The Rectangular Survey System

The shortcomings of indiscriminate settlement, the overlapping of claims, and boundary litigations were well known to the founding fathers. When new territory was being opened to the west, a Congressional Committee was charged in 1784 with the task of preparing a survey ordinance which would prevent a recurrence of boundary problems.

It recommended that all public lands be divided in “hundreds” of ten geographical miles square. The recommendation was tabled, but the following year the ordinance was amended to make the original “hundreds” six miles square and was passed by Congress in 1785. The rectangular survey system is confined to the public domain originally belonging to the Federal Government. Because of this, the states that originated from the public domain are often referred to as public-domain states.

The rectangular survey system is based upon the establishment of a principal meridian and a base line. The principal meridian runs in a true north and south direction; the base line runs east and west at a right angle to the meridian. The point where these lines cross is referred to as the initial point, or starting point. The geographic location of a meridian and base line is not fixed by law, therefore the 34 principal meridians in the United States were located to meet the convenience of government surveyors.

Land in Oklahoma is located with respect to two principal meridians; the Indian Meridian which runs from the Red River to the Kansas line through the central portion of the state, and the Cimarron Meridian, which runs the width of the Panhandle at its extreme western end. The base line to the Indian Meridian runs east and west from border to border across the southern part of the State. The base line to the Cimarron Meridian runs the length of the Panhandle along the southern border (Figure 1). All legal descriptions in Oklahoma, therefore, will end with the notation Cimarron Meridian (C.M.) or Indian Meridian (I.M.).

Townships. The legal description of a tract of rural land essentially is based on an area referred to as a Congressional township, and is not to be confused with a named Civil township. The Congressional township is an area six miles square and contains 36 square miles or sections.

After the principal meridian and base lines are laid out, the surveyor comes back to the beginning point and lays out lines north and south every six miles apart and just south of the base. The lines surveyed result in a grid as illustrated in Figure 2. Each square in the grid is a township. The township marked “A” is referred to as

---

1 Many of the older states - the 13 original states plus Maine, Kentucky and Tennessee as well as Texas had considerable areas already settled when the system was devised. To avoid confusion of boundaries, the metes and bounds system was retained in some areas. In other areas a rectangular system was used, but these do not necessarily correspond with the system used by the U.S. Land office.

2 The actual surveying is a bit more complicated than this, but this describes the final results of the survey.
Township 2 North Range 4 East, because it lies in the second row of townships north of the base line and in the fourth column of townships east of the principal meridian. Township "B" is referred to as Township 2 South, Range 3 West for the same reason. Every township is described with reference to the intersection of the meridian and the base lines. It is so many squares or townships north or south of the base and so many squares or ranges east or west of the principal meridian, Legal descriptions based on the Cimarron Meridian are all north of the base line and ranges are all east of the principal meridian.

Once the township and range lines are laid out, each of the squares is further divided into 36 sections (see Figure 3). Numbering always begins with one in the upper right hand corner and proceeds in a serpentine fashion to the bottom right hand corner of the township to number 36.

The Section. Once the section lines are designated, the half mile points are located so as to divide the section in four quarters. These quarters may be further divided if desired. Figure 4 shows a typical section divided into various sized tracts.

Theoretically, a section contains 640 acres and, of course, a quarter section has one fourth of 640 or 160 acres. However, because of the curvature of the earth and thus the convergence of the range lines some sections are not exactly 640 acres. Sometimes surveying errors result in a discrepancy. Sometimes, you find discrepancies in size when the convergence of the lines in southern Oklahoma is about 32 feet, in northern Oklahoma about 37 feet per six miles. In this State, as we go north from the base line we will find correction lines every 24 miles. This is the point where surveyors again measured the distance to the principal meridian and set out about 200 feet more or less so that the range lines were again a full six miles apart. This is why we see jogs in north and south section line roads at regular 24-mile intervals.
survey of public lands joined Indian lands. For example in Payne County, land was originally surveyed up to the southern border of the Cherokee Outlet. Then, when the “Outlet” was surveyed, the newly laid out sections along this border were odd sized and correction lots are found along the south side of the township.

The normal expectation, however, is that all sections will be full sections except those on the north and west sides of a township. Surveyors generally were instructed to confine any size deficiencies in the township to sections 1 through six and seven, 18, 19, 30 and 31. Even in these sections, shortages were to be confined to the outer borders of the section. See Figure 5. These fractional 40 acre tracts are called “lots” or “government lots.”

**Lots also will be found along rivers.** The Oklahoma Statutes (Title 64 No. 290) declare that all streams of two chains (132 ft.) and over between the mean high water marks are State property. Private ownership stops at these lines. When such a stream cuts into any quarter-quarter to less than 40 acres it is designated as a “lot” and is assigned a number. The numbering system is not uniform in Oklahoma, but generally numbering starts farthest up the river on the right bank then down the river to the section line and back up the left bank. Figure 6. Numbering starts anew in each section. If there are “correction lots” in the section, these lots are numbered first and then the numbering is continued along the river.

Correction lots usually closely approach 40 acres in size, but a river lot may range from just a few acres to nearly 40 acres. In any event, a legal description which includes a lot, e.g. Lots 5 and 6 and S1/2 NE1/4, should warn anyone that the sale includes some fractional 40 of unknown size. Usually an instrument referring to such a tract will mention the acreage, but not always. To discover the acreage one can examine the official plat map usually found in the County Clerk’s office and/or the County Engineer’s office.

In writing a legal description, care must be taken that it actually describes the ownership tract. In describing a tract, the quarter section is really the key. That is, a tract usually is a quarter section, a part of that quarter, or a quarter plus other land. For example any tract smaller than a quarter section is always described as being a part of the quarter in which it is found; N1/2 SW1/4 Sect. 18 or SW1/4 SW1/4 NW1/4 Sect. 20. The final letter combination in the above descriptions designate in which of the four quarters of section the tract is found. In the first case we learn that the particular tract is the North half of the southwest quarter of Section 18. To find the land described SW1/4 SW1/4 NW1/4 Sect. 20 we know first that it is a tract somewhere in the NW1/4 of Section 20. But where? The legal description shows it to be somewhere in the SW quarter of the NW quarter but precisely it is the SW 10 acres of the SW 40 acres which lies in the NW 160 acres of the section.

Any time two letters appear together (NW or SW or SE) we know it indicates one fourth of something. So if we see a two letter combination followed by a section number then we know it is one fourth of the section. Thus any two letter combination is one-fourth of whatever follows. If we see one letter such as N, it may or may not also be followed by 1/2 or the super-script. Whether the 1/2 or the following single letter it always means 1/2 of whatever follows.

If you wish to describe a tract consisting of more than one parcel in a particular quarter, you must describe them separately. For example a 120 acre tract consisting of an 80 and a 40 acre parcel would be described in two parts even though they adjoin each other in the same quarter. Such a description might read: N1/2 SW1/4 and SW1/4 SW1/4 Sect. 10, etc. The word, or the sign meaning, “and” must separate the description of these two parcels. Of course, any tract which lies in two quarters of the section, must each indicate the quarters in which it lies, e.g. S1/2 NW1/4 and N1/2 SW1/4. A description such as S1/2 and S1/2 SW1/4 Sect. 10 does not describe the two halves of the SW1/4. The insertion of the word “and” means we are beginning the description of another

---

5 Unless the word or sign for “and” follows.
tract. When we see the word or sign for "and" we next read the section number. In the above illustration, we have described the N1/2 of Section 10 and the S1/2 of the SW1/4 of Section 10, totaling 400 acres.

Also, you can designate two quarters at one time if both are in the same half of the section; e.g. S2 Section 8 is the same as SW1/4 and SE1/4 of Section 8; or E2 Section 8 = NE1/4 and SE1/4 Section 8. In Figure 7, we show a farm blocked in which might be a typical unit. The farm comprises 600 acres more or less and would be described as follows: Lots 1 and 2 and S1/2 NE1/4 and SE1/4 and S1/2 SW1/4 Section 1, and S1/2 SE1/4 Section 2, and N1/2 NE1/4 Section 11, and NW1/4 NW 1/4 Section 12, all in Twp 16 N Rge. 14 W I.M.

You can not only determine the location, but the size by reading the description. We know the foregoing tract is in the main body of Oklahoma because it is based on the Indian Meridian. We know further that the land is in a township which is 16 townships (between 90 and 96 miles) north of the base line and 14 ranges (between 78 and 84 miles) west of the Indian Meridian; this would place the land in the south east corner of Dewey Co. Then by the section numbers, one, two, 11, and 12, we can locate the land within the township, and the description tells us in which parts of these sections the land is found.

The size or acreage can be determined from the legal description if one remembers that a section has 640 acres. Read the description backward; for example NW1/4 NW1/4 Section 12 is one fourth of one fourth of 640 acres or 40 acres. S2 SE Section 2 is one half of one fourth of the 640 acres in Section 2, or 80 acres. The S2 SW Section 1 is 80 acres. SE of Section 1 is one-fourth of 640 acres or 160 acres. The S2 NE Section 1 is 80 acres, and lots 1 and 2 we know each to be about 40 acres in size or 80 acres more or less. The individual acreages, when added together, equal 600 acres more or less.

For one actually to get to a legally described tract of land, he would need a general highway map of a county such as those produced by the Oklahoma Department of Highways. These maps are revised each year and show every section in the county, the townships and ranges, and the type of road, if open, on every section line. Roads other than section line roads are also shown as are towns and cities and other man-made or natural features. To use such a map one merely selects a starting point and by counting section lines or reading his speedometer he drives to his destination. Such a map may be purchased from the Oklahoma Department of Highways for a nominal sum.

Figure 7. Tract smaller than a quarter section is described as part of quarter where it is found.

Credit is extended to Loris A. Parcher and Clint E. Roush, former staff, who were authors of the original manuscript.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, sex, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Samuel E. Curl, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of $276.00 for 1,500 copies. #1262 0398 ADH

9407 / 4