In the opinion of the writer, the most accurate method for this is that given by T. Hodgman in his "Land Surveying." It is as follows:

First. The exact length of time required for polaris to make a complete circuit around the pole (23° 56' 43") is ascertained. Second. The exact time of the upper culmination is determined. Third. By establishing a proportion between the time required to make a complete circuit to the time elapsed between the last upper culmination and the time of observation, and 96° to the required azimuth, that azimuth can be determined. Fourth. Establish the line of polaris at the time of observation and thence by laying off the angle (east or west as the case may be) as determined above, the true meridian is the result. Although this seems quite complicated, yet so much of the work is the same for every calculation that appropriate tables have been constructed (Hodgman's "Land Surveying," Appendix p. 21.) By the use of which the surveyor's work is rendered very brief and simple.
and any one with a reasonable knowledge of the art of surveying can perform the work correctly.

Another method which is very similar will not give in detail. Instead of using the hour angle of Polaris, the star is taken at its point of greatest elongation, and as its azimuth is always the same for this point, all that is necessary is to establish the meridian of the star at this point and then lay off from this the given azimuth and the sighting line is the true meridian.

A third method is by the use of the solar compass, or a solar attachment to the ordinary transit. The attachment to the transit consists of two arcs graduated, one for setting off the declination of the sun and the other the hour of the day. Upon this is fixed a target and some distance from it a tube through which the sun shines on the target. Thus by setting off the latitude of the locality by the hour angle and of the transit, the declination (at the time of observation) of the sun on its arc, the hour of the day
on its arc, and then turning the instrument till the same spot falls directly on the target, the line of sight of the telescope will be the true meridian. This line established, as many meridians may be established as are desired.

Then this is done, the next thing is to establish the base line, which is done by simply running through the desired point a perpendicular to the principal meridian.

Then at intervals of twenty-four miles (thirty north of the north line of Kansas) north up, the principal meridian lines are run east and west parallel to the base line called standard parallels. Also at intervals of twenty-four miles along the base line and standard parallels guide meridians are established conforming to the principal meridian, thus dividing the land into twenty-four mile squares or nearly perfectly trapezoids.

Thus are divided into townships by meridians conforming to the principal meridian and east and west lines.
parallel to the base line. The townships, according to law, should be first six miles square and contain 23240 acres, but owing to the convergence of the meridians, this is impossible. To avoid this difficulty as much as possible no meridian is drawn farther than from one parallel to another when the distance law again laid off and a new set of meridians established forming a new series of townships. This accounts for the offset in section lines at various places throughout the country. The townships then do not contain exactly 23240 acres but a little less. They are not squares, but trapezoids. Their north and south boundaries being parallel but not equal and their east and west boundaries being equal but not parallel.

At the same time at which the township corners are laid off on the meridians and parallels, the section and quarter section corners are laid off. From three lines are run, north and south line, from south to north and east and west lines from the principal
madian except the line between the
two northern lines of sections which is
always run from east to west.

In order to make the results of the above
work permanent, some notice is necessary
to perpetuate the corner established. The
system adopted by the government is as
follows.

Township corners. There are four general
ways of perpetuating these. First, by a
stake at the corner. This must be at
least four feet long and five inches in
diameter and driven two feet in the
ground. The post above the ground is
squared to receive the marking and
is set with the angles to the cardinal
points. Upon the surface is marked
the town and range also on each the section
which it faces. If it face four townships
six notches are cut on each corner; if it
face only two townships and those on the
north, notches are cut on the west, north
and east corner, but if it face only two
townships and those on the north, notches
are cut on the west, north and east corner
and W. E. is marked on the surface.
There must also be four-bearing trees with the range, townships, section, and distance and bearing from the corner marked on them. In rare, however, there are no trees, pits must be dug to take their places. There must be twelve inches deep, eighteen inches wide and two feet long and set four feet from the post.

Section Corner: This is established at intervals of one mile each and is situated in a similar manner to the township corner—by post, mound, stone or tree. If it is a post, it must be four feet long, tap in the ground and two abore. If then the post is common to two sections, it is set with the corner to the lines and the number of the section marked on the surface of the post facing it. The range and township are also marked on the north-east face. If the posts are on the township line they will have as many notches cut on their respective corners as they are miles distant from the township corner. If they are interior corners, they
han as many notches as the south and east quarter as they are miles distant from the south and east line of the township. These posts must also be witnessed by a town and if not a post in each section corner by eighteen by eighteen inches. If the marking is a mound, it must be four and one half feet in diameter and two feet high, with a post in the center four feet long, one foot in the ground, two in the mound and one above. The markings on the post are the same as that on the post without the mound.

towns on the same line as those on the post without the mound. towns on the same line as the post when used shall, on township lines be set the same as posts, but not in the interior they will face the north. They are marked and witnessed the same as posts. If there is a town on a corner, it is marked the same as a post would be and taken the place of the post.

Disaster Section Reasons: There an established at intervals of 40 chains each half in the north and west line of sections of the township where they are not forty
chains from the inner corner. They are fastened at the same marks as section cornert except that the only markings is (45) and that only two turns are required for witness.

For a more detailed and complete description of the above outlined work, the author will refer his readers to the following works:

J. B. Hawie’s “Manual of U.S. Surveying”
F. Hodgman’s “Land Surveying”
G. Hart’s “Plane Surveying”
Johnson’s “Theory and Practice in Surveying”

J. B. Donnan