BLM Cadastral Survey

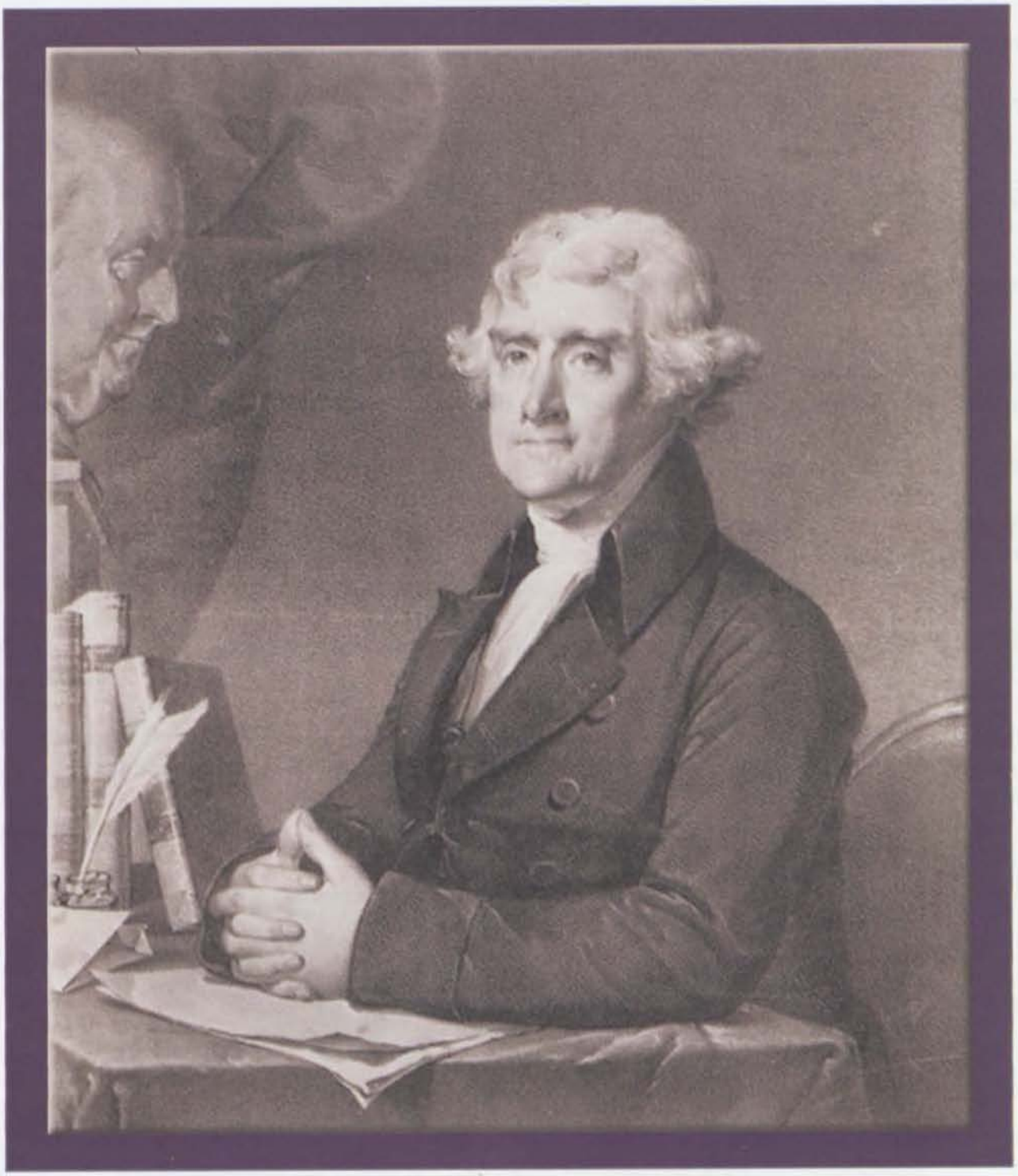
U.S. Department of the Interior

BLM

Bureau of Land Management

SURVEYING OUR PUBLIC LANDS

2002



"Your observations are to be taken with great pains and accuracy, to be entered distinctly and intelligibly for others as well as yourself to comprehend all the elements necessary, with the aid of the usual tables, to fix the latitude and longitude of the places at which they were taken." - Thomas Jefferson

SURVEYING OUR PUBLIC LANDS

SINCE 1785

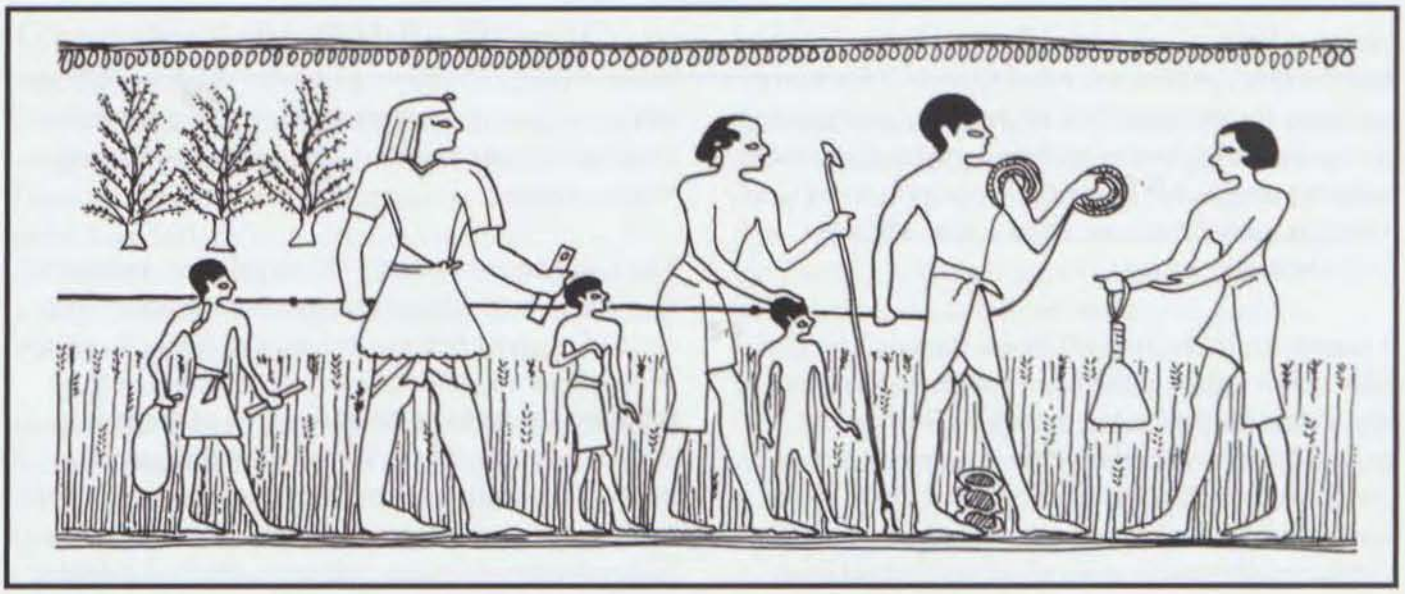
As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. As America's "Department of Natural Resources," Interior works to assure the wisest choice in managing all of our resources so that each will fully contribute to a better United States - now and in the future.

The Bureau of Land Management (BLM) is part of the United States Department of the Interior. Its responsibilities encompass 262 million acres of public lands and managing 300 million acres of mineral rights. BLM also maintains the legal status for 331 million acres of reservations created from public lands, such as the national parks, national wildlife refuges, and national forests, and provides mineral and cadastral services for 56 million acres of Indian lands.

BLM was established on July 16, 1946, by the consolidation of the General Land Office (created in 1812) and the Grazing Service (created in 1939 from the Grazing Division, which was created in 1934). Much of the history of the exploration and development of the public land states appears on the pages of BLM's records. As steward of nearly half of all federally managed. lands, BLM's primary purpose is wisely balancing the use of natural resources. These resources, besides the land itself, include minerals (oil and gas), forests, range, recreational opportunities, wildlife, and soil and water. BLM manages these lands through communication, cooperation, and consultation, all in the service of conservation - building on its strengths, especially its ability to resolve competing demands at the grass roots level.

To manage these resources, BLM must be able to locate the increasingly valuable areas of land with which it has been entrusted.

BLM's Cadastral Survey Program is responsible for the creating, restoring, marking, defining, and managing survey records of these lands. Cadastral Survey is also responsible for the official boundary surveys and survey records management for all federal agencies, tribal governments, and Indian Allotments. Together these entities manage more than 700 million acres.



History . . .

Land surveying dates back to ancient times. More than one civilization recognized the need for marking the boundaries of land for taxation as well as for defining just where one ownership begins and another ends.

The Egyptians, with their great expertise and accuracy in building pyramids more than 7,000 years ago, must have possessed the techniques and instruments to perform surveys comparable in precision to present day requirements. In fact, the Egyptians were very much involved in property surveys since land boundaries along the Nile River were annually lost from flooding, and resurveys were constantly needed.

Most modem BLM monuments have an inscription which reads: UNLAWFUL TO DISTURB. Such warnings are really not new. Babylonian boundary stones set about 3500 years ago contained not only geographical information and the surveyor's name, but also numerous curses on anyone daring enough to move the monument!

There were several other notable surveying endeavors in earlier times, including the Roman rectangular plots laid out with the four-armed groma instrument; William the Conqueror's land surveys of England with their resultant "Doomsday Book"; and the pyramid, road, city, and bridge related surveys of the 11th to 14th century Incas.

In early day America, several types of surveys were performed using state-of-the-art instruments, calling mainly on mathematicians, astronomers, and navigators to perform as land surveyors. Most of these earlier surveys were of the metes and bounds type, meaning they were established by distances and directions that were not in accord with a regular pattern.

Surveying was often listed among the accomplishments of notable scientific and public figures in late 18th century America. When the Penns and Calverts reached an impasse over the boundary between Pennsylvania and Maryland, they asked Britain's Astronomer Royal to send "...some able mathematicians ... of great integrity." If the Astronomer Royal did not confer immortality upon Charles Mason and Jeremiah Dixon, he conferred it upon the boundary they surveyed. David Rittenhouse, a largely self-taught mathematician, astronomer, and instrument maker, was involved in half the boundary surveys of British America.

When Thomas Jefferson came to draft the Land Ordinance of 1785, he brought not only his accomplishments in law, political philosophy, and architecture, but also the heritage of his noted surveyor father, Peter Jefferson, and his own experience as a Virginia surveyor.

Land holdings which surveying fees had helped him acquire, and the frequent employment of his surveying skills for the benefit of his military command in laying out fortifications and topographical mapping, made it possible for George Washington to serve as Revolutionary Commander-in- Chief and the nation's first president.

It remained for the late 1700s for the beginning of what was to become the most ambitious program of land disposal, ownership recording, and on-the-ground boundary marking that has ever occurred. Described as a "marvel of simplicity," the United States rectangular survey was designed to lay out 1-mile square parcels over all of the federal land outside of the original 13 colonies and their western territories. With changes to Thomas Jefferson's original proposal for a rectangular survey, Congress enacted the Land Ordinance of 1785. It set in motion a sequence that tied the New England rectangular survey to the southern penchant for individual settlement.

Two military engineers, Colonel Henry Bouquet and Thomas Hutchins, were also among the contributors. Hutchins, as Geographer of the United States, established the Point of Beginning where the west boundary of Pennsylvania crossed the north bank of the Ohio River (near present day East Liverpool, Ohio). Absolom Martin, of New Jersey, completed the first township in 1786.

Under the principles of the Land Ordinance, 1.5 billion acres have been surveyed into 6-mile square townships, each with 36-mile square sections, resulting in easily understood land descriptions to expedite land transfers and promote security of title. The design is at once both complex and simple. The accomplishment is grand — 2.6 million section corners, each a mile apart. These corners have resorted from a vast cumulative expenditure of human energy in carrying transits, dragging chains, lifting stadia rods, cutting trails, scaling mountains, emplacing monuments, digging pits, and blazing witness trees.

The Land Ordinance of 1785 developed three new theories in land administration. First was the principle of "survey before settlement." Second was the principle of a mathematically designed plan to be followed throughout the entire area of the public domain. And third was the creation of a standard land unit, a section of uniform shape and area, with boundaries marked on the ground. These planned features were not used within the original colonies in America where land locations were made in irregular form and lacked an orderly design.

In 1812, Congress established the General Land Office (GLO) as a bureau of the Treasury Department "to superintend, execute, and perform all such acts ... respecting the public lands...." Before then, the public domain workload was handled by the Treasury Department, but a more focused land management agency was needed. The Surveyor General post, with responsibility for contracting surveys to private surveyors, however, remained independent of the GLO.

Edward Tiffin of Ohio was appointed the first commissioner of the GLO. Tiffin's contributions to land surveying were significant in consolidating and organizing land and survey records. Later as a Surveyor General, he designed a plan of correction lines to solve the troublesome problem of conforming a rectangular pattern to a round earth.

The first lands were surveyed between the Appalachian Mountains and the Mississippi River, an area that seven of the states had ceded to the new nation.

Growth of the Public Domain . . .

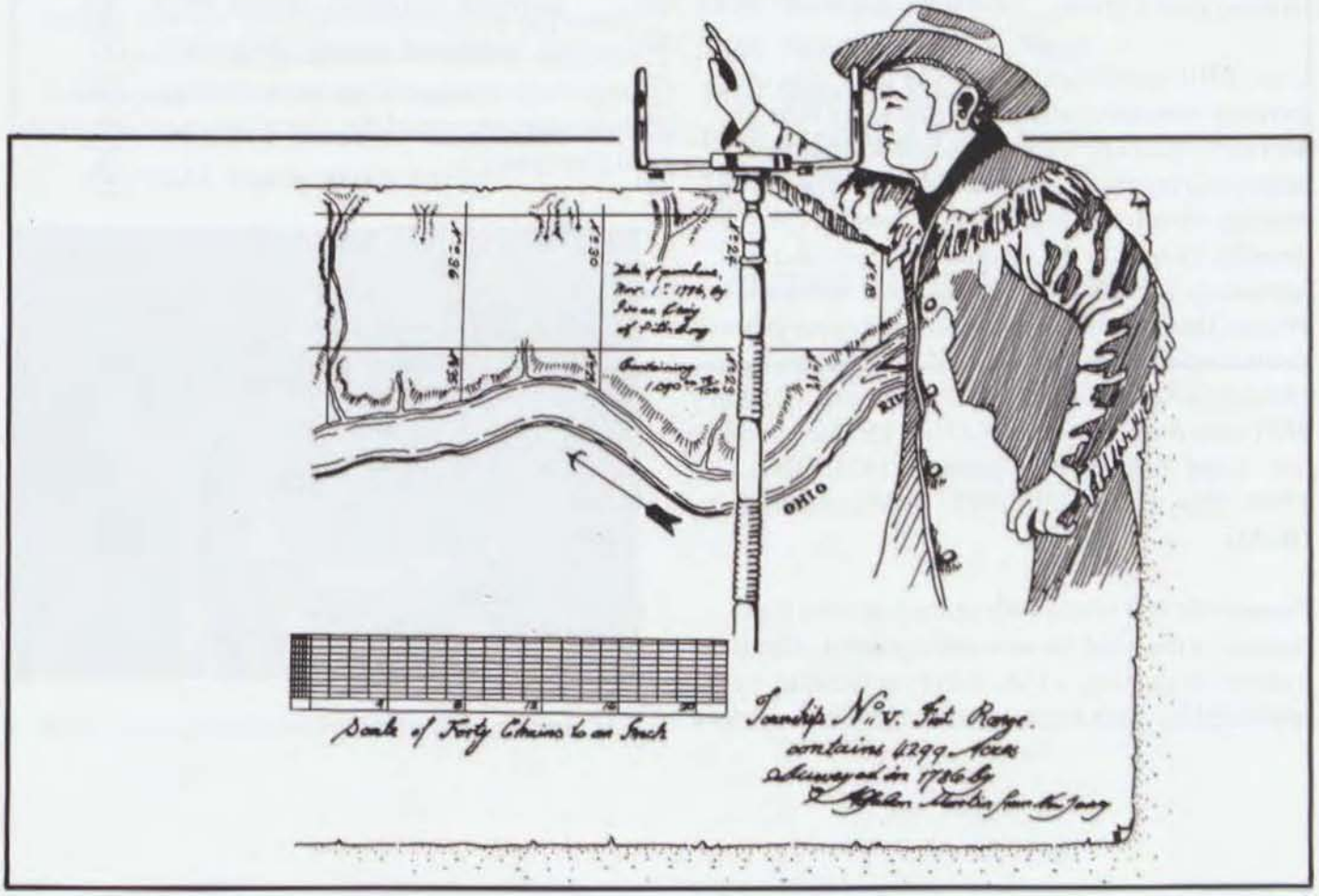
In 1803 President Thomas Jefferson arranged to buy a large amount of land from France. Known as the Louisiana Purchase, this transaction amounted to more than 500 million acres and included most of the land from the Mississippi River west to the Rocky Mountains, except for Texas. The Louisiana Purchase cost the United States $23 million.

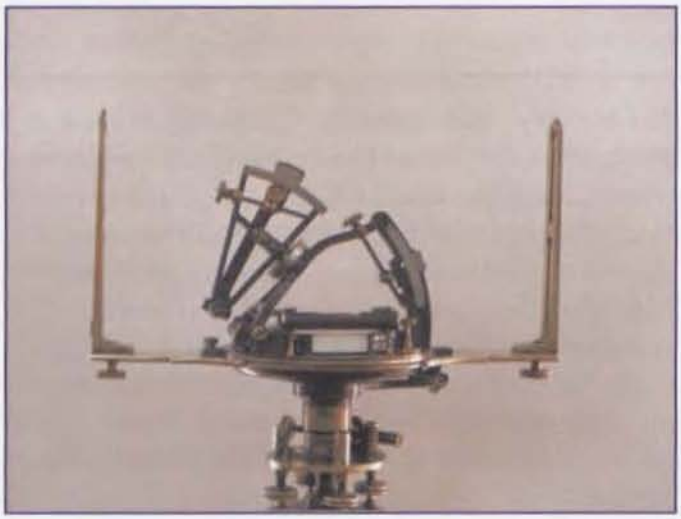
In 1819 the United States purchased Florida from Spain. Texas became part of the U.S. in 1845. A year later the United States signed a treaty with Great Britain. The treaty, known as the Oregon Compromise, added the area that now includes the states of Oregon, Washington, and Idaho.

In 1848, just 1 year before the discovery of gold in California, the United States obtained from Mexico the lands that are now the states of California, Nevada, Utah, and parts of Arizona, New Mexico, Wyoming, and Colorado. The Gadsden Purchase in 1853 added what is now southern Arizona.

The last large addition to the Unites States came in 1867, when the United States purchased Alaska from Russia. The area of Alaska amounted to more than 375 million acres (about one-fifth the area of the rest of the United States). Alaska cost $7 million. With these additions, the public domain stretched from the west boundary of Pennsylvania to the Pacific Ocean, from the Canadian border to the Gulf of Mexico and included Florida and Alaska. Altogether it embraced over 1.8 billion acres.

A remarkable pioneer surveyor was William Burt, who surveyed large areas of land in upper Michigan and Wisconsin in the mid-1800s. Burt, who had little formal education, was the inventor of the solar compass, which used the sun to maintain direction. His invention came of necessity from trying to use the magnetic compass and run lines in a region of vast iron deposits, which caused deviations of the compass needle.





Solar Compass invented by William Burt, U.S. Deputy Surveyor, in the mid 1800s

The exploration and survey of the western lands continued with many oral and written accounts by curious surveyors of colorful descriptions of the nature of a new land, and tales of hardship, misery, and financial loss. One 1852 field note record of an Iowa survey reads "...one of my men was accidentally shot yesterday and died almost instantly." The notes continue with bearings and distances to the stricken man's grave.

Until 1910, public land surveys in each state or territory were generally administered by federal surveyors-general, who contracted with authorized deputy surveyors to perform the work. The survey general often wrote sets of instructions to the deputies to specify the method of survey and the accuracies expected. But it gradually became evident that officially authorized surveying procedures needed to be consolidated. An Oregon Manual of Surveying Instruction was published in 1851, and revised by the GLO in 1855 for national use. Later manuals were issued in 1871, 1881, 1890, 1894, 1902, 1930, 1947 (BLM), and 1973 (BLM).

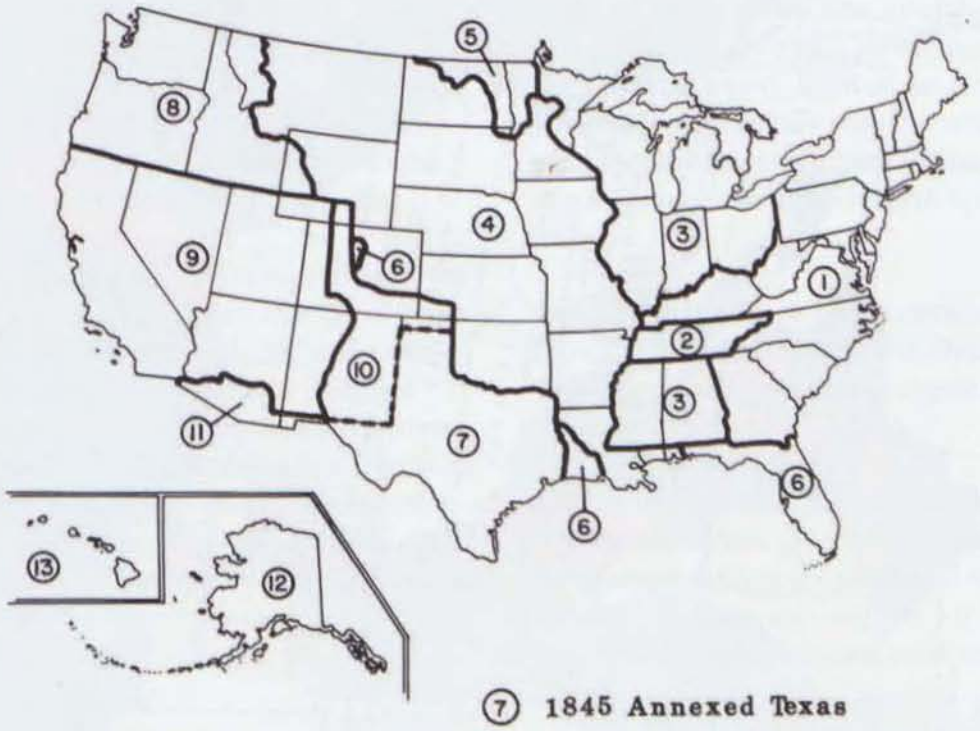
Toward the end of the 19th century several signs pointed to the need for new management. Almost from the beginning, a U.S. Surveyor General was appointed for each territory and state. Under general instructions from the Commissioner of the GLO in Washington, the Surveyor General contracted with deputy surveyors, often after competitive bid. The deputy surveyor hired the crews, purchased the supplies, and supervised the fieldwork.

When public land surveying covered prairies, open bench land, and other relatively accessible land, surveyors competed for such jobs. As surveying embraced fragmentary, rough, and isolated areas, contractors found it hard to bid and keep costs within the limits prescribed by law.

Resurveys became increasingly necessary as a growing proportion of careless, fraudulent, and sometimes practically mythical surveys surfaced as the public lands were occupied. Prospective contractors found it difficult to bid on resurvey work because it was hard to estimate the amount and character of the work. A change to contracting by the day brought some improvement. But ultimately the law was changed to provide for the direct hire of professional surveyors and their assistants at a specified salary.

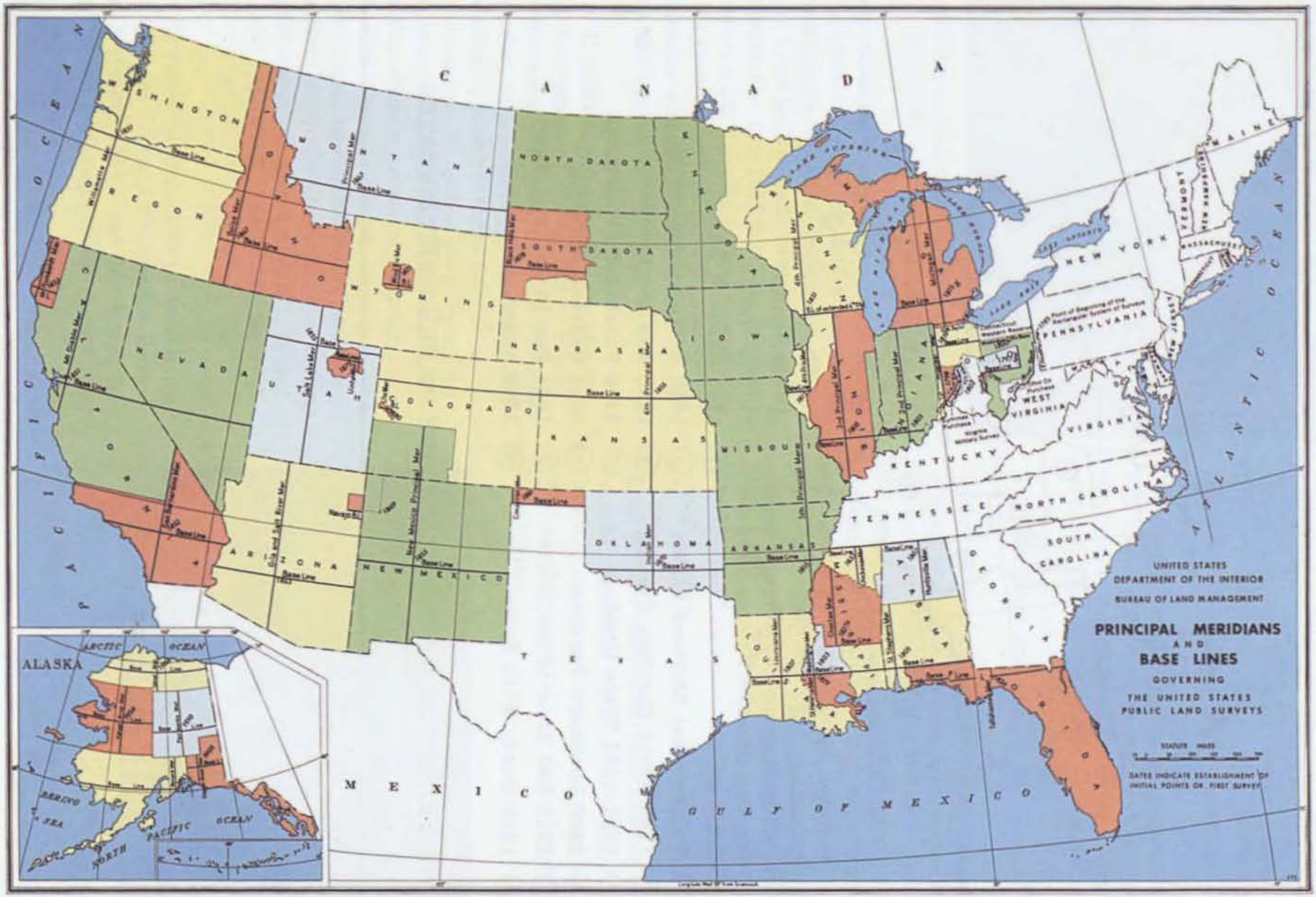
Stable pay and professional pride was thus substituted for contractors beginning July 1,1910. Improved surveys at little extra cost soon justified those who advocated the direct hire of professionals in surveying.

GLO survey crew in desert southwest, circa 1930s



① The Original Thirteen States
② 1790 North Carolina Cession
③ 1781-1802 State Cessions
④ 1803 Louisiana Purchase
⑤ 1818 Red River of the North
⑥ 1819 Treaty With Spain
⑦ 1845 Annexed Texas
⑧ 1846 Oregon Compromise
⑨ 1848 Mexican Cession
⑩ 1850 Purchased From Texas
⑪ 1853 Gadsden Purchase
⑫ 1867 Purchased From Russia
⑬ 1898 Annexed Hawaii

ACQUISITION OF THE TERRITORY OF THE UNITED STATES



Principle Meridians and Base Lines of the United States Public Land Surveys

The Rectangular Survey System . . .

Our present system of public land survey retains the basic elements set forth in the Ordinance of 1785, refined by later legislation and regulations.

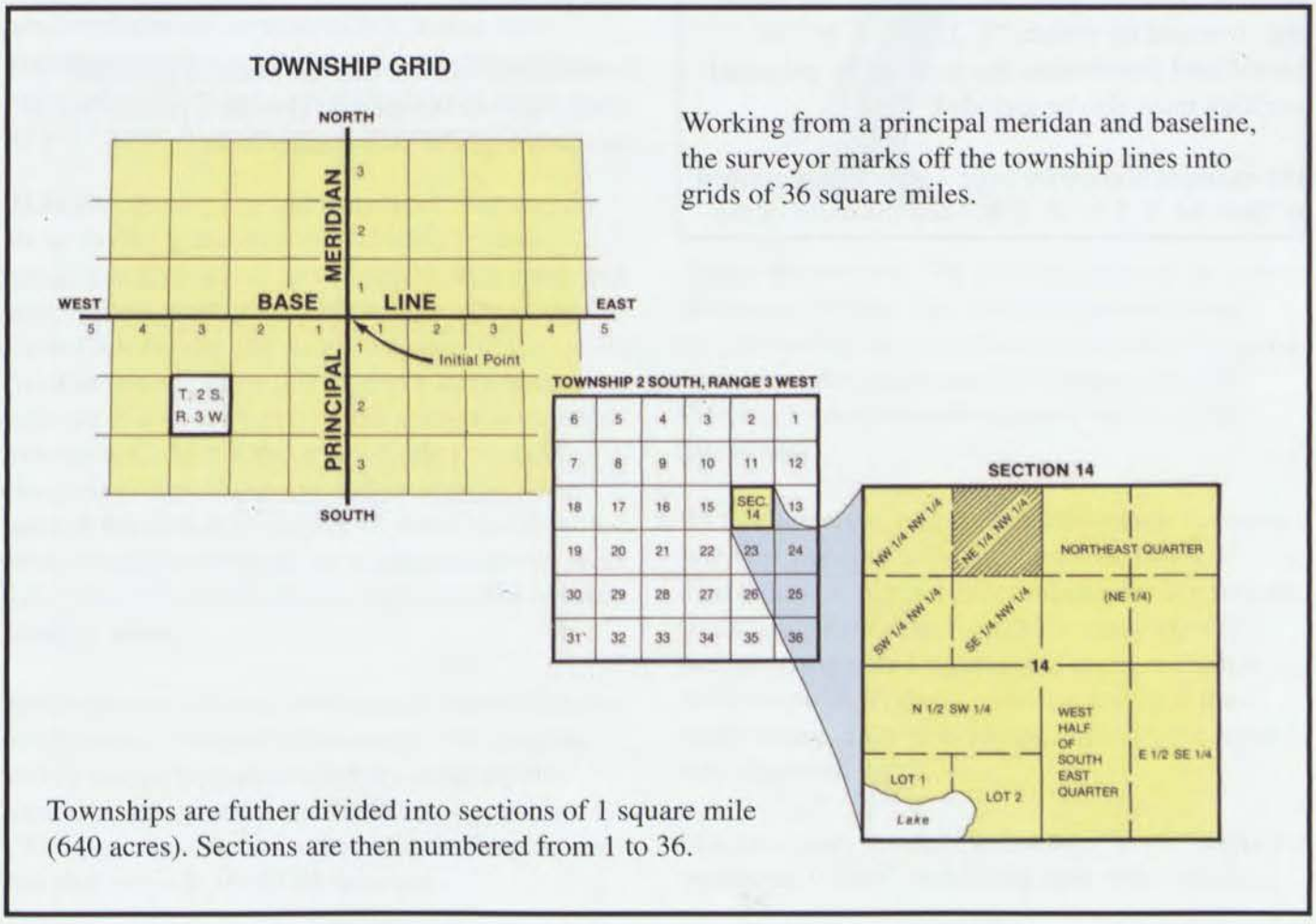
Under the cadastral system, the public domain is plotted into a grid of squares, each 6 miles to the side. These squares are called "townships."

Before any distance can be measured, the surveyor must define an initial point. From that initial point two lines are run, one north-south, the other east-west. The north-south line becomes a principal meridian and is given a name- the Salt Lake Meridian, for example. The Salt Lake Meridian intersects its baseline at the southeast corner of the Mormon Temple grounds in downtown Salt Lake City. The east-west line becomes the baseline for the meridian (see map, page 6).

Working along the principal meridian and the baseline, the surveyor sets township corners at 6-mile intervals, and then, by extension, marks the tract off into a grid. Each of the 6-mile squares is a township of 36 square miles, or about 23,040 acres. Any specific township can then be located according to its relationship to its principal meridian and baseline.

Because of the shape of the earth, meridians come closer together as they extend toward the North Pole. To adjust for this convergence, correction lines are run every 24 miles.

The surveyor further divides the township into sections of 1-mile squares containing 640 acres. Individual sections are identified by a numbering system that starts with section 1 in the northeast corner of the township and ends with section 36 in the southeast corner.



Working from a principal meridan and baseline, the surveyor marks off the township lines into grids of 36 square miles.

Townships are futher divided into sections of 1 square mile (640 acres). Sections are then numbered from 1 to 36.

The section can be further subdivided into quarter sections of 160 acres, which was the basic unit under the Homestead Act of 1862. Quarter sections can be divided into half-quarter sections of 80 acres or into quarter-quarter sections of 40 acres, etc.

The rectangular surveying system forced settlers to take undesirable land along with that deemed most desirable. But this disadvantage may have been more than offset because there was less chance of boundary disputes and fewer cases of expensive litigation than under a system of metes and bounds.

Under the rectangular survey system one can easily describe and locate any one parcel of land. There cannot be another parcel of land with the same identification. To avoid writing out a lengthy description, a shorthand method of describing has been devised.

For example, in the illustration on page 7, the sample township is located two townships south of the baseline and three ranges west of the principal meridian. In short, from the location of the township, it would be written "T. 2 S., R. 3 W." In formal land descriptions the name of the principal meridian must also be included.

The example section on page 7 would be described as "Sec. 14, T. 2 S., R. 3 W." and the name of the principal meridian. Although the name of the state is not required, it is usually added for convenience. One advantage of this system of land description is that the method allows land to be described by small legal subdivisions without an actual detailed field survey.

Divisions of a section of land are known as "aliquot parts." An aliquot part is always described in relation to the four points of the compass. In the lower illustration on page 7 the hatched portion would be described as the "northeast quarter of the northwest quarter (NE1/4NW1/ 4) Sec. 14, T. 2 S., R. 3 W.," and the name of the principal meridian.

BLM has sometimes had to approve uses of land tracts before these tracts have been surveyed. These administrative requirements are handled by a system of "protracted surveys" - map lines that informally extend the public land survey system, even though the boundaries have not yet been laid out on the ground. Protractions help in locating oil and gas leases and allow recording actions dealing with public lands.

Protractions will not take the place of the final official survey but they do provide a present basis for many types of land management.

The Federal Land Surveyor . . .

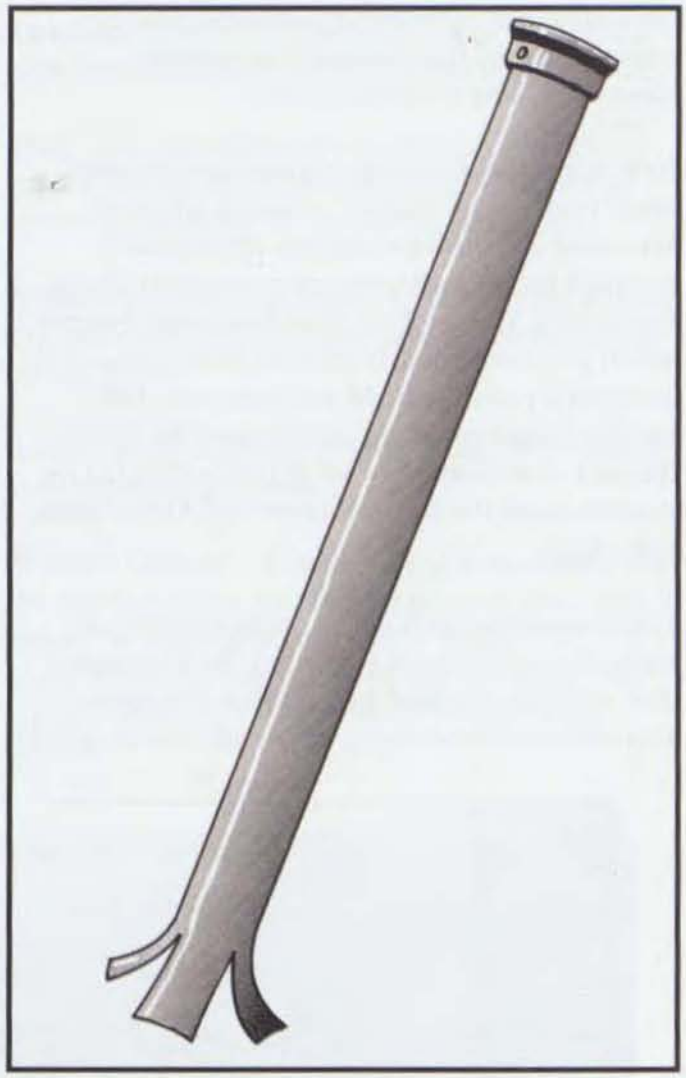
Surveyors are usually within one of three groups. Geodetic surveyors measure the shape and size of the earth. Topographic surveyors locate and map the earth's features, including its contours, water bodies, roads and buildings. Cadastral surveyors lay out and mark property boundaries according to legal requirements and doctrines.

Today, BLM has about 250 permanent cadastral surveyors to augment this corps of professionals. BLM also employs seasonal survey aids and technicians who operate surveying instruments, cut brush, climb hills, maintain equipment, and set permanent monuments. Several other government agencies also employ professional cadastral surveyors for specialized work such as land line location and boundary management.

Travel and long stays away from home offices are commonplace for BLM field surveyors. A good degree of self-reliance is a desirable attribute of surveyor party chiefs, who often must make independent decisions on both technical and crew management matters. Personnel management and logistical abilities are sometimes critical (such as for a 6-month Alaskan field camp operation).

BLM surveyors go to and from work sites on just about anything that moves, including by foot, horseback, four-wheel drive vehicle, helicopter, and boat. Survey work is carried on anywhere in the United States from the Arizona deserts to the Alaskan tundra, along the edge of a large water body, or in a dense forest on the sides of a western mountain. Cadastral surveys fall into two main categories original surveys and resurveys. Since most of the land in the lower 48 states has already been originally surveyed, most original survey work today is carried on in Alaska, quite often in remote, roadless areas.

Resurveys have always been needed in marking the public lands to restore obliterated or lost original survey lines. Permanent statutory authority for resurveys was given to the GLO by Congress in 1909. Resurveys are now the most challenging and complex projects for BLM surveyors.



Corner Monument. The exact location of the corner is stamped on top. The bottom is spread out to prevent pulling the post from the ground. Congress authorized the use of metal monuments in 1908. Stone and wood monuments were mainly used before then.

By law, however, no resurvey can impair the bona fide land rights of affected claimants. Corners established in original cadastral surveys are forever fixed in position even though they may not fall precisely at a stated bearing and distance from a previous point. Today's cadastral surveyor must weigh many kinds of evidence to ensure the protection of private rights.

In recent years, modern technology has replaced the traditional "chain" measuring tape with electronic

instruments. Microwave, light wave, laser beam, photogrammetry, gyroscopic orientations, and electromagnetic satellite signals are among the scientific media integrated in the cadastral surveyor's array of working tools.

New, highly sophisticated surveying techniques range from "Total Station" concepts where all azimuthal and distance data are automatically recorded for later computer processing, to Global Positioning System-Real Time Kinematic systems, which give continuously updated coordinates of the surveyor's position. BLM in Alaska uses this satellite-based system to rapidly meet the survey demand of millions of acres of land scheduled for transfer under the Native Claims and Alaska Statehood Acts.

Computer-aided drafting has replaced the traditional manual methods of platting the boundaries that were measured by the surveyor. Computers also calculate coordinates, or latitude and longitude, for survey corners. These coordinates are incorporated into the BLM's Public Land Survey System/ Geographic Coordinate Data Base and allow the Public Land Survey System to be shown on maps using geographic information system (GIS) technologies. The system and data base are the foundation for parcel-based land information systems, which will allow mapping and analysis of resource and cultural information that relates to the land. "Field to finish" will no longer end at the survey plat, but at any map that shows the Public Land Survey System cadastral theme.

The physical challenge to the cadastral surveyor of laying boundaries across the terrain remains. The mental challenges are increasing. The future survey of our public lands will call for technically adept surveyors who are willing to integrate the wisdom and experience of their predecessors with the expanding knowledge and uses of the scientific, legal, and managerial regimes.

SHORT LIST OF SURVEYING TERMS

Bearing Tree - A marked tree used as a corner accessory, its distance and direction from the corner being recorded. Bearing trees are marked by prescribed cuts into their trunks; the species and size of the trees are also recorded.

Corner - A point on the earth, determined by the surveying process, which defines an extremity on a boundary.

Field Notes - The official written record of the survey, certified by the field surveyor and approved by proper authority. Originally, field notes were prepared by hand but are now computer generated.

Meander Line - A traverse of the margin of a permanent natural body of water.

Monument - The physical object which marks the location of a corner point.

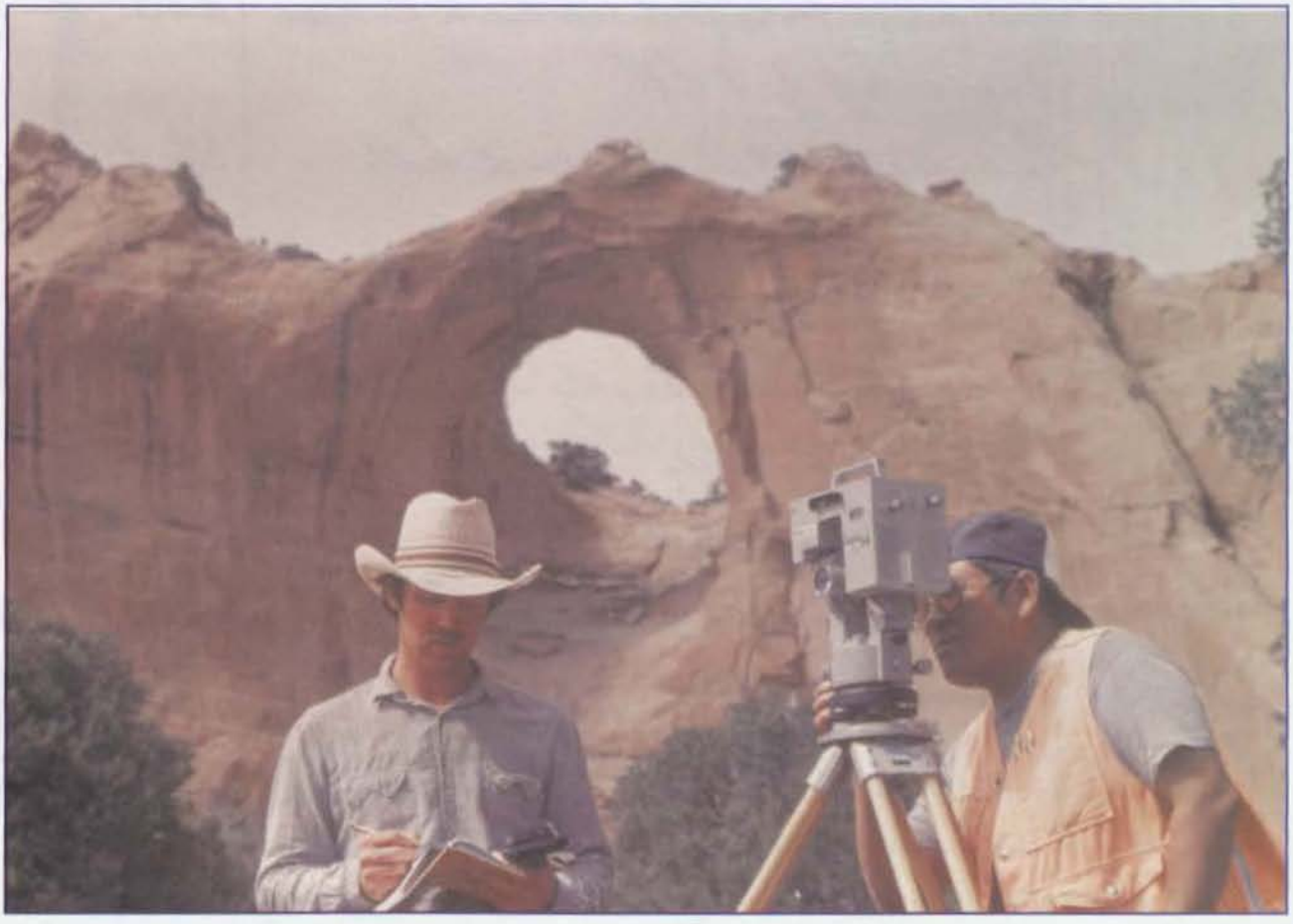
Original Survey - A cadastral survey that creates land boundaries and marks them for the first time.

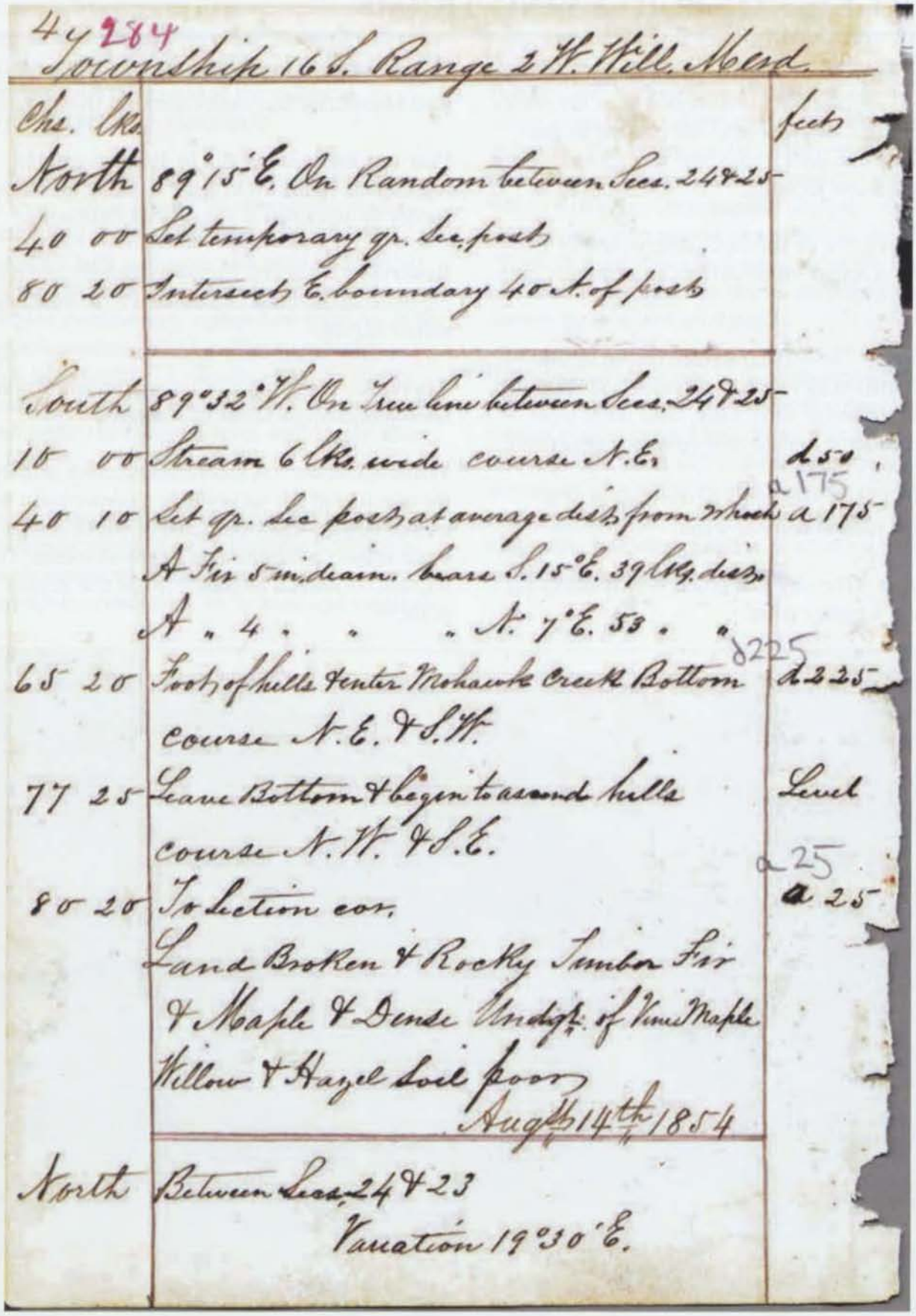
Plat - As used technically by BLM, a graphic representation drawn to scale showing the actual survey as described in the official field notes.

Resurvey - Cadastral survey to identify and remark the boundaries of lands that were established by an earlier survey.

Traverse - A sequence of lengths and directions of lines connecting a series of stations.

Witness Corner - A monumented point usually on the true line of the survey near a corner point which cannot be physically occupied or which falls at a place subject to destruction by the elements. The witness corner is a reference to the true corner point.





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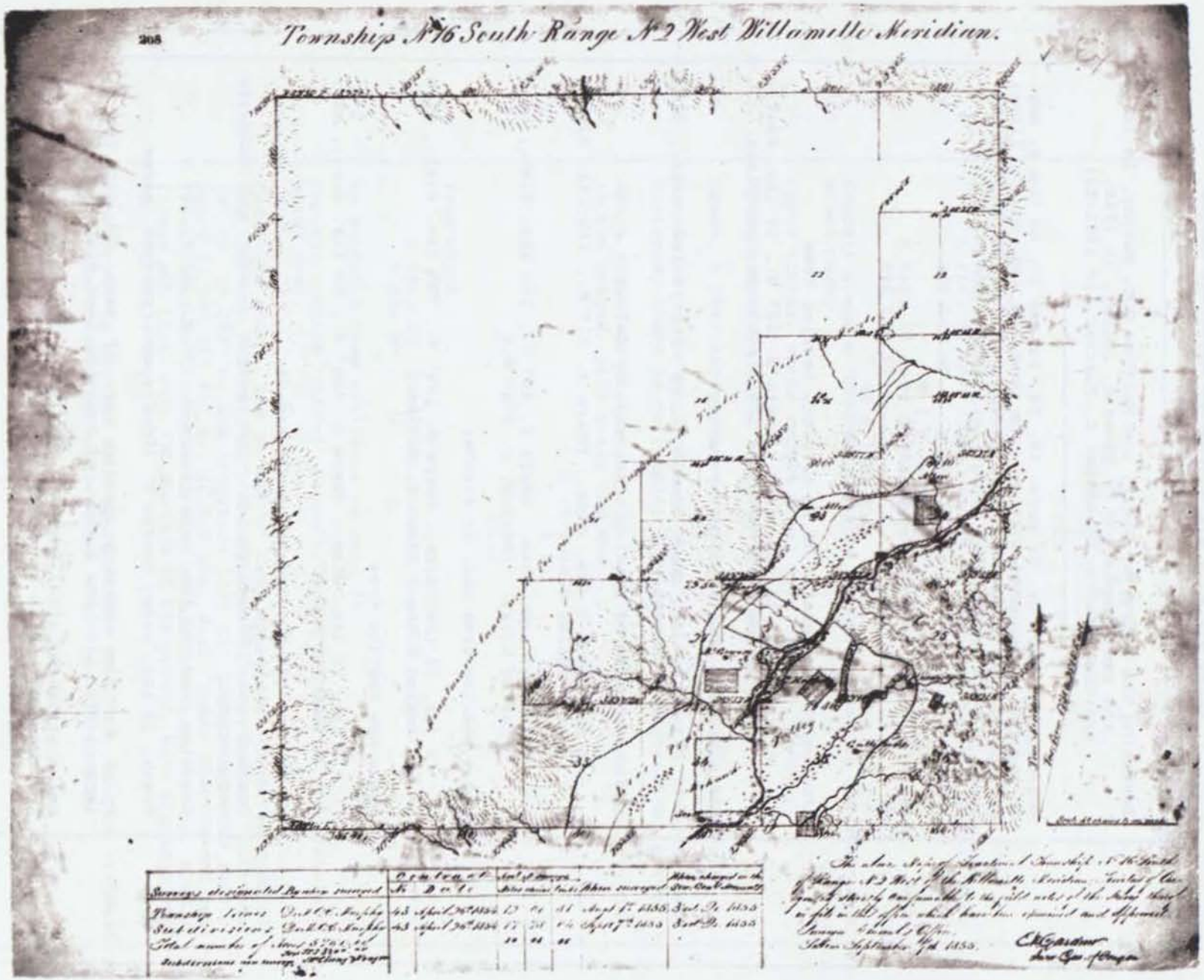
Township 16 S. Range 2 W. Will. Mer.

Chs. Lks.		feet
North	89° 15' E. On Random between Secs. 24 & 25	
40 00	Set temporary qr. Sec. post	
80 20	Intersect E. boundary 40 N. of post	
South	89° 32' W. On True line between Secs. 24 & 25	
10 00	Stream 6 Lks. wide course N.E.	d 50
40 10	Set qr. Sec. post at average dist. from which a 175	a 175
	A Fir 8 in. diam. bears S. 15° E. 39 Lks. dist.	
	A " 4 " " N. 7° E. 53 "	
65 20	Foot of hills & enter Mohawk Creek Bottom d 225	d 225
	course N.E. & S.W.	
77 25	Leave Bottom & begin to ascend hills	Level
	course N.W. & S.E.	
80 20	To Section cor.	a 25
	Land Broken & Rocky Timber Fir & Maple & Dense Undgt. of Vine Maple Willow & Hazel Soil poor	
	Augt 14th 1854	
North	Between Secs. 24 & 23	
	Variation 19° 30' E.	

Handwritten field notes of an original cadastral survey in Oregon (1855)



Original survey plat of an Oregon township (1855)

Dependent Resurvey of a Portion of the Subdivisional Lines, T. 16 S., R. 2 W., Willamette Meridian, Oregon

CHAINS	
	(Restoring the survey by Daniel and Matthew O.C. Murphy, in 1854, the remonumentation by James E. Jelley, in 1965, and the resurvey by Lester E. Fischer, in 1981-82)
	Beginning at the cor. of secs. 19, 24, 25 and 30, on the E. bdy. of the Tp., monumented with an iron post, 2½ ins. diam., firmly set, projecting 4 ins. above the ground (with an iron pipe, 2 ins. diam., 4 foot long, lying alongside), with brass cap mkd. T 16 S R 2 W | R 1 W S 24 | S 19 S 25 | S 30 1965 from which the remains of an original bearing tree A fir stump, 38 ins. diam., bears N. 30° W., 19 lks. dist., with scribe marks R2W T16S S25 visible on open blaze. and a bearing tree reported by Jelley A fir, 12 ins. diam., bears N. 73° E., 17 lks. dist., with healed blaze. and the remains of bearing trees mkd. by Jelley A fir snag, 8 ins. diam., bears S. 11° E., 11½ lks. dist., with healed blaze. A fir, 17 ins. diam., bears S. 40° W., 23½ lks. dist., with healed blaze. (Record, S. 37½° W.) and a bearing tree mkd. by Fischer A fir, 32 ins. diam., bears N. 12½° W., 79½ lks. dist., with healed blaze. (Record, 81 lks.) and a new bearing tree A fir, 24 ins. diam., bears S. 48¼° E., 50 lks. dist., mkd. T16S R1W S30 BT. N. 89° 48' 00" W., bet. secs. 24 and 25. Descend over NW. slope, through medium timber and moderate undergrowth.
4.30	Graveled road, 20 lks. wide, bears N. 10° E. and S. 10° W.
9.10	Creek, 10 lks. wide, course N. 10° E.; asc. over NE. slope.
26.030	Point for the crossing closing cor. of secs. 24 and 25, at intersection with the E. bdy. of Donation Land Claim No. 38. Set a stainless steel post, 28 ins. long, 2½ ins. diam., 24 ins. in the ground, with brass cap mkd.

Field notes of a resurvey in Oregon (1992)

**Dependent Resurvey of a Portion of the Subdivisional Lines,
T. 16 S., R. 2 W., Willamette Meridian, Oregon**

CHAINS	
	T 16 S R 2 W DLC 38 | S 24 CCC | S 25 1992
	from which
	A fir, 21 ins. diam., bears N. 38½° E., 24½ lks. dist., mkd. S24 CCC BT.
	A fir, 12 ins. diam., bears S. 43½° E., 29 lks. dist., mkd. S25 CCC BT.
	Deposit a white "DEEP-1" magnetic marker at base of the stainless steel post.
	Leave timber, enter logged area; asc. over NE. slope.
26.25	Spur, slopes N. 25° E.; desc. over a NW. slope.
35.10	Creek, 5 lks. wide, course N. 15° E.; asc. over NE. slope.
40.20C	Point for the ¼ sec. cor. of secs. 24 and 25, at proportionate distance; there is no remaining evidence of the original corner.
	Set a stainless steel post, 28 ins. long, 2½ ins. diam., 24 ins. in the ground, with brass cap mkd.
	T 16 S R 2 W S 24 ¼ S 25 1992
	from which
	A fir, 13 ins. diam., bears N. 1° E., 77 lks. dist., mkd. ¼ S24 BT.
	No suitable tree available in sec. 25.
	Deposit a white "DEEP-1" magnetic marker at base of the stainless steel post.
	From this point, the Bureau of Land Management Geodetic Control Station No. EC-41173, established in 1992 at latitude 44° 09' 19.533" N. and longitude 122° 52' 13.549" W. (NAD 1927), bears S. 53° 43' 44" E., 10.650 chs. dist. (mean bearing and sea level distance); monumented with an aluminum rod, 3/4 in. diam., firmly set flush with the surface of the ground, with aluminum cap mkd. EC 41173 GPS 1992.
	The corner is located on a spur, slopes N. 30° W. and is 75 lks. S. of the N. edge of logged area, edge bears E. and W.
	Descend over NW. slope.
42.00	Leave logged area, enter medium timber and moderate undergrowth.

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Dependent Resurvey of a Portion of the Subdivisional Lines, T. 16 S., R. 2 W., Willamette Meridian, Oregon

CHAINS	
68.10	Leave timber; enter nearly level cultivated land, edge bears N. 40° E. and S. 40° W.
77.60	Leave nearly level cultivated land, enter medium timber and moderate undergrowth, edge bears N. 70° W. and S. 70° E.; asc. over NE. slope.
80.400	The cor. of secs. 23, 24, 25 and 26, perpetuated by Kenneth Robert Ezell, Registered Land Surveyor No. 952, in 1984, recorded in the County Survey Corner Restoration No. 9826; monumented with an iron pipe, 1 in. diam., firmly set, projecting 12 ins. above the ground, and in a mound of stone, 4 foot base, to top, with brass cap mkd. T 16 S R 2 W S 23 | S 24 S 26 | S 25 1984 from which the remains of an original bearing tree A decayed fir stump, size indeterminate, bears S. 45½° E., 33 lks. dist., no marks visible. and bearing trees mkd. by Ezell A fir, 19 ins. diam., bears N. 77° E., 63 lks. dist., with healed blaze. A fir, 20 ins. diam., bears S. 48½° E., 43½ lks. dist., with healed blaze. A fir, 18 ins. diam., bears S 3° W., 69 lks. dist., with healed blaze. No suitable trees available on sec. 23. The corner is located in a fence line, bears N. and S

Dependent Resurvey of a Portion of Donation Land Claim No. 38, T. 16 S., R. 2 W., Willamette Meridian, Oregon

(Restoring the survey by Jeremiah M. Dick in 1855)

From the S-SE cor. of Donation Land Claim No. 38, perpetuated by C.M. Collier, County Surveyor, in 1906, recorded in the County Survey Corner Restoration No. 347; further perpetuated by Nick Juliano, Registered Professional Engineer No. 3449, recorded in the County Survey File No. 533; further perpetuated by Tom Sauter, County Engineering Technician I, in 1980, recorded in the County Survey Corner Restoration No. 8640; further perpetuated by Kenneth Robert Ezell, Registered Land Surveyor No. 952, in 1991, recorded in the County Survey Corner Restoration No. 11915; monumented with a plastic pipe, 2 3/4 ins. diam., filled with concrete, firmly set, projecting 10 ins. above the ground, with brass cap mkd.

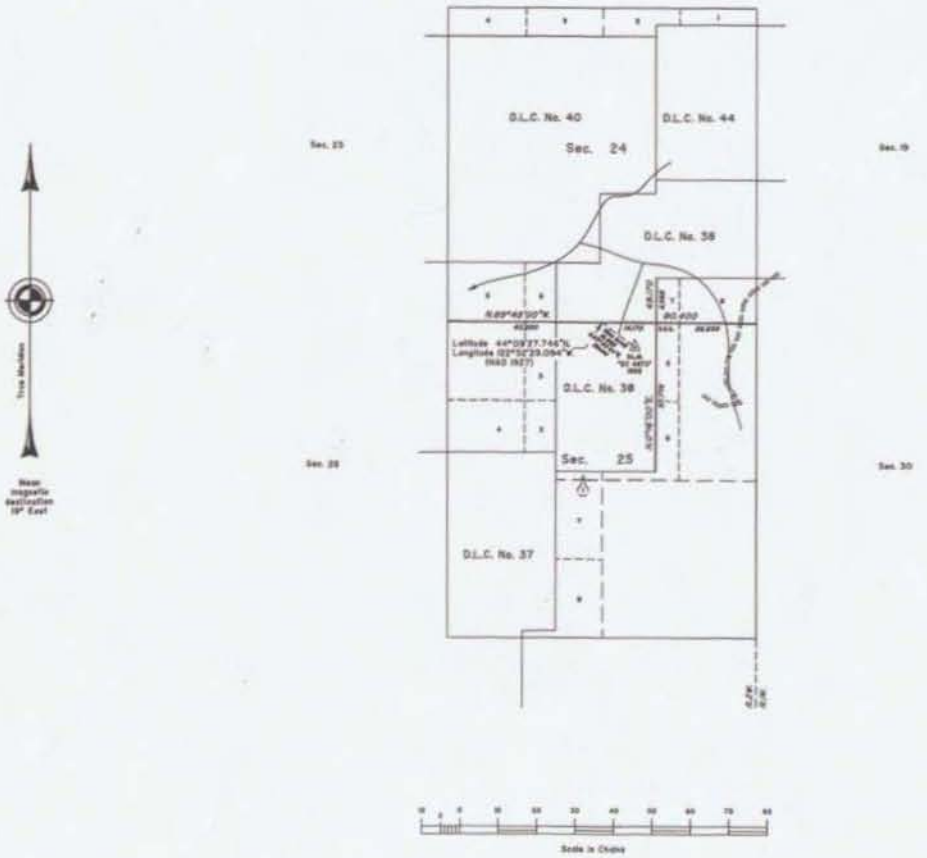
Field notes of a resurvey in Oregon (1992)

6603

ORIGINAL

TOWNSHIP 16 SOUTH, RANGE 2 WEST, OF THE WILLAMETTE MERIDIAN, OREGON

DEPENDENT RESURVEY



A history of surveys is contained in the field notes.

This plat represents a dependent resurvey of the line between sections 24 and 25, and a portion of the boundary of Donation Land Claim No. 38, T. 16 S., R. 2 W., Willamette Meridian, Oregon, designed to restore the corners in their true original locations according to the best available evidence.

The lottings and areas are as shown on the plats approved September 7, 1855, June 1, 1860, and January 8, 1873.

The survey was executed by Craig L. Wanless, Cadastral Surveyor, beginning April 20, 1992, and completed July 1, 1992, pursuant to Special Instructions dated March 25, 1992, under Group Number 1641, Oregon.

Timber in this area consists of Douglas fir, hemlock, cedar, alder, maple and chinquapin.

The tie to the geodetic control station is reported as mean bearing and sea level distance.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Portland, Oregon — July 21, 1994

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Wayne M. Gardner

Chief Cadastral Surveyor of Oregon

Scale in Chains

Resurvey plat of an Oregon township (1992)

The chain is the unit of linear measurement for the survey of the public lands as prescribed by law. All returns of measurement in the rectangular system are made in the true horizontal distance in links, chains, and miles. The only exception to this rule are special requirements for measurement in feet in mineral surveys and townsite surveys.

LINEAR MEASUREMENT

1 Chain = 100 Links or 66 Feet

1 Mile = 80 Chains or 5,280 Feet

1 Mile = 1.61 Kilometers

AREA MEASUREMENT

1 Acre = 10 Sq. Chains or 43,560 Sq. Feet

1 Square Mile = 640 Acres

2.47 Acres = 1 Hectar

BLM/WO-GI-02-003-1420