

SUBDIVISIONS
OF THE
PUBLIC LANDS,
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SUBDIVISIONS
OF THE
PUBLIC LANDS,

DESCRIBED AND ILLUSTRATED,

WITH

Diagrams and Maps.

BY J. S. HIGGINS.

GIVEN IN TWO PARTS.



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INTRODUCTORY.

In preparing this volume it has been the endeavor of the publishers to give such a synopsis of the public surveys with the Instructions and Laws on which they are based, that the *youth* may be able to understand the Legal subdivision of lands sufficient to describe them, and may from the Maps, Diagrams and Instructions learn how to describe, plat, assess, abstract and deed any tract of land; that the *Business Man* may find sufficient reference to Instructions and Laws, together with the Diagrams illustrating the surveys to determine with certainty whether or not his lands have been properly surveyed, located, described, assessed and deeded.

The Teacher will find sufficient data with the Maps and Diagrams, to enable him to teach the *practical subdivisions of land*.

PART I. contains the origin and extent of the Public Lands, and the inauguration of the system under which they have been surveyed; also Extracts from Laws and Instructions, copied from the Public Land Records.

PART II. is intended especially for persons unacquainted with the Legal subdivisions of the Public Lands and the Rectilinear System of Surveys as inaugurated by government; it will be found exceptionally full in the descriptions and subdivisions of the Public Lands; beginning with the simplest subdivisions of the square, all of the government subdivisions of the section are given: following which, are given subdivisions that occur in assessing and deeding, with examples showing correct and erroneous descriptions; also descriptive notes on assessing, abstracting, deeding, surveying and platting.

The Compiling of this Volume has been greatly facilitated by courtesies extended from *General Land Office*, Washington, D. C., in examination of original surveys and in copies of original documents and plats furnished, also by information furnished and courtesies extended by the custodians of the Original Field-Notes in the several States, to whom we acknowledge our indebtedness for favors shown.

SUGGESTIONS TO TEACHERS.

To teachers unacquainted with the *Government surveys* the following order of presenting this work is suggested, viz :

Explain to the pupil the origin and extent of the Public Lands of the United States; show by what authority Government claimed the *Public Domain*, and the necessity that existed (before it could be sold in parcels) of adopting some system of surveying, by which any tract of land when once surveyed could be readily found. Illustrate the necessity of establishing initial points at such places on the *Public Lands* that the surveyors would not be compelled to connect their surveys across large streams or mountain ranges. This can be done by drawing on the blackboard a map of the Mississippi, Ohio, Arkansas and Illinois Rivers; from mouth of Ohio River draw a line north for *Third Principal Meridian*; from a point on Illinois River (due north from its mouth) draw a line north for the *Fourth Principal Meridian*; from mouth of Arkansas River draw a line north for the *Fifth Principal Meridian*, with which illustrate the difference between *surveying meridians* and meridians of longitude, by presenting the following facts, viz: Distance from *First Principal Meridian* to *Second Principal Meridian* about 90 miles; from Second to Third, about 146 miles; from Third to Fourth, about 70 miles; from Fourth to Fifth, about 24 miles, they being established at irregular distances for convenience in making surveys.

The *Public Lands* may be considered as a large field with rivers running through it, and the survey of it may be illustrated by the plan on which a farmer would plow it; he would lay it off into tracts to suit his convenience, and instead of swimming his team and dragging plow and himself across the river for each furrow, he would plow what was on one side of the river, then cross and plow what was on the opposite side; each side would be plowed from a different starting or initial point. So it is with surveying; the surveys on opposite sides of the river were laid out from different initial points.

Maps and descriptive notes illustrating above suggestions can be found in Part I., pages 9 to 29.

From the instructions of Land Commissioner in Part I, page 31, explain the system adopted by Government, or so much of it as the pupil may require to obtain a knowledge of the method of laying off townships and sections; for pupils not advanced in mathematics it is unnecessary to explain in detail the field operations, only the general plan should be given.

A thorough explanation of the sub-divisions of a square on the *Cardinal points* of the compass should be given as illustrated in Part II. by the first seven diagrams and the descriptive matter accompanying them; next the descriptions should be applied to a section of land, illustrated by diagrams 8 to 25. When the regular sub-divisions are understood, examples giving legal descriptions in assessing, taxing, abstracting and deeding, as given on pages 27 to 44, should be illustrated on the blackboard.

In following the above suggestions only the theory, or what was intended, will have been presented to the pupil; when thoroughly conversant with the instructions, present the changes that have occurred from 1785 to the present time by giving the differences; after which, from pages 91 to 151, Part II., explain the surveys made and accepted by Government under the different instructions.

The actual field operations and the different instructions are presented in order that odd-shaped surveys may be understood, examples of which may be placed on the blackboard from notes on irregular surveys on page 141.

Respectfully suggested by

THE PUBLISHERS.

TABLE OF CONTENTS.—PART I.

<i>Public Lands, Extent of and How Acquired by Government.</i>	PAGE.
Cessions by Original Colonies.....	9
Original Boundaries of.....	9
Territory Sold without Surveying.....	10
Additions to Louisiana Purchase.....	10
“ “ East and West Florida Purchase.....	10
“ “ Gaudalupe Hidalgo Treaty.....	10
“ “ Texas Cession.....	10
“ “ Gadsden Purchase.....	19
United States Map, Showing Cessions.....	12, 13
“ “ “ “ Public Lands.....	16, 17
Russian Purchase, Map of, Addition to Public Domain.....	12
 <i>System of Surveys.</i>	
Inaugurated by Congress.....	19
Rectangular System Adopted.....	20
Benefits of the System.....	20
Principal Surveying Meridians, Geographical Position given.....	21
Names and Location of the Thirty-four Principal Surveying Meridians and Base Lines.....	22-29
 <i>Instructions for Field Operations.</i>	
Present and Early Instructions, Extracts from.....	30 to 70
Lands, How Laid Off.....	31
Meridian and Base Lines, How Established.....	50
Standard Parallel “ “.....	53
Auxiliary Meridians “ “.....	53
Townships, “ “.....	54
“ “ Sectionized.....	56
Mounds, Posts and Corners, How Established.....	61
Specimen Field Notes.....	66
“ Township Plat.....	67
Instructions of Edward Tiffin, under which Missouri, Arkansas and Il- linois, and parts of Indiana, Michigan and Ohio have been sur- veyed.....	71 to 76
 <i>Synopsis of Land Laws.</i>	
Acts of Congress from 1785 to 1832, upon which the Instructions for Surveying are based.....	77 to 83

TABLE OF CONTENTS.—PART II.

<i>Subdivisions of the Public Lands, Congressional and Legal.</i>	PAGE.
Subdivisions of a Square on the Cardinal Points of the Compass, North, South, East and West.....	4
A Section Subdivided into Halves and Quarters.....	12
“ “ “ “ Eighths and Sixteenths.....	15
Congressional Subdivisions.....	18, 21
Legal “ (not Congressional).....	24
Fractional Sections.....	27
“ “ Legal Descriptions of for Assessing and Deeding....	26
“ “ Correct Descriptions of.....	30
“ “ Erroneous “ “.....	31
 <i>Applications of Legal Subdivisions in</i>	
Assessing.....	29
Tax Receipt.....	34
Abstract of Title.....	35
Deeding.....	39
 <i>Land Surveying.</i>	
Without Instruments.....	46
With Compass and Chain.....	47
Magnetic Declination of the Needle.....	51
Protractor, Diagram of.....	49
Platting Surveys.....	55
Calculating Contents.....	56
Village Platting.....	64
Road Plat.....	64
School District Plat.....	68
Colonial Farm, Diagram of.....	71
Military Tracts or Land Grants.....	71
 <i>Miscellaneous.</i>	
Stadia Measurements.....	74
Convergence of Meridional Lines.....	75
Subdivision of Townships.....	80
Random Lines.....	81
Suggestions on Re-surveying.....	81
Order of Numbering Townships and Ranges.....	90
 <i>Maps and Diagrams Illustrating Actual Surveys.</i>	
Ohio State Map and References with Diagrams.....	92 to 117
Arkansas State Map and References with Diagrams....	120 to 127
Missouri “ “ “ “ “ “.....	127 to 141
Arkansas and Missouri Irregular Surveys.....	141
Mississippi State Map and References with Diagrams.....	141 to 147
Indian Territory Map.....	150
Public Land Strip.....	151

GENERAL INDEX.—PART I.

	PAGE.
Auxiliary Meridians.....	34, 51
Base Lines, Geographical Position of.....	21
“ “ How Established.....	36, 53
Chain, Length of.....	37
Chaining, Process of.....	38
Corners, Where Established.....	41
“ Description.....	44, 45
“ From Early Instructions.....	42
“ Miscellaneous Markings.....	47, 49
Diagram A.....	52
“ B.....	67
“ C.....	44, 45
“ No. 3.....	63
“ Township Subdivisions.....	72
Field Notes, Specimen of.....	66, 70
Gadsden Purchase.....	19
Gaudalupe Hidalgo Treaty.....	10
Instructions of Land Commissioner.....	30
“ Early, in Italics.....	31
“ Erroneous.....	61
“ By Edward Tiffin.....	71, 76
Louisiana Purchase.....	10
Lines of Survey, How Marked.....	40
“ Random or Trial.....	40
Land Laws, Synopsis of.....	77, 83
Mexican Cession.....	12, 13
“ Purchase.....	12, 13
Meridians, Geographical Position of.....	21
“ Names of.....	22, 30
“ How Established.....	36, 53
National Domain, Original Boundaries.....	9
“ “ Contents of.....	9
“ “ Map of.....	12, 13
“ “ Cession by Original Colonies.....	9
“ “ “ “ Spain.....	10
“ “ “ “ Mexico.....	10
“ “ “ “ Texas.....	10
“ “ Purchase from France.....	10
“ “ “ “ Mexico.....	19
“ “ “ “ Russia.....	12, 13
“ “ Annexation of Texas.....	12, 13

	PAGE.
Public Lands, Extent of, How Acquired.....	9
" " Sold without Survey by Government.....	10
" " Surveyed by Government.....	16, 17
" " How Laid Off.....	31
Russian Purchase.....	12, 13
Rectangular System of Survey Inaugurated.....	19
" " Benefit of.....	20
Random Lines.....	58
Spanish Cessions.....	10
Sections, Original Plan of Numbering.....	34
" Present " " ".....	34
Standard Parallels.....	34, 53
Surveys, Prescribed Limits for Closing.....	60
Sections, Subdivision of.....	61
" Subdivided into Quarter-quarters.....	65
Surveyors General, Instructions of.....	71
Section, Length of Sides.....	71
Sections, Establishment of Quarter Corners.....	71
Section Lines, Establishment of.....	72
United States, Original Boundaries of.....	9, 12, 13
" " Present " ".....	16, 17
Texas, Annexation.....	12, 13
" Cession.....	10
Tally Pins.....	38
Township Lines, How Established.....	54
" Subdivided into Sections.....	56, 60, 71, 76
" Plat of.....	67
" General Description of.....	70

GENERAL INDEX.—PART II.

	PAGE
Assessing.....	29
Abstracts of Title.....	35, 38
Area, Rule of Approximation.....	47
" Examples for Calculating.....	61
Angle, Between two Courses, How Determined.....	62
Arkansas State Map with References.....	120, 121
" Standard Lines and Guide Meridians.....	122
" { Diagram of T. 19 N., R. 5 E.....	125
{ Descriptive Notes of.....	124
Compass and Chain Survey.....	47
Contents Calculated by Squares.....	57
" " " Triangles.....	57

	PAGE.
Contents Calculated by Latitude and Departure.....	57, 62
" Rule for Calculating.....	59
Colonial Farm, Diagram of, with Description.....	70, 71
Descriptions, For Assessing and Deeding.....	26
" Correct.....	30
" Erroneous.....	31, 32
Deeding.....	39
Deed, Bond for.....	41
" General Warranty.....	42
" Quit Claim.....	43
" Estoppel.....	44
Descriptive Notes on Platting.....	55
Example for Platting.....	49
Estoppel, Letter from Thos. T. Gantt.....	88
Instructions for Surveying, By Whom Issued.....	92, 95
Indian Territory, Map of.....	150
" " Survey of.....	142
Irregular Surveys, Explanation of.....	141
Latitude and Departure, Difference of.....	52
Lines, North and South.....	77
" East and West.....	78
" Compared.....	79
Land Grant, Diagram of.....	70, 71
Meridional Lines, Convergence of.....	76, 77
Missouri State Map, with References.....	121, 129
" Guide Meridians.....	127
" Standard Lines.....	132
" { Diagram of T. 33 N., R. 1 E.....	134
{ Descriptive Notes of.....	135, 138
" { Diagram of T. 21 N., R. 33 W.....	139
{ Descriptive Notes of.....	138
" Irregular Surveys, Explained.....	141
Mississippi State Map.....	143
" " " References.....	142
" " Diagram of T. 2 N., R. 1 E.....	146
" " " T. 17 N., R. 7 E.....	147
Needle, Magnetic Declination of.....	51
" Daily Variation.....	51
" Secular.....	52
Offsets, Tangent to Parallel.....	52
Ohio, State Map.....	93
" " " References.....	92
" Southeastern Part, Survey of.....	95
" { Diagram of T. 3, R. 7.....	97
{ Descriptive Notes of.....	96
" { Diagram of T. 19, R. 7.....	101
{ Descriptive Notes of.....	100

	PAGE.
Ohio. U. S. Military Reservation	104
“ “ “ “ Order of Subdivision	105
“ Miami Valley Tract.....	107
“ { Diagram of T. 2, R. 6.....	109
“ { Descriptive Notes of.....	108
“ Southwestern and Northwestern.....	113
“ { Diagram of T. 4, R. 1. E.....	112
“ { Descriptive Notes of.....	114
“ { Diagram of T. 4 N., R. 1 E.....	115
“ { Descriptive Notes of.....	114
Protractor, Diagram of.....	49
“ Description of.....	52
“ Use of, Illustrated.....	53
Petition, Form of for Roads.....	66
Public Land Strip.....	142, 151
Road Plat, Diagram of.....	64
“ “ Descriptive Notes of.....	65
Random Lines.....	81
Re-survey, Suggestions on.....	84
Ranges, Order of Numbering.....	91
Square, Subdivided into Halves and Quarters.....	4
“ “ “ Eighths and Sixteenths.....	7
Section, “ “ Halves and Quarters.....	12
“ “ “ Eighths and Sixteenths.....	15
“ Congressional Subdivision and Contents.....	18, 21
“ Legal Subdivision (not Congressional).....	24
“ Fractional, Plat of.....	27
Square Foot, Yard, Rod, and Mile.....	45
Surveying Land.....	46
“ Farm.....	48
School District, Diagram of.....	68
“ “ Descriptive Notes of.....	69
Survey, Record of.....	73
Stadia Measurement.....	74
Subdivisional Notes, T. 6 N., R. 3 E.....	80
Section Lines, Re-tracing and Re-locating.....	85
Sections, Subdivided into Quarters and Lots.....	86
Subdivisions, Not Designated, How Made.....	87
Survey, Closing of on Standard Line.....	90
Seven Ranges, Survey of.....	95
Tax Receipt.....	34
“ “ Descriptions.....	35
Tables of Measure.....	45
Townships, Order of Numbering.....	90
Village Plat, Diagram of.....	64
“ “ Descriptive Notes of.....	65

military and Connecticut reservations in Ohio ; one hundred and fifty thousand acres located near the falls of the Ohio, in Indiana ; also holdings of the French and Canadian residents at Kaskaskia and St. Vincent. Of the above ceded territory, government sold, ceded or granted, without surveying and subdividing, all the public domain lying in Pennsylvania, Tennessee and Georgia, and the Ohio Company's and Symme's purchases in Ohio, leaving the remainder of the State cessions as public lands, which includes the following States, viz: All of Illinois, Indiana, Wisconsin and Michigan, and parts of Ohio, Mississippi, Alabama and Minnesota. For Territory in Ohio, Georgia and Tennessee not surveyed by Government, see map on pages 16 and 17, Part I. This territory formed the base or nucleus of the public lands of the United States, to which the following have been added at different dates: The first addition was by purchase from France in 1803, and known as the "Louisiana purchase;" this vast tract of land, nearly three times the size of the public lands prior to that time, and much larger than the United States, as acknowledged by Great Britain, was added to our national and public domain, and, except the Indian Territory, has been added to our public lands. This purchase embraced the entire surface of Louisiana, Arkansas, Missouri, Iowa, Nebraska, Oregon, Dakota, Montana, Idaho, Washington and Indian Territory, parts of Minnesota, Kansas, Colorado, Wyoming, Mississippi and Alabama, containing one million one hundred and eighty-two thousand seven hundred and fifty-two square miles. The second addition was acquired by purchase from Spain, in 1819, and known as the "East and West Florida purchase," and comprises the present State of Florida. It contains fifty-nine thousand two hundred and sixty-eight square miles. The third addition was acquired by treaty from Mexico, in 1848, known as the "Gaudalupe-Hidalgo treaty." It embraces the following States and parts, viz: California, Utah, Nevada, and parts of Colorado, Wyoming, New Mexico and Arizona. It contains five hundred and twenty-two thousand five hundred and sixty-eight square miles. The fourth addition was acquired by purchase from Texas, in 1850 ; it embraces parts of New Mexico, Colorado and Kansas, also the public land strip west of Indian



MAP OF ALASKA



**THE ORIGINAL
UNITED STATES**

MAP OF THE UNITED STATES

IDAHO, OREGON & WASHINGTON ARE INCLUDED IN LOUISIANA PURCHASE. TITLE PERFECTED BY OCCUPANCY & TREATY WITH GREAT BRITAIN. BOUNDARIES OF TEXAS CESSION ARE FROM ORIGINAL REPUBLIC OF TEXAS.

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S S E S S I O N S

MAP OF THE UNITED STATES

Public Land

Public Domain Includes Red & Blue


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Territory, and contains ninety-six thousand seven hundred and seven square miles. The fifth addition was by purchase from Mexico, in 1853, known as the "Gadsden purchase." It embraces the southern parts of Arizona and New Mexico, and contains forty-five thousand five hundred and thirty-five square miles. All the additions to the national and public domain above described (except the Indian Territory and public land strip) have been by the several Acts of Congress, surveyed or ordered surveyed and opened for settlement; which makes this vast territory public lands, the boundary of which, and the boundary of the public domain not public lands, which includes Tennessee, north end of Georgia, northwest corner of Pennsylvania, Indian Territory, and Alaska, are shown on map of the United States, pages 16 and 17. See maps showing purchases and cessions, for boundaries of purchases and treaty above described, also for addition of Texas and Alaska to the national and public domain, Texas being national, but not public; and Alaska being public as well as national domain.



SYSTEM OF SURVEY

Inaugurated by Congress.



The territory ceded by the several States to the National Government was organized from time to time into geographical divisions by the laws creating them and the lands were ordered to be surveyed. The same proceeding took place with purchased territory in 1803, 1819, 1848, 1850 and 1853.

The extension of the surveys being authorized by Congress over a district of country, the Commissioner of the General Land office directs the surveyor-general of the district to begin the same.

THE RECTANGULAR SYSTEM OF SURVEY.

“The land surveys under the United States are uniform, and done under what is known as the “rectangular system.” This system of survey was reported from a committee of Congress May 7, 1784. The committee consisted of Thomas Jefferson, chairman; Messrs. Williamson, Howell, Gerry, and Reas.

This ordinance required the public lands to be divided into “*hundreds*” of ten geographical miles square, and those again to be subdivided into lots of one mile square each, to be numbered from 1 to 100, commencing in the northwestern corner and counting from west to east and from east to west continuously; and also that the lands thus subdivided should be first offered at public sale. This ordinance was considered, debated, and amended and on the 3d of May, 1785, on motion of Mr. Grayson, of Virginia, seconded by Mr. Monroe, the size of the townships was reduced to six miles square. It was further discussed until the 20th of May, 1785, when it was finally passed.

The system as adopted provided for sale in sections of 640 acres, one mile square. In 1800 a half section, or 320 acres could be purchased. In 1820 a quarter section, or 160 acres, could be purchased. In 1832 subdivisions were ordered by law into 40-acre tracts or quarter-quarter-sections to settlers, and in 1846 to all purchasers.

THE BENEFITS OF THE PRESENT SYSTEM OF LAND PARCELING.

“This system of surveys came in at the birth of the public domain. It started prior to the opening of the public lands for sale in the territory northwest of the river Ohio, in the survey of the first seven ranges of townships therein adjoining Virginia. It afterward covered the territory south of the river Ohio, and thence was applied to the old Natchez settlement, in the present State of Mississippi. It now extends over portions, if not all, of every land State and Territory in the Union. It has been in operation over one hundred years, and has been a faithful friend to the settlers on the public domain.

In the extensive sphere over which the surveys have progressed from Florida, on the Atlantic, and westward to the Pa-

cific, including all the public land States and Territories of the Union, with the exception of Alaska, formerly Russian America, the system has worked satisfactorily, furnishing facilities for the acquisition of public lands in any region of the country, and methods for the restoration of landmarks which may be lost or destroyed by time or accident. Adequate means exist in the surrounding landmarks of the adjacent public surveys, whereby missing metes and bounds can be restored in accordance with the original field-notes thereof, and the designations placed on township plats. Its recommendations to the public, lie in its economy, simplicity, and brevity of description, in deeding the premises by patent and for future conveyancing, and in the convenience of reference from the most minute legal subdivision to the corners and lines of sections, and of townships of given principal base and meridians. Its greatest convenience is its extreme simplicity of description. Any person, by its monuments and markings, can readily find the tract sought for. It was originated for land-parceling for sale, and it has answered the purpose.”

Geographical Position of the Principal Surveying Meridians, Base Lines and Initial Points.

Preliminary to surveying the public lands, surveying districts are established, in which one or more initial points are located at intersection of meridians and base lines from which to survey the lands of the district.

INITIAL POINTS.

Since the adoption of the rectangular system of public surveys, May 20, 1785, thirty-five initial points have been brought into requisition to secure the certainty and brevity of description in the transfer of public lands to individual ownership. From these initial points, townships of six miles square are run

out and established with regular series of numbers, counting north and south from the base lines, and from the surveying meridians a like series of ranges are numbered, both east and west of the principal meridians. During the period of one hundred years, since the organization of the public land system, the following principal meridians and base lines have been established. The intersection of these base lines with the meridians, forms the several initial points from which the surveys have been made, and from which the townships and ranges number.

SURVEYING MERIDIANS AND BASE LINES.

The *First or Eastern Ohio Meridian* is the State line between Ohio and Pennsylvania; it starts from the first initial point established for public land surveys, which is on the right bank of the river Ohio at intersection of above named State line, runs north to Lake Erie and is coincident with longitude $3^{\circ} 34'$ west from Washington. Three base lines are connected with this meridian, described as follows; The first base known as the "Geographers Line," established in 1786, runs from first initial point west 42 miles, and is the first established line for surveying the public domain. The Ohio River is the base from which all public lands surveyed from this meridian are numbered. The 41st parallel of latitude is the base from which the Connecticut Reserve was surveyed (but not by Government). All public lands lying in Eastern Ohio, except the United States Military Reservation, have been surveyed from this meridian.

The *Great Miami River Meridian* is the left bank of the Great Miami River from the Ohio River to the Indian boundary line. The base line intersects the left bank of Great Miami River near the confluence of Taylor's Creek, and runs east to Little Miami River. It was established by John Cleve Symmes, from which to survey his purchase, and was adopted by government for surveys between the Great and Little Miami Rivers in Ohio. The territory surveyed from this meridian may be described as follows: All the territory lying between the Great and Little Miami Rivers, south and west of the Indian boundary line and Virginia military tract.

The *United States Military Reservation Meridian*, located on the west line of the "First Seven Ranges," was established from a point forty-two miles west, and fifty miles south, from intersection of Ohio and Pennsylvania State line, with right bank of Ohio River, first initial point established, from which point the meridian runs north fifty miles, and the base line west to the Scioto River. Only the United States military reservation is surveyed from this meridian.

The *First Principal Meridian* is the State line between Ohio and Indiana; it starts from the confluence of the Great Miami River and the Ohio, and runs north between Ohio and Indiana to the northeast corner of Indiana. On this meridian there are two initial points, one at the intersection of the meridian with the Ohio River, the other the forty-first parallel of latitude. For the first initial point, the Ohio River is the base line, from the mouth of the Great Miami River to a point down the river, opposite mouth of Kentucky River, where the Indian boundary line intersects it. From this initial point the southwest corner of Ohio, and the southeast corner of Indiana were surveyed. From the second initial point a base line runs east to Connecticut reserve; from which is surveyed the territory described as follows: North-west Ohio, lying west of Connecticut reserve, and north of Indian boundary line and Virginia military tract, except a narrow strip across north end of State, surveyed from Michigan meridian. This meridian is coincident with $7^{\circ}-48'$ of longitude west from Washington.

The *Second Principal Meridian* starts from the confluence of the Little Blue River with the Ohio, runs north to the northern boundary of Indiana. The base line for this meridian commences at Diamond Island in the Ohio River, and runs due west to the Mississippi River, west of territory surveyed from this meridian it is the base for the third principal meridian. All of Indiana (except southeast corner) is surveyed from this meridian. It also governs the survey of southeast Illinois (a strip about four ranges wide.) This meridian coincides with $9^{\circ}-25'$ of longitude west from Washington.

The *Third Principal Meridian* starts from the mouth of

the Ohio River and extends to the northern boundary of the State of Illinois. The base line for this meridian is the continuation of the base line from the second meridian. The territory surveyed from this meridian may be described as follows: All the State of Illinois lying east of the meridian, with the exception of surveys projected from the second meridian, and west of the meridian, all of Illinois lying south of Illinois River. This meridian coincides with $12^{\circ}-7'-29''$ of longitude west from Washington.

The *Fourth Principal Meridian* begins in the middle of the channel of the mouth of the Illinois River, in latitude $38^{\circ}-52'-12''$ north, and longitude $13^{\circ}-26'-55''$ west from Washington; it extends due north through Illinois, Wisconsin and north-eastern Minnesota, terminating at intersection of line between United States and British America. This meridian has two initial points and base lines. The first initial point was established on the right bank of the Illinois River, where the meridian leaves the river, it is seventy-two miles north of its mouth. From this initial point the first base line runs west to the Mississippi River, from which, all of Illinois lying west of the Illinois River, and third principal meridian, was surveyed. The second base line is on latitude $42^{\circ}-30'$ (State line between Illinois and Wisconsin) and extends from the Mississippi River to Lake Michigan. From this base has been surveyed all of Wisconsin, and that part of Minnesota lying East of the Mississippi River and the third guide meridian, west of the fifth principal meridian north of the river.

The *Fifth Principal Meridian* starts from the mouth of the Arkansas River and runs due north to the Mississippi River. From this point the surveys extend up the right bank of the river to a point due north of the fifth principal meridian, where the meridian is again established, terminating at the right bank of the Mississippi River, a few miles above Dubuque, Iowa. The base line for this meridian runs from the mouth of the St. Francis River, in Arkansas, due west to the Indian Territory. The township line between townships 67 and 68 north is used as a base line for Iowa surveys and correction lines, and the $43^{\circ}-30'$ north latitude (line between Iowa and Minnesota) is used as a base line

for surveys and standard parallels in Minnesota. All townships are numbered from base line in Arkansas. This meridian governs the surveys in Arkansas, Missouri, Iowa, and in Minnesota, all west of the Mississippi, and the third guide meridian, north of the river, and in Dakota all east of the Missouri River, and north of Sioux Indian Reservation. This meridian is coincident with $13^{\circ}-55'$ longitude west from Washington.

The *Sixth Principal Meridian* coincides with longitude $20^{\circ}-19'$ west from Washington, and from the principal base line intersecting it on the 40th degree of north latitude (the State line between Kansas and Nebraska) it runs due north through Nebraska to the intersection of the Missouri River (nearly opposite Yankton, Dakota) and due south through Kansas to the 37th degree of north latitude (south line of Kansas). The base line for this meridian runs due west from intersection of 40th degree of north latitude with Missouri River, across the Rocky Mountains to intersection of the line between Utah and Colorado. The following territory has been surveyed from this meridian, viz: All of Kansas, Nebraska and Wyoming, all of Colorado, except south western Colorado, where the surveys are projected from New Mexico and Ute meridians, also that part of Dakota lying west of Missouri River, south of Big Cheyenne River and east of Black Hills country (the exact boundaries of which are not established.)

The *Michigan Meridian*, in longitude $7^{\circ}-16'-08''$ west from Washington, runs from south line of Michigan due north to British America, with a base line on a parallel seven miles north of Detroit, and extending from Lake St. Clair, on the east, to Lake Michigan on the west. This meridian governs the surveys in Michigan, and strip across north end of Ohio.

The *St. Stephens Meridian*, in longitude $10^{\circ}-59'$ west from Washington, starts from head of Mobile Bay, near Mobile, and runs due north about one hundred and sixty miles, passing just east of Saint Stephens in Alabama. It intersects the base line on the 31st degree of north latitude and controls the surveys of the southern district in Alabama, and of the Pearl River district,

lying east of the river and south of township ten north, in the State of Mississippi.

The *Huntsville Meridian*, in longitude $9^{\circ}-35'$ west from Washington, extends from the northern boundary of Alabama due south about one hundred and thirty miles, passing just east of Huntsville. The base for this meridian is the 35th degree north latitude (State line between Alabama and Tennessee) This meridian governs the surveys of northern Alabama and a few townships in Mississippi. (See Mississippi State map.)

The *Washington Meridian* (sometimes called the Saint Helena) is coincident with longitude $14^{\circ}-02'$ west from Washington, and runs from 31st degree of north latitude, due north to the Mississippi River, passing a few miles east of Washington, in the State of Mississippi. The base line for this meridian is on the 31st degree of north latitude. The surveys governed by this meridian are in the south-western angle of the State, between the Pearl and Mississippi Rivers, and extend up the Mississippi River a few miles above Vicksburg.

The *Choctaw Meridian* is coincident with longitude $13^{\circ}-09'$ west from Washington. It runs from a line of latitude established as the base of this meridian (about 29 miles south of Jackson, Mississippi,) due north to the Chickasaw boundary line. The base line runs from point of intersection with the meridian due west four ranges, and due east from said point to State line, and governs the surveys in the central part of the State, east and west of the meridian, and north of the base.

The *Chickasaw Meridian* is coincident with longitude $12^{\circ}-16'$ west from Washington, and runs from the base line which is the State line between Mississippi and Tennessee due south fourteen townships, terminating near the Chickasaw boundary line. The base line for this meridian is on the 35th parallel of north latitude; it extends from the Tennessee River to the Mississippi, and governs the surveys in Northern Mississippi.

The *Saint Helena Meridian* is coincident with longitude $14^{\circ}-08'$ west from Washington; it runs from the 31st degree of north latitude due south to the Mississippi River, just east of Baton

Rouge. The base line is on the 31st degree of north latitude. This line of latitude is the base for four meridians, viz: Saint Stephens, Washington, Saint Helena, and Louisiana meridians. This meridian governs the surveys in Louisiana, east of the Mississippi River.

The *Louisiana Meridian*, longitude $15^{\circ} 17'$ west from Washington, intersects the 31st degree north latitude at a distance of forty-eight miles west of the eastern bank of the Mississippi River, and, with the base line coincident with the said parallel of north latitude, governs the surveys in Louisiana west of the Mississippi.

The *Tallahassee Meridian* in longitude $7^{\circ}-15'$ west from Washington, runs due north and south from the point of intersection with the base line at Tallahassee and governs the surveys in Florida.

The *New Mexico Meridian*, longitude $29^{\circ} 49' 08''$ west from Washington, intersects the principal base line on the Rio Grande del Norte about ten miles below the mouth of the Puerco River, on the parallel of $34^{\circ} 19'$ north latitude, and controls the surveys in New Mexico, and in the valley of the Rio Grande del Norte, in Colorado.

The *Great Salt Lake Meridian*, longitude $34^{\circ}-50'-46''$ west from Washington, intersects the base line at the corner of Temple Block, in Salt Lake City, Utah, on the parallel of $40^{\circ} 46' 04''$ north latitude, and governs the surveys in the Territory of Utah.

The *Boise Meridian*, longitude $39^{\circ} 17'$ west from Washington, intersects the principal base between the Snake and Boise Rivers, in latitude $43^{\circ} 26'$ north. The initial monument at the intersection of the base and meridian, is nineteen miles distant from Boise City, on a course of south $29^{\circ} 30'$ west. This meridian governs the surveys in the Territory of Idaho.

The *Mount Diablo Meridian*, California, coincides with longitude $44^{\circ} 51'$ west from Washington, intersects the base line on the summit of the mountain from which it takes its name, in latitude $37^{\circ} 53'$ north, and governs the surveys of all Central and North-eastern California and the entire State of Nevada.

The *San Bernardino Meridian*, California, longitude $39^{\circ} 53'$, west from Washington, intersects the base line at Mount San Bernardino, latitude $34^{\circ} 06'$ north, and governs the surveys in Southern California lying east of the meridian and that part of the surveys situated west of it which are south of the eighth standard parallel south of the Mount Diablo base line.

The *Humboldt Meridian*, longitude $47^{\circ} 08'$ west from Washington, intersects the principal base line on the summit of Mount Pierce, in latitude $40^{\circ} 25' 30''$ north, and controls the surveys in the north-western corner of California lying west of the Coast range of mountains and north of township 5 south of the Humboldt base.

The *Willamette Meridian* is coincident with longitude $45^{\circ} 41'$ west from Washington, its intersection with the base line is on the parallel of $45^{\circ} 30'$ north latitude, and it controls the public surveys in Oregon and Washington Territory.

The *Montana Meridian* extends north and south from the initial monument established on the summit of a limestone hill, eight hundred feet high, longitude $34^{\circ} 37' 53''$ west from Washington. The base line runs east and west from the monument on the parallel of $45^{\circ} 46' 27''$ north latitude. The surveys for the entire Territory of Montana are governed by this meridian.

The *Gila and Salt River Meridian* intersects the base line on the south side of the Gila River, opposite the mouth of Salt River, in longitude $35^{\circ} 12' 45''$ west from Washington, and latitude $33^{\circ} 22' 57''$ north, and governs the public surveys in the Territory of Arizona.

The *Indian Meridian* intersects the base line at Fort Arbuckle, Indian Territory, in longitude $20^{\circ} 12' 55''$ west from Washington, latitude $34^{\circ} 31'$ north, and governs the surveys in that Territory.

The *Wind River Meridian* governs the subdivisional surveys within the Shoshone Indian Reservation, in the Territory of Wyoming.

The *Uinta special base and Meridian* governs the surveys of the Uinta Indian Reservation, in the Territory of Utah.

The *Navajoe special base and Meridian* controls the surveys of the Navajoe Indian Reservation, in the Territories of New Mexico and Arizona.

The *Black Hills Meridian* is coincident with the west boundary of the Territory of Dakota, on the 27° of longitude west from Washington, and intersects the base line on the parallel of 44° north latitude; it governs the surveys in the south-western corner of the Territory named.

The *Ute Meridian* and base line governs the subdivisinal surveys for allotment to the Ute Indians, in Western Colorado.

The *Cimarron Meridian* is coincident with the eastern boundary of the Territory of New Mexico, or $25^{\circ} 57'$ meridian of longitude west from Washington, and intersects the base line on the parallel of $36^{\circ} 30'$ north latitude, or the north boundary of the State of Texas, and governs the surveys in the strip of public lands inclosed between the States of Kansas and Colorado on the north, the Indian Territory on the east, the State of Texas on the south, and the Territory of New Mexico on the west.



Instructions of Land Commissioner
TO THE
Surveyors General of the United States.

On the succeeding pages are given the latest instructions for surveying the public lands; they are from the Commissioner of the General Land Office to the Surveyors General of the different Surveying Districts of the United States, relative to the survey of the public lands and private land claims, to which are added the sections and paragraphs printed in italics to show the changes and modifications in the public land system since its inauguration in 1785, to the present time: they are based on the written and printed instructions that have been issued from time to time, and from inspection of field-notes of early surveys. To give all the decisions, instructions and laws, would make this work too voluminous, and the following abbreviated plan has been adopted, viz: The sections or paragraphs of the present instructions that have changed the markings in the field work, or the order of establishing surveys, have immediately following them, in italics, all the modifications, changes and differences between the present and past instructions.

For changes shown by original field-notes, based either on special instructions or on lack of definite instructions, see diagrams and descriptive notes with each State.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,

Washington, D. C., May 3, 1881.

GENTLEMEN: The following instructions, including full and minute directions for the execution of surveys in the field, are issued under the authority

given me by sections 453, 456, 2398, and 2399 United States Revised Statutes, and must be strictly complied with by yourselves and your deputy surveyors.

Very respectfully,

J. A. WILLIAMSON,

Commissioner.

TO SURVEYORS GENERAL OF THE UNITED STATES.

In effect January 1st, 1886.

Forms of oaths, bonds and contracts, omitted.

1. The public lands of the United States are ordinarily surveyed into rectangular tracts, bounded by lines conforming to the cardinal points.

2. The public lands shall be laid off, in the first place, into bodies of land of 24 miles square as near as may be. This shall be done by the extension of standard lines from the principal meridian every 24 miles, and by the extension, from the base and standard lines, of auxiliary meridians every 24 miles. Thereafter they shall be laid off into bodies of land of 6 miles square, as near as may be, called *townships*, containing as near as may be 23,040 acres. The townships shall be subdivided into 36 tracts, called sections, each containing as near as may be 640 acres. Any number or series of contiguous townships, situated north or south of each other, constitute a *range*.

SECTION 2 In this section the instruction to lay off the public lands into bodies of land 24 miles square, applies only to surveys established since 1879. Early instructions say: "Standard lines will be run east and west as the case may require." Auxiliary meridians and standard parallels (commonly called correction or standard lines) are located very irregularly in the public land States and Territories. See Section 5.

The law requires that the lines of the public surveys shall be governed by the true meridian, and that the townships shall be *six miles square*—two things involving in connection a mathematical impossibility—for, strictly to conform to the meridian, necessarily throws the township out of square, by reason of the convergency of meridians, and hence, by adhering to the true meridian, results the necessity of departing from the strict requirements of law, as respects the precise area of townships and the subdivisional parts thereof, the township assuming something

of a trapezoidal form, which inequality develops itself more and more as such, the higher the latitude of the surveys. It is doubtless in view of these circumstances that the law provides (see section 2 of the act of May 18, 1796) that the sections of a mile square shall contain the quantity of 640 acres, *as nearly as may be*; and, moreover, provides (see section 3 of the act of May 10, 1800, in the following words: "And in all cases where the exterior lines of the townships, thus to be subdivided into sections or half sections, shall exceed, or shall not extend 6 miles, the excess or deficiency shall be specially noted, and added to or deducted from the western or northern ranges of sections or half sections in such township, according as the error may be in running the lines from east to west, or from south to north; the sections and half sections bounded on the northern and western lines of such townships shall be sold as containing only the quantity expressed in the returns and plats, respectively, and all others as containing the complete legal quantity."

The accompanying diagram, marked A, and the specimen field-notes pertaining to the same, will serve to illustrate the method of running lines to form tracts of land 24 miles square, as well as the method of running out the exterior lines of townships, and the order and mode of subdividing townships will be found illustrated in the accompanying specimen field-notes, conforming with the township diagram B. The method here presented is designed to insure as full a compliance with all the requirements, meaning, and intent of the surveying laws as, it is believed, is practicable.

The section lines are surveyed from *south* to north on true meridians, and from *east* to west, in order to throw the excesses or deficiencies in measurements on the north and west sides of the township, as required by law. In case where a township has been partially surveyed, and it is necessary to complete the survey of the same, or where the character of the land is such that only the north or west portions of the township can be surveyed, this rule cannot be strictly adhered to, but, in such cases, must be departed from only so far as is absolutely necessary. It will also be necessary to depart from this rule where surveys

close upon State or Territorial boundaries, or upon surveys extending from different meridians.

SECTION 2—Paragraph 4. *Section lines established under the public land system are surveyed from south to north and from east to west, except in the following States, viz: Ohio, Mississippi, Alabama and all of Louisiana, east of Mississippi River. For establishment of section lines in above-named States, see diagrams accompanying State maps.*

3. The townships are to bear numbers in respect to the base line, either north or south of it; and the tiers of townships called "ranges" will bear numbers in respect to the meridian line according to their relative position to it, either on the east or west.

SECTION 3—*Applies to all public lands surveyed, except the Miami Valley tract, in Ohio, surveyed from Great Miami River meridian, in which the ranges and townships are reversed in their order of numbering. Ranges number north from base line, and townships number east from the meridian.*

4. The thirty-six sections into which a township is subdivided are numbered, commencing with number one at the northeast angle of the township, and proceeding west to number six, and thence proceeding east to number twelve, and so on, alternately, until the number thirty-six in the southeast angle. In all cases of surveys of fractional townships, the sections should bear the same numbers as they would if the township was full.

SECTION 4. *The present plan of numbering the sections does not apply to the townships in the seven ranges, surveyed from First or Eastern Ohio meridian, and in the Miami Valley tract, surveyed from the Great Miami River meridian. Sections in the above-described tracts are numbered by commencing at the southeast corner of the townships with number one, proceeding north with number six in the northeast corner, each tier is numbered from south to north, in the same manner ending with Section 36 in the northwest corner of the townships.*

The following diagram illustrates the original plan (ordinance of May 20, 1785,) of numbering the sections.

36	30	24	18	12	6
35	29	23	17	11	5
34	28	22	16	10	4
33	27	21	15	9	3
32	26	20	14	8	2
31	25	19	13	7	1

The following diagram illustrates the plan adopted by Government for numbering sections in the subdivision of townships under the public land system, except in the following tracts, viz: "United States Military tract, the Seven Ranges, the Ohio Company's and Symmes' purchases, and the Miami Valley tract, all located in Ohio:

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

5. Standard parallels shall be established at intervals of every 24 miles, north and south of the base line, and auxiliary meridians at intervals of every 24 miles, east and west of the principal meridian; the object being to confine the errors resulting from convergence of meridians, and inaccuracies in measure-

ments, within the tracts of lands bounded by the lines so established.

SECTION 5—Auxiliary Meridians. *In the early surveys they were only known as correction lines, and were established with no regularity. In the more recent surveys there are only six States and Territories in which they are established with any regularity. In these they are established seven or eight ranges apart. (See following classification).*

STANDARD PARALLELS.

The original field-notes show the standard parallels to be established with more regularity than the auxiliary meridians, and the greater necessity exists for it, owing to converging of meridional lines. In nine of the States they are established irregularly; in three States every ten townships; in sixteen States every four or five townships; usually every four townships north and five townships south of the base line. There are two States, California and Nevada, that reverse the order. The standard parallels are established every five townships north, and every four townships south of base line. The Surveyor General of California says: "They were erroneously commenced, making standards every four townships south, and every five townships north from base line. There was no authority for this, but the error once made it has been continued to the present day." The following classifications of States will illustrate the auxiliary meridians and standard parallels, as established in the several States and Territories.

In Ohio, Indiana, Illinois, Arkansas, Missouri, Mississippi, Louisiana, Alabama, Florida and Idaho, the auxiliary (sometimes called guide) meridians, and the standard parallels (called correction lines) are established at irregular distances from base and meridian lines, and from each other.

In Iowa, Wisconsin and Michigan, the auxiliary meridians are established at irregular distances, and the standard parallels every ten townships (60 miles)

In Nebraska, Kansas, Colorado and Wyoming, the meridians are established every 8 ranges (48 miles), and the

standard parallels north of the base line, every four townships, and south of the base, every five townships (24 or 30 miles).

In Minnesota and Dakota the auxiliary meridians are established every 7 ranges (42 miles), and the standard parallels every four townships (24 miles).

In Oregon, Washington, Montana, Utah, Arizona, New Mexico, California, Nevada and Indian Territory, the auxiliary meridians are established at irregular distances, and the standard parallels north of base line every four townships, south of base every five townships, except in California and Nevada, where the order is reversed, north of base line every five townships, and south of base line every four townships.

In the above classification, mountains, rivers and other obstacles make exceptions.

6. The survey of all principal base and meridian, standard parallel, and auxiliary meridian, and township lines must be made with an instrument operating independently of the magnetic needle. Burt's *improved solar compass*, or other instrument of equal utility, must be used of necessity in such cases; and it is deemed best that such instrument should be used under all circumstances. Where the needle can be relied on, however, the ordinary compass may be used in subdividing and meandering. Whenever deputies use instruments with magnetic apparatus only, they must test the accuracy of their work and the condition of their instruments by at least three observations upon a circumpolar star, upon different days, between the commencement and the close of surveying operations in any given township. Deputies using instruments with solar apparatus are not required to make observations of the star Polaris, but they must test their instruments by taking the latitude daily, weather permitting, in running base, standard, meridian, and range lines, and upon three different days during the execution of subdivisive surveys in each township. They must make complete records in their field-notes, under proper dates, of the making of all observations in compliance with these instructions, showing the style and condition of the instrument in use, and the angle formed by comparing the line run with the meridian as by observation determined.

SECTION 6. *In the early surveys a common surveyor's compass was used for establishing all lines, the meridian and base lines, as well as section lines. The following, from instruction of 1837, illustrates the inspection necessary at that time, viz: "The variation of the needle should be taken (by an observation of the pole star) at least once in every fourth range and township." Now only the most improved instruments are allowed to be used, and frequent inspection is required.*

7. The construction and adjustments of all surveying instruments used in the surveying of the public lands of the United States must be tested at least once a year, and oftener if necessary, by comparison with the true meridian, established under the direction of the surveyor-general of the district; and the instruments must be so modified in construction, or in such a way corrected, as may be necessary to produce the closest possible approximation to accuracy and uniformity in the operation of all such instruments. A record will be made of such examinations, showing the number and style of the instrument, name of the maker, the quantity of instrumental error discovered by comparison, in either solar or magnetic apparatus, or both, and means taken for correction. The surveyor-general will allow no surveys to be made until the instruments to be used therefor have been approved by him.

8. The township lines and the subdivision lines will usually be measured by a two-pole chain of 33.03 feet in length, consisting of 50 links, and each link being 7 inches and ninety-two hundredths of an inch long. On uniform and level ground, however, the four-pole chain may be used. The measurements will, however, always be represented according to the four-pole chain of 100 links. The four-pole chains must be adjusted to lengths of 66.06 feet. The object in adding six hundredths of a foot to the 66 feet of a four-pole chain is to assure thereby that 66 feet will be set off upon the earth's surface without the application of a greater strain than about 20 pounds by the chainmen, thus providing for loss by vertical curvature of the chain, and at the same time avoiding the uncertain results attending the application of

strains taxing its elasticity. The deputy surveyor must provide himself with a measure of the standard chain kept at the office of the surveyor-general, to be used by him as a field standard. The chain in use must be compared and adjusted with this field standard each working day, and such field standard must be returned to the surveyor-general's office for examination when his work is completed.

SECTION 8. *Length of chain used in public land system from its establishment in 1785 to 1880, was 66 feet, since that date 66.06 feet. Early instructions were to adjust chain every two days.*

OF TALLY PINS.

9. You will use eleven tally pins made of steel, not exceeding 14 inches in length, weighty enough toward the point to make them drop perpendicularly, and having a ring at the top, in which is to be fixed a piece of red cloth, or something else of conspicuous color, to make them readily seen when stuck in the ground.

SECTION 9. *From printed instructions of 1837: "You must likewise be provided with a full set of tally rods, of iron or steel, or pointed therewith, and allow none others to be used but the precise number you shall have selected for that purpose."*

The above instructions are given to show, by comparison, the care exercised in the present instruction, to avoid mistakes.

PROCESS OF CHAINING.

10. In measuring lines with a two-pole chain, every *five* chains are called "a *tally*"; and in measuring lines with a four-pole chain, every *ten* chains are called "a *tally*," because at that distance the last of the ten tally pins with which the forward chainman set out will have been stuck. He then cries "tally"; which cry is repeated by the other chainman, and each registers the distance by slipping a thimble, button, or ring of leather, or something of the kind, on a belt worn for that purpose, or by some other convenient method. The hind chainman then comes up, and having counted in the presence of his fellow the tally pins which he has taken up, so that both may be assured that

none of the pins have been lost, he then takes the forward end of the chain, and proceeds to set the pins. Thus the chainmen alternately change places, each setting the pins that he has taken up, so that one is forward in all the odd, and the other in all the even tallies. Such procedure, it is believed, tends to insure accuracy in measurement, facilitates the recollection of the distances to objects on the line, and renders a mis-tally almost impossible.

SECTION 10. *In early instructions the detail of chaining was left to the surveyors, and the present instructions have been the outgrowth of errors committed at different times in the field work. For full, minute and specific instructions this section most clearly demonstrates the thoroughness of the present over former instructions.*

LEVELING THE CHAIN AND PLUMBING THE PINS.

11. The length of every line you run is to be ascertained by precise horizontal measurement, as nearly approximating to an air line as is possible in practice on the earth's surface. This all-important object can only be attained by a rigid adherence to the three following observances :

1. Ever keeping the chain *stretched* to its utmost degree of tension on even ground.

2. On uneven ground, keeping the chain not only stretched as aforesaid, but horizontally *leveled*. And when ascending and descending steep ground, hills, or mountains, the chain will have to be *shortened* to one-half its length (and sometimes more), in order accurately to obtain the true horizontal measure.

3. The careful plumbing of the tally pins, so as to attain precisely *the spot* where they should be stuck. The more uneven the surface, the greater the caution needed to set the pins.

SECTION 11. *From printed instructions of 1837: "As the measurement by the chain is the principal source of errors in surveying, you will be careful to attend to your chain-men, that they carry the chain horizontally and plumb the pins."*

MARKING LINES.

12. All lines on which are to be established the legal corner boundaries are to be marked after this method, viz: Those trees which may intercept your line must have two chops or notches cut on each side of them without any other marks whatever. These are called "*sight trees*" or "*line trees.*" A sufficient number of other trees standing within 50 links of the line, on either side of it, are to be *blazed* on two sides diagonally, or quartering toward the line, in order to render the line conspicuous, and readily to be traced, the blazes to be opposite each other, coinciding in direction with the line where the trees stand very near it, and to approach nearer each other the farther the line passes from the blazed trees. Due care must ever be taken to have the lines so well marked as to be readily followed, and to cut the blazes deep enough to have recognizable scars as long as the trees stand.

Where trees 2 inches or more in diameter are found, the required blazes must not be omitted.

Bushes on or near the line should be bent at right angles therewith, and receive a blow of the ax about the usual height of blazes from the ground sufficient to leave them in a bent position, but not to prevent their growth.

ON TRIAL, OR RANDOM LINES,


The trees are not to be blazed, unless occasionally, from indispensable necessity, and then it must be done so guardedly as to prevent the possibility of confounding the marks of the trial line with the *true*. But bushes and limbs of trees may be lopped, and *stakes set* on the trial or random line, at every *ten* chains, to enable the surveyor on his return to follow and correct the trial line and establish therefrom the *true line*. To prevent confusion the temporary stakes set on the trial or random lines must be *pulled up* when the surveyor returns to establish the true line.

From Instructions of 1864.

SECTION 12. "*On trial or random lines, when it is necessary to lop bushes they should be bent in the direction of the line, to prevent mistaking random for true lines.*"

INSUPERABLE OBJECTS ON LINE—WITNESS POINTS.

13. Under circumstances where your course is obstructed by impassable obstacles, such as ponds, swamps, marshes, lakes, rivers, creeks, &c., you will prolong the line across such obstacles by taking the necessary right angle offsets; or, if such be inconvenient, by a traverse or trigonometrical operation, until you regain the line on the opposite side. And in case a north and south, or a true east and west line is regained in advance of any such obstacle, you will prolong and mark the line back to the obstacle so passed, and state all the particulars in relation thereto in your field-book. And at the intersection of lines with both margins of impassable obstacles, you will establish a *witness point* (for the purpose of perpetuating the intersections therewith), by setting a post, and giving in your field-book the course and distance therefrom to two trees on opposite sides of the line, each of which trees you will mark with a blaze and notch facing the post; but on the margins of navigable water-courses, or navigable lakes, you will mark the trees with the proper number of the fractional section, township and range.

 The best marking tools adapted to the purpose must be provided for marking neatly and *distinctly* all the letters and figures required to be made at corners, *arabic* figures being used exclusively; and the deputy is always to have at hand the necessary implements for keeping his marking irons in order.

ESTABLISHING CORNERS.

To procure the faithful execution of this portion of a surveyor's duty is a matter of the utmost importance. After a true coursing and most exact measurements the establishment of corners is the consummation of the work. If, therefore, the corner be not perpetuated in a permanent and workmanlike manner the *great aim* of the surveying service will not have been attained.

The following are the different points for perpetuating corners, viz:

1. For township boundaries, at intervals of every 6 miles.
2. For section boundaries, at intervals of every mile, or 80 chains.

3. For quarter-section boundaries, at intervals of every half mile, or 40 chains. Exceptions, however, occur, as fully set forth hereafter in that portion of the manual showing the manner of running township lines and method of subdividing.

4. Meander corners are established at all those points where the lines of the public surveys intersect the banks of such rivers, bayous, lakes, or islands as are by law directed to be meandered.

For description of corners see field notes.

WITNESS CORNERS.

A Witness Corner must bear the same marks that would be placed upon the Corner for which it is a witness, with the addition of the letters W. C., and be established in all respects like such Corner.

If bearing trees are established for a Witness Corner, each tree must be marked W. C., in addition to the usual marks.

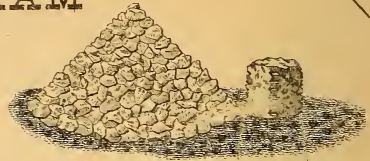
ESTABLISHING CORNERS.

The present instructions are very explicit for form and language to be used for corners. The following are from instructions of 1850. Posts common to four townships have in addition to present markings, on the northeast and southwest faces, the number of ranges they face, on the southeast and northwest faces the number of townships they face. Instructions for districts formed prior to 1850 are for sections only to be marked, leaving off the township and range. Instructions of 1815 make no mention of corner posts or trees to be marked, except notched. For interior section corners prior to 1864 the four corners, instead of two corners, were notched, showing the number of sections from township boundaries, (except instructions for 1815, which are for only two edges to be notched.) Instructions of 1856 for Missouri and Illinois are for trees and posts to be notched on the four edges, but for stones only on two edges, same as present instructions. Mounds, in districts established from 1850 to 1864 had quadrangular trenches around them. See diagram, page 53. The following are the size and shape of mounds, from instructions of 1864: Township mounds will be five feet in diameter at their base, and

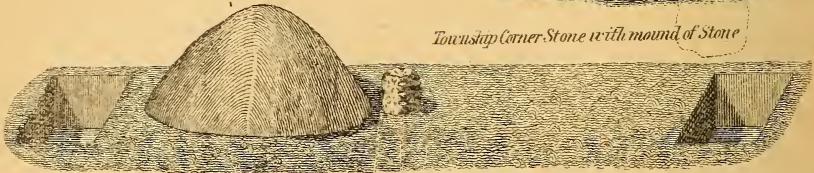
DIAGRAM

-C.

INSTRUCTIONS OF 1881
ILLUSTRATING MODE OF ESTABLISHING
SECTION POST AND MOUND CORNERS.



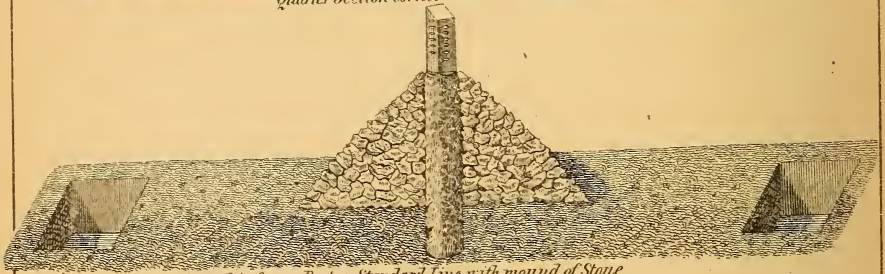
Township Corner Stone with mound of Stone



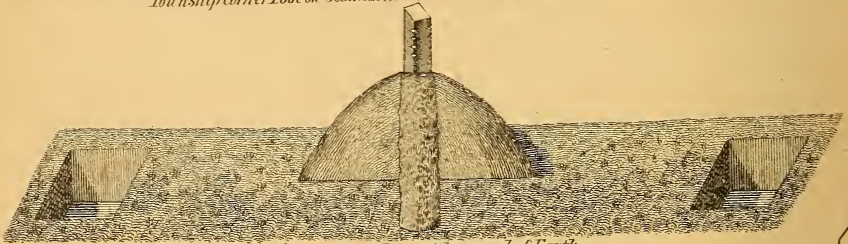
Section Corner Stone with pits and mound of Earth



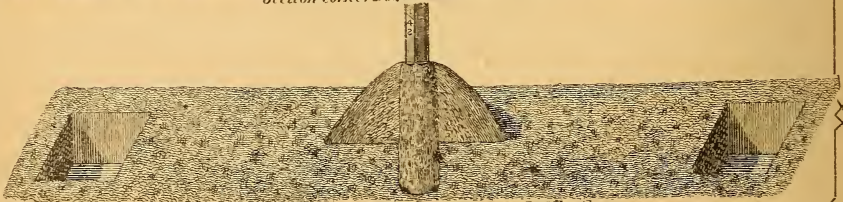
Quarter Section Corner with mound of Earth



Township Corner Post on Standard Line with mound of Stone



Section Corner Post with mound of Earth

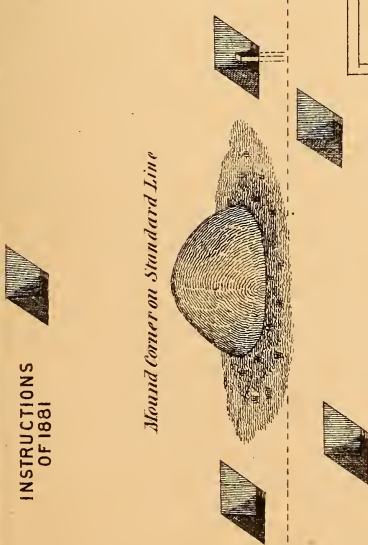


Quarter Section Corner Post with mound of Earth

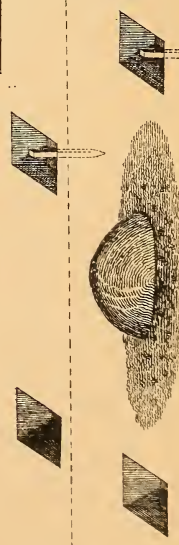
Continued

INSTRUCTIONS OF 1881

Mound Corner on Standard Line



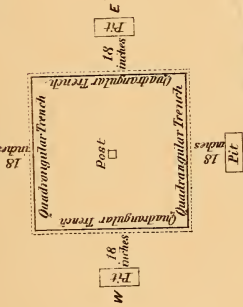
Mound Corner Common to 4 Sections



Quarter-Section Mound Corner

Position of Corner-Mound common to two townships or two sections

PLAN N



INSTRUCTIONS OF 1855

Position of Corner-Mound common to four townships or four sections

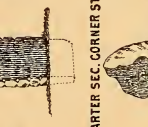
PLAN N



TOWNSHIP CORNER STONE



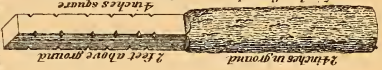
SECTION CORNER STONE



SECTION CORNER Flat Stone



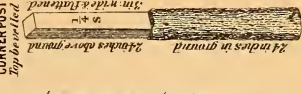
TOWNSHIP CORNER POST. Top beveled to form a rim



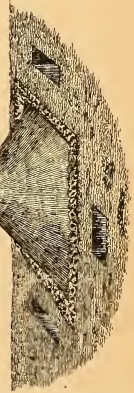
SECTION COR POST. Top beveled



QUARTER SEC CORNER POST. Top beveled



ELEVATION



two and one-half feet in perpendicular height. Mounds at section, quarter section, and meander corners, will be four and one-half feet in diameter at base, and two feet in perpendicular height. Instructions of 1850 for township mounds, six feet base, three feet in height; for section, quarter section and meander corners, five feet base, and two and one-half feet in height. Instructions for 1856 for Missouri and Illinois: Township mounds were five feet square at base, two feet square at top, three feet high; section corner mounds were four feet square at base, two feet square at top and two feet six inches high. Quarter-section corner mounds were three feet six inches square at base, one foot six inches square at the top and two feet high. Earlier instructions give dimensions as follows: For section and quarter-section mounds, diameter at base two feet, height two feet six inches. For Township mounds, diameter two feet six inches at base height three feet.

The early instructions mention for corners, but two bearing trees for any corners previous to 1828, although at township and interior section corners, four trees were marked for witness trees. Mounds erected before that time were smaller than those now used, having no deposit in them for any kind of corner. But since 1828 Deputy Surveyors have been required to describe in their field notes four bearing trees to township and interior section corners; only two being so described for all other corners.

MISCELLANEOUS.

Rock in Place.

SEC. 1. When a rock in place is established for a Corner, its dimensions above ground must be given, and a cross (×) marked at exact Corner point. In other respects form for stone corners will be used.

Mounds of Earth.

SEC. 2. Where mounds of earth are raised "alongside" of Corners, on N. and S. lines, they must be placed on the W. and on E. and W. lines on the N. side of Corner. In case the character of the land is such that this cannot be done, the deputy will state in his notes instead of "alongside," "S" (on E.)

Mounds of Stone.

SEC. 3. In case where pits are practicable, the deputy prefers

raising a mound of stone, or stone covered with earth, as more likely to perpetuate the Corner, he will use the form given for mound of stone, omitting the words "pits impracticable," and adding "covered with earth," when so established.

Bearing Trees.

SEC. 4. Where the requisite number of trees can be found within 300 links of the Corner point, three (3) bearing trees should be established for every Standard or Closing Cor., four (4) for every Cor., common to 4 Townships or Sections, and two (2) for every Quarter Sec. Cor. or Meander Cor. In case the requisite number cannot be found within limits, the deputy must state in his field-notes after describing those established, "no other trees within limits," and "dug pits in Secs. — & —," or "raised a mound of stone alongside."

Stones.

SEC. 5. Stones 18 ins. and less long must be set two-thirds, and over 18 ins. long, three-fourths of their length in the ground. No stones containing less than 504 cubic inches must be used for corners.

Objects to be Noted.

SEC. 6. Particular attention is called to the "Summary of objects and data required to be noted," on pages — and — of these instructions, and it is expected that the deputy will thoroughly comply with same in his work and field-notes.

Line Discontinued at Legal Corners.

SEC. 7. No mountains, swampy lands, or lands not classed as surveyable are to be meandered, and all lines approaching such lands must be discontinued at the section or quarter section corner.

Fractional Townships.

SEC. 8. Where by reason of impassable objects the south boundary of a township cannot be established, an east and west line should be run through the Township, first random, then corrected, from one range line to the other, and as far south as possible, and from such line the section lines will be extended in the usual manner, except over any fractions south of said line, which

may be surveyed in the opposite direction from the Section Corners on the auxiliary base thus established.

Boundaries.

SEC. 9. When no part of the east or west boundaries can be run, both the north and south boundaries will be established as true lines.

Convergency.

SEC. 10. Allowance for the convergency of Meridians must be made whenever necessary.

Red Chalk.

SEC. 11. All letters and figures cut in posts or trees must be marked over with red chalk to make them still more plain and durable.

Mode of Setting Corners.

SEC. 12. Township corners common to four townships, and section corners common to four sections, are to be set diagonally in the earth, with the angles in the direction of the lines. All other corners are to be set square, with the sides facing the direction of the lines.

Size of Posts, etc.

SEC. 13. The sizes of wooden posts, mounds, and pits noted in foregoing descriptions of corners are to be regarded as *minimum*, and whenever practicable to increase their dimensions it is desirable to do so.

Corner Materials.

SEC. 14. In establishing corners, stones should be used wherever practicable; then posts; and lastly, mounds, with stake in pit.

Examine Instructions.

SEC. 15. It is expected that the deputy surveyors will carefully read and familiarize themselves with these instructions, and all others contained in this volume, and will instruct their assistants as to their duties before commencing work. Extra copies will be furnished the deputies for the use of their assistants.

BASE LINE.

The base line shall be extended east and west from the initial point by the use of solar instruments or transits, as may be directed by the surveyor-general, in his special written instructions. Where solar instruments are used, the deputy must test said instruments in every 12 miles of line run, by taking the latitude, or by observation on the polar star; and in all cases where he has reason to suppose that said instrument is in error, he must take an observation on the polar star, and if error be found, must make the necessary corrections before proceeding with his survey. The proper corners shall be established at each 40 and 80 chains, and at the intersection of the line with rivers, lakes, or bayous that should be meandered, in accordance with the instructions for the establishment of corners. In order to check errors in measurement, two sets of chainmen, operating independently of each other, must be employed.

Where transits are used, the line will be run by setting off at the point of departure on the principal meridian, a tangent to the parallel of latitude, which will be a line falling at right angles to the said meridian. The survey will be continued on this line for twelve (12) miles, but the corners will be established at the proper points by offsets northerly from said line, at the end of each half mile. In order to offset correctly from the tangent to the parallel, the deputy will be guided by the table of offsets and azimuths contained in this volume. As the azimuths of the tangent is shown, the angle thence to the true meridian at each mile is readily found, thus indicating the direction of the offset line. The computations are made for a distance of 12 miles, at the end of which observations on the polar star must be taken for the projection of a new tangent. The computations are also upon even degrees of latitude; offsets for intervening parallels can be readily determined by interpolation. Where offset distances to quarter-section corners exceed 50 links, their di-

rection to the parallel can be determined in like manner by interpolation for azimuth.

Where said distances are less than 50 links interpolations for determining directions will not be required.

BASE LINES.

The present instructions, for establishing the Base Lines make them a line of latitude, in some of the early surveys the Base Lines were established at right angles to the meridian line and run due East and West with a common compass. These Base Lines are not lines of parallel but angular lines running East or West from initial points between a parallel and a tangent.

PRINCIPAL MERIDIAN.

The principal meridian shall be extended north and south from the initial point, by the use of solar instruments or transits, as may be directed by the surveyor-general in his special written instructions. Where solar instruments are used, the line will be run in the same manner as prescribed for running the base line by solar instruments. Where transits are used, observations upon the polar star must be taken within each 12 miles of line run. In addition to the above general instructions, it is required that in all cases where the establishment of a new principal meridian seems to be necessary to the surveyor-general, he shall submit the matter, together with his reasons therefor, to the Commissioner of the General Land Office, and the survey of such principal meridian shall not be commenced until written authority, together with such special instructions as he may deem necessary, shall have been received from the Commissioner.

PRINCIPAL MERIDIANS.

The Principal Meridians like the Base Lines were established in the first surveys with a common compass.

STANDARD PARALLELS.

Standard parallels, which are also called correction lines, shall be extended east and west from the principal meridian, at intervals of every 24 miles north and south of the base line, in the same manner as prescribed for running the base line.

AUXILIARY MERIDIANS.

Auxiliary meridians shall be extended north and south from

the base line, at intervals of every 24 miles east and west from the principal meridian, in the same manner as prescribed for running the principal meridian.

It is contemplated that these base, principal meridian, standard, and auxiliary meridian lines shall first be extended over the territory to be surveyed, and that afterwards township and section lines shall be run, where needed, within these tracts of 24 miles square, formed by the extension of these principal lines; and each surveyor-general will therefore cause said principal lines to be extended as rapidly as practicable.

STANDARD PARALLELS AND AUXILIARY MERIDIANS.

For establishment in the different States, see Section 5. page 33, also State maps in second part of this volume. In early surveys they were established with a common compass.

EXTERIORS OR TOWNSHIP LINES.

The east and west boundaries of townships are always to be run from south to north on a true meridian line; and the north and south boundaries are to be run from east to west, or from west to east (according to the location of the township to be surveyed with reference to prior surveys), on a *random* or trial line and corrected back on a true line. The distance north or south of the township corner to be closed upon, from the point of intersection of these random lines with the east or west boundary of the township, must be carefully measured and noted. Should it happen, however, that such random line should fall short, or overrun in length, or intersect the east or west boundary more than *three chains'* distance from the township corner thereon, as compared with the corresponding boundary on the south (due allowance being made for convergency), the line, and if necessary the entire exterior boundaries of the township, must be retraced, so as to discover and correct the error. In running random lines temporary corners are to be set at each 40 and 80 chains, and permanent corners established upon the true line as corrected back, in accordance with instructions, throwing the excess or deficiency on the west half mile, as prescribed by law. Permanent corners are to be established in accordance with instructions on the east and

west township boundaries at the time they are run. Whenever practicable the township lines within these tracts of 24 miles square, must be surveyed in regular order from *south to north* i. e., the exterior boundaries of the township in any one range lying immediately north of the south boundary of such tract of 24 miles square must first be surveyed, and the exteriors of the other three townships in said range extended therefrom, in regular order from *south to north*, and it is preferable to first survey the entire range of townships in such tract adjoining the east boundary or adjoining the west boundary, and the other three ranges in regular sequence. In cases, however where the character of the land is such that this rule cannot be complied with, the following will be observed.

In extending the *south* or *north* boundaries of a township to the *west* where the *southwest* or *northwest* corners cannot be established in the regular way by running a north and south line, such boundaries will be run *west on a true* line, allowing for convergency on the west half mile; and from the township corner established at the end of such boundary, the west boundary will be run *north* or *south*, as the case may be. In extending *south* or *north* boundaries of a township to the *east*, where the *southeast* or *northeast* corner cannot be established in the regular way, the same rule will be observed, except that such boundaries will be run *east on a true line*, and the *east* boundary run *north* or *south*, as the case may be. One set of chainmen only is required in running township lines.

From Instructions of 1837 and 1843,

EXTERIOR OR TOWNSHIP LINES.

“All Township boundary lines must be run with the compass adjusted to the true meridian unless otherwise instructed by this office. The variation of the needle should be taken by an astronomical observation at least once in every Fourth Range and Township and the result entered in your Field Book. Range lines will be run north or south as the case may require, and corners for quarter sections and sections will be established thereon at every half-mile and mile for the quarter sections and sections to the west

and not for those to the east of the line, except at Township corners. East and west standard lines will be run, east or west as the case may require, and corners established thereon at every half-mile and mile for the quarter-sections, sections and townships north of the line, and not for those south of it. All east and west township boundary lines other than standard lines will be run west on random and corrected east from township corner to township corner and the excess or deficiency in the length of the boundary must be added to or deducted from the south boundary of Section 31, west of the quarter-section corner. The section and quarter section corners, east of the quarter section corner on the south side of Section 31 will be established on the corrected line at every half mile and mile therefrom. At the intersection of all lines (randoms excepted) with navigable water courses you will establish corners for fractional sections. Whenever your course may be obstructed by impassable obstacles you will state in your Field Book the precise way you may adopt to prolong the line across.

Manual of surveying instructions prepared for Oregon in 1851 show the following change, from instructions previous to that time, as well as instructions since 1855, viz.: The township and section lines south of the base are made to start therefrom and close on the first standard parallel south, whereas under present instructions such lines are made to start from the first standard parallel south and to close to the north on the base.

From instructions of 1856 for Missouri and Illinois. "Range lines * * * will be run north * * *. Standard lines will be run either east or west, as the case may require. * * * All other east and west township lines will be run west on randoms, and corrected east from township corner to township corner, etc."

METHOD OF SUBDIVIDING.

1. The first mile, both of the south and east boundaries of each township you are required to subdivide, is to be carefully traced and measured before you enter upon the subdivision thereof. This will enable you to observe any change that may have taken place in the magnetic variation, as it existed at the time of running the township lines, and will also enable you to compare your chaining with that upon the township lines.

2. Any discrepancy arising either from a change in the magnetic variation or a difference in measurement, is to be carefully noted in the field-notes.

3. After adjusting your compass to a variation which you have thus found will retrace the eastern boundary of the township, you will commence at the corner to sections 35 and 36, on the south boundary, and run a line parallel to the range line, forty chains, to the quarter-section corner, which you are to establish between sections 35 and 36; continuing on said course forty chains farther, you will establish the corner to sections 25, 26, 35 and 36.

SECTIONS 1, 2 AND 3.—*The present method does not apply to early surveys made in Ohio, Alabama, Mississippi, and eastern part of Louisiana. For order of subdivision of townships surveyed from First or Eastern Ohio, Great Miami River, Choctaw, Chickasaw, St. Stephen, Washington and Helena meridians, see Diagrams with above mentioned States. (Second part.)*

Field notes accepted under present instructions instead of running the subdivision of south tier of sections in townships parallel to east line of township as per instruction, they run them due north with same variation as the range line.

*The following extract is from Commissioner's letter of Nov. 10th, 1885: * * * "The use of the word parallel in the third paragraph is not correct, mathematically speaking; the intention is to have the line run north by the compass, so adjusted as to retrace the range line." * * * **

4. From the section corner last named run a *random* line, without blazing, *due east*, for the corner of sections 25 and 36, on east boundary, and at forty chains from the starting point set a post for *temporary* quarter-section corner. If you intersect exactly at the corner, you will blaze your random line back, and establish it as the *true* line; but if your random line intersects the said east boundary, either north or south of said corner, you will measure the distance of such intersection, from which you will calculate a course that will run a *true* line back to the corner from which your random started, You will establish the *permanent* quarter-section corner at a point equidistant from the two terminations of the *true* line.

5. From the corner of sections 25, 26, 35 and 36, run due north between sections 25 and 26, setting the quarter-section post as before, at forty chains, and at eighty chains establishing the corner of sections 23, 24, 25, and 26. Then run a random *due east* for the corner of sections 24 and 25 on east boundary; setting temporary quarter-section post at forty chains; correcting back, and establishing *permanent* quarter-section corner at the equidistant point on the *true* line, in the manner directed on the line between sections 25 and 36.

SECTIONS 4 AND 5.—“*Random lines are to be run due east.*”
The following is from General Instructions to Deputy Surveyors, Dated 1837: “Where a township is not rectangular it may be convenient to deviate from the cardinal points in running random lines in order to intersect the corner run for. There are no objections to this mode but the exact course at which you run must be stated in your field notes.”

6. In this manner you will proceed with the survey of each successive section in the first tier, until you arrive at the north boundary of the township, which you will reach in running up a random line between sections 1 and 2. If this random line should not intersect at the corner established for sections 1, 2, 35, and 36, upon the township line, you will note the distance that you fall east or west of the same, from which distance you will calculate a course that will run a true line south to the corner from which your random started. If the north boundary of a township is a base or standard line, the line between sections 1 and 2 is to be run north as a *true* line, and the closing corner established at the point of intersection with such base or standard line; and in such case the distance from said closing corner to the nearest section or quarter-section corner on such base or standard line must be carefully measured and noted as a *connection line*.

7. In like manner proceed with the survey of each successive tier of sections, until you arrive at the fifth tier; and from each section corner which you establish upon this tier you are to run random lines to the corresponding corners established upon the range line forming the western boundary of the township; setting

as you proceed, each *temporary* quarter-section corner at forty chains from the interior section corner, so as to throw the excess or deficiency of measurement on the extreme tier of quarter sections contiguous to the township boundary; and on returning establish the *true* line, and establish thereon the *permanent* quarter-section corner.

SECTIONS 6 AND 7.—*The instructions in these sections represent one of the three important changes in the Public Land System since its adoption in 1785. The three important changes are the following, viz: 1st. A change in mode of subdividing townships; for illustration see Diagrams with Ohio Map. 2d. A change in subdividing the north and west tier of sections represented by these sections (6 and 7). 3d. The establishment of correction lines—dividing the public lands into squares twenty-four miles across, the object being to confine the errors resulting from converging of meridians and inaccuracies in measurements within the tracts of lands bounded by the correction lines. Present instruction in Sections 6 and 7 are to subdivide the north and west tier of sections into sections by running lines to the section corners established when the exterior lines of townships were run, etc. Under this instruction the following territory has been surveyed, viz: All the public lands surveyed west of the Mississippi River except Missouri and Arkansas. East of the Mississippi River the following has been surveyed from this instruction: Florida, Wisconsin and north two-thirds of Michigan. Instructions for Arkansas, Missouri, Illinois, Indiana, west part of Ohio and south part of Michigan were to subdivide the north and west tier of sections in each township by running lines due north to the township line and due west to the range line; establish corners at points of intersection and note the distance to the nearest section corner. This instruction in effect made two sets of corners around each township. The plan adopted in the first surveys in Mississippi, Alabama, Eastern Ohio and Louisiana, made three sets of corners on township lines. For subdivision of townships see Diagrams*

8. It is not required that the deputy shall complete the sur-

vey of the first tier of sections from south to north, before commencing the survey of the second or any subsequent tier, but the corner on which the random line closes must have been previously established by running the line north on which it is established, except as follows: Where it is impracticable to establish such section corner in the regular manner it may be established by running the east and west line *east* or *west*, as the case may be, *on a true line*, setting the quarter-section corner at 40 chains and the section corner at 80 chains.

9. Quarter-section corners, both upon north and south, and upon east and west lines, are to be established at a point *equidistant* from the corresponding section corners, *except* upon the lines closing on the north and west boundaries of the township, and in those situations the quarter-section corners will always be established at precisely *forty chains* to the north or west (as the case may be) of the respective section corner from which those lines respectively *start*, by which procedure the excess or deficiency in the measurements will be thrown, according to law, on the extreme tier of quarter-sections.

PRESCRIBED LIMITS FOR CLOSING AND LENGTH OF LINES
IN CERTAIN CASES

1. Every north-and-south section line, except those terminating in the north boundary of the township must be *eighty chains* in length.

2. The east-and-west *section lines*, except those terminating in the west boundary of the township, are to be within *eighty links* of the actual distance established on the south boundary line of the township for the width of said tier of sections, and must close within eighty links north or south of the section corner.

3. The north boundary and south boundary of any one section, except in the extreme western tier, are to be within *eighty links* of equal length.

4. The meanders within each fractional section, or between any two meander posts, or of an island in the interior of a section, must close within one chain and fifty links.

5. In running *random* township exteriors, if such random lines fall short or overrun in length, or intersect the eastern or western boundary, as the case may be, of the township, at more than *three chains* north or south of the true corner, the lines must be *retraced*, even if found necessary to remeasure the meridional boundaries of the township. One set of chainmen, only, is required in subdividing.

LIMITS FOR CLOSING.

The following is from General Instructions to Deputy Surveyors in 1837: "It is not thought advisable to prescribe any limit of measurement within which a survey shall close; but having made allowance for the inaccuracy or obliquity of adjoining surveys, an excess or deficiency of a close in course or distance of a township line of more than five chains; of a section line of more than one chain; of meanders of a section of more than one chain, fifty links, would be sufficient to cause a distrust in the accuracy of the survey." In later instructions the above limits became the prescribed limits for closing until instructions of 1881.

SUBDIVISION OF SECTIONS.

Under the provisions of the act of Congress approved February 11, 1805, the course to be pursued in the subdivision of sections is to run straight lines from the established quarter-section corners—United States surveys—to the opposite corresponding corners, and the point of intersection of the lines so run will be the corner common to the several quarter-sections, or in other words, the legal center of the section.

ERRONEOUS INSTRUCTIONS.

The following from Appendix of Instructions issued from office of the Surveyor General in 1856, for the States of Illinois and Missouri, is here inserted, for the reason that many surveys in Illinois and Missouri have been and are now being made under this instruction, believing it in accordance with law. The following will show the object of giving the instruction which the Surveyor General states "is not *positive directions* to County Surveyors."

APPENDIX.

[1.]

"Numerous and repeated applications having been made to the Surveyor General, by county and United States Deputy Surveyors and others

interested in the *Public Surveys within the District of Illinois and Missouri*, for information and directions as to the proper method of making re-surveys, renewing missing corners formerly established, and subdividing Sections, regular, anomalous, and fractional, the answers to which would occupy much time and delay other public business, it is deemed advisable to publish, for the information of those concerned, a brief statement of the system adopted by the General Land Office for the surveys of the public lands, together with such other information as the records show to be most needed by those engaged in the re-tracing of old surveys, or dividing the public lands according to the sales made thereof by the officers of the United States; and more especially necessary since it is known that a large portion of the early surveys, both in Illinois and Missouri, were carelessly, and, in some cases, erroneously executed.

In the incorrect surveys above alluded to, the Township lines are not always straight, the measure frequently being more or less erroneous, and it is impossible to frame instructions so minute in detail as to meet every case, and enable a deputy or county Surveyor to do equal and exact justice to all parties concerned. After all that might or could be said, much will depend upon the judgment and experience of the Surveyor on the ground.

It is not intended, by what is here recommended for renewing missing corners or subdividing Sections, to give any positive directions to county Surveyors. This office has no control over them whatever, but it is believed that the information here given will enable the Surveyor in most cases to do justice to the parties interested, without any further correspondence with the Surveyor General on the subject."

The following statement shows law of 1805 to be overlooked.

[23.]

"None of the Acts of Congress, in relation to the public lands, make any special provision in respect to the manner in which the subdivisions of sections should be made by deputy surveyors.

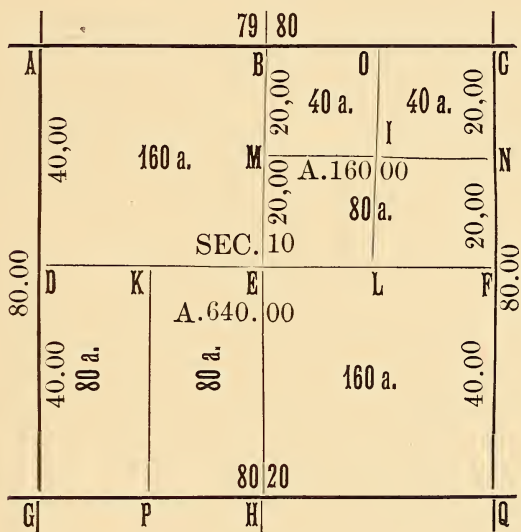
The following plan may, however, be safely adopted in respect to all sections, excepting those adjoining the north and west boundaries of a township, where the same is to be re-surveyed."

[24.]

Subdivision of Interior Sections.

DIAGRAM No. 3.

REGULAR SECTION.



[25.]

“The surveyor should have descriptions of all the established corners of the section to be subdivided, in order to identify them, and find the place where each corner post, stone or mound, had been set. Then begin at a quarter section corner, on a north and south line, say at D, from which run east on a random line, set a temporary post at 40.00 chains, note the distance to the point where said line intersects the last boundary of the section, and the distance it falls north or south of the quarter section corner at F, Then, by means of offsets from the random, run a true line from the corner at F to that at D, and at equidistance between them establish the corner E. Then, by first running randoms as aforesaid, make a straight line from E to B, and from E to H, and you have the section divided into quarters. But should it be necessary to subdivide any of the quarters, say, for example, the north-east quarter, into four forty acre lots, and the southwest quarter

into two equal parts, then, in running the random line east from *D* to *F*, temporary posts should be set at twenty and sixty chains, to mark the points lettered *K* and *L*, and the corners should be established on the true TRUE line, from *F* to *D*, so as to place the corner *L* at average distance between *F* and *E*, and the corner *K* at average distance between *E* and *D*. In like manner the corner at *M* should be equi-distant between *E* *B*; *O* equi-distant between *B* *C*; *N* equi-distant between *C* *F*, and *I* equi-distant between *M* *N*, and straight lines from *I* to *O*, and *I* to *L*. The corner at *P* should be equi-distant between *G* *H*, and a straight line run between *P* and *K*."

[26.]

"This method of first running a line from *D* to *F* is considered preferable to basing the work on the north and south line *H* to *B*, for the reason that the corners at *D* and *F* are on the north and south lines, all of which, except those intersecting the north boundary of a township, are 80.00 chains in length, and have the quarter section corners thereon precisely at 40.00 chains; whereas, what are called east and west lines, excepting those in the west tier of sections, are never due east and west, at the variation assumed, unless a random line, which has to be first run, happens to strike the corner run for."

To subdivide Section 10 into quarters in the diagram, number 3, on page 75 according to present instructions and the law of Congress, lines should be run as follows: Straight lines should be run between *F* and *D*, and between *B* and *H* and the point of intersection of these lines would be the legal centre of the section. In the subdivision of the northeast quarter into forty acre tracts, straight lines should be run between *L* and *O*, and between *N* and *M*, the intersection of which would be the legal centre of the quarter. See Law.

In the subdivision of fractional quarter-sections where no opposite corresponding sections have been or can be fixed, the subdivision lines should be ascertained by running from the established corners due north, south, east or west lines as the case may be, to the water-course, Indian boundary line, or other external boundary of such fractional section.

The law presupposes the section lines surveyed and marked in the field by the United States deputy surveyors to be due north and south or east and west lines, but in actual experience this is not always the case ; hence, in order to carry out the spirit of the law, it will be necessary, in running the subdivisional lines through fractional sections, to adopt mean courses where the section lines are not due lines, or to run the subdivision line parallel to the section line when there is no opposite section line,

Upon the lines closing on the north and west boundaries of a township, the quarter-section corners are established by the United States deputy surveyors at precisely forty chains to the north or west of the last interior section corners, and the excess or deficiency in the measurement is thrown on the outer tier of lots, as per act of Congress approved May 10, 1800.

In the subdivision of quarter-sections the quarter-quarter corners are to be placed at points equidistant between the section and quarter-section corners and between the quarter corners and the common center of the section, *except* on the last half mile of the lines closing on the north or west boundaries of a township, where they should be placed at twenty chains, proportionate measurement, to the north or west of the quarter-section corner.

The subdivisional lines of fractional quarter-sections should be run from points on the section lines, intermediate between the section and quarter-section corners due north, south, east or west, to the lake, water-course or reservation which renders such tracts fractional,

When there are double sets of section corners on township and range lines the quarter corners for the sections south of the township lines and east of the range lines are not established in the field by the United States surveyors, but in subdividing such sections said quarter-corners should be so placed as to suit the *calculations of the areas of the quarter-sections adjoining the township boundaries* as expressed upon the official plat, adopting proportionate measurements where the present measurements of the north or west boundaries of the sections differ from the original measurements.

SPECIMEN FIELD NOTES No. 5.
 FIELD NOTES
 OF THE SURVEY OF THE
 SUBDIVISION AND MEANDER LINES
 OF THE
 TOWNSHIP NO. 6 NORTH, RANGE NO. 34 EAST,
 OF THE
 Principal Base and Meridian of Montana Territory,

As Surveyed by WALTER W. de LACY, U. S, Deputy Surveyor,
 Under his Contract, No. 87, Dated July 3, 1880.

Survey commenced August 6th, 1880.

Survey completed August 16th, 1880.

Preliminary Oaths of Assistants omitted.



Chains. Preliminary to commencing this survey, I ran west on a blank line on the south boundary of Sec. 36, and at 39.97 chs. found the $\frac{1}{4}$ sec. cor. and at 80.01 chs. found the sec. cor. As the east boundary of Sec. 36 crosses the Yellowstone River it was not re-run. My compass will therefore run the same line as the exterior boundaries, and the chaining practically agrees.

Survey commenced August 6, 1880, with a Burt's improved solar compass.

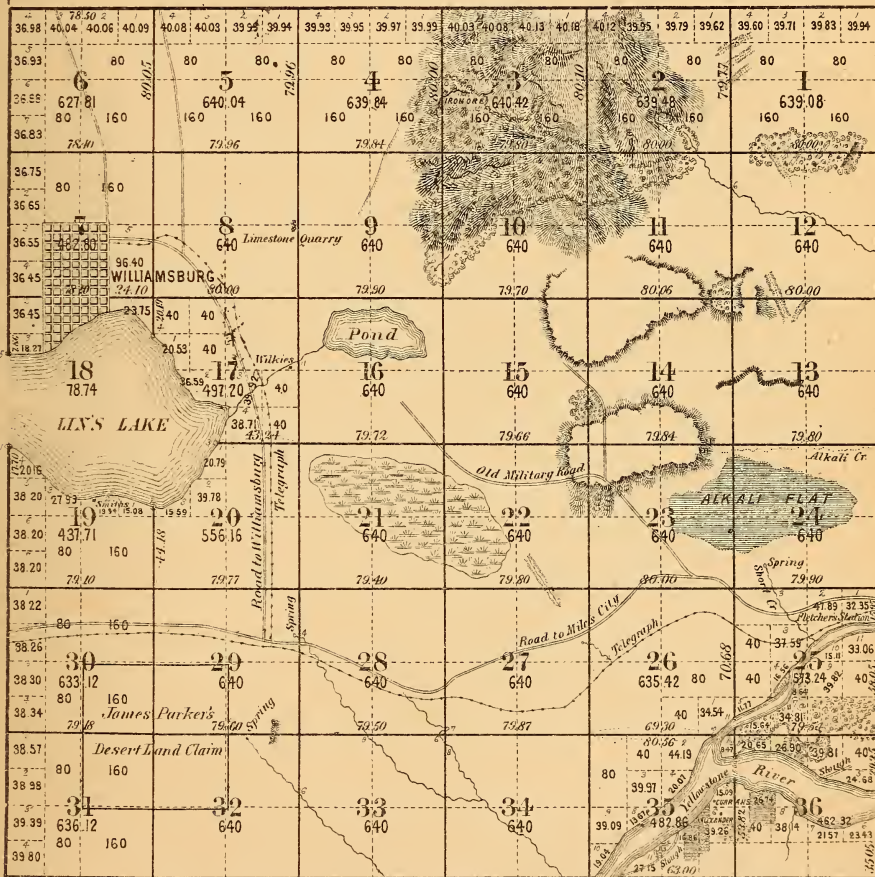
I commenced at the cor. to Secs. 1, 2, 35, and 36, on the south boundary, which is a sandstone $30 \times 8 \times 2\frac{1}{2}$ ins firmly set in the ground, with one notch on E. and 5 notches on W. edges, and pits $18 \times 18 \times 12$ ins. in each sec. $5\frac{1}{2}$ ft. dist. with mound of earth 2 ft. high, $4\frac{1}{2}$ ft. base alongside. Thence I run North bet. Secs. 35 and 36.

Va. $18^{\circ} 30' E.$

- 20.00 Enter scattering timber. Alexander's house bears N. $31^{\circ} W.$
 31.00 Leave scattering timber.
 40.00 Set a post 3 ft. long, 3 ins. square, with marked stone, 12 ins. in the ground, for $\frac{1}{4}$ sec. cor., marked $\frac{1}{4}$ S. on W. side, dug pits $18 \times 18 \times 12$ ins. N, and S. of post, $5\frac{1}{2}$ ft. dist., and raised a mound of earth $1\frac{1}{2}$ ft. high, $3\frac{1}{2}$ ft. base, around post.
 Alexander's house bears S. $53\frac{3}{4}^{\circ} W.$
 52.70 Enter brush.
 53.82 Right bank of the Yellowstone River. Set a post 4 ft. long, 4 ins. square, with marked stone, 12 ins. in the ground, for meander cor. to fractional secs. 35 and 36, marked M. C., and
 T. 6 N. on S.,
 R. 34 E. S. 36 on E., and
 S. 35 on W., faces, dug pit 3 ft. square, 12 ins. deep, 8 lks. S. of post, and raised mound of earth 2 ft. high, $4\frac{1}{2}$ ft. base around post.
 There being an island on line on N. side of channel, I send a flag across, and set it on line bet. secs. 35 and 36, on bar S. of Island. I then go

DIAGRAM - B.

TOWNSHIP N° 6 NORTH, RANGE N° 34 EAST OF THE PRINCIPAL MERIDIAN MONTANA



Area of Public Land 21462.71 Acres. of Water Surface 1310.96 Ac. of Town Site 207.10 Ac. Total number of Ac. 22980.77
 Date of Survey and Certificate omitted

REFERENCE

Section Line -----
 Section Number 26
 Lot Numbers -----
 Lot Lines -----

across to flag and run a base line W. 11.14 chs., to a point from which meander cor. on right bank bears S.37°50' E., which gives for distance across the river to edge of bar 14.34 chs. I then run north from flag 66 lks., to south bank of island, making the whole distance 53.82+14.34+0.66 chs., or

- 68.82 To south bank of island, which point I established by setting a post 4 ft. long, 4 ins. square, with marked stone, 12 ins. in the ground, for meander cor. to fractional secs. 35 and 36 on S. bank of island, marked M. C., and *

T. 6 N. on N.,

R. 34 E. S. 36 on E., and

S. 35 on W. faces, dug pit 3 ft. square, 12 ins. deep, 8 lks. N. of post, and raised a mound of earth 2 ft. high, 4½ ft. base, around post.

Thence continue on line across island, enter brush.

- 72.50 Leave brush, enter timber.

- 80.00 Set a post 4 ft. long, 4 ins. square, with marked stone, 12 ins. in the ground, for cor. to secs. 25, 26, 35 and 36, marked

T. 6 N. S. 25 on N. E.,

R. 34 E. S. 36 on S. E.,

S. 35 on S. W., and

S. 26 on N. W., faces, with 1 notch on S. and E. edges, from which A cottonwood, 12 ins. diam., bears N. 12¾° E. 180 lks. dist., marked T. 6 N., R. 34 E., S. 25 B. T.

A cottonwood, 18 ins. diam., bears S. 82° E., 154 lks. dist., marked T. 6 N., R. 34 E., S. 36 B. T.

A cottonwood, 10 ins. diam., bears S. 29½° W., 56 lks., dist., marked T. 6 N., R. 34 E., S. 35 B. T.

A cottonwood, 10 ins. diam., bears N. 46½° W., 119 lks. dist., marked T. 6 N., R. 34 E., S. 26 B. T.

Land level.

Soil, rich loam—1st rate.

Timber, cottonwood and willow undergrowth same, 12.30 chains.

East on a random line, bet. secs. 25 and 36.

Va. 18° 20' E.

This line is wholly on the island.

- 1.33 A cottonwood, 20 ins. diam.

- 21.50 Leave timber.

- 31.00 Enter timber and brush.

- 35.00 Leave timber and brush.

- 40.00 Set temporary ¼ sec. cor.

- 47.50 Enter timber.

- 53.00 Leave timber.

- 61.00 Enter brush.

- 66.00 Leave brush, enter scattering timber.

- 79.54 Intersect the east boundary of the township at 58 lks. N. of the cor. to secs. 25, 30, 31, and 36, which is a post 4 ft. long, 4 ins. square, firmly set in the ground, marked

T. 6 N. S. 30 on N. E.,

R. 35 E. S. 31 on S. E.,

R. 34 E. S. 36 on S. W., and

S. 25 on N. W., faces, with 5 notches on N. and 1 notch on S. edges, from which

A cottonwood, 20 ins. diam., bears N. 30½° E., 166 lks. dist., marked T. 6 N., R. 55 E., S. 30 B. T.

A cottonwood, 24 ins. diam., bears S. 39° E., 67 lks. dist., marked T. 6 N., R. 35 E., S. 31 B. T.

A cottonwood, 24 ins. diam., bears S. 39° E., 67 lks. dist., marked T 6 N. R. 35 E. S. 31 B. T.

A cottonwood, 14 ins. diam., bears S. 89½° W., 170 lks. dist., marked T. 6 N., R. 34 E., S. 36 B. T.

A cottonwood, 16 ins. diam., bears N. 23° W., 40 lks. dist., marked T. 6 N., R. 34 E., S. 25 B. T.

Thence 1 run

N. 89° 35' W. on a true line, bet. secs. 25 and 36, with same va.

39.77 Set a post 3 ft. long, 3 ins. square, with marked stone, 12 ins. in the ground for ¼ sec. cor., marked ¼ S. on N. face, dug pits 18×18×12 ins. E. and W. of post, 5½ ft. dist., and raised a mound of earth 1½ ft. high, 3½ ft. base, around post.

79.54 The cor. to secs. 25, 26, 35 and 36. Land level. Soil, alluvial—1st rate. Timber, cottonwood and willow, undergrowth same, 36.50 chs.

August 6, 1880.

* * * * *

The section lines in the remainder of this township are surveyed according to instructions on page 58.

GENERAL DESCRIPTION.

This township contains nearly every variety of land from plains to mountains, and the soil ranges from alkali to rich loam. The soil of the bottom land along the Yellowstone River and on the island is generally rich, black loam, capable of producing abundant crops without irrigation. The soil of the remaining portion of the township, except the alkali flat in secs. 23 and 24, and the mountainous land, can nearly all be classed as second rate, is covered with an abundant growth of rich nutritious grasses, and will produce crops without irrigation. In the southwestern portion of the township only the grass is more scanty, and irrigation may be necessary.

Cottonwood timber is found along the Yellowstone River, on the island, and some scattering along the creeks. The mountain is covered with a dense growth of pine and fir timber, many of the trees being very large.

There is one limestone quarry in secs. 8 and 9 which affords excellent building stones, and, from surface indications, it is probable that large bodies of limestone and sandstone underlie other portions of the township. Iron ore was found in section 3.

The township is well watered by the Yellowstone River, which runs through the southeastern portion, and many small springs and brooks. The eastern end, comprising only a small portion of Lin's Lake, is included in this township. This lake is about ten miles long, and its greatest width about four miles. The water is clear and pure, and varies in depth from 10 to 200 feet.

The town of Williamsburg is the county seat of Custer County, contains a court house, two churches, two hotels, several stores, and about 50 dwelling houses. Its estimated population is 300.

There are two settlers in sec. 35, and one each in secs. 16, 17, 19 and 25.

James Parker has fenced a portion of his desert land claim, in sec. 36, and is boring an artesian well to bring water upon it.

WALTER W. DE LACY,
U. S. Deputy Surveyor

EDWARD TIFFIN'S INSTRUCTIONS OF 1815,

UNDER WHICH SURVEYS HAVE BEEN MADE IN OHIO, INDIANA, MICHIGAN, ILLINOIS, ARKANSAS AND MISSOURI.

Edward Tiffin was United States Surveyor General for Northwestern Territory from 1815 to 1825, and the following Instructions for Deputy Surveyors was received with letter of July 26, 1815; they are now on file in General Land Office, Washington D. C.

[Copy of Instructions received by publishers Sept. 1, 1885, through courtesy of Commissioner.]

INSTRUCTIONS FOR SUB-DIVIDING TOWNSHIPS.

1. When the township lines are completed, you must begin the survey of sections at the southeast corner of the township and move on in continued progression from east to west and from south to north, in order that the excess or defect of the township as to complete sections may fall on the west and north sides of the township, according to the provisions of the Act of the 10th of May, 1800.

2. Each side of a section must be made one mile in measure by the chain, and quarter section corners are to be established at every half mile, except when in the closing of a section. If the measure of the closing side should vary from 80 chains or one mile, you are in that case to place the quarter section corners equi-distant, or at an average distance from the corners of the section, but in running out the sectional lines on the west or north side of the township, you will establish your quarter section posts or corners at the distance of half a mile from the last corner, and leave the remaining excess or defect on the west or north tier of quarter sections, which balance or remainder you will carefully measure and put down in your field-notes, in order to calculate the remaining or fractional quarter section on the north and west side of the township; also in running to the western or northern boundary, unless your sectional lines fall in with the posts established therefor the corners of sections in the adjacent townships, you must set post and mark bearing trees at the points of intersection of your lines with the town boundaries, and take the distance of your corners from the corners of the sections of the adjacent townships, and note that and the side, on which it varies in chains or links, or both.

3. The sections must be made to close by running a random line from one corner to another, except on the north and west ranges of sections, and the true line between them is to be established by means of offsets.

4. In fractional townships on rivers it will be necessary to vary from the foregoing rules, and the lines must be continued from the rectilinear boundaries of the township, which may be parallel to the river, perpendicularly to those boundaries till they meet the river. The sections, however, must be made com-

plete on the sides of the township bounded by straight lines, and all excess or defect of measure must be thrown into the fractional sections on the river. The measure of the lines from the last entire sectional corner should be made very exact, in order to calculate the fractional section with exactness.

ILLUSTRATION.

Begin at N, the southeast corner of the township, and run west 40 chains, and establish the quarter section corner at n of section 36, if it be not already established, continue 40 chains further and establish the corner at O of sections 36 and 35; from O run a true north course 40 chains and mark the quarter section corner.

Between 35 and 36 continue 40 chains farther on the north line and establish the corner 25, 26, 35 and 36. From this corner run a random line for post or corner of M, without blazing; at the distance of every 20 chains on this line set up a stake or post, or mark some other mark on the random line; if you strike the post or corner M exactly, you have only to blaze the line back and establish the quarter section corner, which you will take care to establish at the average distance between the corner at M and the corner between 25, 26, 35 and 36, but if running for the post M you fall north or south of it, you must note the departure or deviation in your field book, and return on the true course, observing to correct it by means of offsets from your marks made on the random line.

	A	a	B	b	C	c	D	d	E	e	F	f	G
	43.10	40	c lks	1.50	42.11	381	42.20	37	42.00	121	41.00	118	
Y	s.6	6	s.5	6	s.4	6	s.3	6	s.2	6	s.1	6	g
Y	6	42.20	5	4	3	2	1						H
X	43.50	40											
X	s.7	5	s.8	5	s.9	5	s.10	5	s.11	5	s.12	5	h
X	6	5	4	3	2	1							I
w	s.18	4	s.17	4	s.16	4	s.15	4	s.14	4	s.13	4	i
W	6	5	4	3	2	1							K
v	44.10	40											
V	s.19	3	s.20	3	s.21	3	s.22	3	s.23	3	s.24	3	k
V	6	5	4	3	2	1							L
u	44.20	40											
U	s.30	2	s.29	2	s.28	2	s.27	2	s.26	2	s.25	2	l
U	6	5	4	3	2	1							M
t	43.80	40											
T	s.31	1	s.32	1	s.33	1	s.34	1	s.35	1	s.36	1	m
T	s	S	r	R	q	Q	p	P	o	O	n		N

From the corner of sections 25, 26, 35 and 36, run due north one mile, setting the half mile post as before at 2 on the line from O to F; return south to O and establish at o and P your quarter section and section corners; then run north from P and establish quarter section and section corners as before

and run a random line from the section corner on the line P E to the corresponding corner on the line O F; proceed in this manner till you arrive to the last corner towards the western boundary of the township from M to U, viz: between sections 29, 30, 31 and 32; from this corner run west and at the distance of 40 chains from it establish the quarter section corner at 6 in the line, from M to U; continue west till you intersect the town boundary, suppose at U, note carefully the distance of the point of intersection from the last section or quarter section corner, and also the distance of this point from the section corner of the adjacent township post west of you, or the distance of U from M and on which side it lies, viz: either north or south; at the point of intersection U, set the section post or corner and take bearing trees.

In this manner you will proceed until your township is completed, observing always to move either in a range of sections from that at the southeast corner of the township to the western boundary, or from that section to the northern boundary, but when you shall have completed the sections to the north boundary of the township you will proceed from the last section corners, establish quarter section corners at 40 chains from them, and continue north until you intersect the town boundary in the same manner as on the western side of the township, observing to note the distance at which you intersect the north boundary from the section or quarter section corner which you left last. Also you will be careful to note the distance of the point of intersection from the corner of the section of the adjacent township and whether it be on the east or west side of it; then the distances from 6 to F or from 6 to E on the lines O F and P E must be carefully noted in your field notes and also the distance from F where you intersect to O the post on the town above and on which side, whether east or west.

5. Great care must be taken that the north and south lines be run according to the true meridian as required by law, and the east and west lines be run at right angles to them as far as it is practical in closing, but if on running on a true east and west line you find the post you are running for lies very much to the north or south of the lines, you are then to mistrust the measure by the chain, and if possible, the line on which the posts are established must be remeasured; also in running a meridional line by the compass, if you find the measurement of the closing lines of the section, that is an uniform convergency or diagonally of these lines; you may then reasonably mistrust the accuracy of the direction of your lines by the needle. In such case it will be well to endeavor to run parallel to the meridian adjacent on which section closes in order that it may contain a just or legal quantity, viz: 640 acres or one mile square.

6. As the measurement by the chain is the principal source of errors in surveying, you will be careful to attend to your chainmen, that they carry the chain horizontally and to prevent their losing a tally rod; you must be provided with a set of them, pointed with iron or steel, and to allow no other to be used but the precise number, which you shall have selected for the purpose.

7. In meandering rivers you will take the bearings according to the true meridian of the river, and note the distance on any course where the river intersects the sectional lines, and the calculations of the contents of the fractions

are to be made by the tables of difference of latitude and departure, and returned on your plats; but the quantity or contents of the whole section only are to be put down; in all the other sections and each of them is to be accounted one mile square or 640 acres, unless your closing lines deviate *very much* from 80 chains, in which case you will be very careful to put down their true length on your plats.

8. You must frequently, while in the field, attend to the correction of your chain; for this purpose you should be provided with some measure taken from the standard chain in the Office of the Surveyor General.

9. All random lines, as well as the true, are to be noted in your field book at the time of running them, and are to be kept in the order in which the work is executed, also you must be careful to note the variation of the random lines from the corners or posts which they were intended to strike.

10. All courses of whatever lines must be taken with the sight of your compass set to the variation and estimated according to the true meridian, for which purpose the variation of the needle at the place where your survey must be taken or previously known and your compass regulated to it before you commence running the lines.

11. No lines of whatever description are to be run, or marks of any kind made by any person but yourself, or who may be under the immediate inspection of yourself or some deputy surveyor duly authorized from this office.

12. Any considerable departure from these instructions will be considered as a forfeiture of the conditions of the contract, or any claim for payment; and loose, inaccurate or precipitate work will not be admitted, either as it respects surveys in the field or their returns on paper.

13. You will take care that your posts be well driven into the ground and that there be one or two sight trees marked between every quarter section corner, also at the section corner that there be marks for every section corner where they corner.

GENERAL INSTRUCTIONS FOR DEPUTIES.

1. You will provide a good compass of Rittenhouses construction, having a nonius division and movable sights and a two-pole chain of 50 links; the chain must be adjusted by the Standard Chain in the Office of the Surveyor General, and it will be of importance that both it and the compass be frequently examined in the field in order to determine any errors and irregularities which may arise from the use of them.

2. Whenever you may be obstructed by insuperable obstacles, such as ponds, swamps, rivers, creeks, &c.; you will take the necessary offsets, or work by a traverse or trigonometry, in order to ascertain the distance on any line which is not actually run.

3. The courses of all navigable rivers, which may bound or pass through your district, must be accurately surveyed and their width taken at those points where they may be intersected by township or sectional lines; also the distance of those points from the sectional corners and from the commencement of any course where you are meandering the river; you will likewise not fail to make special notice of all streams of water which fall in your way, with their width and course from whence they appear to come or run.

4. All townships or sectional lines which you may survey are to be marked in the manner hitherto practiced in the surveys of the United States lands, viz: all those trees which your line cuts must have two notches made on each side of the trees where the line cuts; but no spot or blaze is to be made on them, and all or most of the trees on each side of the line and near it, must be marked with two spots or blazes diagonally or quartering towards the line.

5. *The posts* must be erected at the distance of every mile and half mile from where the town or sectional lines commenced (except a tree may be so situated as to supply the place of a post) which post must be at least three inches in diameter and rise not less than three feet. All mile posts must have as many notches cut on two sides of them as they are miles distant from the town or sectional line commenced, but the town corner posts or trees shall be notched with six notches on each side, and the half mile sectional posts are to be without any marks; the places of the posts are to be perpetuated in the following manner, viz: at each post the courses shall be taken and the distances measured to *two or more adjacent trees* in opposite directions, as nearly as may be, which trees, called bearing trees shall be blazed on the side next the post and one notch made with an axe on the blaze, and there shall be cut with a marking iron on a bearing tree, or some other tree within and near each corner of a section, the number of the section and over it the letter T, with the number of the township and above this the letter R, with the number of the range, but for quarter section corners you are to put no numbers on the trees; they are to be distinguished by the mark $\frac{1}{4}$ S.

6. You will be careful to note in your field book all the courses and distances you shall have run, the names and *estimated diameters* of all corner or bearing trees, and those trees which fall in your line called *station or line trees*, notched as aforesaid, together with the courses and distances of the bearing trees from their respective corners, with the letters and numbers marked on them as aforesaid; also all rivers, creeks, springs and smaller streams of water, with their width and the course they run in crossing the lines of survey, and whether navigable, rapid or mountainous; the kinds of timber and undergrowth with which the land may be covered; all swamps, ponds, stone-quarries, coal beds, peat or turf grounds, uncommon, natural or artificial productions, such as mounds, precipices, caves, &c; all rapids, cascades or falls of water; minerals, ores, fossils, &c; the quality of the soil and the true situation of all mines, salt licks, salt springs and mill seats, which may come to your knowledge, are particularly to be regarded and noticed in your field books.

7. In all measurements the level or horizontal length is to be taken, not that which arises from measuring over the surface of the ground when it happens to be uneven and hilly; for this purpose the chainmen in ascending or descending must alternately let down one end of the chain to the ground and raise the other to a level, as nearly as may be, from the end of which a plumb should be let fall to ascertain the spot where to set the tally rod or stick; and where the land is very steep it will be necessary to shorten the chain by doubling the links together, so as to obtain the true horizontal measure.

8. Though the line be measured by a chain of two perches, you are, notwithstanding, to keep your reckoning in chains of four perches of one hundred links

each, and all entries in your field books and all your plans and calculations must be made according to the decimal measure of a chain.

9. Your courses and distances must be placed in the margin of your field books on the left, for which purpose it should be large and your remarks made on the right in the following manner:

NORTH.	
CHAINS, LINKS.	Between sections 35 and 36 township 4, range 6.
20. 30.	A white oak 20 inches in diameter.
37. 10.	A stream 30 links wide S. E.
40. —.	Set half mile post, from which a B. oak 18-inch diameter bears S. 50° E. 40 links and a sugar tree 15 inch diameter bears N. 10° W. 34 links.
CHAINS, LINKS.	
80. 00.	Set post corner of section No. 25, 26, 35 and 36, township 4, range 6, from which a white oak 10 inch diameter bears S. 78° 30' E. distant 20 links, and a hickory 15 inch diameter bears N. 50° W. 37 links distant.
EAST.	
CHAINS, LINKS. Between No. 25 and 36, township 4, range 6, on a random.	
16. 40.	A brook 30 links wide, course S. 20° E.
40. 00.	Set temporary quarter section post. This half mile over broken land, timber, oak, ash, &c.
64. 30.	A stream 25 links wide, course S.E.
79. 90.	Intersected N. and S. line 20 links south of section corner, hilly land, soil rich and good for farming, timber, oak, hickory, poplar, ash, &c.
WEST. Between sections 25 and 36, township 4, range 6.	
CHAINS, LINKS. On true line.	
39. 95.	Moved temporary post to the average distance for $\frac{1}{4}$ section corner, from which a black jack 10 inch diameter bears S. 50° E. 100 links, and a white oak 19 inch in diameter bears N. 25° W. 40 links.
55. 00.	A white oak 14 inch in diameter.
79. 90.	Section corner.

In this manner you must enter all courses and distances in your field book, the date must follow the close of each day's work, which field book, written with a fair hand, of each township separately, or a true and fair copy, together with the original, you will return to the Office of the Surveyor General.

10. The plat of each township and fractional part of a township must be neatly and accurately protracted on durable paper, by a scale of two inches to a mile, or forty chains to an inch, and must be in such measure and projections in every line and part as actually was determined by measurement in the field, a compass having the true and magnetic meridian, and the scale by which the lines are laid down, are to be placed on the southeast corner of the plat.

11. The following certificate must be inscribed on your plat and signed by you:

Pursuant to a contract with, and instructions from.....Surveyor General of the United States, bearing date the..... day of.....I have ad-measured, laid out and surveyed the above described township (or fractional part), and do hereby certify that it had such marks and bounds, both natural and artificial, as are represented on said plat and described in the field notes made thereof and returned with the plat into the Surveyor General's Office. Certified thisday of.....

METHOD BY WHICH TO CALCULATE THE NORTHERN AND WESTERN TIER OF FRACTIONAL QUARTER SECTIONS.

You will commence, say at the northeast corner of the township, the length of the line from G to g being 40 chains, as established in running the exterior boundary of the township; you will proceed by adding the length of the line from 6 to F on the line from O to F which is 42 chains to the length G.g 40 chains and divide it by two, which will give you the length of the line from the

	A	a 2.00B	b	C1.50 c	D4.00 d	1.50E	e 3.00 F	f	G		
	42.00	42.00	41.00	43.00	43.50	42.00					
Y	SEC. 6	SEC. 5	SEC. 4	SEC. 3	SEC. 2	6	SEC. 1		g		
180		79.00	80.00	80.00	80.00	80.00	80.00				
Y	41.00 6	5	R	4	Q	3	P	2	O	1	H
x	SEC. 7	h	centre of the section to f on the town boundary, which being added to the length of the line G.g and divided by two will give you the length of one of the lines required for calculating the N.E. quarter of section No. 1; then the length of the line from G to f being 40 chains, and the south boundary of the section being 80 chains, the length of the line H to I is 40 chains—the length of the line from G to f—therefore there is no necessity for additions or divisions, as the line from I to f is parallel to the line G.H; then by multiplying those two sides together and cutting off as many decimals as there are in the sums multiplied and dividing by 10, you have the contents of the N. E. quarter of section 1 in acres and decimal parts of an acre. You will then proceed to calculate the N.W. quarter of the same section by taking the length of the line from the centre of the section to f, as found in your former calculation, to which add 42 chains, the length of the line from 6 to F, and divide by two, which gives you the length of one of the lines required. Then as the line from O to F intersected the town boundary 3 chains east of the section corner, the length of the line from F to f is only 37 chains which, added to 40 chains (the length of the south line of the southwest quarter of section 1) and divided by two, will give you the length of the line from 6 to the centre of the section, which being added to 37 and divided by two, will give you the length of the other line required, which you will calculate in the same manner as above.								
X	90	40.00 6	I								
w	SEC. 18	l									
W	3.00	40.50 6	K								
v	SEC. 19	k									
V	1.50	41.20 6	L								
u	SEC. 30	l									
U	1.50	41.00 6	M								
t	SEC. 31	m									
T		S									
		s									

As the length of the line from F to f is only 37 chains, the length of the line from e to F must be 43 chains: the length of the line E to e is 38.50 chains; the length of the line from d to E 41.50 chains, etc; the quarter section corners not being placed at the average distance between the section corners except when you strike the corners of the sections established in running the exterior lines of the township.

SYNOPSIS

—OF—

Land Laws of the United States.

FROM INSTRUCTIONS ISSUED AT

General Land Office, Washington, D. C.,

May 3, 1881, and May 13, 1883.

The present system of survey of the public lands was inaugurated by a committee appointed by the Continental Congress, and consisting of the following delegates :

Hon. THOS. JEFFERSON, <i>Chairman</i> ,	-	Virginia.
Hon. HUGH WILLIAMSON,	- - -	North Carolina.
Hon. DAVID HOWELL,	- - -	Rhode Island.
Hon. ELDRIDGE GERRY,	- - -	Massachusetts.
Hon. JACOB READ,	- - -	South Carolina.

On the 7th of May, 1784, this committee reported "An ordinance for ascertaining the mode of locating and disposing of lands in the western territory, and for other purposes therein mentioned." This ordinance required the public lands to be divided into "hundreds" of ten geographical miles square, and those again to be subdivided into lots of one mile square each, to be numbered from 1 to 100, commencing in the *northwestern* corner, and continuing from west to east and from east to west con-

secutively. This ordinance was considered, debated, and amended, and reported to Congress April 26, 1785, and required the surveyors "to divide the said territory into townships of 7 miles square, by lines running due north and south, and others crossing these at right angles. * * The plats of the townships, respectively, shall be marked by subdivisions into sections of 1 mile square, or 640 acres, in the same direction as the external lines, and numbered from 1 to 49. * * * And these sections shall be subdivided into lots of 320 acres." This is the first record of the use of the terms "township" and "section."

May 3, 1785, on motion of Hon. William Grayson, of Virginia, seconded by Hon. James Monroe, of Virginia, the section respecting the extent of townships was amended by striking out the words "seven miles square" and substituting the words "six miles square." The record of these early sessions of Congress are not very full or complete; but it does not seem to have occurred to the members until the 6th of May, 1785, that a township six miles square could not contain 49 sections of 1 mile square. At that date a motion to amend was made, which provided, among other changes, that a township should contain 36 sections; and the amendment was *lost*. The ordinance as finally passed, however, on the 20th of May, 1785, provided for townships, 6 miles square, containing 36 sections of 1 mile square. The first public surveys were made under this ordinance. The townships, six miles square, were laid out in ranges, extending northward from the Ohio river, the townships being numbered from south to north, and the ranges from east to west. The region embraced by the surveys under this law forms a part of the present State of Ohio, and is usually styled "The Seven Ranges." In these initial surveys only the *exterior lines* of the township were surveyed, but the plats were marked by subdivisions into sections of 1 mile square, and mile corners were established on the township lines. The sections were numbered from 1 to 36, commencing with No. 1 in the *southeast* corner of the township, and running from *south* to *north* in each tier to No.

36 in the *northwest* corner of the township, as shown in the following diagram :

DIAGRAM No. I.

36	30	24	18	12	6
35	29	23	17	11	5
34	28	22	16	10	4
33	27	21	15	9	3
32	26	20	14	8	2
31	25	19	13	7	1

The surveys were made under the direction of the Geographer of the United States. It further provided that the first line running north and south should begin on the Ohio River, at a point due north from the western terminus of a line run as the south boundary of the State of Pennsylvania, and the first line running east and west should begin at the same point, and extend through the whole territory. The act of Congress approved May 18, 1796, provided for the appointment of a surveyor-general, and directed the survey of the lands northwest of the Ohio River, and above the mouth of the Kentucky River, "in which the titles of the Indian tribes have been extinguished." Under this law *one-half* of the townships surveyed were subdivided into sections "by running through the same, each way, parallel lines at the end of every two miles, and by making a corner on each of said lines at the end of every mile," and it further provided that the "sections shall be numbered, respectively, beginning with the number one in the northeast section and proceeding west and east alternately, through the township, with progressive numbers

till the thirty-sixth be completed." This method of numbering sections, as shown by the following diagram, is still in use :

DIAGRAM No. 2.

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

The act of Congress approved May 10, 1800, required the "townships west of the Muskingum, which * * * are directed to be sold in quarter townships, to be subdivided into half sections of three hundred and twenty acres each, as nearly as may be, by running parallel lines through the same from east to west, and from south to north, at the distance of one mile from each other, and marking corners, at the distance of each half mile on the lines running from east to west, and at the distance of each mile on those running from south to north. * * * And the interior lines of townships intersected by the Muskingum, and of all the townships lying east of that river, which have not been heretofore actually subdivided into sections shall also be run and marked. * * * And in all cases where the exterior lines of the townships thus to be subdivided into sections or half sections shall exceed, or shall not extend, six miles, the excess or deficiency shall be specially noted, and added to or deducted from the western and northern ranges of sections or half sections in such township, according as the error may be in running the lines from east to west or from south to north." Said act also provided that the northern and western tier of sections should be

sold as containing only the quantity expressed on the plats, and all others as containing the complete legal quantity.

Act of June 1, 1796, U. S. Statutes at Large, vol. 1, p. 490.

The act approved June 1, 1796, "regulating the grants of land appropriated for military services," &c., provided for dividing the "United States Military Tract," in the State of Ohio, into townships 5 miles square, each to be subdivided into quarter townships containing 4,000 acres.

Act of March 1, 1800, U. S. Statutes at Large, vol. 2, p. 14.

Section 6 of the act approved March 1, 1800, amendatory of the foregoing act, enacted that the Secretary of the Treasury was authorized to subdivide the quarter townships into lots of 100 acres, bounded as nearly as practicable by parallel lines 160 perches in length by 100 perches in width. These subdivisions into lots, however, were made upon the plats in the office of the Secretary of the Treasury, and the actual survey was only made at a subsequent time when a sufficient number of such lots had been located to warrant the survey. It thus happened, in some instances, that when the survey came to be made the plat and survey could not be made to agree, and that fractional lots on plats were entirely crowded out. A knowledge of this fact may explain some of the difficulties met with in the district thus subdivided.

The act of Congress approved February 11, 1805, directs the subdivision of the public lands into quarter sections, and provides that all the corners marked in the public surveys shall be established as the proper corners of sections or subdivisions of sections which they were intended to designate, and that corners of half and quarter sections *not marked* shall be placed as nearly as possible "equidistant from those two corners which stand on the same line." This act further provides that "The boundary lines actually run and marked * * * shall be established as the proper boundary lines of the sections or subdivisions for which they were intended; and the length of such lines as returned by * * * the surveyors * * * shall be held and considered as the true length thereof, and the boundary lines

which shall not have been actually run and marked as aforesaid shall be ascertained by running straight lines from the established corners to the opposite corresponding corners ; but in those portions of the fractional townships, where no such opposite or corresponding corners have been or can be fixed, the said boundary line shall be ascertained by running from the established corners due north and south or east and west lines, as the case may be, to the * * * external boundary of such fractional township."

The act of Congress approved April 25. 1812, provided "That there shall be established in the Department of the Treasury an office to be denominated the General Land Office, the chief officer of which shall be called the Commissioner of the General Land Office, whose duty it shall be, under the direction of the head of the Department, to superintend, execute, and perform all such acts and things touching or respecting the public lands of the United States, and other lands patented or granted by the United States, as have heretofore been directed by law to be done or performed in the office of the Secretary of State, of the Secretary and Register of the Treasury, and of the Secretary of War, or which shall hereafter by law be assigned to the said office."

The act of Congress approved April 24, 1820, provides for the sale of public lands in half quarter-sections, and requires that "in every case of the division of a quarter-section the line for the division thereof shall run north and south * * * and fractional sections containing 160 acres and upwards shall, in like manner, as nearly as practicable, be subdivided into half quarter-sections, under such rules and regulations as may be prescribed by the Secretary of the Treasury ; but fractional sections containing less than 160 acres shall not be divided."

The act of Congress approved May 24, 1824, provides "That whenever, in the opinion of the President of the United States, a departure from the ordinary mode of surveying land on any river, lake, bayou, or watercourse would promote the public interest, he may direct the surveyor-general in whose district such land is situated, and where the change is intended to be made,

under such rules and regulations as the President may prescribe, to cause the lands thus situated to be surveyed in tracts of two acres in width, fronting on any river, bayou, lake or watercourse, and running back the depth of forty acres." * * *

The act of Congress approved April 5, 1832, directed the subdivision of the public lands into quarter quarters; that in every case of the division of a half quarter-section the dividing line should run east and west, and that fractional sections should be subdivided under rules and regulations prescribed by the Secretary of the Treasury. Under the latter provision the Secretary directed that fractional sections containing less than 160 acres, or the residuary portion of a fractional section, after the subdivision into as many quarter quarter-sections as it is susceptible of, may be subdivided into lots, each containing the quantity of a quarter quarter-section as nearly as practicable, by so laying down the line of subdivision that they shall be 20 chains wide, which distances are to be marked on the plat of subdivision, as are also the areas of the quarter quarters and residuary fractions.

The two acts last above mentioned provided that the corners and contents of half-quarter and quarter quarter-sections should be ascertained, as nearly as possible, in the manner and on the principles directed and prescribed in the act of Congress approved February 11, 1805.

From the foregoing synopsis of Congressional legislation it is evident—

1st. That the boundaries of the public lands established and returned by the duly appointed Government surveyors, when approved by the surveyors general and accepted by the Government, *are unchangeable.*

2d. That the original township, section and quarter-section corners established by the Government surveyors must stand as the true corners which they were intended to represent, whether the corners be in place or not.

3d. That quarter-quarter-corners not established by the Government surveyors must be planted equidistant and on line between the quarter section and section corner.

4th. That all subdivisional lines of a section must be straight lines, running from the proper corner in one exterior line to its opposite corresponding corner in the opposite exterior line.

5th. That in fractional sections where no opposite corresponding corner has been or can be established, any required subdivision line of such section must be run from the proper original corner in the boundary line due east and west, or north and south, as the case may be, to the water-course, Indian reservation, or other exterior boundary of such section.

PART II.

DIAGRAMS

WITH

DESCRIPTIVE NOTES,

ILLUSTRATING THE

Legal Subdivisions of Land,

WITH

SUGGESTIONS

—ON—

SUBDIVIDING, PLATTING, ASSESSING^{AND} DEEDING,

ALSO,

MAPS AND PLATS

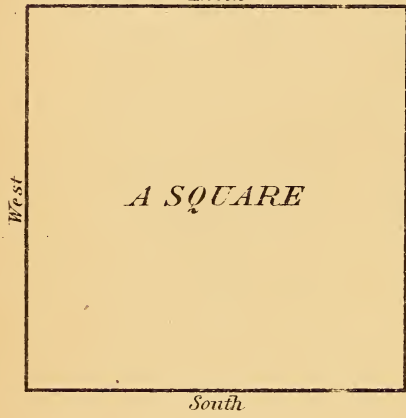
ILLUSTRATING

EARLY SURVEYS.

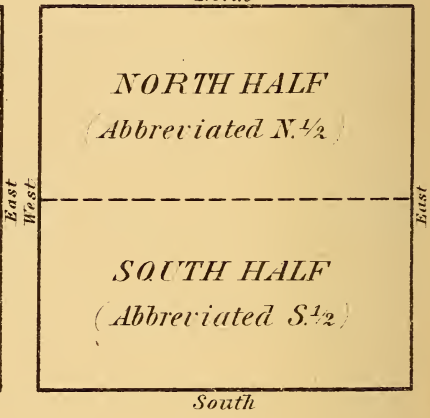


DIAGRAMS

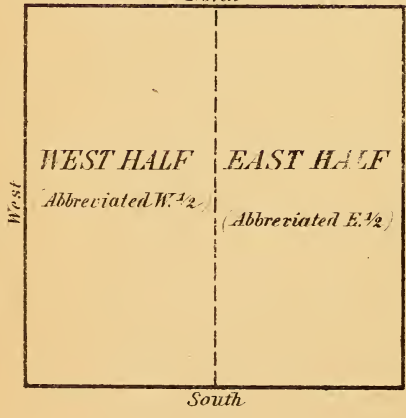
N^o 1
North



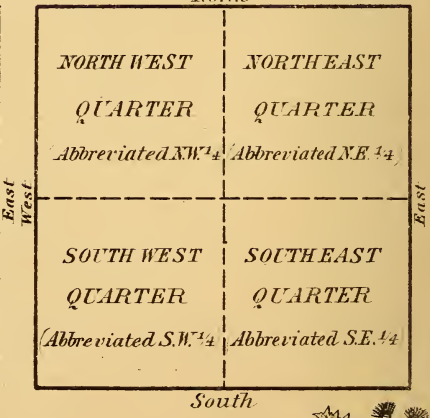
N^o 2
North



N^o 3
North



N^o 4
North



Legal or Congressional Subdivisions

OF THE SQUARE

FOR LAND PARCELING.

The square represents the form adopted by Government for surveying and subdividing the public lands, and the basis of the public land system lies in the fact that the subdivisions of a square can be readily located and described when divided into halves and quarters, or subdivided into half-quarters and quarter-quarters on the cardinal points of the compass, north, south, east and west.

The following diagrams give the legal subdivisions of the square as designated by Congress for locating lands. First is given the square with the sides designated by the cardinal points of the compass. Next is given the divisions and subdivisions of the square into halves, quarters, half-quarters and quarter-quarters, these are the legal subdivisions used by government for locating parcels of land.

Diagram No. 1, represents a square having equal sides with the top marked North, the bottom South, the right side East, the left side West.

Diagram No. 2 represents the square divided into two equal parts called halves, by a line running east and west, designated as the North half and the South half. When it is written for legal purposes it is usually abbreviated thus ; $N\frac{1}{2}$ and $S\frac{1}{2}$.

Diagram No. 3 represents the square divided into two equal

parts, by a line running north and south, designated as the East half and West half, abbreviated $E\frac{1}{2}$ and $W\frac{1}{2}$.

Diagram No. 4, represents the square divided into four equal parts called quarters, by lines running north and south and east and west through the center of the square. The square between north and east is designated as the northeast quarter, the square between north and west the northwest quarter, the square between south and east the southeast quarter, the square between south and west the southwest quarter, abbreviated thus; $NE\frac{1}{4}$, $NW\frac{1}{4}$, $SE\frac{1}{4}$ and $SW\frac{1}{4}$.—

Diagram No. 5, represents the square with the quarters subdivided into half-quarters, the quarters are subdivided into two equal parts by lines running north and south through the centers of the quarters. In the northeast quarter the subdivisions are designated as the east half of the northeast quarter and the west half of the northeast quarter, written thus: $E\frac{1}{2}$ of $NE\frac{1}{4}$ and $W\frac{1}{2}$ of $NE\frac{1}{4}$. In the southeast quarter they are designated as the east half of the southeast quarter and the west half of the southeast quarter, written, $E\frac{1}{2}$ of $SE\frac{1}{4}$ and $W\frac{1}{2}$ of $SE\frac{1}{4}$. In the northwest quarter they are designated as the east half of the northwest quarter and the west half of the northwest quarter, written thus: $E\frac{1}{2}$ of $NW\frac{1}{4}$ and $W\frac{1}{2}$ of $NW\frac{1}{4}$. In the southwest quarter they are designated as the east half of the southwest quarter and the west half of the southwest quarter, written thus: $E\frac{1}{2}$ of $SW\frac{1}{4}$ and $W\frac{1}{2}$ of $SW\frac{1}{4}$. In each subdivision will be found the abbreviations written on the diagram.

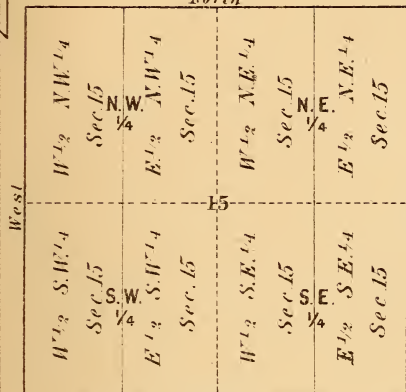
Diagram No. 6, represents the square with the quarters subdivided into half-quarters by lines running east and west through the centres of the quarters. The abbreviations are marked on each piece, in the northeast quarter, the two half-quarters are designated as the north half of the northeast quarter and the south half of northeast quarter, written: $N\frac{1}{2}$ of $NE\frac{1}{4}$ and $S\frac{1}{2}$ of $NE\frac{1}{4}$, the same division is made of each quarter,

Diagram No. 7, represents the square with the quarters subdivided into sixteen quarter quarters. Each quarter is divided in same manner as the square in *diagram* number 4, by running lines north and south and east and west through the

DIAGRAMS

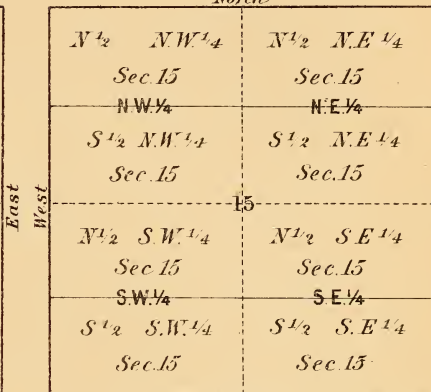
N^o 5

North



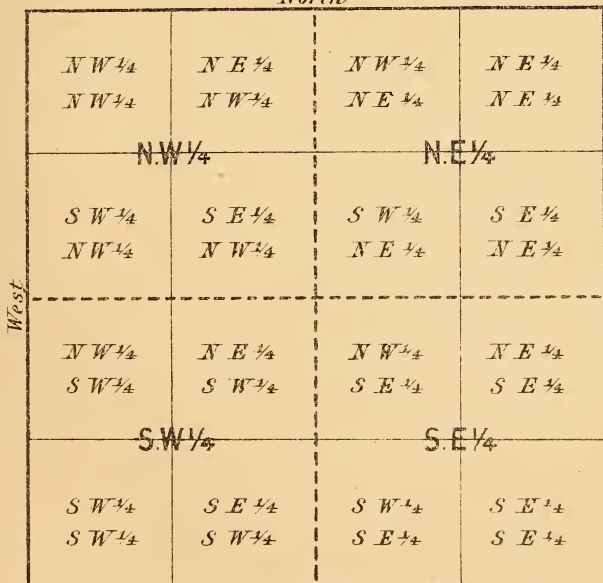
N^o 6

North



N^o 7

North



REFERENCE

Lines dividing squares into ¹/₄ into ¹/₈ and ¹/₁₆

centres of the quarters, these lines subdivide each quarter into four quarters. In the northeast quarter these subdivisions are designated as follows: Northeast quarter of the northeast quarter, written: $NE\frac{1}{4}NE\frac{1}{4}$ (of, being implied) the northwest quarter of the northeast quarter, written: $NW\frac{1}{4}NE\frac{1}{4}$, the southeast quarter of the northeast quarter, written: $SE\frac{1}{4}NE\frac{1}{4}$ and the southwest quarter of the northeast quarter, written $SW\frac{1}{4}NE\frac{1}{4}$. In the southeast quarter they are designated as the northeast quarter of the southeast quarter, written: $NE\frac{1}{4}SE\frac{1}{4}$. The southeast quarter of the southeast quarter, written: $SE\frac{1}{4}SE\frac{1}{4}$, the northwest quarter of the southeast quarter, written: $NW\frac{1}{4}SE\frac{1}{4}$, the southwest quarter of the southeast quarter, written: $SW\frac{1}{4}SE\frac{1}{4}$. The northwest and southwest quarters are subdivided in the same manner as the northeast and southeast quarters. The written abbreviations on each piece are used when applied to land descriptions. Should this diagram seem complicated, draw a square, mark on it in the center $NE\frac{1}{4}$, put north on top, south on bottom, on the right east, on the left west, subdivide it into four equal parts, and write out the description of each quarter as in Diagram 4. You will then have the subdivision of the northeast quarter, to each description must be added northeast quarter. Proceed in same manner with the northwest, southeast and southwest quarters.

The subdivisions given in the seven preceding diagrams are the legal subdivisions of a square as designated by Congress for land parceling. Government in subdividing the public lands applies it only to sections of land, except in early surveys in Ohio, in which half and quarter townships were sold.

Practice on the following examples until familiar with the subdivisions of the square into halves, quarters, half-quarters, and quarter-quarters.

FIRST EXAMPLE.

$N\frac{1}{2}-NE\frac{1}{4}-SE\frac{1}{4}-NE\frac{1}{4}-SW\frac{1}{4}-NE\frac{1}{4}-NW\frac{1}{4}-SE\frac{1}{4}-N\frac{1}{2}-SW\frac{1}{4}$
 $-S\frac{1}{2}-SW\frac{1}{4}$.

SECOND EXAMPLE.

$N\frac{1}{4}-NW\frac{1}{4}-N\frac{1}{2}-SE\frac{1}{4}-S\frac{1}{2}-SE\frac{1}{4}-NE\frac{1}{4}-SW\frac{1}{4}-W\frac{1}{2}-SW\frac{1}{4}$
 $-SE\frac{1}{4}-SW\frac{1}{4}$.

THIRD EXAMPLE.

$E\frac{1}{2}-NE\frac{1}{4}$ — $W\frac{1}{2}-NE\frac{1}{4}$ — $N\frac{1}{2}-NW\frac{1}{4}$ — $S\frac{1}{2}-NW\frac{1}{4}$ — $E\frac{1}{2}-SE\frac{1}{4}$ — $W\frac{1}{2}-SE\frac{1}{4}$ — $N\frac{1}{2}-SW\frac{1}{4}$ — $S\frac{1}{2}-SW\frac{1}{4}$.

FOURTH EXAMPLE.

1st Description.....	$NE\frac{1}{4}-NW\frac{1}{4}$	9th Description.....	$NW\frac{1}{4}-SE\frac{1}{4}$
2nd “	$NW\frac{1}{4}-SW\frac{1}{4}$	10th “	$NE\frac{1}{4}-NE\frac{1}{4}$
3rd “	$SE\frac{1}{4}-SE\frac{1}{4}$	11th “	$SW\frac{1}{4}-NW\frac{1}{4}$
4th “	$SW\frac{1}{4}-NE\frac{1}{4}$	12th “	$SE\frac{1}{4}-SW\frac{1}{4}$
5th “	$SW\frac{1}{4}-SW\frac{1}{4}$	13th “	$SE\frac{1}{4}-NE\frac{1}{4}$
6th “	$SE\frac{1}{4}-NW\frac{1}{4}$	14th “	$SW\frac{1}{4}-SE\frac{1}{4}$
7th “	$NW\frac{1}{4}-NE\frac{1}{4}$	15th “	$NE\frac{1}{4}-SW\frac{1}{4}$
8th “	$NE\frac{1}{4}-SE\frac{1}{4}$	16th “	$NW\frac{1}{4}-NW\frac{1}{4}$

Description numbers from one to sixteen are prefixed merely to assist in proving the example.

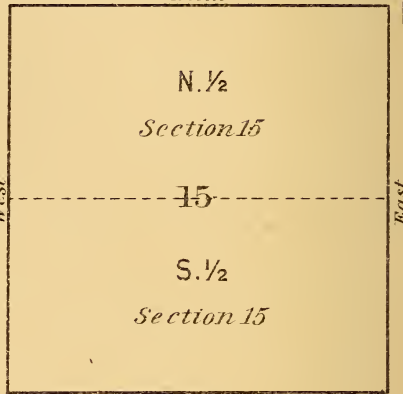
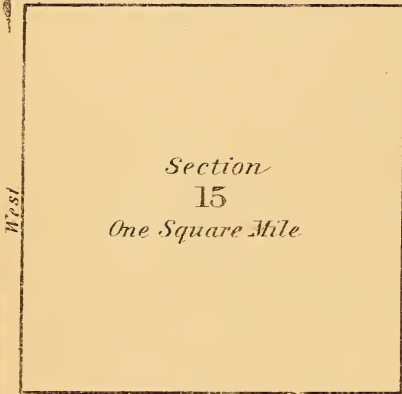
To prove the above example, first draw a large square; divide it into quarters, next subdivide each quarter into quarters. You will then have 16 squares; write north on the top, south on the bottom, east on the right, west on the left of the square. In each square write the description belonging to it. When completed place on each square with the description the number of the description. Thus, on the $NE\frac{1}{4} NW\frac{1}{4}$ place 1, on the $NW\frac{1}{4} SW\frac{1}{4}$ place 2, and so on to number 16 on the $NW\frac{1}{4} NW\frac{1}{4}$, add these numbers together from top to bottom, from right to left and from corner to corner. The sum of each row of numbers will be the same.



DIAGRAMS

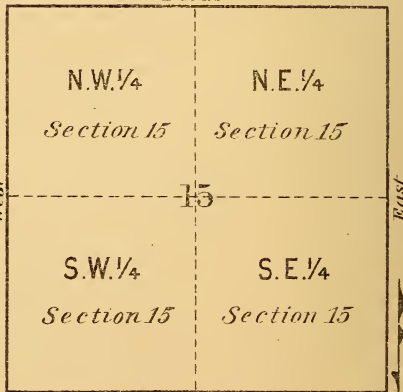
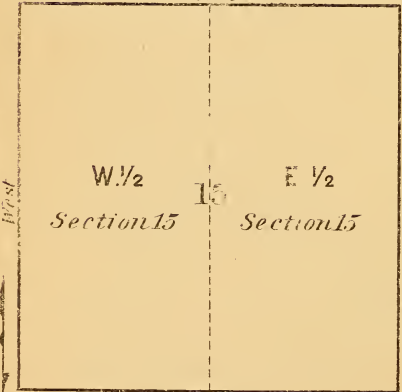
N^o 8
North

N^o 9
North





N^o 10
North

N^o 11
North



REFERENCE

Section Lines 
 Line dividing Sec. into 1/2 & 1/4 

The Legal Divisions and Subdivisions of a Square, Applied to a Section.

Government in surveying and describing the Public Lands calls each square mile of land a section and designates it by a number. The subdivisions of the square given in the seven preceding diagrams will apply to any section by adding the section number to each division or subdivision.

The following diagrams are drawn on the cardinal points of the compass as in first seven diagrams :

Diagram No. 8, marked Section 15, represents a square mile of land, the sides of which are each one mile in length.

Diagram No. 9, represents Section 15 divided into north and south halves, which are designated as the north half of section 15, and south half of section 15 ; written thus, $N\frac{1}{2}$ Sec. 15 and $S\frac{1}{2}$ Sec. 15.

Diagram No. 10, represents Section 15 divided into east and west halves, written $W\frac{1}{2}$ Sec. 15, and $E\frac{1}{2}$ Sec. 15.

Diagram No. 11, represents Section 15 divided into quarters, the descriptions are written on each quarter ; abbreviated they are written, $NE\frac{1}{4}$ Sec. 15 ; $NW\frac{1}{4}$ Sec. 15 ; $SE\frac{1}{4}$ Sec. 15 ; and $SW\frac{1}{4}$ Sec. 15.

Diagram No. 12, represents the four quarters of Section 15 divided into east and west halves by lines running through the centers of the quarters north and south.

In the northeast quarter the subdivisions are designated as east half of the northeast quarter Sec. 15 and west half of the northeast quarter Sec. 15. In the northwest quarter the subdivisions are designated as the east half of the northwest quarter Sec. 15 and west half of the northwest quarter Sec. 15. In the southeast quarter the subdivisions are designated as the east half of the southeast quarter Sec. 15 and the west half of

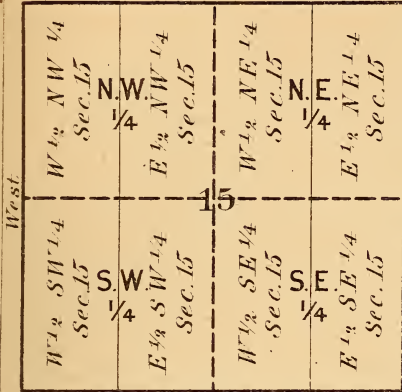
the southeast quarter Sec. 15. In the southwest quarter the subdivisions are designated as east half of the southwest quarter Sec. 15, and the west half of the southwest quarter Sec. 15. The descriptions required for deeds are given on each subdivision, abbreviated as generally used.

Diagram No. 13, represents the four quarters of Sec, 15 divided into north and south halves by lines running through the centers of the quarters east and west. In the northeast quarter, the subdivisions are designated as the north half of the northeast quarter Sec. 15 and the south half of the northeast quarter Sec. 15. In the northwest quarter the subdivisions are designated as the north half of the northwest quarter Sec. 15 and south half of the northwest quarter Sec. 15. In the southeast quarter the subdivisions are designated as the north half of the southeast quarter of Sec, 15 and the south half of the south east quarter of Sec. 15. In the southwest quarter the subdivisions are designated as the north half of the southwest quarter Sec. 15 and the south half of the southwest quarter of Sec. 15. The abbreviations are written on each piece.

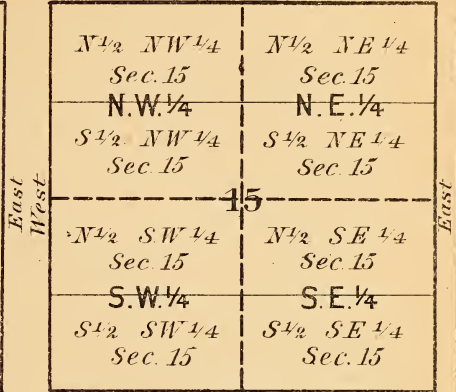
Diagram No. 14, represents the four quarters of Section 15 divided into quarters by lines running through the centre of each quarter both north and south and east and west, each quarter section is subdivided into quarters. In the northeast quarter the subdivisions are designated as the northeast quarter of the northeast quarter of Sec. 15 ; the southeast quarter of the northeast quarter of Sec. 15 ; the northwest quarter of the northeast quarter of Sec. 15, and the southwest quarter of the northeast quarter of Sec 15. In the northwest quarter the subdivisions are designated as the northeast quarter of the northwest quarter of Sec. 15, the northwest quarter of the northwest quarter of Sec. 15, the south east quarter of the northwest quarter of Sec. 15, and the south west quarter of the northwest quarter of Sec. 15. In the southeast quarter the subdivisions are designated as the northeast quarter of the southeast quarter of Sec. 15, the northwest quarter of the southeast quarter of Sec. 15, the southeast quarter of the southeast quarter of Sec. 15, and the southwest quarter of the southeast quarter of Sec. 15. In the southwest quarter

DIAGRAMS

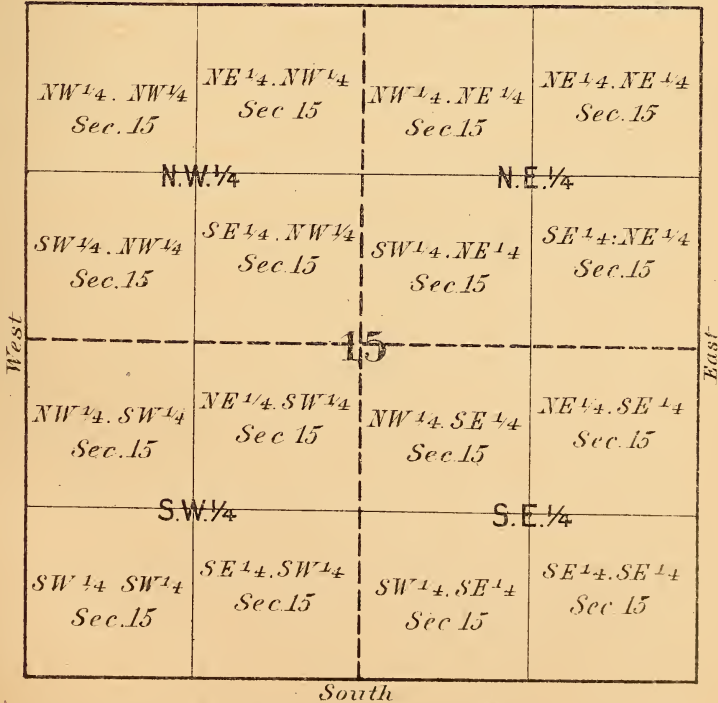
N^o 12
North



N^o 13
North



N^o 14
North



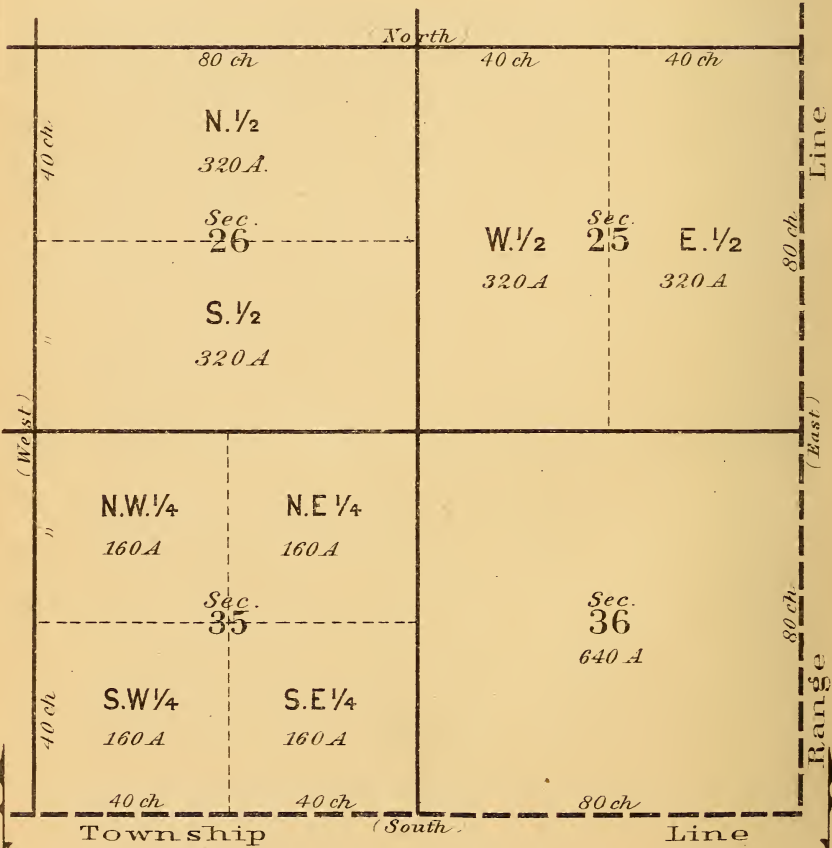
REFERENCE *Line dividing Sec. into 1 4* ————
Line dividing Sec. into 1 8 & 1 16 - - - - -

DIAGRAM

N^o 15

SECTIONS-25,26,35 & 36

Explanation on Page 19



REFERENCE

Section Lines _____
 Line dividing Sec. into 1/2 & 1/4 -----

the subdivisions are designated as the northeast quarter of the southwest quarter of Sec. 15, the northwest quarter of the southwest quarter of Sec. 15, the southeast quarter of the southwest quarter of Sec. 15 and the southwest quarter of the southwest quarter of Sec. 15. The abbreviations are written on each piece.

The foregoing subdivisions are the legal subdivisions recognized by Government in deeding and describing lands, represented in amounts by 160, 80 and 40 acres.



**DIAGRAMS ILLUSTRATING THE NUMBER OF ACRES
IN EACH LEGAL DIVISION OR SUBDIVISION
OF A SECTION OF LAND.**

Diagram No. 15 represents sections 25, 26, 35, and 36, four sections of land located in the southeast corner of a Congressional township.

Section 36 is represented as a square containing 640 acres, the sides of which are each 80 chains or 320 rods. Government in deeding a section deeds it by its number, adding the number of the range and township in which it is located.

Section 25 illustrates a section divided into east and west halves each containing 320 acres the sides of which are 40 by 80 chains (or 160 by 320 rods.) The descriptions when abbreviated for assessing or deeding are $E\frac{1}{2}$ sec 25, 320 Acres, and $W\frac{1}{2}$ sec. 25, 320 Acres.

Section 26 illustrates a section divided into north and south halves the sides of which are 40 by 80 chains (or 160 by 320 rods) each half containing 320 Acres. The descriptions of which are $N\frac{1}{2}$ Section 26, 320 Acres and $S\frac{1}{2}$ Sec. 26, 320 Acres.

Section 35 illustrates a section divided into quarters by lines running through the center of the section, N., S., E. and W. Each square represents 160 acres the sides of which are each 40 chains or 160 rods in length. The following are the descriptions of

the quarters: Northeast quarter of section 35, containing 160 acres abbreviated thus: $NE\frac{1}{4}$ Sec 35, 160 A. The abbreviations of the other quarters are $NW\frac{1}{4}$ Sec. 35, 160 A. The $SW\frac{1}{4}$ Sec. 35, 160 A., and the $SE\frac{1}{4}$ Sec. 35, 160 A.

Diagram No. 16, represents Sections 25, 26, 35 and 36, divided into 40 and 80 acre tracts. Sections 25 and 36 are subdivided into 80 acre tracts, and sections 26 and 35 are subdivided into 40 acre tracts. In each section one-half of the subdivisions have the abbreviated descriptions and number of acres written on them, the other subdivisions are left blank as examples to be filled with descriptions and number of acres. In sections 25 and 36 the 80 acre tracts are each 20 by 40 chains (or 80 by 160 rods.) In sections 26 and 35 the 40 acre tracts are each 20 chains, or 80 rods square. The descriptions of the subdivisions of the northwest quarter of Sec. 25 for deeds are $E\frac{1}{2}$ $NW\frac{1}{4}$ Sec. 25, 80 A., and $W\frac{1}{2}$ $NW\frac{1}{4}$ Sec. 25, 80 acres. The descriptions of the subdivisions of the northwest quarter of sec. 26 for deeds are, $NE\frac{1}{4}$ of $NW\frac{1}{4}$ of Sec. 26, forty acres, the $SE\frac{1}{4}$ of $NW\frac{1}{4}$ of Sec. 26, forty acres, the $SW\frac{1}{4}$ of $NW\frac{1}{4}$ Sec. 26, forty acres and the $NW\frac{1}{4}$ of $NW\frac{1}{4}$ of Sec 26 forty acres. In the southeast quarter of Sec 26 add to each abbreviation the number of the section.

In section 35 the NE and SW quarters have abbreviated descriptions written on each subdivision. The subdivision of the southwest quarter, when written on deeds or tax receipts would be $SE\frac{1}{4}$ of $SW\frac{1}{4}$ of Sec. 35, containing 40 acres. The $NE\frac{1}{4}$ of $SW\frac{1}{4}$ of Sec. 35 containing 40 acres. The $NW\frac{1}{4}$ of $SW\frac{1}{4}$ of Sec. 35 containing 40 acres, and the $SW\frac{1}{4}$ of $SW\frac{1}{4}$ of Sec. 35 containing 40 acres each of the 40 acre tracts, are 20 chains square. One-half of the quarters in this diagram are marked off into 40 and 80 acre tracts for examples. Draw square, as in diagram, and fill in abbreviated description on each subdivision. Length and breadth of each piece are given in rods or chains.



DIAGRAM

N^o 16

SECTIONS-25,26,35&36

DIVIDED INTO EIGHTHS
AND SIXTEENTHS

Explanation on Page 20

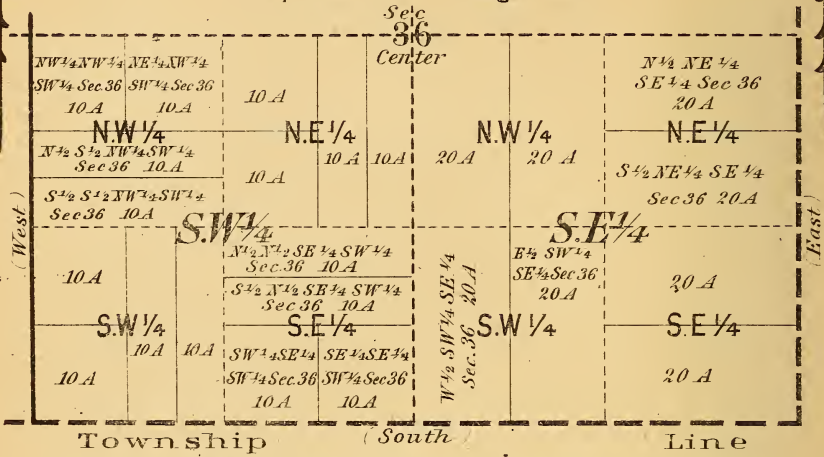


Section Line
 Line dividing Sec. into quarters - - - - -
 Line dividing ¹/₄ Sec into 40 & 80 A. tracts _____

DIAGRAMS

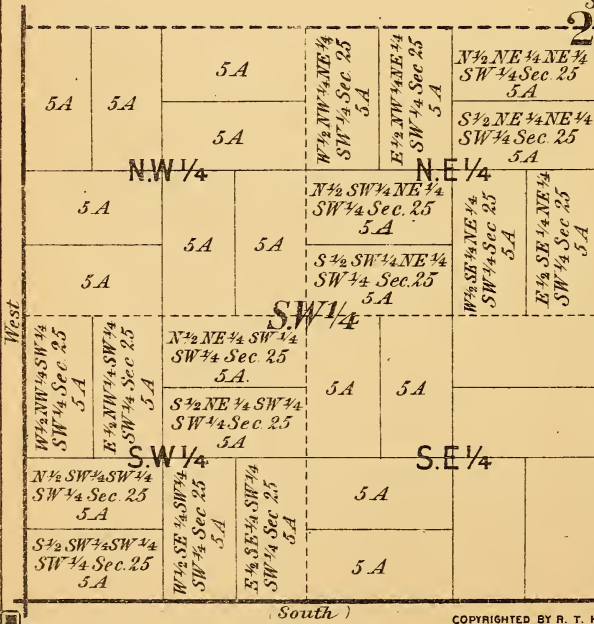
N^o 17

Explanation on Page 25



REFERENCE: *Line dividing Sec. into 1/4*
Line dividing 1/4 into 40 A. tracts
Line dividing 40 A. tracts into 10 & 20 A

Center of
Sec.
25



N^o 18

Explanation on Page 25.

REFERENCE

Line dividing Section into 1/4
Line dividing 1/4 into 40 A tracts
Line dividing 40 A tracts into 5 Acres

DIAGRAMS ILLUSTRATING THE SUBDIVISION OF A SECTION INTO 5, 10, AND 20 ACRE TRACTS.

Diagram 17 represents the south half of Section 36. The south half of section 36 is subdivided into ten and twenty acre tracts. In the southeast quarter, which is subdivided into twenty acre tracts, by subdividing each forty acres into halves, one-half of the subdivisions are left blank for examples, to fill with descriptions, and number of acres. To subdivide the southeast quarter, draw a square, let it represent the southeast quarter, mark north, south, east and west on the margin, in correct position, and in the center mark $SE\frac{1}{4}$, divide it into quarters, and each of these quarters into halves. From the abbreviated descriptions given in the diagram you will be able to determine descriptions of the blank subdivisions. For the southwest quarter of section 36 draw square and subdivide as before, with this addition, divide each half into halves. The abbreviated descriptions will be found on diagram. Locate the following descriptions: $W\frac{1}{2}$ of $E\frac{1}{2}$, of $SE\frac{1}{4}$ of $SW\frac{1}{4}$ Sec. 36; $S\frac{1}{2}$ of $N\frac{1}{2}$ of $SW\frac{1}{4}$ $SW\frac{1}{4}$ Sec. 36; $SE\frac{1}{4}$ of $NE\frac{1}{4}$ of $SW\frac{1}{4}$ Sec. 36. To determine the number of acres in each piece, multiply the denominators of the fractions of each subdivision together, and divide 640 (number of acres in a section), by the product, the result obtained will be the number of acres for each subdivision.

Diagram 18.—This diagram represents the southwest quarter of Section 25, divided into tracts of five acres each. The northeast quarter and the southwest quarter, of the southwest quarter, as marked on the diagram, have the number of acres and section, with abbreviated description of each tract marked on it. The northwest quarter, and the southeast quarter are divided into five acre tracts without descriptions for examples. To subdivide a section into five acre tracts draw a large square on the cardinal points of the compass; let it represent a section; divide it into quarters by running lines through the centre, north and south and east and west, the square between south and west will repre-

sent diagram 18, the southwest quarter. Subdivide this quarter into quarters, as above described, each of which will represent forty acre tracts. Subdivide each quarter-quarter, or forty acre tract into quarters as before, each square will represent ten acres; subdivide each ten acre tract into halves, as in diagram. This will complete the subdivision of the southwest quarter into five acre tracts. Subdivide each quarter in same manner.

Fractional Sections Subdivided into Lots

—WITH—

Legal Descriptions for Assessing and Deeding

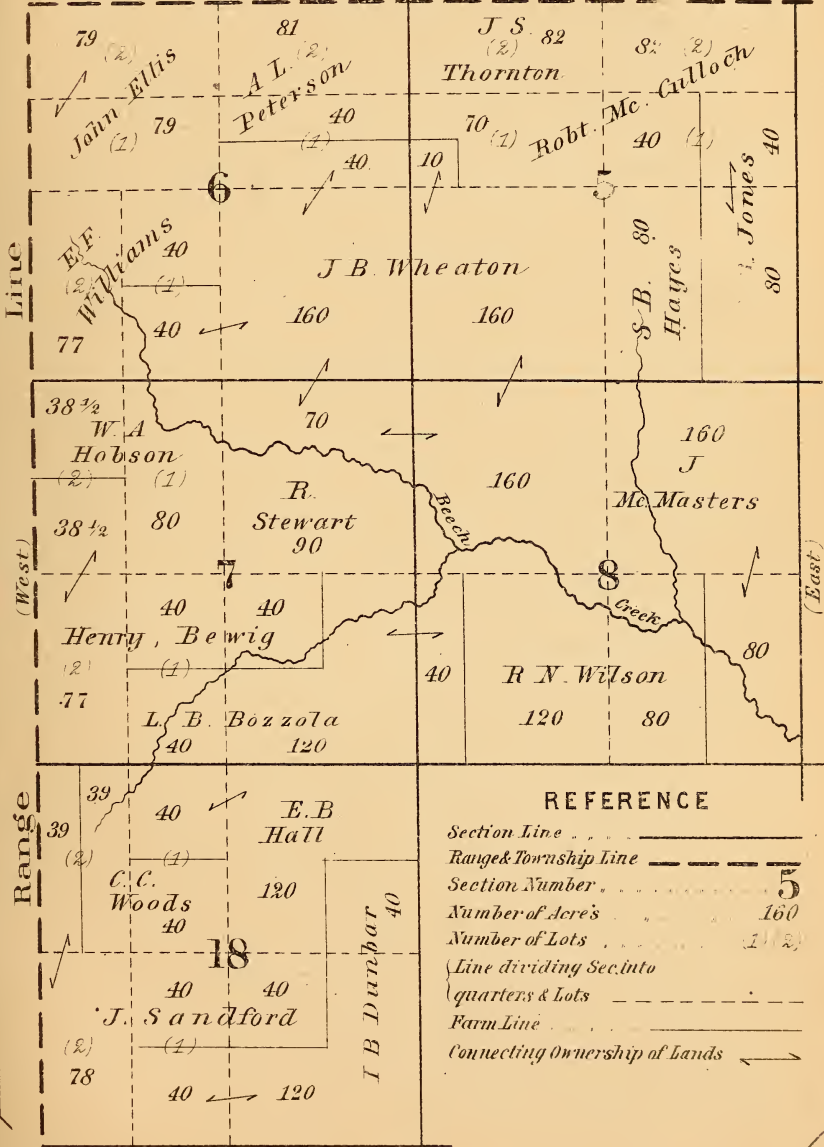
Diagram 19 represents the northwest corner of a township, in which the fractional quarters are lotted according to plan adopted for a majority of the townships in Missouri, Illinois, Indiana, Arkansas, and some of the other States. There are many exceptions in these States, as will be seen by reference to the township diagrams, with each State. In all cases where government designates, and patents a piece of land by a number, instead of the description, the number should be used in assessing, deeding, and in abstracting. Previous to law passed by Congress, making subdivisions when subdivided on the cardinal points of the compass and described as halves and quarters, legal descriptions; land descriptions contained the lengths and bearings of the lines, or the boundaries by calling for corners and owners names adjoining. In this diagram the quarter sections, on the west and north of the township, are lotted, and in deeding should be deeded as lots; for example. In Section 18 the southwest quarter is designated by government as Lot 1, southwest quarter, and Lot 2, southwest quarter, instead of east half of southwest quarter, and west half of southwest quarter; usually

DIAGRAM

No. 19

Explanation on Page 26.

Township 10 North, Range 12 West, of the 2nd Principal Mer.
 Township (North) line



REFERENCE

Section Line	—
Range & Township Line	---
Section Number	5
Number of Acres	160
Number of Lots	(1) (2)
(Line dividing Sec. into quarters & Lots)	---
Farm Line	—
Connecting Ownership of Lands	↔

the west half of Sections 7, 18, 19, 30 and 31, and the south-west quarter of Sec. 6 are divided into lots by lines running north and south as in Sec. 18; and the north half of Sections 1, 2, 3, 4, 5 and 6, divided into lots by lines running east and west as in Sec. 5. Each quarter lotted by government should be described in the same manner. This diagram has been inserted to illustrate the correct descriptions of land to be used in assessing, abstracting and deeding, and the following descriptions are from the subdivisions given in the diagram.



ASSESSING.

Assessing is placing a valuation on property or profits of business for the purpose of taxation. In each county or assessing district the assessor uses his discretion as to the value placed on all property, which is usually less than the real value or less than the price for which it could be purchased. In each state at regular intervals, of one or more years, all property subject to taxation is assessed by persons elected for that purpose. The following notes on assessing are confined to real estate descriptions.

Before commencing the assessment, the assessor should be furnished with complete township plats, showing the amounts of land sold in each quarter section, and all lots designated on original plats should be marked on each fractional quarter section. Blank township plats subdivided into forty acre tracts are needed, on which each tract should be checked as assessed; it will save a great amount of labor in making final books. Grouping together a number of pieces, some of which are fractional should be avoided; descriptions of fractional pieces should occupy a separate line, otherwise some difficulty will be experienced in telling when each section has been correctly assessed. On the following pages 30 and 31 are given a correct and erroneous assessment of lands in Diagram 19, page 27.

CORRECT DESCRIPTIONS

FOR ASSESSMENT OF

Sections 5, 6, 7 and 18, T. 10 N., R. 12 W,

No. of Acres.

SECTION 5.

See Diagram 19, Page 27.

80	E $\frac{1}{2}$ SE $\frac{1}{4}$	J. B. Jones.
40	E $\frac{1}{2}$ Lot 1, NE $\frac{1}{4}$	“ “
80	W $\frac{1}{2}$ SE $\frac{1}{4}$	S. B. Hayes.
40	W $\frac{1}{2}$ Lot 1, NE $\frac{1}{4}$	Robt. McCulloch.
82	Lot 2 NE $\frac{1}{4}$	“ “
70	Lot 1 NW $\frac{1}{4}$ except SW $\frac{1}{4}$ W $\frac{1}{2}$	“ “
82	Lot 2 NW $\frac{1}{4}$	J. S. Thornton.
160	SW $\frac{1}{4}$	J. B. Wheaton.
10	SW $\frac{1}{4}$ W $\frac{1}{2}$ Lot 1 NW $\frac{1}{4}$	“ “

SECTION 6

160	SE $\frac{1}{4}$	J. B. Wheaton
40	S $\frac{1}{2}$ Lot 1 NE $\frac{1}{4}$	“ “
40	S $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	“ “
40	N $\frac{1}{2}$ Lot 1 NE $\frac{1}{4}$	A, L. Peterson.
81	Lot 2 NE $\frac{1}{4}$	“ “
79	Lot 1 NW $\frac{1}{4}$	John Ellis.
79	Lot 2 NW $\frac{1}{4}$	“ “
40	N $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	E. F. Williams.
77	Lot 2 SW $\frac{1}{4}$	“ “

SECTION 7.

120	E $\frac{1}{2}$ SE $\frac{1}{4}$ and SW $\frac{1}{4}$ SE $\frac{1}{4}$	L. B. Bozzola.
40	S $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	“ “
40	NW $\frac{1}{4}$ SE $\frac{1}{4}$	Henry Bewig.
40	N $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	“ “
77	Lot 2 SW $\frac{1}{4}$	“ “
38 $\frac{1}{2}$	S $\frac{1}{2}$ Lot 2 NW $\frac{1}{4}$	“ “
90	All NE $\frac{1}{4}$ S of Beech Cr.	R. Stewart.
70	All NE $\frac{1}{4}$ N of Beech Cr.	J. B. Wheaton.
80	Lot 1 NW $\frac{1}{4}$	W. A. Hobson.
38 $\frac{1}{2}$	N $\frac{1}{2}$ Lot 2 NW $\frac{1}{4}$	“ “

SECTION 18.

120	E $\frac{1}{2}$ SE $\frac{1}{4}$ and SW $\frac{1}{4}$ SE $\frac{1}{4}$	I. B. Dunbar.
40	S $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	“ “
40	SE $\frac{1}{4}$ NE $\frac{1}{4}$	“ “

No. of Acres.	SECTION 18 Continued.	
40	NW $\frac{1}{4}$ NE $\frac{1}{4}$	J. Sandford.
40	N $\frac{1}{2}$ Lot 1 SW $\frac{1}{4}$	“ “
78	Lot 2 SW $\frac{1}{4}$	“ “
39	W $\frac{1}{2}$ Lot 2 NW $\frac{1}{4}$	“ “
120	W $\frac{1}{2}$ NE $\frac{1}{4}$ and NE $\frac{1}{4}$ NE $\frac{1}{4}$	E. B. Hall.
40	N $\frac{1}{2}$ Lot 1 NW $\frac{1}{4}$	“ “
40	S $\frac{1}{2}$ Lot 1 NW $\frac{1}{4}$	C. C. Wood.
39	E $\frac{1}{2}$ Lot 2 NW $\frac{1}{4}$	“ “

ERRONEOUS DESCRIPTIONS

Of Sections 5, 6, 7, etc.

(Frequently used in assessing.)

No. of Acres.	SECTION 5.	
120	E $\frac{1}{2}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$,	J. B. Jones.
80	W part of SE $\frac{1}{4}$,	S. B. Hayes.
122	W $\frac{1}{2}$ and NE $\frac{1}{4}$ -NE $\frac{1}{4}$,	Robt. McCulloch.
70	Part S $\frac{1}{2}$ NW $\frac{1}{4}$.	“ “
81	N $\frac{1}{2}$ NW $\frac{1}{4}$,	J. S. Thornton.
170	SW $\frac{1}{4}$ and part of NW $\frac{1}{4}$,	J. B. Wheaton.
SECTION 6.		
240	SE $\frac{1}{4}$, S $\frac{1}{2}$, S $\frac{1}{2}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$,	J. B. Wheaton.
121	N $\frac{1}{2}$ NE $\frac{1}{4}$, N $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$,	A. L. Peterson.
158	NW $\frac{1}{4}$,	John Ellis.
117	W $\frac{1}{2}$ and NE $\frac{1}{4}$ SW $\frac{1}{4}$,	E. F. Williams.
SECTION 7.		
160	E $\frac{1}{2}$ and SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$,	L. B. Bozzola.
195 $\frac{1}{2}$	{ NW $\frac{1}{4}$ SE $\frac{1}{4}$, W $\frac{1}{2}$ and NE $\frac{1}{4}$ } SW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$,	Henry Bewig.
90	Part of NE $\frac{1}{4}$,	R. Stewart.
70	Part of NE $\frac{1}{4}$,	J. B. Wheaton.
118 $\frac{1}{2}$	E $\frac{1}{2}$ and NW $\frac{1}{4}$ NW $\frac{1}{4}$,	W. A. Hobson.
SECTION 18.		
200	{ E $\frac{1}{2}$ and SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ } SW $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$,	I. B. Dunbar.
197	{ W $\frac{1}{2}$ and NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ } SE $\frac{1}{4}$, W $\frac{1}{2}$ W $\frac{1}{2}$ NW $\frac{1}{4}$,	J. Sandford.
160	W $\frac{1}{2}$ and NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$,	E. B. Hall.
39	SE $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ W $\frac{1}{2}$ NW $\frac{1}{4}$,	C. C. Woods.

ERRONEOUS DESCRIPTIONS ON PAGE 31 ILLUSTRATED.

First is given the assessment of Sections 5, 6, 7 and 18, with correct descriptions. On page following is given the same sections, with erroneous descriptions. The descriptions on page thirty are definite legal descriptions, by which each piece can be exactly located, and the lot numbers conform to original patents from government. The erroneous descriptions on page thirty-one are such as are frequently used in assessing, and sometimes in deeding. As a rule lot one is full, and two is the fraction; to deed, or assess these lots, as the east and west halves, or north and south halves, would not be correct. The descriptions, as designated by government are the correct descriptions.

To readily comprehend the difference between correct and erroneous descriptions, the following is suggested: From Diagram 19, Page 27, draw off the description of each piece as you think it should occur in a tax receipt, after completing it, compare it with the correct and erroneous descriptions on pages 30 and 31.

The following are the errors in the descriptions of Section 5, on Page 31: The first description (120 acres) should give the number of the lot, and be described in two parts, giving the lot description separately. The second description (80 acres) should state $W\frac{1}{2}$ instead of W. part. The third description (122 acres) should give the lot numbers and be in two descriptions. The fourth description (70 acres) should state what part so that a definite location can be had (land cannot be sold for taxes unless it can be located by the description) The fifth description (82 acres) should give the lot number, the erroneous description would lose one acre of land. The sixth description (170 acres) should give location of 10 acres separate from the 160 acres and the subdivisonal part of lot. See correct description.

Section 6. The first description (240 acres) should be in three descriptions and give the lots separately. The second description (121 acres) should give lot descriptions separately. The third description (158 acres) should be given in lots. The fourth description (117 acres) should be given with lot numbers.

In assessing a city or town, the assessment should commence with Lot 1 in the original town, and if there are blocks, with Block 1, and proceed in consecutive order with the lots in each block, and in consecutive order with the blocks. Each addition should be assessed separately, taking the lots in consecutive order; following which, the assessment of the outlots and small pieces should be made. If there are a number of small pieces without numbers, in and around the city, which are hard to describe, and on which they refuse to pay taxes, because not properly described, as is frequently the case, the following plan is suggested for assessing, viz: The assessor should plat so much of the city or town, as to show the location of the pieces, (showing the blocks and lots they join,) mark it, *assessor's plat*, and number the lots consecutively, beginning with number one. Have plat recorded as assessor's plat, and in assessing write lot number, and after it, "assessor's addition." If you use number of acres with lot number, and exact amount is not known, place before each number of acres the word *about*.

The above suggested plan, wherever tried, has proved a remedy against refusal to pay taxes on account of indefinite descriptions. In assessing Spanish grants and irregular shaped tracts, give such a description that the tracts can be located. The original number, or name given, must be added to the description. When a military tract or a grant is subdivided into small tracts make a plat of the tract or grant, and place a number on each subdivision, (it is not necessary to survey it; plat it from the deeds,) have plat recorded as assessor's plat and assess as described above. Assessments should be put on a strictly business basis. They are not complete unless every piece of land can be located by the description. This is a necessity, not only as a protection to the Counties, against those who refuse to pay taxes, but it is due the men who pay their taxes, to have every description a definite legal description, without which, a tax title is not worth the paper it is written on.

In Sections 7 and 18 the same class of errors exist, which will be seen by comparing the descriptions with the diagram.

STATE OF MISSOURI,
COUNTY OF _____

No.
Collector's Office, _____, Mo., 1887.

Received of J. B. Wheaton Eighty-six Dollars,
Being the amount of State, State Interest Fund, County, Road and School Taxes assessed for the year 1886, in _____ County, Mo., on Real Estate below detailed.

Acres	PARTS OF SECTIONS.	Sec. Lot	Twp. Block.	Range	VALUE	State Rev.	State Int.	County Rev.	Road Tax.	School Tax.	TOTAL TAX.
160	S. W. $\frac{1}{4}$	5	10	12	\$800	\$4.00	\$0.80	\$3.00	4.00	1.60	18.40
10	S. W. $\frac{1}{4}$ W $\frac{1}{2}$ of Lot 1 N. W. $\frac{1}{4}$	5	10	12	200	1.00	20	2.00	1.00	40	4.60
160	S. E. $\frac{1}{4}$	6	10	12	1,280	6.40	1.28	12.80	6.40	2.56	29.44
40	S. $\frac{1}{2}$ Lot 1 N. E. $\frac{1}{4}$	6	10	12	160	80	16	1.60	80	32	3.68
40	S. $\frac{1}{2}$ Lot 1 S. W. $\frac{1}{4}$	6	10	12	160	80	16	1.60	80	32	3.68
70	All N. E. $\frac{1}{4}$ N. of Beech Cr... ..	7	10	12	210	1.05	21	2.10	1.05	42	4.83
160	S. W. $\frac{1}{4}$	8	10	12	480	2.40	48	4.80	2.40	96	11.04
	Lots in original town of Hermitage	17			150	75	15	1.50	75	30	3.45
	Lots in original town of Hermitage	18			200	1.00	20	2.00	1.00	40	4.60
	Lots in Jackson's add.	7	2		75	37	07	7.5	37	15	1.71
	Lots in Jackson's add.	8	2		50	25	05	50	25	10	1.15

NO PERSONAL PROPERTY. \$86.48
H. E. BLAKEMAN, Deputy Collector., Collector of _____ County.

TAX RECEIPT DESCRIPTIONS.

The descriptions in tax receipt on page 34 are from Diagram No. 19 and represent the farm of J. B. Wheaton, located in Sections 5, 6, 7 and 8. The first description is southwest quarter of Sec. 5, that is: one-quarter of 640 acres (a section), which is 160 acres. The next description is southwest quarter, west half Lot 1, northwest quarter Sec. 5, that is one-quarter of one-half of Lot 1; one-quarter of one-half equals one-eighth, and Lot 1 is 80 acres; hence we have one-eighth of 80 acres, which is 10 acres. The next description is southeast quarter of Sec. 6, same as southwest quarter of Sec. 5, 160 acres. The next description is south half of Lot 1, northeast quarter Sec. 6, Lot 1, is 80 acres; one-half of 80 is 40 acres. The next description is south half Lot 1 southwest quarter Sec. 6, same as Lot 1, northwest quarter, 40 acres. The next description, all northeast quarter north of Beech Creek, Sec. 7, 70 acres; this is considered an indefinite description, as creek is liable to change, but is generally used. The next description is northwest quarter of Sec. 8, 160 acres. Following the lands in Diagram 19 are the descriptions of lots and outlots in the town of Hermitage, from Diagram 27 page 64. The description of all lots should give number of lot, number of block, and name of addition, (if it is not the original town.) Outlots should show number of acres.

ABSTRACTS OF TITLE.

Abstracts of title are short extracts taken from deeds, wills, decrees of courts, or other legal conveyances, and from mortgages, judgments, liens, and all legal papers affecting the title, of the property. These extracts, or abstracts of conveyances, should show the character of each legal paper affecting the title,

ABSTRACT OF TITLE.—CONTINUED.

Number 5.

WILLIAM T. PHELPS and Wife, } Mortgage, Dated Sept. 13, 1847. Acknowledged same day before
 SARAH, } Daniel Townley, J. P. Recorded Sept. 14, 1847, Book 7 of Mort-
 TO } gages of said county, conveys land described in No. 4, to secure pay-
 JOHN ROSE, } ment of Note \$5,000, bearing 8 per cent annual interest, dated Sept.
 13, 1847, and payable in two years from date.

Number 6.

JOHN ROSE } Discharge of Mortgage, set forth in No. 5. Dated Dec. 21, 1849, and
 TO } duly acknowledged same day. Recorded in Book 8 of Mortgages,
 WILLIAM T. PHELPS, } Page 604.

Number 7.

WILLIAM T. PHELPS, } Warranty Deed. Dated June 14, 1858, duly acknowledged same day,
 TO } Recorded July 21, 1858, Book 25, Page 211, conveys same as No. 4,
 OSCAR P. LAMB, } except the S½ Lot 1 SW¼, is erroneously described as SE¼-SW¼ Sec. 6.
Number 8.

OSCAR P. LAMB, Bachelor, } Warranty Deed, Dated October 23, 1884. Acknowledged before Notary
 TO } Public same day. Recorded Book 47, Page 191, conveys said SE¼
 JOEL B. WHEATON, } Sec. 6, and S½ Lot 1 NE¼ Sec. 6 and S½ Lot 1 SW¼ of said Sec. 6.
 STATE OF ILLINOIS, } ss.

Clark County, } I, TIMOTHY NORTON, Recorder of Deeds of said county, hereby
 contains all the conveyances I find of record in my office affecting the title to said lands set forth at head
 of this Abstract, and I further certify that there are no mortgages, judgments, taxes or liens of any kind
 appearing of record against said land, or which affect the title to any of them.
 Witness my hand and official seal, Oct. 27, 1885.

[SEAL]

TIMOTHY NORTON, Recorder of Deeds.

NOTE.—The Title to said lands appears to be perfect in said Joel B. Wheaton, assuming that William T. Phelps was a wid-
 ower June 14, 1858, subject to erroneous description of S½ Lot 1 SW¼ Sec. 6 in No. 7, viz: SE¼-SW¼ Sec. 6.

whether an absolute or conditional conveyance, also the acknowledgments and records of each with their dates ; the names and residence of all parties legally connected with each conveyance. The property set forth should be accurately and minutely described, and any irregularity or omission should be noted. The records should be examined for the following, viz: Deeds, Orders, or Decrees of Courts, Wills, Titles by Descent, and Encumbrances among which may be mentioned Mortgages, Judgments, Dowers, Taxes, Liens, Leases and Rents.

PUBLIC LAND ABSTRACTS.

In abstracting the public lands the title is not traced back of the patent from government, it being conceded that the treaties, purchases and cessions to the national government carries absolute title ; and the abstracts should show a chain of title from the government patent to the present owner. When patent is not recorded, the entry in original entry book, is considered sufficient evidence of ownership. In a perfect title, the transfer from each party should be a Warranty Deed, or its equivalent, and all encumbrances cancelled or satisfied.

ABSTRACT OF FARM ILLUSTRATED.

On pages 36 and 37, is given the abstract of title to J. B. Wheaton's farm of 410 acres, situated in Clark county, Illinois. For plat of farm see Diagram 19. This abstract of title is traced from United States patent to J. B. Wheaton, with exceptional notes given at foot of abstract. Beginning with land in Sec. 5, the original patent embraces the southwest quarter of Sec. 5, and Lot 1 northwest quarter, but in subsequent transfers only ten acres of Lot 1 is sold ; this tract shows an unbroken title. The lands in Sec. 6 show a mortgage, which was subsequently released. One piece was erroneously described, as shown in abstract, and one acknowledgment fails to show whether the grantor was married or single. In the erroneous description southeast quarter, southwest quarter Sec. 6, if surveyed by that description, a strip would be cut off the west side of the tract and given Lot 2. See erroneous descriptions for assessing, page thirty-one.

DEEDING.

Deeding in law is a formal written expression of something done by the party or parties from whom it proceeds; in the following it will be applied only to the conveyancing of real estate.

In the general forms for *Bond* and *Deeds* on pages 41 to 43 the descriptions are from diagram 19, and are here inserted to show the correct descriptions for fractional as well as regular subdivisions of the public lands.

The public land system of surveys and descriptions may be termed "*the practical part of geography*," for no other part of geography can be put into such general use by the "land owners" of this country as the subdivisions and descriptions of the public lands. Every year the land owners are called upon to describe their lands and to pay taxes on those descriptions, for State, county, school and road purposes. Besides this every home must be surveyed, described and deeded, and it is of great importance that every person who expects to own a home should understand thoroughly the descriptions used in the public land system of surveys, and be able to determine for himself not only the descriptions of his own home, but of any tract or parcel of the public lands. The law makes it every man's duty to furnish to the assessor a correct description of his lands; the wrong descriptions furnished the assessor, and the wrong descriptions in the deeds have been the loss of many homes. The basis needed is a correct location and a correct description; without this, all labor is lost.

In the accompanying deeds we call attention to the correct location of the lands deeded, in Diagram 19, and to the correct descriptions as shown in abstract of title on pages thirty-six and thirty-seven. In deeds the following should be carefully given viz: The proper names, the consideration, and legal descriptions. The acknowledgments should be properly attested.

LEGAL DESCRIPTION FOR DEEDS.

In the public lands the following is necessary for a legal description, viz: First, the section, or fractional part, as designated by government on original patent, adding, more or less, fractional part of, or lot number, whenever it occurs in the original patent; next, the number of the township and range, the name or number of the surveying meridian, and the number of acres. Land grants, military tracts, and irregular shaped pieces should be deeded by metes and bounds, that is, give the length and the bearings of the sides, to which should be added number of acres and original name or number. Deeds for town or city lots should show size of lot, number of lot, and name of the original town or addition, with name of county and state added.

DIRECTIONS RELATING TO THE PURCHASING OF LAND.

These directions for purchasing land are from a "Pocket Companion," edited by John Playford, and printed by Edward Midwinter at the Looking Glass on London Bridge in 1730. It illustrates the precaution thought to be necessary for the transfer of Real Estate at that date, and although our present system for keeping records from which to make abstracts is considered complete, the last two lines of this stanza are recommended to all who deal in lands.

PUBLISHERS.

*"First, see the Land which thou intend'st to buy
Within the Seller's Title clear do lie:
And that no Woman to it doth lay claim,
By Dowry, Jointure, or some other Name
That may it cumber. Know if bound or free
The tenure stand, and that from each Feoffee
It be releas'd. That the Seller be so old
That he may lawful sell, thou lawful hold:
Have special care that it not Mortgag'd be,
Nor be entayled on Posterity.
Then if it stand in Statute, bound or no,
Be well advis'd what Quit rent out must go,
What Custom Service hath been done of old,
By those who formerly the same did hold;
And if a Wedded Woman put to Sale,
Deal not with her unless she bring her Male;
For she doth under Covert-Baron go,
Atho' sometimes some traffique so (we know)
Thy Bargain being made, and all this done,
Have special Care to let thy Charter run
To Thee, thy Heirs, Executors, Assigns.
For that beyond thy Life securely binds,
These things foreknown and done, you may prevent
Those Things rash Buyers many Times repent,
And yet when you have done all that you can,
If you'll be sure, deal with an Honest Man."*

BOND FOR DEED.

KNOW ALL MEN BY THESE PRESENTS, That *Peter Atwill, of East St, Louis*, of the County of *St. Clair* and State of *Illinois* is held and firmly bound to *Joel B. Wheaton*, of the *City of St. Louis* and State of *Missouri*, in the sum of *Three Thousand Dollars*, to be paid to said *Joel B. Wheaton*, his Executors, Administrators or Assigns, to the payment whereof he binds himself and his Heirs, Executors and Administrators, firmly by these presents. Sealed with his seal and dated the *Fourth* day of *March A. D. 1884*.

THE CONDITION of this obligation is, that if he the said *Peter Atwill*, upon payment of *Two Thousand Dollars*, and interest thereon, as agreed and promised by said *Joel B. Wheaton*, agreeably to this promissory Note, dated *March 4, 1884*, and made payable as follows, to-wit:

\$2,000.

ST. LOUIS, Mo., *March 4, 1884*.

One year after date for value received I promise to pay Peter Atwill, or order, Two Thousand Dollars with interest.

(Signed)

J. B. WHEATON.

Shall convey to said *Joel B. Wheaton*, his Heirs, Executors, or Assigns, FOREVER, the following described Real Estate, situated, lying and being in the County of *Clark*, and State of *Illinois*, to-wit: *SW $\frac{1}{4}$ Sec. 5, 160 acres, and SW $\frac{1}{4}$ of W $\frac{1}{2}$ Lot 1, NW $\frac{1}{4}$ Sec. 5, 10 acres, lying in T. 10 N. R. 12 W. 2d P. M. containing in all 170 acres, more or less, according to the United States survey thereof.*

By *Warranty Deed* or Deeds in common form duly executed and acknowledged, and in the mean time shall permit said *Joel B. Wheaton* to occupy and improve said premises for his own use, then this obligation shall be void, otherwise it shall remain in full force.

Signed, Sealed and delivered in presence of *Samuel Paywell*.

Peter Atwill. [SEAL]

STATE OF *Missouri*, }
CITY OF *St. Louis*, } ss.

BE IT REMEMBERED, That on this *4th* day of *March A. D. 1884*, before the undersigned, a *Notary Public* within and for the *City of St. Louis* aforesaid personally came *Peter Atwill*, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument of writing, as party thereto, and acknowledged the same to be his act and deed for the purposes therein mentioned.

IN TESTIMONY WHEREOF I have hereunto set my hand and affixed my official seal at my office in *City of St. Louis* in said State, the day and year first above written.

My term of office as Notary Public will expire *Jan. 1st, 1887*.

For plat see Diagram 19. page 27.

J. J. Jones.

GENERAL WARRANTY DEED.

THIS INDENTURE, Made on the *Fourth* day of *March* A. D. *One Thousand Eight Hundred and Eighty Five*, by and between *Peter Atwill, (Widower,)* of *East St. Louis, Illinois*, party of the First Part; and *Joel B. Wheaton*, of the *City of St. Louis*, in the State of *Missouri*, party of the Second part.

WITNESSETH, That the said party of the First Part in consideration of the sum of *Two Thousand Dollars* to *him* paid by the said party of the Second Part, the receipt of which is hereby acknowledged, does by these presents GRANT, BARGAIN and SELL, CONVEY and CONFIRM, unto the said party of the Second part, *his* heirs and assigns, the following described Lots, Tracts or Parcels of Land, lying, being and situated in the *County* of *Clark* and State of *Illinois*, to-wit : *The S W $\frac{1}{4}$ Sec. 5, 160 acres, and S W $\frac{1}{4}$ of W $\frac{1}{2}$ Lot 1, N W $\frac{1}{4}$ Sec. 5, 10 acres lying in T. 10 N. R. 12 W. 2d P. M., containing in all 170 acres, more or less, according to the United States survey thereof.*

TO HAVE AND TO HOLD the premises aforesaid, with all and singular the rights, privileges, appurtenances, immunities and improvements thereto belonging, or in any wise appertaining unto the said party of the Second Part, and unto *his* heirs and assigns, FOREVER; the said *Peter Atwill*, hereby covenanting that *he* will WARRANT and DEFEND the title to the said premises unto the said party of the Second Part and unto *his* heirs and assigns FOREVER, against the lawful claims and demands of all persons whomsoever.

IN WITNESS WHEREOF, The said party of the First Part has hereunto set his hand and seal the day and year first above written.

Signed. Sealed and Delivered in Presence of us,

Leander Smith, }
Addison Walters. }

Peter Atwill. [SEAL]

STATE OF MISSOURI, }
City of St. Louis, } ss.

On this *Ninth* day of *March* 1885, before me personally appeared *Peter Atwill, (Widower,)* to me known to be the person described in and who executed the foregoing instrument, and acknowledged that *he* executed the same as *his* free act and deed. And the said *Peter Atwill* further declares *himself* to be single and unmarried.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal, at my office in the *City of St. Louis*, the year and day above written

My term of office as Notary Public expires *July 4th, 1888.*

Thomas Bryan.

For plat see Diagram 19, page 27.

QUIT-CLAIM DEED.

This Indenture, made on the 2nd day of November, A. D. One Thousand Eight Hundred and Eighty-six, by and between John B. Lamb, of the County of St. Louis, and State of Missouri, party of the First Part, and W. W. Ward of the County of Scott, and State of Missouri, party of the Second Part,

WITNESSETH, That the said party of the First Part, in consideration of the sum of One Thousand Dollars, to him paid by the said party of the Second Part, the receipt of which is hereby acknowledged, does by these Presents, Remise, Release, and forever Quit-Claim unto the said party of the Second Part, the following described Lots, Tracts, or Parcels of Land, lying, being and situate in the County of St. Louis and State of Missouri, to wit: *All of Lot 2 in Survey 999, bounded and described as follows: Beginning at a marked stone at the northwest corner of Survey 999 (for location and description of stone see original field notes and plat); thence N. 69° 30' W. one hundred and twenty rods to a limestone rock marked with a +, mound of stone alongside; thence S. 20° E. one hundred and twenty rods to a sandstone, on south line of survey 999, from which an oak tree 16 inches in diameter bears N. 73° W. 89 links; thence W. one hundred and twenty-eight rods to mound of earth from which an ash tree twenty inches in diameter bears N. 43° E. 117 links; thence N. 20° W. seventy-five rods to beginning, containing seventy-three acres more or less: also the following lots situated in the town of Hermitage, viz.: Lots No. one (1), two (2), three (3), four (4), five (5) and six (6), in original town, and lots one (1), two (2), eight (8) and seven (7), in Block No. 1 Jackson's addition.*

To have and to hold the same, with all the rights, immunities, privileges and appurtenances thereto belonging, unto the said party of the Second Part, and his heirs and assigns, FOREVER; so that neither the said party of the First part, nor his heirs, nor any other person or persons for him or in his name or behalf, shall or will hereafter claim or demand any right or title to the aforesaid premises, or any part thereof, but they and every of them shall, by these presents, be excluded and forever barred.

In witness whereof, The said party of the First Part has hereunto set his hand and seal, the day and year first above written.

Signed, Sealed and Delivered
in Presence of us:

Samuel H. Owens,

Allen McDowell.

.....	[SEAL.]
John B. Lamb.....	[SEAL.]
.....	[SEAL.]
.....	[SEAL.]

STATE OF MISSOURI, }
COUNTY of St. Louis. } ss. On this third day of November, 1886, before me personally appeared John B. Lamb, to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed. And the said John B. Lamb further declares himself to be single and unmarried.

In testimony whereof, I have hereunto set my hand and affixed my official seal, at my office in Clayton, the day and year first above written. My term of office expires Jan. 1st, 1884.

S. FORD,
Notary Public.

ESTOPPEL DEED.

This Indenture, made on the 3rd day of November, One Thousand Eight Hundred and Eighty-six, by and between W. W. Ward, of Scott County, State of Missouri, and Henry Chomeau, of St. Louis County, State of Missouri.

Whereas a survey has been made by John Irwin Moore, of a tract of land in survey 999, the plat and description whereof are recorded in plat book No. 4 of the office of Recorder of Deeds for St. Louis County, State of Missouri, at page 39, and whereas W. W. Ward and Henry Chomeau have several interest in the tract surveyed, the portion owned by W. W. Ward being represented on said plat by the figure at the angles of which are the letters A. B. C. D. and the portion owned by Henry Chomeau being in like manner represented by the figure, at the angles of which are the letters A. B. E. F. Now W. W. Ward and Henry Chomeau believing the said survey to be correct do mutually declare, covenant and agree that they accept the same as a true and correct representation of their respective interests in said tract of land; that they invite the world to deal with each of them on the basis of the correctness of said survey, and that they and those claiming under them will never impeach or disturb the said survey.

In testimony whereof we have hereunto set our hands and seals the day and year first above written.

Signed in presence of us:

FRANCIS H. SHEPHERD,

W. W. WARD, [Seal.]

JOHN S. HIGGINS,

HENRY CHOMEAU. [Seal.]

State of Missouri, County of St. Louis. S. S. On this 3rd day of November, 1886, before me a Notary Public within and for said County, personally appeared W. W. Ward and Henry Chomeau to me known to be the same persons described in and who executed the foregoing Instrument and acknowledged that they executed the same as their free act and deed. IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial seal at my office in St. Louis the day and year last above written. My term of office expires 4th of March, 1888.

GEORGE MATTHEWS,
Notary Public.

LINEAR MEASURE.

Linear measure is used in measuring lines or distances; the unit is the yard.

TABLE.

12 inches make 1 foot, abbreviated.....ft.	320 rods make 1 statute mile, abbrev'd.m.
3 feet make 1 yard, "yd.	6 miles make 1 Congressional Town-
5½ yards, or 16½ feet, make 1 rod, ab.....rd.	ship, abbreviated.....Tp.

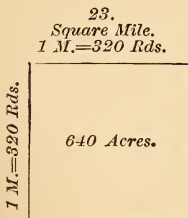
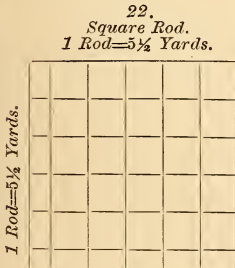
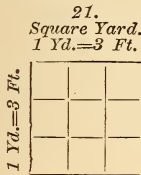
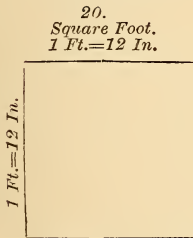
SURVEYOR'S LINEAR MEASURE.

The unit is the chain of 66 feet (4 ro's) in length, and consists of 100 links. (Government surveyors add six hundredths of a foot to overcome the vertical curvature of the chain.)

TABLE.

7.92 inches make 1 link, abbreviated.....lk.	4 rods, or 66 feet, make 1 chain, abv'd.ch.
25 links make 1 rod, "rd.	80 chains make 1 mile, abbreviated.....m.

DIAGRAMS.



SQUARE MEASURE.

144 square inches make 1 square foot, abbrev'd....sq. ft.
9 square feet make 1 square yard, "sq. yd.
30¼ square yards make 1 square rod, "sq. rd.
160 square rods make 1 acre, " a.
10 square chains make 1 acre, " a.
100,000 square links make 1 acre, " a.
640 acres make 1 square mile, "sq. m.
36 square miles, or 23,040 acres, "Tp.

A *Square Foot* is a square, the sides of which are each a linear foot (12 inches) in length, and is equal to 144 square inches.

A *Square Yard* is a square, the sides of which are each a linear yard (3 feet) in length, and is equal to 9 square feet.

A *Square Rod* is a square, the sides of which are each a linear rod (5½ yards) in length, and is equal to 30¼ square yards.

A *Square Acre of Land* is a square, the sides of which are each 12.64+ rods in length, and contains 160 square rods.

A *Square Mile* is a square, the sides of which are each a linear mile (320 rods) in length, and is equal to 102,400 square rods, or 640 acres. It is denominated a section by Congress in describing and deeding public lands.

A *Congressional Township*, so called because established by act of Congress, is a tract of land 6 miles square, containing 36 square miles, or sections.

The above definition of a Congressional Township is what was intended by the law; but the Townships, as they are surveyed, conform to the above description only so far as converging of meridional lines and inaccurate surveys will permit.

LAND SURVEYING.



Land surveying is the art of measuring land and delineating it on paper. In the first part of this volume will be found very explicit instructions to United States Deputy Surveyors for Public Land surveys, and the following remarks on land surveying are intended to be supplementary to those instructions for persons unacquainted with the use of instruments, by illustrating how to read the Compass in determining angles, and the use of the Protractor in platting them on paper; three methods of calculating the contents of a piece of land from the surveyors notes are given, to which are added directions for farm, village and school district platting. Also notes on stadia measurements, diagrams with descriptive matter, illustrating the converging of meridional lines, and an explanation on random lines and the subdivisinal notes of a township.

SURVEYING WITHOUT INSTRUMENTS.

Under this head only distances by pacing or walking will be considered. A sufficiently accurate measurement may be had of a four-sided field for fencing, plowing, or seeding, by walking across one side and one end of the field at a uniform pace, and counting the steps. First, you must learn to walk in a straight line; this may be done by choosing two objects in the desired line; let the first object keep the second hid from view. Before reaching the first object choose a second one in same manner and proceed as before. Second, you must ascertain the length of your step. Do not attempt to pace three feet at each step, but take natural steps, and ascertain what length they are. Should you desire to learn to pace a certain distance take the length of the English military pace, two and a half feet, and practice walking on some measured distance; for instance, a house fifty

feet long will be twenty steps ; a house seventy-five feet long will be thirty steps ; a house 100 feet long will be forty steps.

APPROXIMATE AREAS.

To ascertain the contents of a field, which you find to be sixty-six paces on the end and 528 paces on the side, each pace to represent two and a half feet, multiply sixty-six by two and a half, which gives 165 feet for length of the end ; next multiply 528 by two and a half, which gives 1,320 feet for length of the side. Multiply 1,320 by 165, which equals 217,800, divide this amount by 43,560 (the number of square feet in an acre,) the result obtained will be five acres. Hence the following : Multiply separately the number of paces across one end and one side of the field by the length of your pace, multiply these two amounts together, and divide the product by number of square feet in an acre ; 43,560. If accustomed to pacing three feet the work is very much simplified by multiplying the number of paces across the end by number across the side, and dividing the product by the number of square yards in an acre, viz : 4,840, the result will be the number of acres. A field 66 by 528 paces (if paces were three feet in length,) would contain seven and one-fifth acres.

The following is added for yard measurements, viz : If a field is 100 yards across the end, each forty-eight and two-fifth yards along the side make an acre :

If 150 yards,	each	32 $\frac{4}{5}$	yards	make	an	acre.
If 200	"	24 $\frac{1}{5}$	"	"	"	"
If 220	"	22	"	"	"	"
If 250	"	19 $\frac{9}{25}$	"	"	"	"
If 300	"	16 $\frac{2}{15}$	"	"	"	"
If 350	"	13 $\frac{3}{35}$	"	"	"	"
If 400	"	12 $\frac{1}{10}$	"	"	"	"
If 440	"	11	"	"	"	"

SURVEYING WITH COMPASS AND CHAIN.

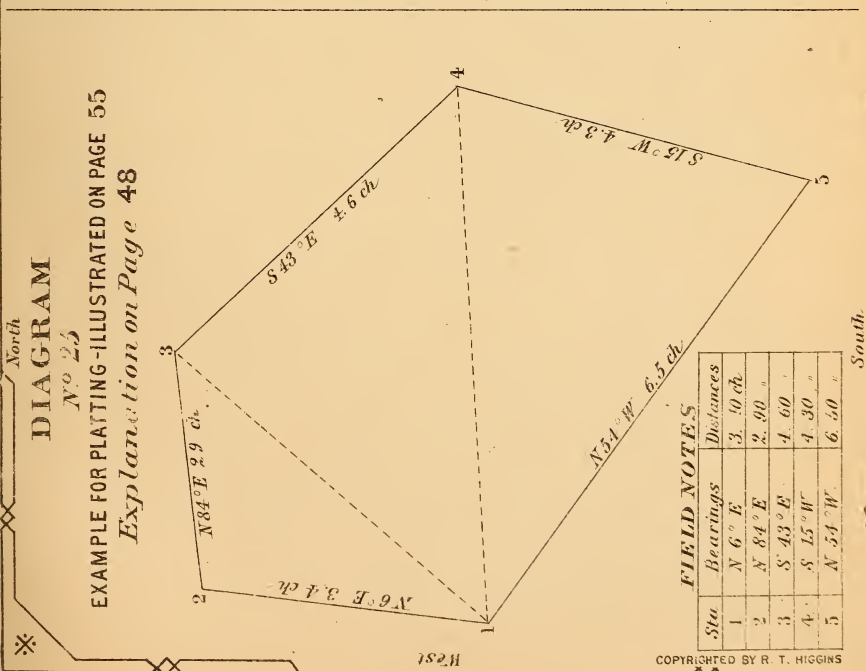
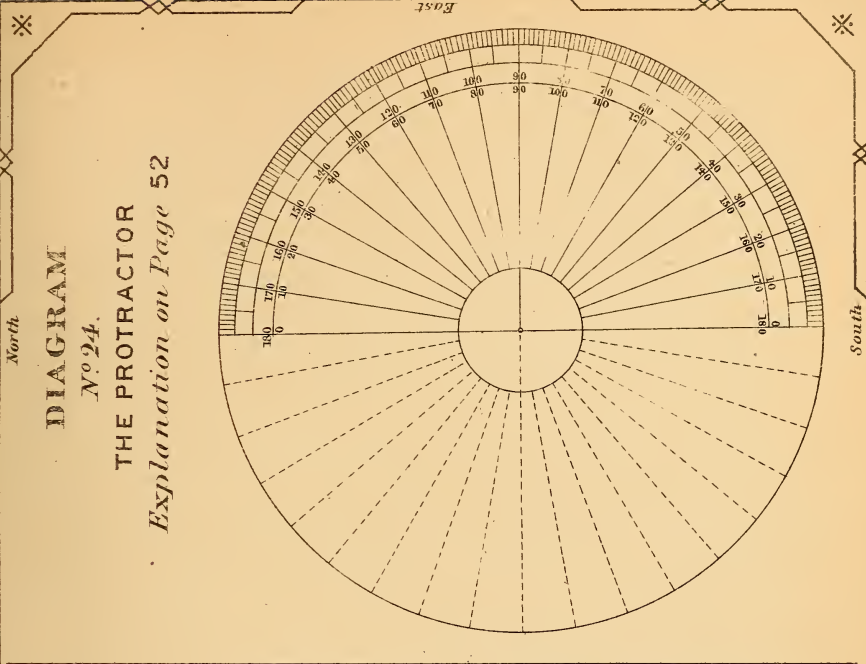
Before describing the survey of field in diagram 25 a few suggestions on the defects of the compass and the inaccuracies of

a chain measurement, may be of use in determining how nearly a survey should close to be considered an accurate survey.

Government surveyors in running around a section are allowed about 105 feet as the extreme limit for closing surveys, that is, the north line of a section must be within eighty links of the south line in length, either eighty links more, or eighty links less, making 160 links (or 105.6 feet) as the difference between two lines that could be established by the surveyor, and have it approved by government. The discrepancies can be attributed both to the compass and the chain. See page 60, first part, for closing distances of surveys. For *daily* and *secular* changes and variations in the needle, see second part of this volume. These changes cause a lack of correctness in the compass, which is its most serious defect. Another defect is, the part of a circle to which the needle points cannot be read with precision, as the needle has considerable thickness, and cannot quite touch the circle. Prof. W. M. Gillespie says: "Notwithstanding these defects the compass is a very valuable instrument, from its simplicity, rapidity and convenience in use; and though never precise, and seldom correct, it is generally not very wrong." For instructions in chaining see page 38, first part. The principal source of error in surveys is the chaining, and the instructions for chaining are very explicit; an illustration of errors in the government surveys resulting from chaining over rough ground is given in diagram 46, the excess of 143.78 chains (about one and three-quarter miles) on the east line of the township is caused by careless chaining over a distance of thirty-six miles. See description with diagram.

SURVEY OF FARM IN DIAGRAM 25.

Let Diagram 25 Page 49 represent the farm to be surveyed 1, the starting point. Prepare three columns, head them Stations, Bearings, Distances, as in Diagram 25. Place the compass at 1, take the bearing to 2; in taking the bearings; keep the north end of the compass from you, and place your eye at the south compass sight, on the inside of the graduated circle the compass is marked N. S. W. E. which will determine the north and south



end of the compass, read the degree that the north end of the needle stops at, which has been found to be 6; place the two letters found on the inside of the graduated circle nearest the north end of the needle with this number 6, as in diagram 25. N. or S. should always be placed before the number, and E. and W. after the number of degrees, thus N. 6° E. Place number of station in first column and the bearing in second column. You will observe that E. and W. on the compass are reversed from the cardinal points of the compass; this is done for convenience in reading the bearings. The advantage will be seen by keeping the north end of the compass ahead in the line of sight, and reading from the north end of the needle. Measure the distance from 1 to 2, as per instruction on page 39 (first part of this volume); distance is represented as 3.40 chains; place it in the third column; next place the compass at 2, take the bearing to 3, and read compass, as before, N. 84° E. measure the distance from 2 to 3, 2.90 chains. Next place compass at 3, take bearing to 4, reading compass as before, S. 43° E.; measure distance from 3 to 4, 4.60 chains; place compass at 4, take bearing to 5, which is S. 15° W.; measure the distance 4.30 chains; place compass at 5, take bearing to 1, which is N. 54° W.; measure distance 6.50 chains, placing each of the stations, bearings, and distances in their columns; this will complete the survey of the field sufficient to calculate the contents by either of the three methods shown in this work.

THE MAGNETIC DECLINATION OR VARIATION OF THE NEEDLE.

The magnetic declination at any place is the angle which the compass needle, when it is correctly constructed and freely suspended, makes with the true meridian. The true meridian is fixed, but the declination varies because the direction in which the needle points is in a continuous state of change.

The declination is called "West" when the north end of the needle points to the west of the true meridian, and it is called "East" when the north end of the needle points east of the true meridian. In order to give an idea of the amount of the declination at present observable within the limits of the United States we instance the following places at or near which it reaches extreme value, which are given to the nearest whole degree:

At Easton, Me., the declination is 18° west.

At the mouth of the Rio Grande, Texas, 8° east.

At San Diego, Cal., 14° east.

At Sitka, Alaska, 28° east.

At Fort Yukon, Ala., 36° east.

The daily variation.—It has been found that at about the time of sunrise the north end of the needle has a slow motion towards the east which soon ceases. The needle is then said to be at its eastern elongation; its north end then begins a retrograde motion towards the west, and at about one o'clock in the afternoon reaches the point at which it is said to be at its western elongation, after which it again turns back towards the east.

The average position of the needle for the day is called the *mean magnetic meridian*.

At about six o'clock in the evening (and for about an hour before and after), throughout the year, the position of the needle coincides very nearly with the mean magnetic meridian, and this, therefore, is the time most favorable for making observations to obtain at once the mean declination.

The secular variation of the magnetic declination is a subject of the greatest importance to surveyors. It manifests itself by a gradual change in one direction, which at first increases slowly, then more rapidly, diminishing again afterward until the needle becomes stationary and subsequently returns by similar changes to its former position, the whole period extending over nearly two and a half centuries. Thus it will be seen by a table given below that at Philadelphia the declination was $8\frac{3}{4}^{\circ}$ west in 1700, whence it diminished until in 1890 it reached a minimum 2.1° ($2^{\circ} 6'$), and will increase again to 6.8° in 1880. At present all along the Atlantic and Gulf coasts the effect of the secular variation is to *increase* west declinations, or to *decrease* east declinations by from $2'$ to $5'$ but on the Pacific coast the effect is opposite in direction, viz., *increasing* east declinations by from $1'$ to $3'$.

In Alaska, however, we have indications of a decrease of east declinations.

Table showing the difference of latitude and departure in running 80 chains at any course from 1 to 60 minutes.

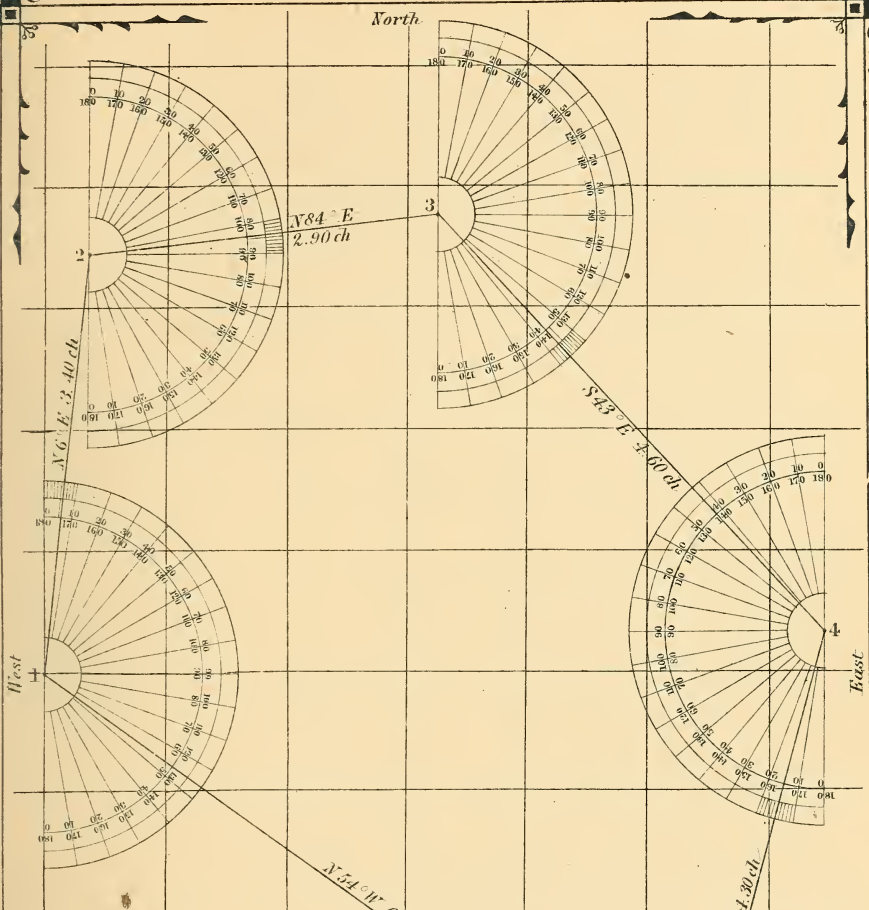
Min-utes.	Links.	Min-utes.	Links.	Min-utes.	Links.	Min-utes.	Links.	Min-utes.	Links.	Min-utes.	Links.
1.....	2 $\frac{1}{3}$	11.....	25 $\frac{2}{3}$	21.....	49	31.....	72 $\frac{1}{3}$	41.....	95 $\frac{2}{3}$	51.....	119
2.....	4 $\frac{2}{3}$	12.....	28	22.....	51 $\frac{1}{3}$	32.....	74 $\frac{2}{3}$	42.....	98	52.....	121 $\frac{1}{3}$
3.....	7	13.....	30 $\frac{1}{3}$	23.....	53 $\frac{2}{3}$	33.....	77	43.....	100 $\frac{1}{3}$	53.....	123 $\frac{2}{3}$
4.....	9 $\frac{1}{3}$	14.....	32 $\frac{2}{3}$	24.....	56	34.....	79 $\frac{1}{3}$	44.....	102 $\frac{2}{3}$	54.....	126
5.....	11 $\frac{2}{3}$	15.....	35	25.....	58 $\frac{1}{3}$	35.....	81 $\frac{2}{3}$	45.....	105	55.....	128 $\frac{1}{3}$
6.....	14	16.....	37 $\frac{1}{3}$	26.....	60 $\frac{2}{3}$	36.....	84	46.....	107 $\frac{1}{3}$	56.....	130 $\frac{2}{3}$
7.....	16 $\frac{1}{3}$	17.....	39 $\frac{2}{3}$	27.....	63	37.....	86 $\frac{1}{3}$	47.....	109 $\frac{2}{3}$	57.....	133
8.....	18 $\frac{2}{3}$	18.....	42	28.....	65 $\frac{1}{3}$	38.....	88 $\frac{2}{3}$	48.....	112	58.....	135 $\frac{1}{3}$
9.....	21	19.....	44 $\frac{1}{3}$	29.....	67 $\frac{2}{3}$	39.....	91	49.....	114 $\frac{1}{3}$	59.....	137 $\frac{2}{3}$
10.....	23 $\frac{1}{3}$	20.....	46 $\frac{2}{3}$	30.....	70	40.....	93 $\frac{1}{3}$	50.....	116 $\frac{2}{3}$	60.....	140

Table of Offsets from Tangent to Parallel, Given in Feet.

L.	1 M.	2 M.	3 M.	4 M.	5 M.	6 M.	7 M.	8 M.	9 M.	10 M.	11 M.	12 M.
30°	.0.39	.1.54	..3.47	..6.17	..8.64	..13.88	..18.89	..24.67	..31.23	..38.55	..46.65	..55.52
35°	.0.47	.1.87	..4.20	..7.47	..11.68	..16.81	..22.89	..29.89	..37.83	..46.71	..56.62	..67.26
40°	.0.56	.2.24	..5.03	..8.95	..13.93	..20.11	..27.40	..35.78	..45.29	..55.91	..67.65	..80.51
45°	.0.67	.2.66	..5.99	..10.65	..16.64	..23.96	..32.61	..42.59	..53.91	..66.54	..80.53	..94.84
50°	.0.79	.3.17	..7.12	..12.68	..19.80	..28.52	..38.82	..50.70	..64.17	..79.22	..95.86	..114.08

DESCRIPTION OF THE PROTRACTOR.

Descriptive notes illustrating the use of the Protractor in laying off or measuring angles. The root of the protractor is a circle divided into 360 degrees, in its use it represents the compass, for with it the angles determined by the compass can be accurately laid down on paper. There are three principal forms of the protractor, viz: the rectangular, the semi-circular and the circular. The rectangular consists usually of a thin rectangular piece of ivory, or metal, three edges of which are graduated from 0 to 180 degrees by portions of radii, converging to the middle of the fourth edge as a centre. It is used only where an approxi-



DIAGRAM

N^o 26.

THE USE OF PROTRACTOR

Illustrated

Descriptive Notes on Page 55

FIELD NOTES

Sta	Bearings	Distances
1	N 6° E	3.40 ch
2	N 84° E	2.90
3	S 43° E	4.60
4	S 15° W	4.30
5	N 54° W	6.30

mation to accuracy suffices. The circular and semi-circular protractors, with or without arms, are graduating circulars and arcs, usually paper, metal or horn. They sometimes have one or more straight edged arms turning about the perforated centres, and carrying verniers for the accurate reading of their arcs.

The reflectory protractor is the three-arm circular protractor improved. Diagram 24 represents a semi-circular protractor, the complete circle divided into 360 degrees, radiating from a common centre, is shown, to illustrate from whence the degrees from 0 to 180 on the arc of the protractor are obtained; also the centre point from which all degrees are marked. The semi-circular protractor is used in diagram 26 to lay out the different bearings, it being considered sufficiently accurate for common field platting.

In platting put the dot represented in diagram 24, as the centre of the circle over the station from which bearing is to be platted, and the two 0-0 or 180 on the protractor, on a line drawn through the station north and south. When the bearing is either northeast, east or southeast put the circular side of the protractor to the east or right of the station. When the bearing is northwest, west, or southwest, put the circular side of the protractor to the west, or left of the station. When the bearing is northeast or northwest count number of degrees from north end of protractor; when southeast or southwest count from south end of protractor.

PLATTING SURVEY WITH PROTRACTOR.

Diagram 26 illustrates the use of the semi-circular protractor. In platting the survey in this diagram the first station is so chosen that the paper will contain the survey (with top of paper marked north) From the first station lay off the first bearing, from field notes in diagram, $N 6^{\circ} E$; by placing the protractor on the paper in such a position that the line drawn through the two zeros (0-0) and the centre of the horizontal side of the protractor will be north and south, and the centre point over the first station, with the figures ninety on east side of station; see diagram 26. As the bearing is east of north,

count from zero on north end of protractor, six degrees, as graduated on the circular edge, at which, place a dot on the paper, from station 1 draw line of indefinite length through dot; at point in line representing 3.40 chains from scale of plat put 2, at which point place protractor in position as before, the second bearing is N 84° E, count from north end of protractor 84° , at which place a dot and draw line from 2 through the dot, lay off 2.90 chains from scale of plat, at which place 3, place protractor in position at 3 as before; the third bearing is S 43° E, as this bearing is southeast, count from south end of protractor 43° , at which place a dot, draw line from 3 through dot and lay off 4.60 chains from scale of plat, at which place 4; place protractor in position at 4, as follows: Place the horizontal side of the protractor N and S with the centre dot over station 4; the fourth bearing is S 15° W; as the bearing is southwest place the graduated edge of the circle to the left or west, as in diagram; count from the south end of the protractor 15° , at which place a dot; lay off 4.30 chains as before, marked on diagram 5, place protractor in position at 5, as in diagram, as the fifth bearing is N 54° W, count from north end of protractor 54° , at which place a dot; a line drawn from 5 to 1 should pass through dot and measure 6.50 chains on scale of plat, closing the survey.

If the plat should not close, measure on the plat from point where survey stops to first station; find what distance that represents on the ground; multiply that distance by the length of the first course and divide by the sum of all the courses, and the quotient will be the distance to move the second station parallel to line connecting the first and last points, that do not close. To ascertain how far to move each corner multiply the distance the survey will not close, by the distance the station is from first station and divide by sum of all the courses, the quotient will be the distance to move the corner.

CALCULATING THE CONTENTS.

There are many methods of calculating the contents of a piece of land from the surveyors notes. In this volume only

three methods will be presented, viz: by squares, by triangles and by latitudes and departures.

TO CALCULATE THE CONTENTS BY SQUARES.

After platting the survey to a scale, as in diagram 26, which should be accurately done, draw on a sheet of transparent paper, large enough to cover the plat, parallel lines at right angles to each other, one chain apart, to the scale of the plat, lay this on the plat and count the squares. To calculate the fractional parts, cut off one of the squares, subdivide it into twenty-five squares by parallel lines; lay this on the fractional parts and you will have an approximate calculation of contents. The squares can be drawn on the plat, as in diagram 26, if preferred. Divide whole number of squares by ten, the result will be number of acres.

TO CALCULATE THE CONTENTS BY TRIANGLES.

Draw straight lines across the plat in such a manner as to divide the plat into angles, either by running straight lines, between corners, or from some point within the survey to the corners, making all the triangles as nearly equilateral as possible. See diagram 21. Calculate the contents of each triangle separately, by measuring the base and perpendicular height (separately) with a pair of dividers, apply it to the scale and multiply the number of equal parts it includes, by the number of chains, rods or feet which each represents; for example, if the plat is on scale of six chains per inch, and line is four and three-quarter inches in length; six multiplied by four and three-quarters equals twenty-eight and one-half, the length in chains of the line in the field. For each triangle multiply the base by the altitude, and divide by two. Add contents of the several triangles together; if the scale is given in chains divide by ten, the number of square chains in an acre. If the scale is given in rods divide by 160, the number of square rods in an acre. If the scale is given in yards divide by 4840, the number of square yards in an acre. If the scale is given in feet divide by 43560, the number of square feet in an acre.

TO CALCULATE THE CONTENTS BY LATITUDE AND DEPARTURE.

The *Latitude* of a station is its distance north or south of some line running east or west. The *Longitude* of a station is

its distance east or west of some line running north and south. The distance which one end of a line is due north or south of the other end is called its *Latitude*. The distance which one end of a line is due east or west of the other end is called its *Departure*. To calculate the Latitude and Departure for any bearing from Traverse Table, ; if bearing is less than 45° read from top of page and left side, if more than 45° read from bottom of page and from right side. The distance from 1 to 9 inclusive on top and bottom of the pages may represent any unit of measurement, such as chains, rods, yards, feet, etc. For example take the bearings and distances in Diagram on page 49, the first bearing is 6° and distance 3.40 chains, find 6° in left hand column. Lay rule across the page just above or below the line and in column marked 3 on top of page, find the latitude opposite 6° , 2984, and the departure, 0314, next the latitude and departure in column 4; place them one figure to the right, as shown in the following latitudes and departures for the example in diagram 25, add together and point off three more decimals than found in each distance; when an 0 occurs in the number, the latitude or departure for next figure is placed two figures to the right.

Bearing.	Latitude.	Departure.	Bearing.	Latitude.	Departure.
6°	2984	0314	84°	0209	1989
Distance.	3978	0418	Distance	0941	8951
3.40	<u>3.3818</u>	<u>0.3558</u>	2.90	<u>0.3031</u>	<u>2.8841</u>
Bearing	2925	2728	Bearing	3864	1035
43°	4388	4092	15°	2898	0776
Distance	3.3638	3.1372	Distance	4.1538	1.1126
4.60			4.30		
Bearing	3527	4854			
54°	2939	4045			
Distance	3.8209	5.2585			
6.50					

After calculating the latitudes and departures arrange ten columns, and head them as in following example; in the first col-

umn place the number of the stations, in the next the bearings, in the next the distances, in the next all the north latitudes marked +, in the next all the south latitudes marked —, in the next all the east departures marked +, in the next all the west departures marked —, find the double meridian distances and the double areas from the following rule, and place them in the last three columns, as in example :

Station	Bearings.	Distances.		Latitudes.		Departures.		Double Areas.		
		Chains.		N +	S —	E +	W —	D. M. D.	North +	South —
1	N6°E	3.40	3.38	.....		0.36	.....	+ 0.36	1.2168	.....
2	N84°E	2.90	0.30	.....		2.88	.....	+ 3.60	1.0800	.....
3	S43°E	4.60	.....	3.36		3.14	.....	+ 9.62	.....	32.3232
4	S15°W	4.30	.....	4.15		.....	1.11	+11.65	.....	48.3475
5	N54°W	6.50	3.82	.....		.....	5.26	+ 5.28	20.1696	.....
		21.70	7.50	7.51		6.38	6.37	.....	22.4664	80.6707

Contents 2.91 acres..... 22.4664

2)58.2043

Square chains, 29.10215

TO CALCULATE THE AREA OR CONTENTS OF LAND.

If the sum of each adjacent pair of distances perpendicular to a meridian (Departures) assumed without the survey be multiplied by the northing or southing between them, in succession, round the figure in the same order, the difference between the sum of the north products and the sum of the south products will be double the area of the tract.

The meridian distance of a course is the distance of the middle point of that course from an assumed meridian.

Hence the double meridian distance of the first course is equal to its departure.

And the double meridian distance of any course is equal to the double meridian distance of the preceding course, plus its departure, plus the departure of the course itself, having regard to the algebraic sign of each.

The meridian assumed must pass through the most easterly or westerly station, to ascertain which, make a rough hand sketch,

and the first course must count from this meridian in calculating double meridian distances; if survey is balanced the double meridian distance of the last course, as well as the first, will equal its departure, and its coming out so, is a test of the accuracy of the calculation of all the preceding double meridian distances; the double meridian distances are used instead of meridian distances to avoid fractions.

The following amounts marked D. M. *Station* D. in the margin opposite each station are the Double Meridian Distances, for example given above. They are found by a continual addition and subtraction, having regard to the algebraic signs plus and minus. The Double Meridian Distances are multiplied by the corresponding latitudes, and the contents of the field obtained, as directed in the following rule.

To find the area—

1.	+0.36	D. M. D.
	+0.36	
	+2.88	
2.	+3.60	D. M. D.
	+2.88	
	+3.14	
3.	+9.16	D. M. D.
	+3.14	
	-1.11	
4.	+11.65	D. M. D.
	- 1.11	
	- 5.26	
5.	+5.28	D. M. D.

1. Multiply the double meridian distance of each course by its northing or southing.

2. Place all the plus products in one column and all the minus products in another.

3. Add up each column separately and take their difference.

This difference will be double the area of the land.

In balancing the work the error for each particular course is found by the proportion. As the sum of the courses is to the error of latitude (or departure) so is each particular course to its correction.

When a bearing is due east or west, the error of latitude is nothing, and the course must be subtracted from the sum of the courses before balancing the columns of latitude; and so with the departures, when a bearing is due north and south.

The following example is given to illustrate the application of the preceding rule, where the errors in latitude and departure are considerable and necessitate balancing.

EXAMPLE FOR CALCULATING THE AREA.

Stations.	Courses.	Dist. Chains	Diff. Lat.		Departure.		Balanced.		D.M.D +	Area. +	Area. -	
			N +	S -	E +	W -	Latitude.	Departure				
1	N46½° W	20.00	13.77	.....	.....	14.51	+13.88	-14.56	14.56	202.0928	.....
2	N51¼° E	13.80	8.54	.....	.....	10.84	+ 8.61	+10.81	10.81	93.0741	.....
3	East	21.25	.....	.....	.....	21.25	.....	+21.20	42.82	.....	.....
4	S56° E	27.60	.....	15.44	.....	22.88	.....	-15.29	+22.82	86.84	.....	1327.7826
5	S33¼° W	18.80	.....	15.72	.....	10.31	-15.63	-10.36	99.30	.....	.....	1552.0590
6	N74½° W	30.95	8.27	.....	.....	29.83	+ 8.43	-29.91	59.03	497.6229	.....	.....
...	Sums.....	132.40	30.58	31.16	.....	54.97	.....	.....	.....	792.7898	.....	2875.8426
			30.58	54.65								792.7898
	Error in Northing.....	0.58	0.32	Error in Westing.								2)2087.0528

Answer—104 A. 1 R, 16 P..... 1043.5264

TO BALANCE THE SURVEY.

From the sum of the courses subtract the course, the bearing of which is east, thus, 132.40—21.25=111.15, for the correction of the latitude of the first course we have the following proportion, viz: As the sum of courses 111,15 is to the error in latitude, .58, so is the first course, 20.00, to the correction, which is, .11, as the error is in northing we add it to latitude of first course, 13.77 making 13.88 for corrected latitude of first course placed in 8th column. Find corrected latitude for each course in same manner, adding when the sum and latitude are the same names, and subtracting when they are of different names. Errors of latitude and departure take name of the less column. For the departure corrections proceed in same manner, except use 132.40 as sum of courses, for proportion.

TO TEST THE ACCURACY OF THE COURSES.

At each station a fore-sight and a back-sight should be taken to determine whether or not there is local attraction; if the back-sight does not agree with the first or forward sight, this rule may be followed: "When the back-sight is greater than the fore-sight subtract the difference from the next-fore sight, if that course and the preceding one have both their letters the same, or both their letters different; or add the difference if either the first or

last letters of the two courses are different. When the back sight is less than the foresight, add the difference in the case in which it has just been directed to subtract it, and subtract it where it was before directed to add it.

TO DETERMINE THE ANGLE BETWEEN TWO COURSES.

$\begin{array}{r} \text{N } 46^\circ \text{ W} \\ \text{N } 15^\circ \text{ W} \\ \hline 31^\circ \end{array}$	}	When the first and last letters of the bearings are alike the difference of the bearings is the angle between the courses.
$\begin{array}{r} \text{N } 19^\circ \text{ W} \\ \text{N } 49^\circ \text{ E} \\ \hline 68^\circ \end{array}$	}	When the first letters are alike, and the last letters different, the sum of the bearings is the angle between the courses.
$\begin{array}{r} \text{N } 43^\circ \text{ W} \\ \text{S } 12^\circ \text{ W} \\ \hline 180^\circ - 55^\circ = 125^\circ \end{array}$	}	When the first letters are different, and last letters alike, the angle between the courses is equal to 180° , minus the sum of the bearings.
$\begin{array}{r} \text{N } 87^\circ \text{ W} \\ \text{S } 33^\circ \text{ E} \\ \hline 180^\circ - 54^\circ = 126^\circ \end{array}$	}	When both the first and last letters are different, the angle between the course is equal to 180° , minus the difference in the bearings.

To apply the above rule to courses taken around the field instead of connecting at a single point, reverse one of the two bearings between which you desire the angle included. Thus in example, on page 49. The first two bearings are N 6° E and N 84° E.

$\begin{array}{r} \text{N } 6^\circ \text{ E} \\ \text{S } 84^\circ \text{ W} \\ \hline 180^\circ - 78^\circ = 102^\circ \end{array}$	}	By reversing the second bearing we have 102° , the angle included, as shown in margin.
---	---	---

The interior angles included in a survey of a field when added together should equal twice as many right angles as the figure has sides, less two.

DIAGRAM No. 28 ROAD PLAT.

T. 1 N. R. 3 E. of 5th P. M.

Explanation
on Page 65

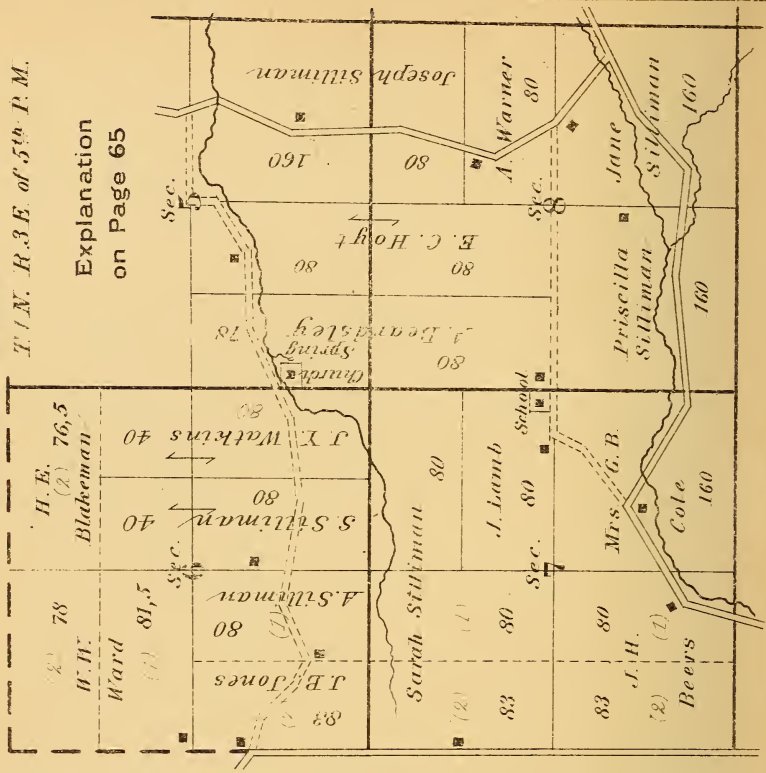
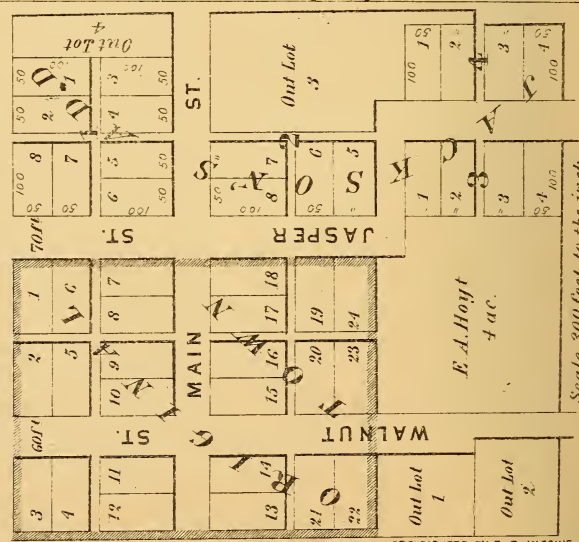


DIAGRAM No. 27.

HERMITAGE

Number of Blocks 3
Number of Lots 123

Original Town



DESCRIPTIVE NOTES ON VILLAGE PLATTING.

Diagram 27.—This diagram represents a village consisting of original town, an addition and out-lots. In laying out a village plat, the scale should be decided on first; next draw to the scale the outside boundary of the original town, lay out the streets, next the alleys, and last subdivide the blocks into lots, these lines should be drawn with hard pencil, proceed in the same manner with each addition, to which add the out-lots and small pieces. The difference between original and additions can be shown, as in diagram, or can be colored in different colors, which should be done before inking. After laying out all the line work in pencil, the plat is ready for inking, which should be done with a ruling pen and India ink. First draw the heavy lines of the plat, which are shown in diagram, on the north and east sides of the street (south and west sides can be used if preferable.) These lines should be double the width of lines on opposite side of the street. After completing the heavy lines draw the light lines of the streets, next ink the alleys and lot lines; with a common writing pen add the lot and block numbers, and write or print in name of streets, original town and additions.

If the plat is wanted for making deeds, or for use where measurements are required, the length of each lot should be given, as in Jackson's addition.

If necessary to draw plat from record, trace the lines on thin paper, put number of feet on each lot, street or alley, to assist in drawing to right scale.

DESCRIPTIVE NOTES ON ROAD PLAT, DIAGRAM 28.

This diagram, on page 64, represents a road plat to accompany a petition for a new road and a change in the road. To make a plat as represented in diagram, first draw the section lines, (2 inches square for a section will be very convenient) divide the sections into quarters, fill in the farms from tax receipts or assessors books; if no survey has been made of the road, mark

it on by inspection, as near as possible, and locate the houses on the forty acres on which they stand, by inspection show where road connects with existing roads. This plan will show the lands the road passes through, and who is to be benefited. Give an approximate description, thus: Beginning in county road on north side of southeast quarter of Section 5, T. 1 N., R. 3 E., thence west to centre of Section 5, thence south about twenty-five rods to stream, thence across southwest quarter Section 5, on north side of stream in southwest direction to northwest corner of church lot, thence in a westerly direction across SE and SW $\frac{1}{4}$ of Section 6, intersecting county road on range line at J. B. Jones' house.

If road has been surveyed the bearings and distances should be given.

In making plat for change of road, as in Sections 7 and 8 in diagram, show the old road and the proposed new one, and give description, as in the following petition.

FORM OF PETITION FOR CHANGE OF ROAD.

Petition can be used for new road with little change.

To the Honorable County Court or to the Honorable Board of Supervisors, as the case may be, of — County of the State of —.

We, the undersigned citizens of — township, would respectfully ask your honorable body to make the following change in road leading from — to —, the change is made for the purpose of cultivation, (avoiding culverts, or for making better road, as case may be,) the change asked for is in Sections 7 and 8, T. 1 N., R. 3 E. Beginning in the southeast quarter of Section 7, at angle in the road near Mrs. G. B. Cole's house, thence in a northeasterly direction to quarter section line, about 160 yards west of school-house, thence east on quarter section line to intersection of county road in east half of Section 8, just north of J. Silliman's house.

If survey has been made give bearings and distances.

As citizens living in the immediate vicinity and interested in having good county roads, we will ever pray, etc.

NAMES.

ED. PARKER.

NAMES.

W. W. CARTER.

DIAGRAM

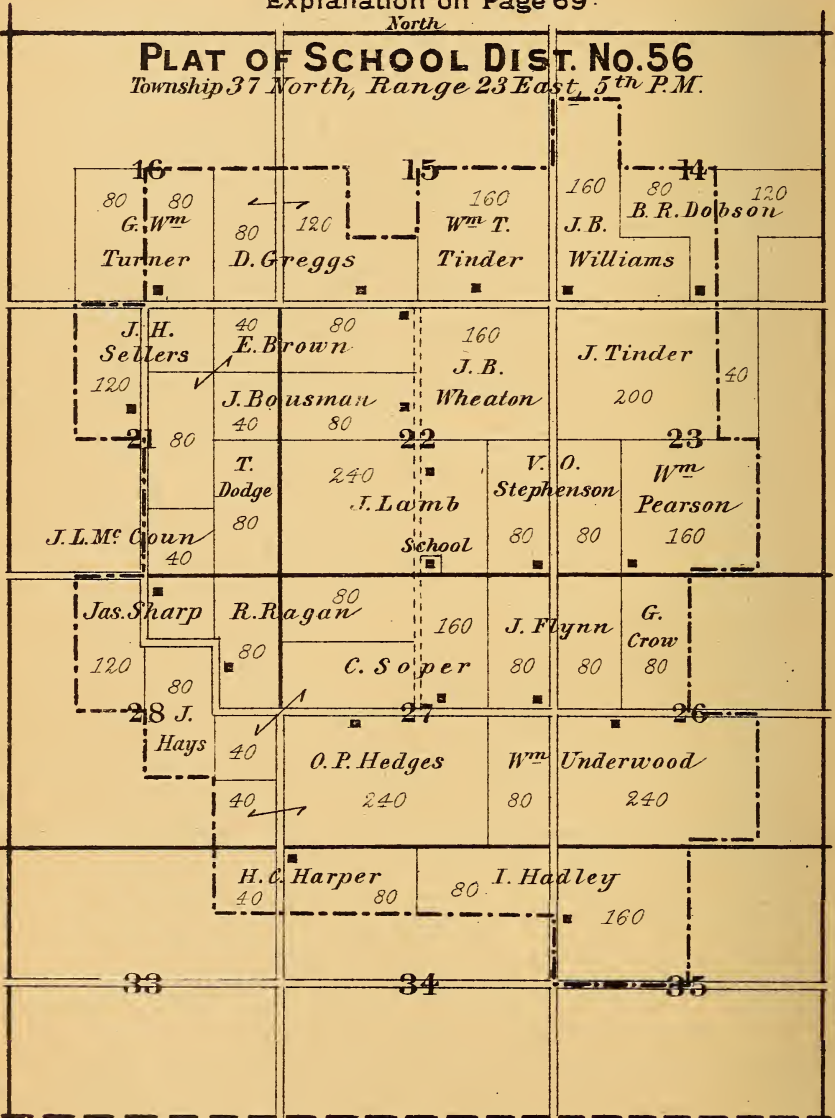
No. 29.

Explanation on Page 69.

North

PLAT OF SCHOOL DIST. No. 56

Township 37 North, Range 23 East, 5th P.M.



REFERENCE. Section Line _____
 Section Number 33
 Farm Line _____
 Number of Acres 120

Public Road _____
 Proposed Road _____
 Houses _____
 Boundary of School Dist. _____

**DESCRIPTIVE NOTES FOR PLATTING SCHOOL DISTRICT
No. 56, DIAGRAM 29.**

Having first determined on the number of sections to be contained in the school district, choose such a scale that the paper will contain the work. A scale of two inches per mile will be found very convenient and of sufficient size to admit of number of acres and owners names being written on all pieces of forty acres, or larger. First with pencil draw heavy lines across the paper two inches apart, so as to form squares, measuring two inches on each side. Each square will represent a section; subdivide each square into four quarters by drawing light pencil lines through the centre of the squares from top to bottom, and from right to left. Mark on the sides of the paper North, South, East and West, and in centre of the large squares the section numbers. Draw off the farms and put owners names on, as in Diagrams 29 or 28, either from the clerks school register, tax receipts or assessor's books; if you experience any difficulty in locating small pieces follow instructions with Diagram 7, afterwards locating the quarter on the plat; make a small square dot, as in diagram, for the houses when possible to locate them, as that will show who are best accommodated in the school district; locate the school-house lot. After locating the lands locate what roads you can (you will know what lands the roads run between) draw a light line parallel with the section or farm line, making a double line, and through farms draw a double line for roads, if there are private roads running directly to the school-house it is important to show them. In this diagram the school-house is on a private, or neighborhood road. In locating the houses and streams no measurement is necessary, locate them by inspection. Draw the boundary of the school district by dash and dot. Should you desire to finish the map with ink you will need a rule, a cake of India ink and a drawing pen. With drawing pen, draw two light lines parallel to each other for the roads; next the private

roads, with two parallel dotted lines ; next draw the boundary line with a dash and dot ; next the section lines, with a heavy line, and last, the farm lines, with a light line. With a sharp pointed pen, ink the houses, next ink number of sections, write in names of owners, and number of acres.

COLONIAL FARM.

Diagram 30, page 71, represents the shape of a farm of 108 acres, taken under the old colonial order of surveys, *in ye olden times*. It is here inserted to illustrate the odd shape of farms in the original colonies, where there were no established government surveys. In many cases the imperfections in the descriptions render it impossible to locate the farm from the deed, and parole evidence is often used to find the exact corners and boundaries. The direction and distance are frequently omitted, and the corners only described, as follows : “Running from top of ledge joining ——— lands to centre of pond on ——— line, thence with said line to a chestnut stump near a spring,” &c. This lack of a definite description, or the many courses and bearings, where a complete survey has been made, when compared with the Public Land System, for either deeding or assessing, illustrates the simplicity and convenience of the system inaugurated by government, and described in this volume.

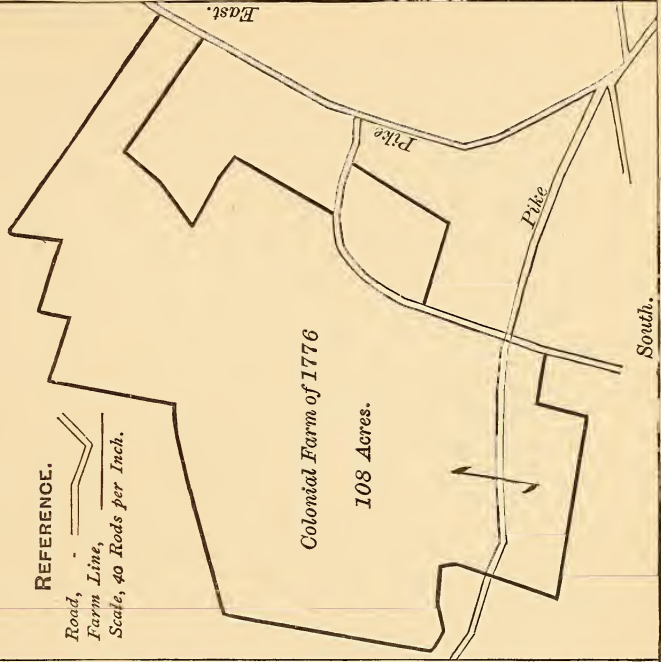
MILITARY TRACT OR LAND GRANT SURVEY.

Diagram 31 illustrates three land grants, or tracts, with the number of the survey, number of acres, and the bearing and length of the boundaries given. In the division of survey No. 999 the subdivisions are numbered as Lots 1 and 2 ; this should be done in all cases by the surveyor, where lots are irregular, and the plat should be recorded with the lot numbers. The advantage of all irregular shaped tracts being designated by a number when laid out by the surveyor should not be overlooked ; the survey must be made a matter of record, after

North.

DIAGRAM
No. 30.
COLONIAL FARM.

Explanation on Page 70.



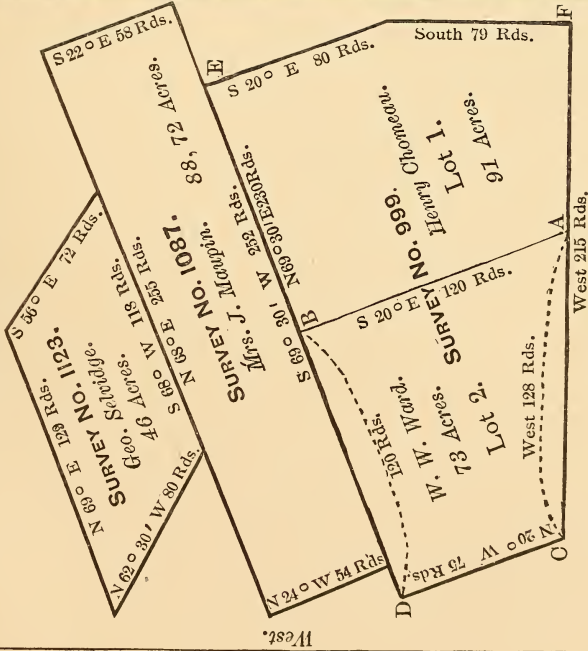
REFERENCE.

Road,
 Farm Line,
 Scale, 40 Rods per Inch.

North.

DIAGRAM
No. 31.
MILITARY TRACTS or LAND GRANTS.

Explanation on Page 70.



REFERENCE.

Boundary of Survey,
 Survey Number, 1123
 Line Dividing Survey into Farms,
 South.

which the description, either in an assessment, or tax receipt, can be greatly simplified by using the number. The surveys in each congressional township should commence with Lot 1, and number in consecutive order. For deed description of Lot 2, in survey No. 999, see *Quit Claim Deed* on page 43, it gives the starting point, bearings and lengths of lines, description of corners, number of acres, number of survey and number of lot. In making a deed of an irregular shaped piece, a plat of the land should accompany it when possible, although not an absolute necessity to a complete description, yet in many cases it would prove of great value in avoiding errors. By following directions on page 52 for using protractor any official with little practice will be able to furnish with each deed a plat of the lands deeded.

RECORD OF SURVEY.

Division of Survey No. 999 _____ tp. _____ Co.
State of _____, survey made in Jan. 1886.

Survey of line between Henry Chomeau and W. W. Ward, as shown on accompanying plat in Diagram 31, page 71: Beginning on south line of survey number 999, 128 rods east of southwest corner of said survey, starting point marked A on plat, where set sandstone $18 \times 9 \times 30$ inches, on which I place a +, from which a white oak 18 inches diameter bears $N35^\circ E$. 135 links distant; a walnut 15 inches diameter bears $N 60^\circ W$. 400 links distant; run thence $N.20^\circ W$. intersected north line of survey at 120 rods, marked B on plat; set limestone rock $20 \times 11 \times 36$ inches, marked with a +, no bearing trees, put mound of stone alongside; thence ran $S.69^\circ W$. 120 rods on line of survey to NW corner of the survey, where I found marked stone with witness trees. In the division of survey 999 the east part is designated as Lot 1, and the west part as Lot 2. Recorded on surveyors record, page —. Variation of needle 7° .

SURVEYING WITH TRANSIT AND STADIA, OR STADIA MEASUREMENTS.

In Stadia measurements the instruments used are the ordinary field *transit* with vertical circle, and a graduated rod or board, called a *Stadia*. There are two methods of making these measurements. Only the one adopted by the United States Coast Survey, who have given the greatest attention to Stadia measurements, will be described here. This may be called the two-hair method, for on the field end of the telescope, in addition to the usual horizontal and vertical cross-hairs, two *horizontal hairs* are placed parallel with the central one and equally distant on each side from it. These two extra hairs are so placed that if a leveling rod is held 100 feet from the telescope they will enclose one foot of its length. With this as a constant (1 foot in 100) a table can be made, and any distance that the *Rod* may be from the instrument can be precisely measured by reading its face, *i. e.* that is, if the hairs take in $2\frac{1}{4}$ feet of a rod, the rod is 225 feet away; $3\frac{1}{2}$ 350 feet away. For elevation the vertical angle is read on the vertical circle of the transit when the telescope is directed towards a point of the Stadia rod as far from the ground as the telescope is above the stake over which it is set. By this measurement, the compass, chain and level, for horizontal distances or elevations are dispensed with, and the slow and laborious process of chaining over rough ground and leveling up and down hill are avoided.

For accuracy the telescope must be of sufficient power to read the Stadia rod correctly, and the starting point for the stadia measurement, a point as far in front of the object glass as is its focal length (in ordinary field transits from 10 to 16 inches in front of centre of instrument) This distance must be added to each stadia sight. No definite comparison can be made between the stadia and the compass and chain surveys as made by government, for government uses them for different surveys; the

(North)

DIAGRAM

N^o 32

Explanation on

Page 77

(West)

(East)

Parallel of Latitude

Tangent Line of Parallel Latitude Line

Meridian West
Auxiliary
2nd Standard
1st Standard
BASE

MERIDIAN
PRINCIPAL

2nd Standard Parallel North
1st Standard Parallel North

LINE

(South)

former for topographical surveys, the latter for land surveys. The few comparisons that have been made are greatly in favor of the Stadia measurements.

CONVERGENCE OF MERIDIONAL LINES.

Diagram 32.—This diagram represents the relative position of the auxiliary meridians and standard parallels, with reference to the principal surveying meridians and base lines; it also represents the converging of north and south lines and the curvature of the parallels of latitude.

NORTH AND SOUTH LINES.

In the diagram the centre meridian line of the page is shown as a principal surveying meridian, and the positions of the first and second auxiliary meridians west are given. The north and south lines, converge as they extend north from the base line, which is shown at bottom of the page, and parallel to the base line, the first and second standard parallels north are shown as lines of latitude. From position of these lines as given, the necessity of establishing standard parallels from which to lay out the townships and sections to prevent them from becoming too narrow is apparent. An illustration can be had from the public land surveys, made from the fifth principal meridian, which governs the surveys in Arkansas, Missouri, Iowa, and western part of Minnesota. The base line for this meridian runs east and west through Arkansas, immediately south of Little Rock. When this base line was surveyed township corners were established every six miles, from which range lines were run north. If these range lines were continued due north to British America, distance about 1,000 miles, without standard parallels, the townships would be only four and seventy-eight hundredths miles wide, instead of six miles, as laid out on base line, but in the original survey the government surveyors established, between the base line and British America thirty-three standard parallels, besides using the following rivers and lines to close surveys on, viz: Arkansas, White and Missouri Rivers, and State lines between Arkansas and Missouri, and between Missouri and Iowa. On each standard parallel the

townships were laid out six miles wide, for the surveys north of the line (except the first standard parallels north of the above named rivers and lines, from which surveys were made south to the rivers or lines) In establishing surveys these thirty-three standards are the same as thirty-three base lines, for the townships on each were laid out in same manner as on the first base line, from which the townships number north to British America, from 1 to 164, inclusive, and south to Louisiana State line, from 1 to 20, inclusive. The lines extended south of the base would diverge in same manner as those north of it converge.

EAST AND WEST LINES.

True east and west lines are lines of latitude, as represented in the diagram, and are not at right angles to the meridian lines, except at the equator. A true east and west line (parallel of latitude) and a line running at right angles to the meridian line (marked tangent) are shown on diagram to illustrate their relative positions in reference to the meridian line. The tangent is a straight line run at right angles to the meridian from which offsets are made to the parallel line. See table True east and west lines are curved lines, but in the public land surveys they are marked by corners and blazed on trees, as angular lines. On standard parallels offsets are made every half mile from the tangent to the parallel, these corners are subsequently connected by lines run either with transit or common compass, which makes the lines established as east and west lines, a series of short, straight lines, with the corners on the parallel lines. A line run with a compass, east or west, is neither a parallel of latitude nor a tangent, but a line between the two, if the stations on a compass line are only ten or twenty rods apart, and from each station a line is run either east or west, the line will conform very closely to a parallel of latitude, but if the stations on the compass line are four or six miles apart the line will run nearer a tangent. A true east and west line is a curved line and cannot be run with a compass or any other instrument by direct sights, except on the equator.

NORTH AND SOUTH AND EAST AND WEST LINES COMPARED.

For illustrating the difference between *true* east and west lines, and *due* east and west lines, suppose a compass to be placed at southwest corner of a township marked A in diagram 33, page 81, from which southeast corner of township can be seen, a flag placed at C would be shown by the compass at A to be *due* east, while B would be *true* east, by a *true* east and west line is meant a line running parallel to the equator. Suppose the compass to be changed to C it would show D to be west. As this township is located in Montana, C would be about 25 feet south of B, and D about 50 feet south of A; while B is *true* east from A, and A *true* west from B, C is *due* east from A, and D *due* west from C. As a further illustration suppose a compass to be placed at each section corner on the east line of the township, from B to F, as shown in diagram 33, with their sights turned north and south, a line run *due* north from compass at B should pass through each compass sight. A compass placed at any point on this line, when extended either north or south would retrace or extend the line as a straight line, by running *due* north or south. Next suppose the sights of each compass to be turned east and west, and straight lines drawn through sights of each, both east and west, to an indefinite length; these lines would converge, going either east or west (in same manner as north and south lines converge from the equator) the lines run east would all cross the equator at the same point, viz: 90 degrees east of the line of the township where compasses were set, and the lines run west would cross the equator 90 degrees west of the line. Should you change the compasses to points on these lines, either east or west, the lines could not be retraced to starting point, nor extended as straight lines by direct bearings, east or west. Each change in the compass, either east or west, changes the bearing of the line. From the above it can be seen that a north and south line can be run as a straight line, while an east and west line changes its direction at each station.

Notes on Subdivision of T. 6 N., R. 3 East, Montana Meridian, Showing the Importance of North and South Lines, and the Use of Random Lines, etc.

The field-notes of this township are given in first part of this volume. The township was surveyed by Walter W. deLacy, in 1880, with a Burt's improved solar compass. A thorough examination of the field-notes will show, that the interior section corners in the township were established by measurements on north and south lines, except corner at Sections 7, 9, 17 and 18; that lines run either east or west, except between Sections 26 and 35, 20 and 17 and 8 and 17, were run as *Random lines* to find section corners from which to establish true lines, not as east and west lines, but as straight lines, from one section corner to the other, and that the topography on east and west lines has been given on the random lines instead of on the true line.

In Diagram 33, page 81, the numbers marked on the section lines are the page numbers in first part of this volume, on which the survey of each section line can be found; the dotted lines on the plat are to represent the *Random Lines*.

Commencing at corner of Sections 35 and 36 on the township line they ran north between Sections 35 and 36; variation $18^{\circ}30'E$; at twenty chains enter timber; at 31 chains leave scattering timber; at 40 chains set $\frac{1}{4}$ section corner post, marked $\frac{1}{4}S$, on the west side; at 52 chains and 70 links enter brush; at 53 chains and 82 links intersect right bank of river; the markings of the post M. C. are for Meander Corner, the other markings, T. 6 N. on S., R. 34 E., S.36 on E. and S.35 on W., stands for: Township 6 North on south face; Range 34 East, Section 36 on east face and Section 35 on west face; at 68 chains and 82 links south bank of Island. set post; marking same as on right bank, except T. 6 N. is on north face instead of south face; at 72 chains and 50 links, or sometimes called 72 and fifty-hundredth chains leave brush, enter timber; at 80 chains set post; this post was set in the ground with the edges

DIAGRAM

No. 33

CONGRESSIONAL TOWNSHIP.

IN

MONTANA.

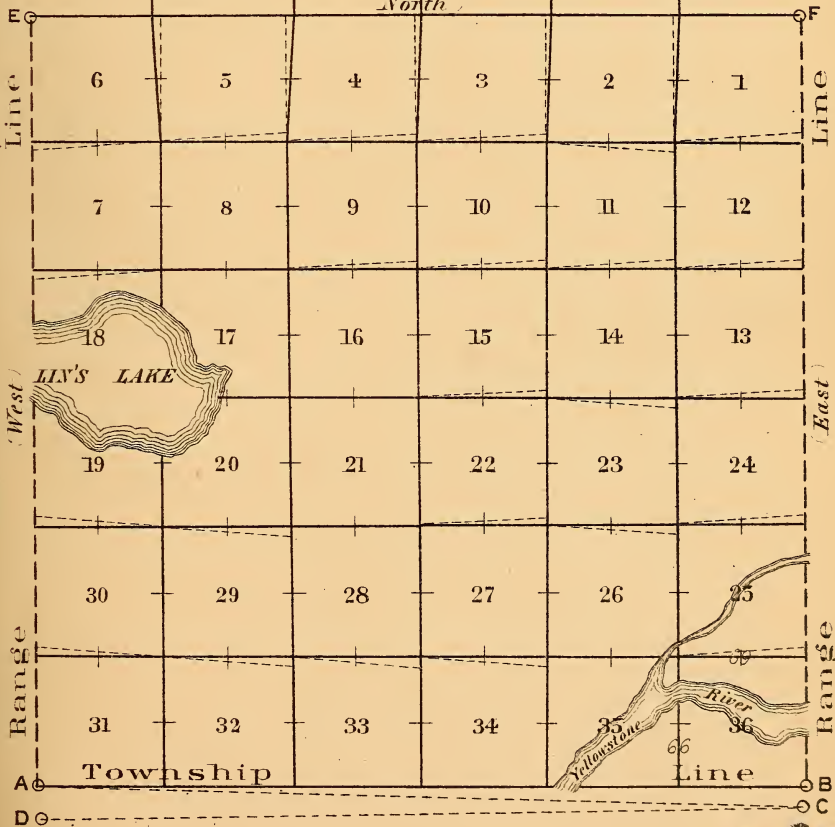
Random Lines
of

Township 6 North, Range 34 East of the Montana Meridian.

Township

Line

North



Random Line -----
 Quarter Sec. Corner +-----

North, South, East and West, and the markings taken from the field-notes stand for the following: Township 6, North, Section 25 on Northeast face; Range 34, East, Section 36, on Southeast face; Section 35 on Southwest face, and Section 26 on Northwest face of the post, with one notch on the South edge and one notch on the East edge, to show that the post stands one mile from the South and East sides of the township; the marks on the trees, in addition to the Township, Range and Section on which they stand are B. T., standing for bearing-tree. (After establishing the line between section corners, the quality of the soil and the kind of timber is given) thence East on *random line* represented on diagram by the dotted line, at 79.54 chains; intersected range line, 58 links North of the corner. By reference to the field-notes you will see the topography is given on the random line. To establish the true line it was necessary to calculate a course that would intersect the section corner; the random line run enabled the surveyor to readily determine the bearing.

See table, showing difference of latitude and departure, etc. From table you will see 25 minutes represents $58\frac{1}{2}$ links, subtracting 25 minutes from 90 degrees we have $N89^{\circ}35'W$ as the bearing for the line established as the true line. The lines run North are each 80 chains, except through North tier of sections; of the East and West lines, only five are 80 chains in length, they were run as straight lines between corners established on the North and South lines. In running random lines East, only two in the township intersected at the section corners. In reading over the field-notes of the subdivision of this township trace the lines on Diagram 33, and on Diagram B in first part.

Following the field-notes is a general description of the township, which may be considered from a disinterested standpoint, and as a rule may be taken as a fact; in addition to the general description, the soil and timber is given on each section line, from which a fair description may be had of the public lands. From the page numbers on the section lines in diagram, you can trace the survey of the township and determine the direction the lines were run; in tracing the page numbers on the diagram refer to the field-notes until familiar with the survey,

and you will experience no difficulty in determining the surveys of the townships which follow, or understanding the survey of any township when you have the original field-notes.

SUGGESTIONS ON RE-SURVEYING AND SUBDIVIDING THE PUBLIC LANDS.

In re-surveying the public lands, the corners and lines must be located by county surveyors, where original survey placed them, see law. That is, the same class of errors made by government surveyors, must be committed, or an allowance made for them by the county surveyor.

If original lines were run with a common compass and chain, to resurvey the lines with the same instruments, and in the same direction, the lines will more nearly conform to the old lines than lines run and measured with more precise instruments. While the transit is more precise and correct than the compass (see stadia measurement, page 74), the compass will continue to be the instrument used, to retrace the lines originally established with it, and where land is not too valuable, it will be used in subdividing. Its easy transportation, the lesser cost, and its rapidity and convenience in use will recommend it to surveyors, especially so as long as their work is not made a matter of record. Where precise surveying and measuring is demanded more improved instruments than the compass and chain must be employed. Surveyors who attempt to retrace the government surveys should be not only good surveyors but good guessers and good hunters. A good guesser to guess where the original errors were committed, and a good hunter to find the corner in the locality where he guesses it to be. Many persons are unnecessarily exacting about the lines of their farms, more from a misunderstanding of the correctness of a survey made with a compass and chain, or a knowledge of the law and instructions governing the original surveys than a desire to add a few feet to their possessions. A perusal of diagram 46, and the descriptive notes with it, will illustrate how the lines, called east and west lines, were run from

one section corner to the other as straight lines, and will designate the lines which were established by government, and those which were only designated on the plat, for county surveyors to establish. On the diagram page 134 the dotted lines were not run by government surveyors, but designated on the original plat for future subdivisions of the sections. Attention is called to the odd shaped lots in the north half of Sections 1, 2, 3, 4, 5 and 6, also to Section 31. In Section 1 there are 1650 acres of land. The north half of the section is subdivided into 15 lots. The original plat gives the length of each quarter section, on the north and west sides of the township, and the amount of land in, and number of, each lot ; all of which are not given in the field-notes. Before commencing a survey provide yourself with a copy of the original plat of the township and such field-notes as will enable you to fully identify the corners, and length of lines in the immediate neighborhood.

RETRACING AND LOCATING SECTION LINES.

In retracing and locating the section lines surveyors are not called upon to run North, South, East and West lines, but are to make their lines and corners conform to the original surveys, no matter how erroneous they may have been made ; whether established according to law or instructions, or not ; the acceptance of the survey by government and the subsequent sale of the land by the plat, establishes the survey.

EAST AND WEST SUBDIVISIONAL LINES A FAILURE.

Government after nine years trial, from 1796 to 1805, in establishing *east* and *west* lines in the subdivision of townships, recognized them as impracticable, and used straight lines run from section corners to section corners established on north and south lines, except in the west tier of sections in each township, in certain States. See page 59, first part. Missouri and Arkansas being the only States west of the Mississippi River in which the west tier of sections are subdivided by lines running west, except on correction lines. Diagram 46 illustrates the impracticability of using east and west lines, see west tier. The fol-

lowing is suggested, viz : Locate corners, when you can, by north and south lines, run the straight lines in the same direction as the originals were.

TO SUBDIVIDE SECTIONS INTO QUARTERS AND LOTS, AS DESIGNATED
ON ORIGINAL PLAT.

In the interior sections of a township (which includes all except the north and west tiers of sections), run straight lines from quarter section corners to corresponding quarter section corners. In the north and west tiers subdivide by proportionate measurements, according to the areas given on the plats. The areas given on the plats may not have been calculated according to instructions, viz : To consider the quarter section lines in Sections 1, 2, 3, 4, 5 and 6, as running parallel to the east line of each section, and in Sections 6, 7, 18, 19, 30 and 31 as parallel to south line of each section, or they may not have been calculated as contemplated by some of the State laws, as in Missouri, for instance, where law is ;

Sections 27 and 28 from Wagner's Statutes of Missouri, 1870.

SECTION 27.—“The blank quarter section corners on the west side of fractional Section 6, 7, 18, 19, 30 and 31, are required to be established the same distance north or south of the quarter section corners, to Section 1, 12, 13, 24, 25 and 36, as the corresponding fractional section corners south thereof are north or south of the section corners above named.”

SECTION 28.—“The blank quarter section corners on the north side of fractional Sections 1, 2, 3, 4, 5 and 6, are required to be established the same distance (after taking into consideration the length of the south boundaries thereof, as established by the deputy United States surveyor,) east or west of the quarter section corners, to Sections 31, 32, 33, 34, 35 and 36, as the corresponding fractional section corners east thereof are east or west of the section corners above named.”

But in all cases the original plat from which the lands have been sold must govern. The length of the lines and the areas given, will enable the surveyor to determine how to proceed with

the survey. If the areas have been calculated to run the quarter line to the quarter corner on the north or west, or to a point equidistant between the section corners; or parallel to east line; the quarter section corner should be so placed as to suit the calculation of the areas of the quarters.

TO SUBDIVIDE QUARTERS AND LOTS NOT DESIGNATED ON
ORIGINAL PLATS.

In subdividing quarters and lots not marked on original plat, make subdivision in accordance with the laws, which can be found in this volume, and see that the instructions of the surveyor-general under which the original surveys were made are carried out, found in first part, except in the instructions of 1856, for Illinois and Missouri, for subdividing interior sections. (See page 61, first part.) In this instruction the law of Congress of 1805 was overlooked, and the statement that there was no law on the subject was a mistake. To what extent surveys in Missouri and Illinois have been made, under this instruction, it is impossible to tell, as the subdivisions made by surveyors have not been recorded as a general thing, but became the private property of the surveyors making them, and in many cases no notes of the surveys were kept, the importance of having a record, of every survey made, cannot be overestimated; a public record of all surveys would be of great value to the different counties. That the subdivisions made under instructions of 1856 are erroneous there is no doubt, for the instructions were merely advisory to county surveyors, and being wholly at variance with the law they could have no force. Where these surveys have been the established survey for years, the courts will have to decide to what extent they are binding. There are a number of surveyors in Missouri to-day who subdivide sections under instructions of 1856, believing that the instructions governing the original surveys will be sustained; and the decision of the Supreme Court of Missouri, which is: "Where the statutes of this State conflict with the regulations of the U. S. Land Department * * * the latter must govern," has confirmed that belief. If the instructions of 1855 had not been at variance with

the law when made, this rule would hold good, but the law of Missouri and law of Congress are the same for subdivision of interior sections () Hence the importance of subdividing an interior section according to the law. Owing to the fact that no two surveys exactly agree, and that the discrepancies arising in chaining, and the changes in the variation of the needle make the lines uncertain, the following is suggested, viz: When a survey is made, see that it conforms to the law, that no mistakes are made on the ground in measurements, and have permanent corners erected. Make a public record of the survey, and if the lands are valuable, or valuable improvements are to be made near the line, there should be an agreement or deed entered into binding each party interested, to the lines established by the survey. To parties desirous of establishing permanent lines the following opinion and suggestions are commended. They are from the pen of Hon. T. T. Gantt, as shown by the following letter:

St. Louis, December 26, 1885.

Messrs. Higgins & Co:

Dear Sirs: You ask me whether two (or more) parties interested believing in the correctness of a survey, which may, however, possibly be erroneous, may, as between, or among, themselves, confer upon it the qualities of unchangeableness and validity. In my opinion this may be done. The controversy most likely to arise, in the absence of a convention between the parties, would be respecting the true location of the boundary between contiguous proprietors. It has been repeatedly decided that if the parties, understandingly agree upon such a line, neither will be subsequently at liberty to show that it is erroneous. Such an agreement need not even be in writing, but the imprudence of neglecting the best, which is also the easiest mode of authenticating it, is obvious. Such a deed as the following will mutually estop the parties to it, viz:

“Whereas a survey has been made by —, of a tract of land in —, the plat and description whereof are recorded in Record Book or Plat Book —, of the office of Recorder of

“ *Deeds for — County, State of —, at p. —, and whereas*
 “ *A, and B. have several interest in the tract surveyed, the por-*
 “ *tion owned by A. being represented on said plat by the figure*
 “ *at the angles of which are the letters [m, n, o, ***] and the*
 “ *portion owned by B. being in like manner represented by the*
 “ *figure at the angles of which are the letters —. Now the said*
 “ *A. and B. believing the said survey to be correct, do mutually*
 “ *declare, covenant, and agree that they accept the same as a true*
 “ *and correct representation of their respective interests in said*
 “ *tract of land: that they invite the world to deal with each of*
 “ *them on the basis of the correctness of said survey: and that*
 “ *they, and those claiming under them, will never impeach or dis-*
 “ *turb the said survey. In testimony,*” &c. *This instrument*
should be signed, sealed, acknowledged, and recorded, as directed
by law respecting conveyances of real estate. It had better be
executed in duplicate: tho’ being recorded this will not be essential.

Very respectfully, your ob’t. serv’t,

Thos. T. Gantt.

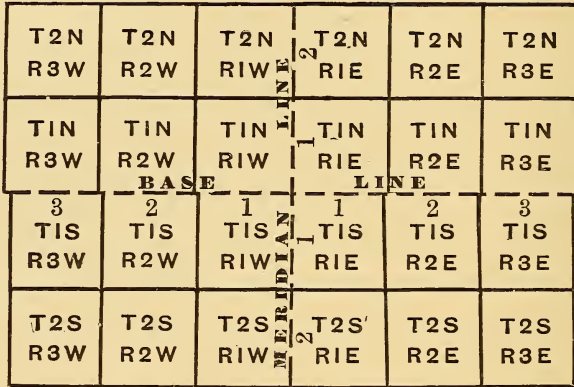
See *Estoppel Deed*, page 44, arranged from above opinion.

ORDER OF NUMBERING TOWNSHIPS AND RANGES FROM INITIAL POINTS.

The following diagram illustrates the manner of numbering the townships and ranges from the different *Initial points* established in the Public Land Surveys. Each square represents six miles square, a congressional township of thirty-six sections; the first six miles, either east or west of the meridian line, is called Range 1, the next six miles Range 2, and so on. The first six miles, either north or south of the base line is called Township 1, the next six miles Township 2, and so on. This is the plan adopted, except in early surveys in Ohio; in the Seven Ranges the townships do not number from the base, from which they were surveyed, but count from the River Ohio; and in the Miami Val.

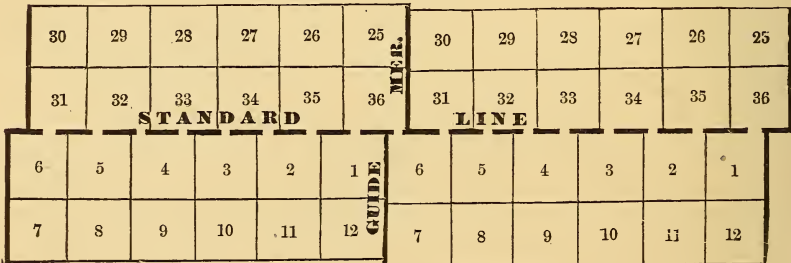
ley tract the townships count east from the meridian, instead of north and south. For further description see Ohio State map references.

DIAGRAM No. 34.



The following diagram illustrates the relative position of townships lying East of a Meridian and on a Standard line. The townships on the *North* side of the Standard line jog to the *East* owing to converging of meridional lines, see page 77. Townships *West* of a Meridian jog to the *West* in same manner as those in diagram jog *East*.

DIAGRAM No. 35.



SURVEYS UNDER DIFFERENT INSTRUCTIONS ILLUSTRATED.

The following *Maps, Diagrams* and *Descriptive Notes* illustrate the actual surveys made and accepted under the different *Instructions* which were first issued by the "Geographer of the United States," and subsequently by the Surveyors General and Land Commissioners. The several Instructions under which the Public Lands have been surveyed were issued from time to time, as defects in the field operations demanded, or as the Surveyors General and Land Commissioners thought expedient.

SUBDIVISION OF TOWNSHIPS INTO SECTIONS.

Subdivisions of townships into sections in Ohio, Missouri, Arkansas and Mississippi are illustrated by diagrams 36 to 50; diagrams 42, 44, 46 and 47 illustrate the subdivisions of townships into sections in Illinois, the greater part of Indiana, west part of Louisiana and south part of Michigan; diagrams B and 33 illustrate the subdivisions of townships into sections in the other "Land States" and the Territories. (See instructions on pages 68 to 72, part I).

SECTIONS SUBDIVIDED INTO LOTS.

Early Instructions make no mention of the manner of subdividing the fractional sections into lots, or the order of numbering them. The lotting and numbering was done in the office, under the immediate supervision of the Surveyor in charge of the work. The lots are not mentioned in the *original field notes*, and the only record of them is on the official plats, as accepted by Government. The lotting has been done so irregularly that no general system can be given that will illustrate all the subdivisions in the several States and Territories; but the following classification of the States will serve as a guide in determining descriptions of land, viz: in the *Public Lands* west of the Mississippi River, except Missouri, Arkansas, and part of Louisiana. There are no duplicate lot numbers in a section, and in the above described territory the following is a legal description, viz: Lot 1, Sec. 4, T—, R—; while in Missouri and Arkansas, and the *Public Lands* east of the Mississippi River, except Wisconsin and parts of Michigan and Florida, the legal description should state the quarter section. (See diagrams B, Part I. and 46, Part II.). The Original Plats, as filed by Government, are the official records for size and number of lots.

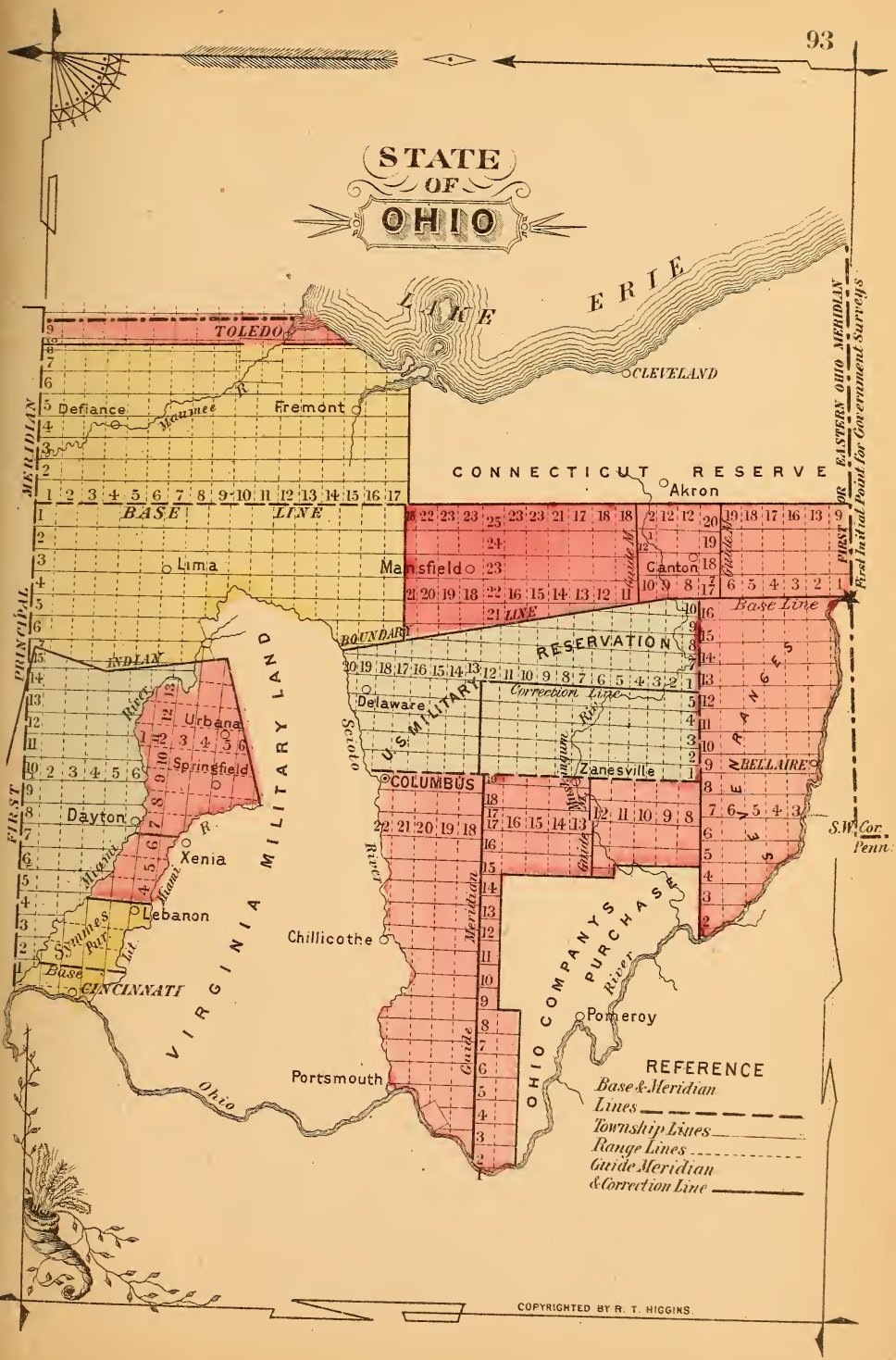
In subdividing sections into 40 acre tracts for the Indians, Government surveyors establish but three lines, viz: One line dividing the section into north and south halves; next each half is divided into north and south halves. The north and south lines are not run. This is done to save labor, by order of Land Department.

OHIO STATE MAP REFERENCES.

The *Public Land System* was first inaugurated in this State in 1786, by Thos. Hutchins, Geographer of the United States, by the establishment of the first initial point and first base line for surveying the lands belonging to government. This initial point was established on the right bank of "the River Ohio" at the intersection of the State line between Ohio and Pennsylvania. The law under which it was established provided that the first line run north and south, should run from this point, and the first line run east and west should begin at the same point and extend through the whole territory. (For ordinance see first part of this volume). The meridian running from first initial point north to Lake Erie, was the first meridian established for designating the location of lands. This is called the First or Eastern Ohio meridian, to distinguish it from the First Principal meridian.

One is the line between Ohio and Pennsylvania, the other the line between Ohio and Indiana. The first surveys were under the personal supervision of the "Geographer of the United States," (Thomas Hutchins), assisted by ten surveyors, appointed from different States. The geographer was ordered to survey the public lands into townships, and to report to the board of treasury each seven ranges, as soon as surveyed. The "first Seven Ranges" was ordered laid off between the river Ohio and a line run west from first initial point; subsequent acts ordered tracts, of seven ranges laid off, viz: one on the river Ohio east of the Sciota River, one west of the Great Miami River, and one north of the first seven ranges. This ordinance gave rise to the term "the Seven Ranges," as designating the first lands surveyed. The geographer gave instructions for field work for first surveys. After appointments of surveyor-generals each surveyor-general gave instructions for the territory or district over

STATE OF OHIO



FIRST OR EASTERN OHIO MERIDIAN
First Initial Point for Government Surveys

REFERENCE
 Base & Meridian Lines ————
 Township Lines ————
 Range Lines ————
 Guide Meridian & Correction Line ————

which he had jurisdiction; following this plan the Commissioners of the General Land Office issued instructions, which have been changed and perfected, from time to time, thereby insuring more complete and uniform surveys. Following the description of the several tracts of Ohio, that have been surveyed from the different initial points, are townships, with descriptive notes to illustrate the subdivisions, under different instructions.

The public lands of Ohio have been surveyed from six different initial points, and may be described in tracts, as follows, viz: Southeastern Ohio, including the Seven Ranges, the United States Military tract, the Miami Valley tract, Southwestern and Northwestern Ohio, including the Michigan strip. They are described and bounded, as follows:

SURVEY OF SOUTHEASTERN OHIO, INCLUDING THE SEVEN RANGES.

Surveyed from First or Eastern Ohio Meridian.

The first tract of land laid off and subdivided into townships of six miles square, and subsequently into sections of one mile square, is located in the southeastern part of Ohio, and known as the "Seven Ranges," bounded as follows, viz: Beginning at a point on the river Ohio, due north of the southwest corner of Pennsylvania, (the first initial point established for surveying the public lands) thence west forty-two miles, thence south to river Ohio, thence up said river to beginning. In surveying the Seven Ranges the north boundary (running west from first initial point) was used as a base line for establishing surveys from, but not for numbering. In surveying this base line west from first initial point a section corner was established every mile, and a township corner every six miles. The first six miles was called Range one; the next, Range two, Ranges three, four, five, six and seven, were established in regular order. From each of these township corners, range lines were surveyed south to the river Ohio, and township corners established every six miles, making fractional townships on the river. The townships do not number from base line south to the river, as surveyed, but commence

in each range on the river with the fractional townships as number one, and number north in regular order to the north line of the Seven Ranges, and subsequently, were continued north to the south line of Connecticut reserve. The river Ohio runs in a general southwest course from first initial point to the mouth of Scioto river, this causes an irregular number of townships in each range. See numbers on south line of Connecticut reserve, (state map.) In the first range there are 9 townships; in the second range there are 13 townships, etc. The Public Lands of Ohio that have been surveyed from First or Eastern Ohio meridian, in same manner as the Seven Ranges may be described as follows: viz: All of southeastern Ohio, lying south of Connecticut reserve and east of Scioto river, except the United States military reservation. The Ohio company's purchase was surveyed from same point and sections numbered same as Seven Ranges, (but not by Government.) It occupies Ranges 8, 9, 10, 11, 12, 13, 14, 15 and 16, along the river Ohio, and townships number in these ranges from the river in same manner as though Government had surveyed them. The United States military reservation is treated as a blank in numbering townships in Ranges, 8 to 21, inclusive. For subdivision of Township 3, Range 7, a township of the Seven Ranges, see diagram No. 37. For subdivision of Township 19, Range 7, East of Scioto river, see diagram No. 38.

Townships and Ranges located in Southeastern Ohio, from First or Eastern Ohio Meridian, are not usually marked Township North and Range West, as there are no Townships South, or Ranges East.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 3 R 7.,
FIRST OR EASTERN OHIO MERIDIAN, OHIO.

Diagram 37, on page 97.

The numbers in this diagram on the section lines are the page record of original field-notes (on file at Washington,) of survey and subdivision of Township 3, Range 7, East of Scioto River, one of the Townships of the Seven Ranges. Instructions at time of subdivision of townships in the seven ranges and public lands adjoining were to first subdivide the townships into blocks containing four sections. This was done by running

DIAGRAM

No. 37

CONGRESSIONAL TOWNSHIP,
OF THE SEVEN RANGES,

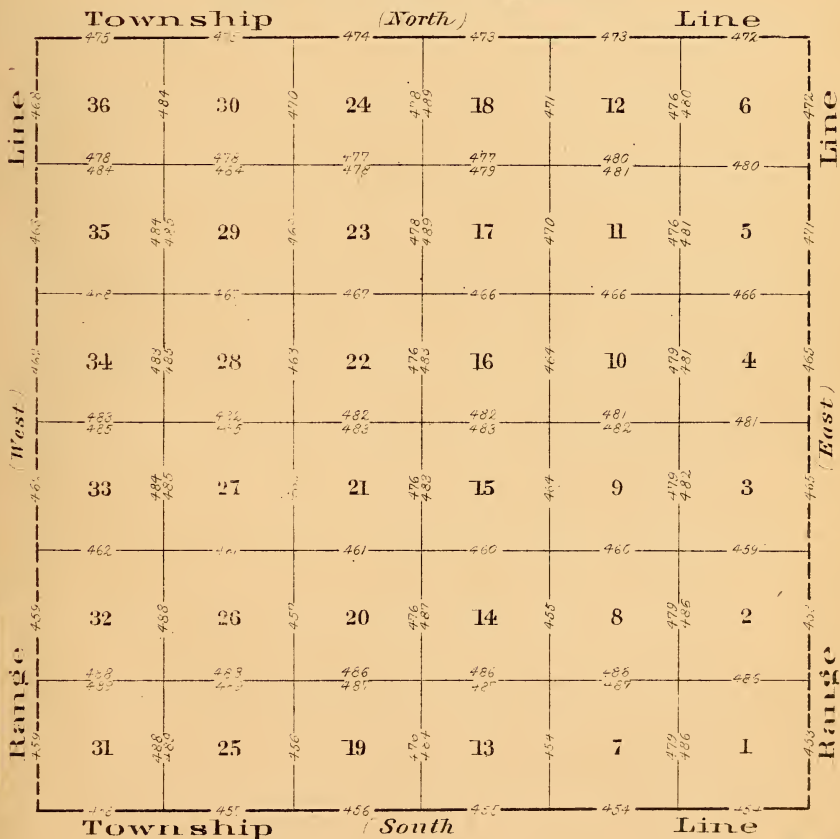
IN

OHIO

See Page N^o 96

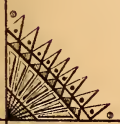
T.3—R.7—East of the Scioto River

FIRST OR EASTERN OHIO MERIDIAN



REFERENCE

Section Line _____ 26
 Section Number _____ 45
 Order of Subdividing township



lines north and south and east and west, at the end of every two miles, counting from township corners. In this diagram these lines have only one set of numbers on them. Subsequently the blocks were subdivided into sections by first running random lines from section corners, through them each way, and afterwards correcting them by establishing the true line. On this diagram the number of page record is given to illustrate the direction the random and true lines were run, and at what points temporary corners were established. The following description of the subdivision of this township conforms to record of page numbers from 453 to 489 inclusive, marked on the diagram. In tracing the numbers on diagram, where two numbers occur on a line, the less number is the page record for the random line. Beginning at southeast corner of the township they ran north two miles, (recorded on page 453), returning to southeast corner they run west two miles, thence north two miles, (page record 454 and 455); from southwest corner of Section 7 ran west two miles, thence north two miles; from southwest corner of Section 19 ran west two miles, thence north two miles; from southeast corner Section 3 ran west six miles, thence north two miles; from southwest corner Section 21 ran north two miles; from southwest corner Section 9, ran north two miles; from southeast corner Section 3 ran north two miles, thence west six miles, thence north two miles to northwest corner of township; from southwest corner Section 23 ran north two miles; from southwest corner Section 11, ran north two miles; from southeast corner Section 5 ran north two miles to northeast corner of the township, thence west six miles to northwest corner of township. The survey above described completes the division of the township into blocks of four sections each. In subdividing the blocks into sections, the first lines run through the blocks, both north and south, and east and west were random lines. The first line was not corrected back and true line established, until the second random line (at right angles to first), had been run. This is necessary to properly locate the centre section corner in each block, without a second adjustment

of corners from first line, as shown in Diagram 38. In the subdivision they commenced on south line of township at corner of Sections 13 and 19, ran north four miles; from corner of Sections 4, 5, 10 and 11 they ran north two miles; from corner of Sections 11, 12, 17 and 18 ran west four miles; from corner of Sections 16, 17, 22 and 23 ran north two miles. In the subdivision the above described lines are random lines. The next line ran was a true line between Sections 23 and 24, and 17 and 18, ran from west to east. For completion of subdivision see consecutive numbers from 479 to 489. In the division of the townships into blocks of four sections they established section corners every mile, and in the subdivision of these blocks they ran lines from section corners to corresponding section corners on opposite sides of the block. All townships in the seven ranges have sections numbered same as in diagram, viz: Section 1 in the southeast corner; Section 36 in the northwest corner.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 19., R. 7.,
FIRST OR EASTERN OHIO MERIDIAN, OHIO.

Diagram on page 101.

Diagram No. 38. This diagram represents the survey and subdivision of Township 19, Range 7, east of Scioto River. The numbers of the page record of original field-notes (on file at Washington,) are placed on the section lines in order of subdivision, and number from 437 to 468 inclusive. Beginning at southeast corner of the township they ran north on random line six miles; recorded on pages 437 and 438; thence south on true line, correcting this line back to southeast corner, recorded on page 439; thence west six miles (on south line of township), thence north two miles, returned to corner of Sections 32 and 33 on township line, ran north two miles; from corner of Sections 34 and 35 on township line, ran north two miles, thence east two miles; from corner of Sections 22, 23, 26 and 27, ran first north two miles, returned and ran west four miles, thence north two miles; from corner of Sections 20, 21, 28 and 29, ran north two miles; from corner of Sections 12 and 13, on range line ran west six miles, thence north two miles; from corner of Sections 8, 9, 16 and 17, ran north two miles; from corner of Sections 10, 11,

DIAGRAM

No. 38.

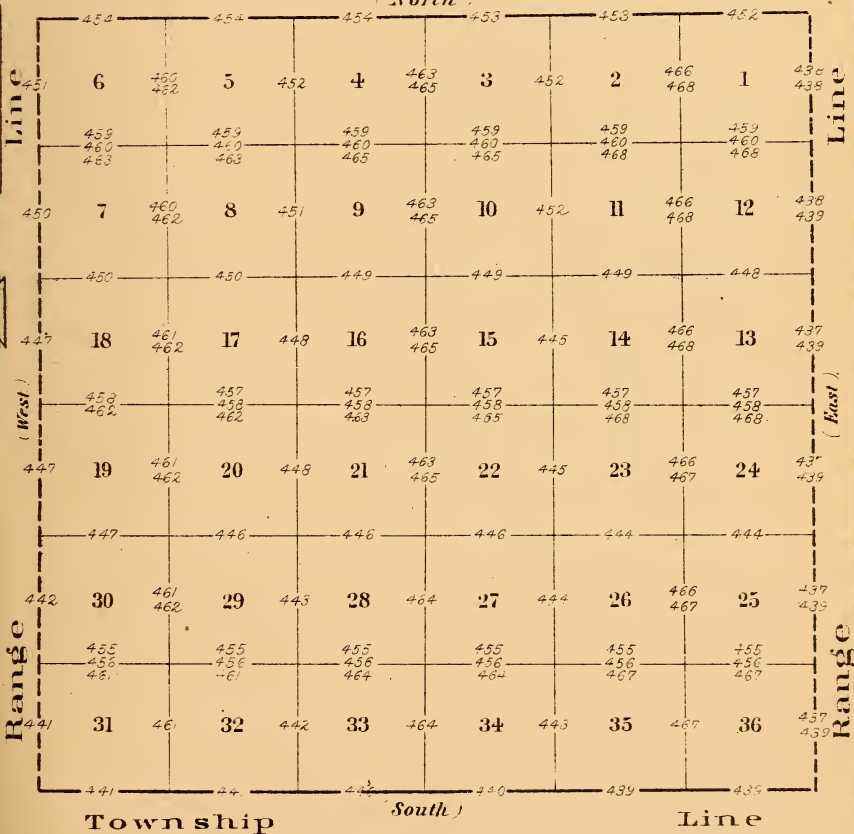
CONGRESSIONAL TOWNSHIP,
EAST OF THE SCIOTO RIVER

IN
OHIO

Explanation on Page 100
Township 19, Range 7

FIRST OR EASTERN OHIO-MERIDIAN

Township North Line



REFERENCE

Section Line _____
Section Number 26
Order of Subdividing township _____

14 and 15, ran north two miles ; from northeast corner of township, ran west six miles to northwest corner. The above described survey (recorded on pages 437 to 454 inclusive), divided the township into nine blocks, each containing four sections, with section corners established every mile on lines run. These blocks were subdivided into sections, by running lines from section corners through the blocks north, south, east and west to corresponding corners. The subdivision commenced at corner of Sections 25 and 36 on range line, thence west on random line six miles (recorded on page 455), returned east six miles on true line (recorded on page 456) ; from corner of Sections 13 and 24 on range line, ran west six miles on random line, returned east six miles on true line ; from corner of Sections 1 and 12 on range line, ran west six miles on random line, returned east six miles on true line. In running the random lines through blocks west, they established temporary quarter section and section corners ; returning east on true line they placed the corners in position on true lines. The blocks were next divided north and south, beginning at corner of Sections 5 and 6 on township line, thence south six miles on random line, (recorded on pages 460 and 461), thence north six miles on true line) ,recorded on pages 461 and 462) ; in running the random line south, temporary corners were marked ; on the true line run north, they were established as true corners, and the quarter section corners on east and west lines adjusted. For example take block containing Sections 29, 30, 31 and 32 ; in running true line north, they commenced at corner of Sections 31 and 32, on township line, ran north establishing quarter section corner equidistant between section corner and the center corner at intersection of the lines for the centre of block, then readjusted the quarter section corners on the east and west line, which had been placed in position north and south by true line run east, but not east and west (the readjustment caused the quarter section corners to be moved after being established on true line). This plan of subdividing often confuses the county surveyors in determining the legal corner in centre of each block, for a corner was marked on random line run west, one on true line run east, one on random line run south, and one on true line

run north ; and for each quarter section corner on east and west lines three corners were marked (first two corners were not always obliterated). Each of the blocks was subdivided in same manner as one above described ; for continuation of subdivision of township, see consecutive numbers from 462 to 468.

In Diagram No. 37 the subdivision of the blocks, by running random lines through blocks both north and south, and east and west, before establishing the first true line, simplifies the subdivision, as the readjustments of the quarter corners on true lines are not necessary.

UNITED STATES MILITARY RESERVATION,

Surveyed from United States Military Reservation Meridian.

By act of June 1st, 1796, the following tract of land was surveyed, viz: "Beginning at northwest corner of Seven Ranges, thence due south fifty miles along the western boundary of the Seven Ranges, thence due West to the main branch of the Scioto River, thence up the main branch of said river to the place where the Indian boundary crosses the same, thence along said boundary line to the Tuscaroras branch of the Muskingum river at the crossing place above Fort Lawrence, thence up said River to the point where a line run due west from the place of beginning will intersect the said river, thence along the line so run to place of beginning."

ORDER OF SUBDIVISION.

"The Surveyor General shall cause the said tract to be divided into townships of five miles square, by running, marking and numbering the exterior lines of the said townships, and marking corners in the said lines at the distance of two and one-half miles from each other, etc."

By this act the above described tract was granted in one-quarter townships on warrants for military service, except salt springs and three several tracts of land containing 4000 acres each, at Shoenbrun, Gnadenhutton and Salem, being the tracts formerly set apart by an ordinance of Congress for the society of United Brethren, for propagating the Gospel among the Heathen.

DIAGRAM

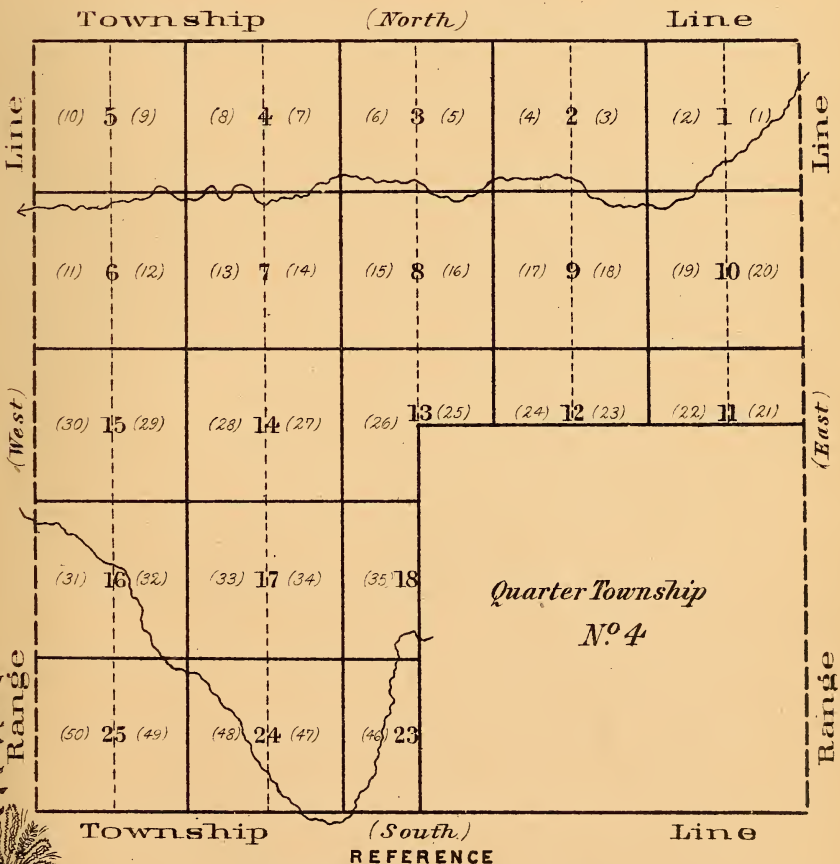
No. 39.

Township in the United States Military Reservation



Explanation on Page 104

Township N^o 3, Range 2 Military tract



Quarter Township
N^o 4

Section Line _____
 Section Number 26
 Lot Numbers (3)

By Act of March 1st, 1800, the townships were to be divided into quarters by running straight lines from the quarter section corners established on the township boundaries to corresponding quarter section corners, whether the interior lines thus extended shall be parallel to the exterior lines of the said township or not, and the exact quantity expressed in the plat and survey returned by the Surveyor-General shall be considered the area.

The initial point for this reservation is the southeast corner of reservation, from which the base line extends West, and the meridian extends North, and from which the Ranges and Townships were laid out and numbered. Some of the townships were subsequently divided into lots. For division of Township 3, Range 2, see diagram 39.

MIAMI VALLEY TRACT.

Surveyed from Great Miami River Meridian.

This tract of land, called the "Garden of America," in southwest Ohio, lying between the Great and Little Miami Rivers, west of Virginia Military Lands, south of Indian boundary, and north of river Ohio, was sold to John Cleve Symmes. The original purchase contemplated one million acres; only two hundred and forty-eight thousand five hundred and forty acres of the land was patented to Symmes and his associates. The remaining portion reverted to government, became public lands, and was surveyed under the public land system. During the period the tract was held by Symmes he laid out into townships, not only what was patented to him, but established north and south lines in a portion of the one million acres that reverted to government, Act of Congress, March 3, 1801, provided "That the lines thus established should be used up to seventh range, and north of the seventh range the surveyor-general was to lay it off according to such uniform rule and method as in his opinion would best secure the rights and interests of those who were entitled to pre-emption." The order, or system adopted by Symmes for numbering the townships and ranges was accepted by the sur-

veyor-general for subdividing into townships the Miami Valley tract. This order reverses the ranges and townships. Ranges count north from base line and Townships east from meridian line. The base line for Symmes' survey runs from the initial point on the Great Miami River (near mouth of Taylor's Creek), east to Little Miami River, passing about seven miles north of Cincinnati; the Great Miami River is the meridian. Symmes surveyed from this base line three ranges north, and one and a fraction south. The north line of Symmes' purchase is shown on State map, with heavy line; it runs east and west, near Lebanon. For subdivision of a township in this tract into sections, see Diagram No. 40.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 2, R. 6,
GREAT MIAMI RIVER MERIDIAN, OHIO.

Diagram on page 109.

Diagram No. 40. This diagram represents the numbering and subdivision of Township 2, Range 6, east of Great Miami River. Townships surveyed from *Great Miami River Meridian*, like those in the *Seven Ranges*, are numbered by commencing at southeast corner of the township with number one, and ending in northwest corner with number thirty-six. For establishment of north and south lines, by J. Cleve Symmes, see description of Miami Valley tract on page 107. The line described, as line between Ranges 6 and 7, is the north line of this township, and is known as the Ludlow correction, or base line, (in this tract ranges count north from base line). The north and south lines through this township were established by J. Cleve Symmes' survey, in which corners were established every mile; these corners were used by government, except the corners on the north line of the township. Israel Ludlow having established a correction line between Ranges 6 and 7, from Great Miami to Little Miami Rivers, his survey was used for the north line, causing the small sections on north side of the township. In subdividing and establishing east and west lines they commenced at the northeast corner of the township; thence west to section line run by Symmes, (marked number one on range line); thence south

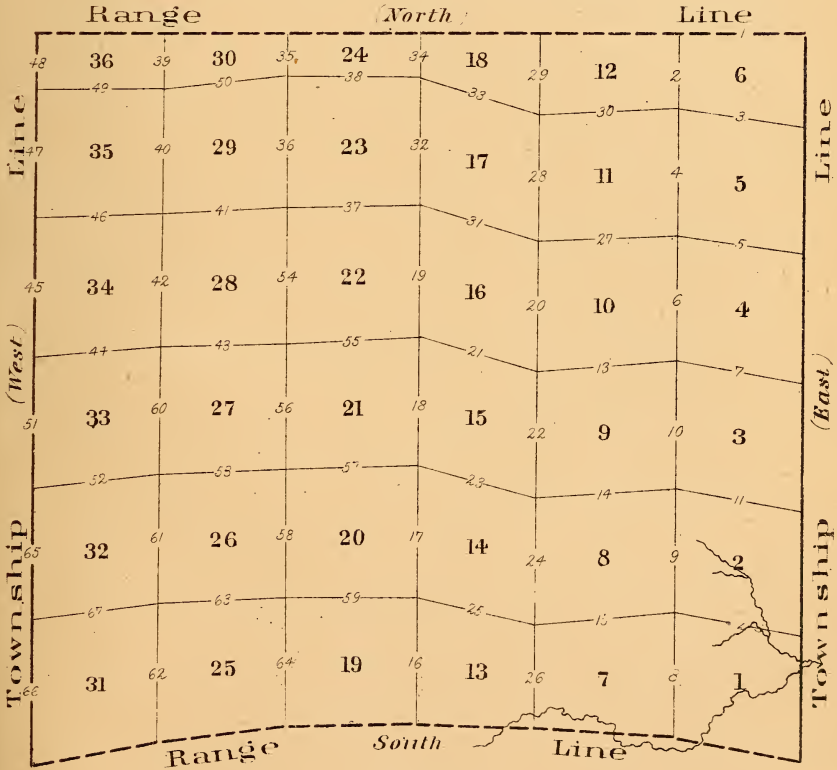
DIAGRAM

No. 40.

CONGRESSIONAL TOWNSHIP,
 BETWEEN GREAT & LITTLE MIAMI RIVER
 IN
OHIO

Explanation on Page 108

Township 2 E. Range 6 N. East of Great Miami River Mer.



REFERENCE

Section Line _____
 Section Number 26
 Order of Subdividing township 30

DIAGRAM

No. 41

CONGRESSIONAL TOWNSHIP

IN

SOUTHWESTERN OHIO

Explanation on Page 114

Township 4, Range 1 East, 1st Principal Mer.

Township (North) Line

6	39	5	15	4	54	3	14	2	56	1
41		42		38		37		36		35
7	40	8	16	9	53	10	13	11	55	12
18		17		12		11		10		9
18	43	17	19	16	49	15	8	14	57	13
17		48		34		33		32		31
19	44	20	23	21	50	22	7	23	58	24
24		21		6		5		2		1
30	45	29		28	51	27	4	26	59	25
31				23		27		26		25
31	46	32	27	33	52	34	3	35	63	36

FIRST PRINCIPAL (West) MERIDIAN

Range East Line

Township South Line

REFERENCE

Section Line _____ 26
 Section Number _____ 30
 Order of Subdividing township _____



on section line between Sections 6 and 12 to section corner for Sections 5, 6, 11 and 12, (marked two on line), thence east to southeast corner of Section 6 on township line, marked three on line, from corner of Sections 5, 6, 11, and 12, ran south one mile, thence east one mile; from corner of Sections 4, 5, 10 and 11 ran south one mile, thence east one mile, marked on diagram 4, 5, 6 and 7; from corner of Sections 1 and 7, on range line they ran north three miles, marked on diagram 8, 9 and 10; next ran line between Sections 2 and 3; next between Sections 1 and 2. By following the numbers consecutively from 1 to 68 you can determine the order of subdividing the township. In the survey by Symmes but little attention was paid to east and west lines. Running over rough ground, through thick undergrowth of bushes and briars, together with carelessness in chaining, caused the odd shape of east and west lines in this township.

SOUTHWESTERN AND NORTHWESTERN OHIO.

Surveyed from First Principal Meridian.

These portions of the State were surveyed from the First Principal meridian, (except a strip about ten miles wide, running from Lake Erie west, surveyed from Michigan meridian). Starting on the right bank of the Ohio River, at mouth of Great Miami River, the first principal meridian runs due north, terminating at the northeast corner of Indiana. It forms the boundary line between Ohio and Indiana. This meridian has two base lines; the first is the Ohio River base, and extends from mouth of Great Miami River to mouth of Kentucky River; from this base line is surveyed a tract of land on the north side of the Ohio River, lying in Ohio and Indiana, bounded by the Great Miami River and the Indian boundary line. For numbering and subdividing townships from this base line, see Diagram 41.

The second base line is the forty-first parallel of north latitude, from which Northwestern Ohio has been surveyed; it embraces the seventeen ranges lying west of Connecticut Reserve and north of Indian boundary line (except strip above mentioned), For subdivision of townships from second base line, see Diagram 42.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 4, R. 1, E.,
FIRST PRINCIPAL MERIDIAN, OHIO.

Diagram on page 112.

Diagram No. 41. This diagram represents the subdivision of Township 4, Range 1, East, First Principal Meridian surveyed from the Ohio River, as a base line. The townships surveyed from this base are established in regular order, and the original field-notes in giving number of township leave off *North*, as there are no townships south of base. The subdivision of this township was in 1805; they first divided it into nine blocks of four sections each, and subsequently subdivided the blocks into sections. Commencing at corner of Sections 24 and 25, on range line, they ran west two miles, from corner of Sections 34 and 35, on township line, ran north two miles, thence west two miles, etc. The order of subdivision of the township is represented on diagram by consecutive numbers, from 1 to 60 inclusive, placed on each section line, instead of the number of page record. In subdividing the blocks they ran random and true lines, and moved the quarter section corners in same manner as in Diagram 38. The subdivision of townships established from the First Principal Meridian, north of Indian boundary line, is a decided improvement over the plan just given. See Diagram 42. The change is credited to Capt. Jared Mansfield, aided by the advice of Thomas Jefferson.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 4, N., R. 1,
E., FIRST PRINCIPAL MERIDIAN, OHIO.

Diagram on page 115.

Diagram 42. This diagram represents the subdivision of Township 4, North, Range 1, East, surveyed from the First Principal Meridian and the forty-first parallel of latitude, the base line for northwestern Ohio. This township is located in Defiance county, west of Defiance (the county seat). In the preceding diagram the subdivision of Township 4, Range 1, East, from same meridian, is given; it is located in Butler county, west of Hamilton, (the county seat,) both are Township 4, North, Range 1, East. The difference made on the original field-notes is, *North*

DIAGRAM

No. 42

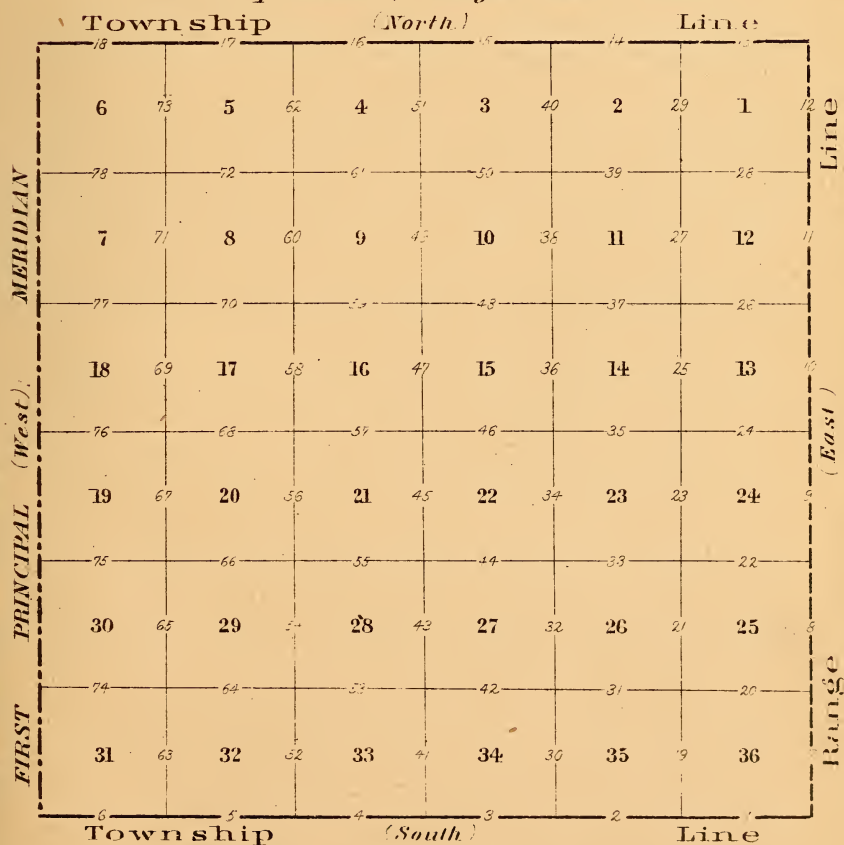
CONGRESSIONAL TOWNSHIP,

IN

NORTHWESTERN OHIO

Explanation on Page 114

Township 4 North, Range 1 East, 1st P.M.



REFERENCE

Section Line
 Section Number 26
 Order of Subdividing township 30

is left off from all townships surveyed from the Ohio River base. The subdivision of this township represents the order in use in present instructions of Land Commissioner, except in closing on the township lines on north and west sides. Commencing at the corner of Sections 35 and 36, on south line of township, they ran north one mile on true line, thence east on random line to range line, corrected line back, establishing the true line as a straight line from corner of Sections 25 and 36 on range line, to corner of Sections 25, 26, 35 and 36, (establishing straight lines from corner to corner in the subdivision of a township, instead of attempting to establish east and west lines, was a long step taken in the right direction), thence north one mile on true line, thence east on random line to range line, and corrected back as before; the subdivision was continued across the township in the same manner: running the last line between Sections 1 and 2 due north to township line, instead of making it eighty chains (one mile); each tier of sections was subdivided in same manner, shown on diagram by consecutive numbers, from 1 to 60, marked on the section lines in order of subdivision; in the last tier of sections on the west, the lines were run due west to range line and corners established. By running the lines due north and west to the township lines, as the surveys seldom coincided with the other townships, two sets of corners were established on township lines.

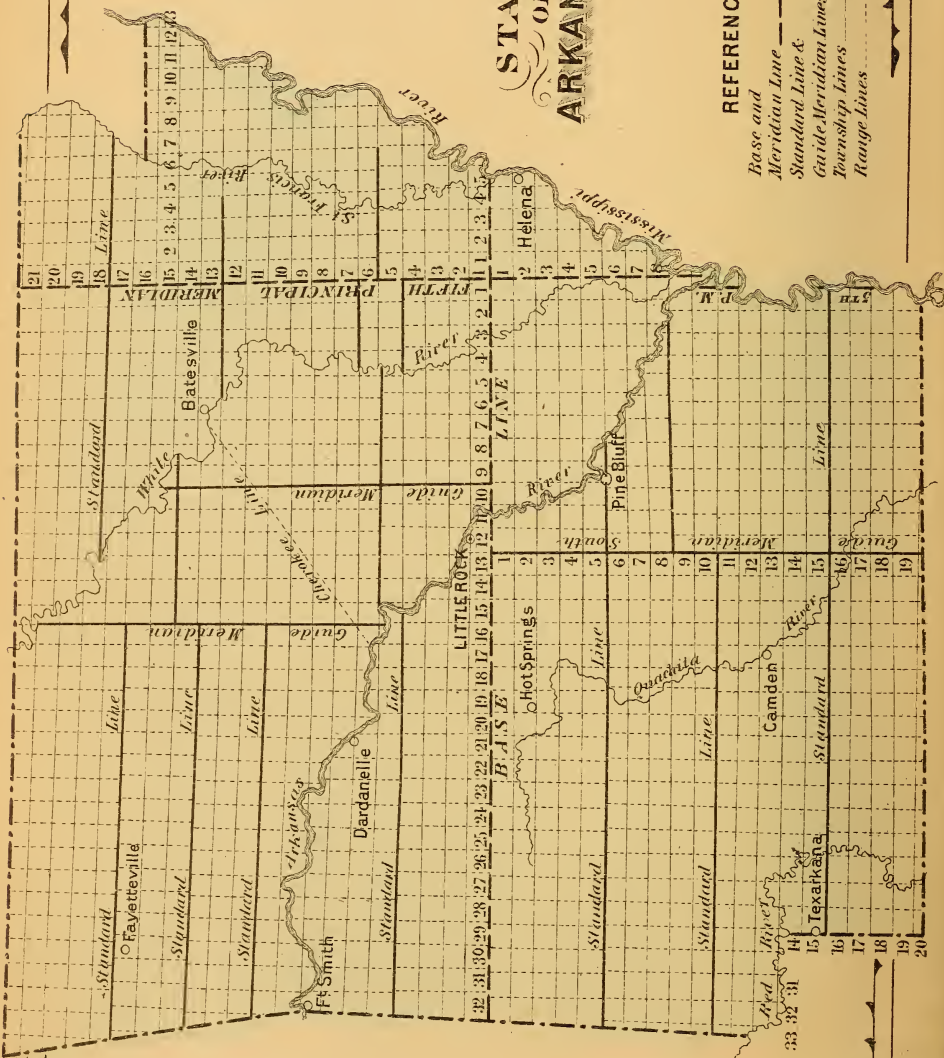
LANDS NOT SURVEYED BY GOVERNMENT.

In addition to the public lands of Ohio there are four tracts, located in different parts of the State, viz: 1st. Ohio Company's purchase; 2nd. Symmes' purchase; 3rd. Connecticut reserve; 4th. Virginia Military lands. been described above.

STATE OF ARKANSAS

REFERENCE

- Base and Meridian Line ———
- Standard Line & Guide Meridian Lines ———
- Township Lines ———
- Range Lines ———



ARKANSAS AND MISSOURI STATE MAP REFERENCES.

The early surveys of Arkansas and Missouri were made under one General Instruction, and from the same meridian, the *Fifth Principal Meridian*. The State of Iowa and greater part of Minnesota were surveyed from the same meridian, but not under same instructions. Arkansas and Missouri are the only States west of the Mississippi River surveyed under the early instructions of E. Tiffin, United States Surveyor-General for Northwest territory, bearing date of 1815; they were made applicable to Missouri Territory, which at that time contained the present States of Arkansas and Missouri.

FIRST SURVEYOR-GENERAL OF MISSOURI TERRITORY.

William Rector was surveyor of Illinois, Missouri and Arkansas from 1814 to 1824. In 1815 the *Fifth Principal Meridian* was surveyed from mouth of Arkansas River north to the Missouri River, a distance of 317 miles, 35.76 chains, and subsequently continued north to the Mississippi River. The Base Line for this meridian was surveyed from mouth of St. Francis River west to Arkansas River in 1815, from Arkansas River west to range nineteen west in 1818, thence west to west line of the State in 1837, 1838 and 1841; the initial or starting point at crossing of meridian and base lines and from which the lands were surveyed and numbered in Arkansas, Missouri, Iowa and part of Minnesota, was, when established, fifty-seven miles sixty and one-half chains north, from mouth of Arkansas River, and twenty-six miles and thirty chains west from mouth of St. Francis River. Since that time the Mississippi River has changed westward at both the mouth of Arkansas and St. Francis Rivers; Beulah Lake at the mouth of Arkansas River was at that time the main river; the mouth of St. Francis River is now about one mile south of

the base line. After establishing the initial point they proceeded to lay off the lands into townships six miles square, which were subsequently divided into sections. As the surveys progressed correction, or standard lines, were found to be a necessity; they are now called Guide or Auxiliary Meridians and Standard Parallels.

STANDARD LINES AND GUIDE MERIDIANS IN ARKANSAS.

In surveying the State, the Arkansas and White Rivers were used to close surveys on, which makes the standard lines in north half of the State irregular, and while the townships number across the river, the sections in most cases do not connect, and in a few cases duplicate sections occur on opposite sides of the river. The dates of the establishment of the standard lines are given to show the small amount of territory laid off directly from the base line, which is a strip from twenty to thirty miles wide on the north side of the line.

STANDARD LINES AND GUIDE MERIDIANS NORTH OF BASE.

North of base line and east of White River, the following established standard lines are marked on the State map with heavy lines, viz: One surveyed in 1828 from the Fifth Principal Meridian, west to White River, between Townships 4 and 5 north; one surveyed in 1816 from the meridian east between Townships 5 and 6 north, across Crowley's ridge to the bottom lands, a distance of thirty-six miles; one surveyed in 1816 from meridian east between Townships 12 and 13 north to St. Francis River, and extended west to White River in 1817; another was surveyed in 1816 from meridian east to St. Francis River, between Townships 17 and 18 north, and extended west to White River, in 1817. Between White and Arkansas Rivers there are two Guide Meridians; one surveyed from Base Line north to White River between Ranges 9 and 10 west; this was surveyed from base line north to old Cherokee boundary in 1818 and 1819, and continued to White River in 1829; from this guide meridian a standard line was surveyed west to Arkansas River in 1818, between Townships 5 and

6 north, and extended east to White River in 1819. The other guide meridian was surveyed from Arkansas River north to White River in 1829, between ranges 15 and 16 west; from this guide meridian three standard lines were run west to State line; one between Townships 10 and 11 north, surveyed in 1829, one between Townships 13 and 14 north, and one between Townships 16 and 17 north; the last two were surveyed in 1831; a standard line was surveyed from same meridian east to White River, between Townships 14 and 15 north, in 1829. Between Arkansas River and base line there is one standard line, surveyed from Arkansas River west to State line, between Townships 4 and 5 north; this was established in 1825; (the base line was not completed to Indian Territory until 1841, long after the lands along the Arkansas bottoms and around Ft. Smith had been sectionized).

GUIDE MERIDIAN AND STANDARD LINES SOUTH OF BASE.

South of the Base the Standard Lines are established with more regularity than those north of it. The Fifth Principal Meridian south of the Arkansas River could not be made available in the surveys in Arkansas, without connecting them across the Mississippi River, for the meridian extended south, would be in channel of, or east of Mississippi River, except at one point, (south of Belle Island.) Recognizing the impracticability of establishing the surveys in the south part of the State from this meridian, the government surveyors established a *Guide Meridian*, from which all of the State, south of the base line and Arkansas River (over one-third of the State,) was surveyed; this *Guide Meridian* was established from base line south, to south line of State, between Ranges 12 and 13 west; it was surveyed from base line south ninety miles in 1818, from thence to State line in 1827; from this Guide Meridian the following standard lines were established, viz: One between Townships 4 and 5 south, surveyed west to State line in 1818, and from guide meridian east to Arkansas River in 1825; one between Townships 8 and 9 south, surveyed from guide meridian east to Arkansas bottoms, a distance of fifty-four miles; in running this standard line

the compass was not properly adjusted, and the line was established too far north (this error is the cause of the short sections at Pine Bluff and the long sections immediately south of this line); a standard line was established in 1818 between Townships 10 and 11 south, from guide meridian west to State line; a standard line was established between Townships 15 and 16 south, surveyed west to Red River in spring of 1819, continued to State line in 1840; it was surveyed from guide meridian east to Lake Chicot in 1818, from Lake Chicot to Mississippi River in 1823; in that year they surveyed up and down the river laying out townships and sectionizing them; during that time the east line of range 1 west, which is the Fifth Principal Meridian, was established, but the detached portions of it, south of Arkansas River, were not surveyed until 1835, when it was found to be about four miles west of the meridian, north of the river. The Ranges are numbered from the Fifth Principal Meridian, but the surveys were made from the Guide Meridian above mentioned. For subdivision of Townships into Sections, see following diagram: DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 19, N., R. 5, E., FIFTH PRINCIPAL MERIDIAN, ARKANSAS.

Diagram on page 125.

Diagram 44 illustrates the subdivision of Township 19, North, Range 5, East of Fifth Principal Meridian: Beginning at corner of Sections 35 and 36 on township line, thence north one mile, establishing quarter section corner at 40 chains, and section corner of 25, 26, 35 and 36 at 80 chains, marked 1 on section line; thence east on random line in search of corner of Sections 25 and 36, established on range line when exterior lines of the township were run, when found, they ran a straight line from it, to corners of 25, 26, 35 and 36, establishing quarter section corner on line equidistant from section corners; thence north one mile; thence east on random and corrected back as before. The north and south lines were run due north, and section corners established one mile apart; the east and west lines were run between two corners as straight lines. The survey was continued north in same manner until line between Sections 1 and 2 was reached, which they ran north to north line of township, estab-

DIAGRAM

No. 44.

CONGRESSIONAL TOWNSHIP,

IN

ARKANSAS

Explanation on Page 124

Township 19 North, Range 5 East, Fifth Principal Mer

Township

(North)

Line



REFERENCE

Section Line	.....	26
Section Number	.....	30
Order of Subdividing township	.....	30

lishing the quarter section corner at 40 chains and the section corner on township line, leaving the excess or deficiency north of quarter corner. Each tier of sections was surveyed in same manner except the west tier of sections, which was subdivided by running a line from each section corner due west to range line. Running lines due north and west, to north and west sides of the townships, made double corners on township lines. The only States surveyed under this instruction lying west of the Mississippi River are Missouri and Arkansas. The first tier of sections was not completed before commencing the second tier, for order of survey as shown by page record, on file at Washington, see consecutive numbers from 1 to 57 inclusive, annotated on the plat on the section lines; the swamp or lake in southeast corner of township makes fractional quarters. For irregular surveys, see Missouri diagrams. There was no general plan adopted for lotting the fractional sections, or pieces, in the early surveys. In this township the fractional quarter sections on the north and west sides of the township are subdivided into fractional forty acres or quarter-quarters; around Cache swamp the subdivisions are irregular; they were laid off on the plat by the surveyor, as he thought would best suit the purchasers; the dotted lines on the township plat were not surveyed by government surveyors, but drawn on the original plats, to designate the position and amount of each piece for future subdivision. In this township the fractional pieces were not lotted, but sold as parts of fractional quarters.

GUIDE MERIDIANS AND STANDARD LINES OF MISSOURI.

The original field notes of the Surveys of Missouri do not show any of the Range lines of the State to have been established as *Guide Meridians*; as the Range lines from which the surveys were laid out, or on which they closed, were not designated by any name, they cannot be determined from the original field notes,

except by date of establishment or by determining the direction of the Random Township lines ; but in *the establishment of the Standard lines* nearly all are so designated on the notes.

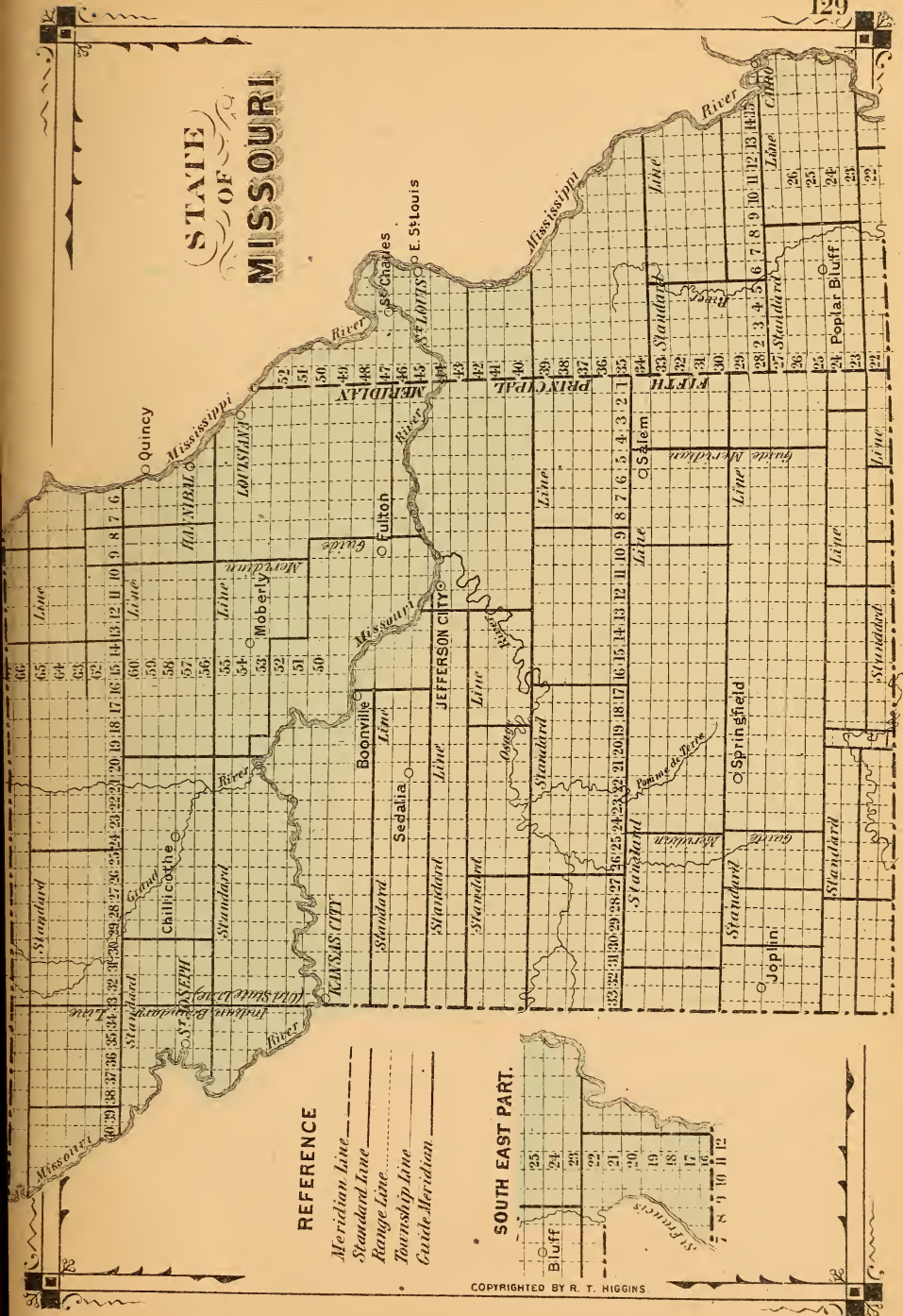
The Fifth Principal Meridian was established on the west side of the Mississippi River to avoid connecting the surveys across the river, but if extended from starting point, either South to south line of Arkansas or North to British America, it would cross the Mississippi River several times ; at those points from the mouth of the Arkansas River South, and from Townships 53, North to British America, where the meridian is East of the Mississippi River, the surveys were not connected across the river, but they were laid out from a *Guide Meridian*, established West of the river. *The Fourth and Fifth Principal Meridians* are about twenty-five miles apart, one established on the east and one on the west of the Mississippi River, but they both cross the Mississippi River twice in the great bend in Eastern Iowa ; one, *the Fourth*, a few miles above Davenport and Rock Island, the other, *the Fifth*, a few miles below ; but no surveys are made from *the Fourth*, West of the river, and no surveys are made, from the *Fifth* east of the river.

GUIDE MERIDIANS OF MISSOURI.

The Principal Guide Meridian of the State, is the one governing the surveys in Northeastern Missouri, from Missouri River north to Iowa State Line. *The Fifth Principal Meridian* terminates, in Missouri, on the right bank of the Mississippi River, in Township 53 North, but the surveys are laid out from the Meridian North to British America ; this necessitated the establishment of a *Guide Meridian*, to obviate extending the *Fifth Principal Meridian* on the East side of the Mississippi River, and connecting the surveys across it.

The establishment of this *Guide Meridian* and the surveys north of the river was done in the following manner, viz : In January, 1816, Government surveyors started on the *Fifth Principal Meridian* at corner of Townships 46 and 47 North, and ran West forty-eight miles (8 Ranges) ; from this point in April, 1816, they

(STATE OF)
MISSOURI



REFERENCE

- Meridian Line ————
- Standard Line - - - -
- Range Line ————
- Township Line ————
- Guide Meridian ————

SOUTH EAST PART.



established the First and Principal Guide Meridian of the State, as follows : First they ran South to the Missouri River, returned and ran North twenty-four miles, (4 Townships) to township line between Townships 50 and 51 North ; They next ran West 30 miles, (5 Ranges) to range line between Ranges 13 and 14 West. In July, 1816, they continued the Guide Meridian North, from Township 50, between Ranges 9 and 10 West, to Standard line between Townships 55 and 56. In August, 1816, they commenced at corner of Townships 52 and 53 on range line, between Ranges 18 and 19 West (the date of establishing line shown on state map from Townships 50 North, R. 13 West, to this point is not given in original field notes) ran thence North one township ; thence West one range ; thence North two townships to corner of Townships 55 and 56 North on range line between Ranges 19 and 20 West ; from this point in November, 1816, two surveying parties started, at same time, to establish the Standard line across the State on North line of Township 55 N. ; one surveyed East to the Mississippi River, one West to the old State line (Range 33 West) and subsequently it was extended to Missouri River.

In April, 1818 they continued the Guide Meridian North from Townships 55 North, between Ranges 9 and 10 West, to the standard line between Townships 62 and 63, from this standard line they ran the Guide Meridian North to State line, between Ranges 8 and 9 West. This Guide Meridian between Ranges 8 and 9, and 9 and 10, from Missouri River North, to Iowa State Line, takes the place of the Fifth Principal Meridian, in establishing surveys, but not in numbering the Ranges.

The Guide Meridians are designated on the State map with heavy lines running from one Standard parallel to another. The following explanation of original surveys made of Townships 30, 31, 32, 33 and 34, from Meridian West to State line, will illustrate the use of the Guide Meridians and the cause of some of the townships being too narrow, while others are too wide, viz : In the Townships above mentioned the survey of Ranges 1, 2 and 3 West, connect with the Fifth Principal Meridian ; Ranges 4, 5, 6, 7, and 8 connect on Guide Meridian between Ranges 4

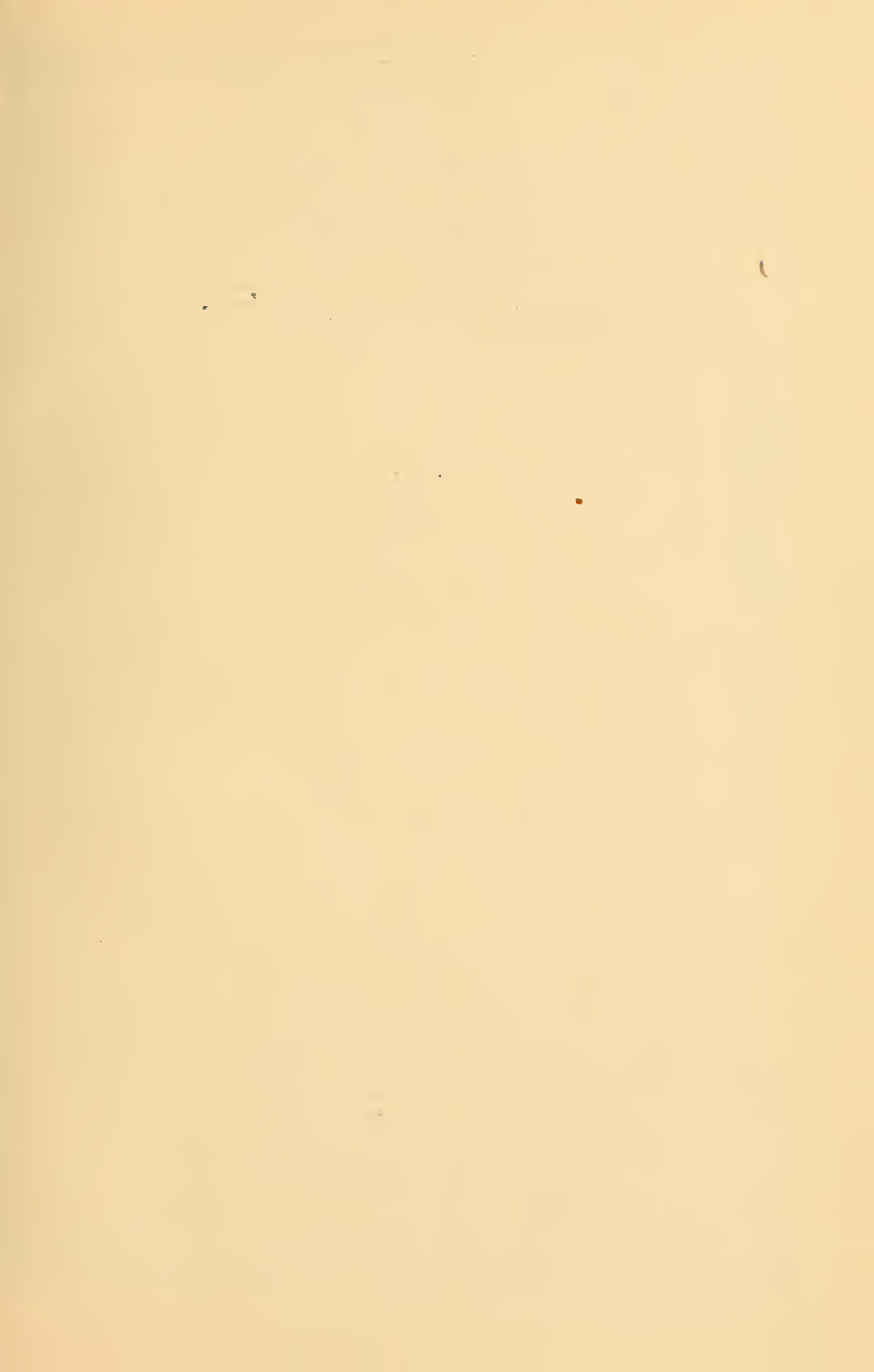
and 5 West ; survey of Ranges 9, 10, 11, 12, 13, 14, 15 and 16 connect with Guide Meridian, between Ranges 8 and 9 ; survey of Ranges 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29, connect with Guide Meridian between Ranges 24 and 25 ; survey of Ranges 30, 31, 32 and 33 connect with Guide Meridian between Ranges 31 and 32, and the exterior random lines of these Townships were run East in the following Ranges, viz : 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 25, 26, 27, 28, 29 and 32, and in the following they were run West, viz : 4, 9, 17, 18, 19, 20, 21, 22, 23, 24, 30 and 31.

STANDARD LINES IN MISSOURI.

The principal standard lines are marked on the State map of Missouri with heavy lines, and are located as follows : One between Townships 22 and 23, from the Mississippi River West to White River, and continued west to State line, except across Range 20 ; one between Townships 24 and 25, from Fifth Principal Meridian west to west line of the State ; one between Townships 27 and 28, from meridian east to Mississippi River ; one between Townships 29 and 30, from meridian west to State line, east of meridian, it is a standard line from Range 7, East, to Mississippi River ; one between Townships 33 and 34, from meridian east to Mississippi River ; one between Townships 34 and 35, from meridian west to State line ; one between Townships 39 and 40 runs across the State from Mississippi River to west line of State. The following county seats are located in the first tier of townships north of the line, viz : Hillsboro, Vienna, Tuscumbia, Warsaw and Butler. A standard line is located between Townships 42 and 43, from meridian east to Mississippi River, west of the meridian it is a standard line from Range 9 West, to west line of State ; one between Townships 44 and 45, from Missouri River west to State line ; one between Townships 47 and 48, from Range 19 West to west line of State.

STANDARD LINES NORTH OF MISSOURI RIVER.

A standard line runs between Townships 46 and 47, from meridian West to Range 10 West ; one between Townships 55



and 56 across the State, from Mississippi River west to Missouri River; one between Townships 60 and 61, running from Range 10 West to Missouri River; one between Townships 62 and 63 from Mississippi River west to Range 17, West, and one between Townships 65 and 66, running from Range 13, West, to Missouri River. In addition to the standard lines the Missouri River and the State lines between Missouri and Arkansas, and between Missouri and Iowa, are used to close surveys on. Instead of using White River in this State, as in Arkansas, to close surveys on, government surveyors closed their surveys on both the east and west sides of Range 20, West, from State line north to standard line between Townships 24 and 25.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 33 N., R. 1
E., FIFTH PRINCIPAL MERIDIAN, MISSOURI.

Plat of Township in Diagram 46.

This diagram not only illustrates the subdivision into sections of Township 33, North, Range 1, East, of Fifth Principal Meridian, but illustrates the manner of lotting an irregular shaped township; the irregularity was caused by a closing of the government surveys on the Fifth Principal Meridian and a Standard Parallel. The following manner of surveying and establishing the meridian, standard parallels and township lines, by the original surveyors, will explain the odd shape of this township. In the year 1815 the Fifth Principal Meridian was established from the mouth of the Arkansas River north to the Missouri River; from this meridian running east to the Mississippi River there were established standard parallels or correction lines, at intervals of thirty-six miles, or less, the object being to confine the errors resulting from converging of north and south lines and inaccuracies in measurements, within the tracts of lands bounded by the lines so established. The north line of this township is a standard parallel and was run due east from the Fifth Principal Meridian, and established before the townships were laid out. The township in this diagram lies between the two standard parallels running east from Fifth Principal Meridian, one on north side of Township 27 and one on north side of

Township 33, North; the east line of it was surveyed over the rough broken lands bordering on Black River and its tributaries; the surveyors were not as careful in chaining as the law contemplated, and the discrepancy illustrates the importance of using great care in measuring over rough ground. The range line, six miles east of the Fifth Principal Meridian between the two standard parallels (thirty-six miles apart), measured thirty-seven miles, two hundred and fifty-five rods and three links, a difference of one mile two hundred and fifty-five rods and three links, in a distance of thirty-six miles. The subdivision of the township into sections was in 1822, commencing at corner of Sections 35 and 36 on township line; they ran due north on true line, established quarter section corner at 40.00 chains and corner of Sections 25, 26, 35 and 36 at 80.00 chains; thence east on random line to range line, which was intersected 20.57 chains north of corner to Sections 25 and 36, established when range line was run; from corner of 25 and 36 ran a straight line between Sections 26 and 36 to corner of Sections 25, 26, 35 and 36 establishing the quarter section corner equidistant between the section corners, the topography is given on the random lines, which in this case is a quarter of a mile from true line on one end. In this State the topography is given on random lines; the present instructions are to give topography on true line; thence due north, establishing the quarter section corner at 40.00 chains, and section corner to Sections 23, 24, 25 and 26 at 80.00 chains; thence east on a random line to the range line, intersect 21.35 chains north of corner to Sections 24 and 25, ran a straight line from corner of Sections 24 and 25 to corner of Sections 23, 24, 25 and 26, establishing quarter section corner, equidistant as before; thence due north one mile, establishing corners as before; thence east on random line and corrected back as before. As the law did not require the survey of the east tier of sections to be completed before commencing another tier, they next commenced at corner of Sections 34 and 35 on township line; ran due north one mile; thence east on random line correcting the line back and establishing section and quarter section corners, as in east tier,

just described. Each tier of sections was surveyed in same manner, except the north tier of sections, instead of establishing the section corner at 80.00 chains, (one mile), they continued north to township line. In the west tier of sections, instead of running to section corners, on the meridian line, they ran the section lines due west and noted the distances they intersected the meridian line, south of the section corners, which distances are annotated on the plat along the Fifth Principal Meridian; the numbers on the section lines from 1 to 60 designate the order of establishing the section lines; number 1 is placed on first section line surveyed, number 2 on second line surveyed, and so in consecutive order to 60. In illustrating the surveys of Missouri, the township in this diagram was selected to demonstrate the importance of the north and south lines, as compared with the east and west lines. From the north and south lines all the interior section corners were established; they also determine the lengths and bearing of the east and west lines (except in west tier of sections). In establishing the north and south lines, they ran due north on true lines, establishing quarter corners every 40.00 chains and section corners every 80.00 chains, except in the north tier of sections. In the east and west lines they ran east on a random line in search of the section corner; when found they established a straight line between the two section corners, regardless of distance or direction, and placed the quarter section corner equidistant, except in the west tier of sections, which was subdivided by running a true line due west, and establishing the quarter section corner at 40.00 chains, throwing the excess or deficiency in the west half of the section. The lottings in this diagram and the one following, illustrates the irregularity with which the lots are numbered, and show the importance of the Original plats as a record, as well as the Original field-notes. The laying off and numbering of the lots were not done in the field, and are not recorded in the Original field-notes, but were drawn and numbered on the Original plat in the office, after the field work was completed. Diagrams 46 and 47 illustrate the fact that lots have been established in different parts of townships as occasion required, or the survey-

ors thought best. The light dotted lot and quarter section lines on the diagram, were not surveyed by government, but were designated on the plat for future subdivisions, which should in all cases be followed.

DESCRIPTIVE NOTES ON ORIGINAL SUBDIVISION OF T. 21 N., R.
33 W., FIFTH PRINCIPAL MERIDIAN, MISSOURI.

Plat of Township in Diagram 47.

This diagram illustrates the subdivision of Township 21, North, Range 33, West. The government surveyors commenced at the northeast corner and proceeded south and west, leaving the lottings and fractions on the south and west sides, instead of north and west, as is usual. The diagram further illustrates the fact that lots may be laid off by government surveyors in any part of a township, should the occasion require. This township lies in the southwest corner of the State. The boundaries were established from south to north, closing on the south and west sides of the State lines, hence the reason for beginning at the northeast corner to subdivide the township. Beginning at corner of Sections 1 and 2, on township line, they ran line between Sections 1 and 2, south, establishing quarter section corner at 40.00 chains, and section corner to Sections 1, 2, 11 and 12 at 80.00 chains; thence east on random line to range line, corrected line back, establishing true line a straight line between corner of Sections 1 and 12 on range line and corner of 1, 2, 11 and 12, just established; thence south, establish quarter section corner at 40.00 chains, and section corner to Sections 11, 12, 13 and 14, at 80.00 chains; thence east on random line to range line, corrected back as before. For order of subdivision see consecutive numbers from 1 to 60 on the section lines. In the survey of the south tier of sections they established quarter section corners at 40.00 chains, leaving the excess on the south line, which is the State line. The west tier of sections were surveyed in usual manner. The lots in Sections 1, 6 and 9, were laid out on the township plat and designated by government surveyors by numbers, instead of subdividing those sections into 40 and 80 acre tracts. The quarter section and lot lines shown on the diagram with

DIAGRAM

No. 47.

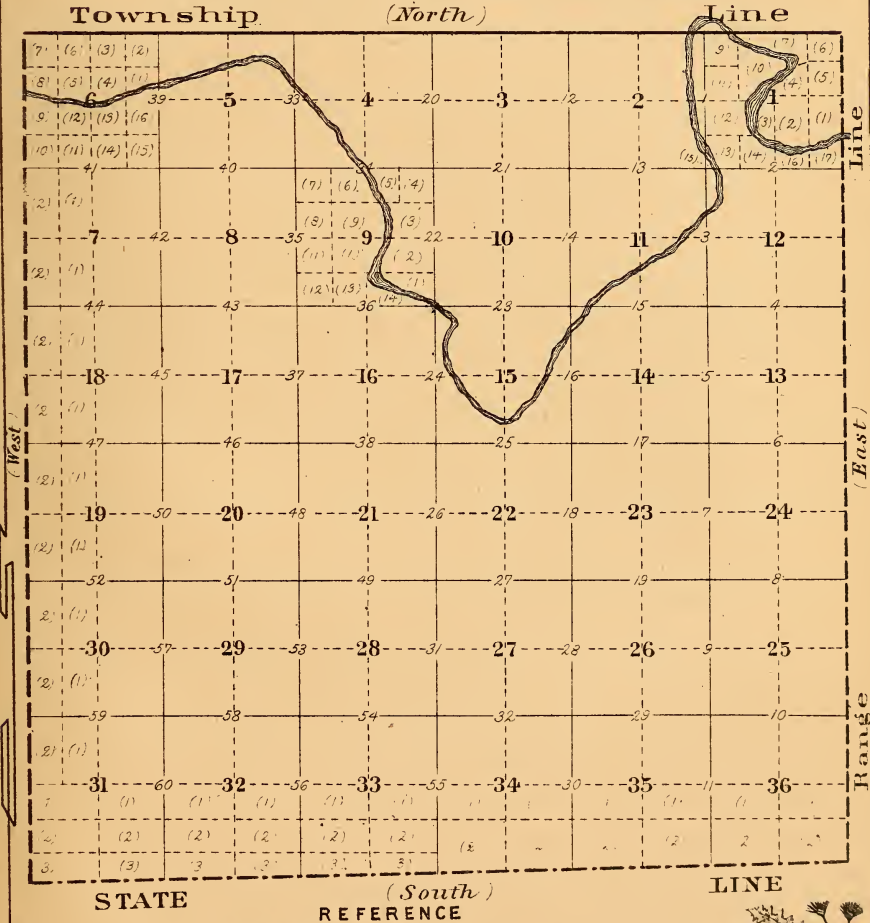
CONGRESSIONAL TOWNSHIP,

IN

MISSOURI

Explanation on Page 138

Township 21 North, Range 33 West, of the 5th P.M.



Section Line _____ 26
 Section Number _____ 30
 Order of Subdividing township _____
 Quarter Sections & Lot Lines _____
 Lot Numbers _____ 16

dotted lines, were not surveyed by government, but designated on the original plat to guide the county surveyor in laying off each lot. In subdividing a township, government surveyors established at each section corner a monument of some kind to designate the exact location of the corners, and equidistant from these corners, on each side of an interior section is established a quarter section corner, making four section and four quarter section corners to guide county surveyors in subdividing the sections. A section subdivided into 80 acre tracts (all running one way) requires seven corners to be established in addition to the government corners; if divided into 40 acre tracts, it requires seventeen subdivisional corners to be established. From the subdivision of this township, represented by numbers from 1 to 60, and from description given of the random lines, the direction of the random lines can be readily determined. In Missouri and Arkansas, in subdividing townships, the north and south lines were run without random lines. All east and west lines (except lines dividing the west tier of sections and fractional lines) were run east as random lines, and established as straight lines from corner to corner.



IRREGULAR SURVEYS.

Duplicate Townships and Sections illustrated by Missouri and Arkansas Surveys.

The Government Surveyors, in making surveys from the Fifth Principal Meridian, found it impracticable to connect their surveys across the Arkansas, Missouri and along parts of the White and St. Francois Rivers, and the surveys were accordingly extended to opposite sides of the rivers independently, except as they connect with the Meridian or Base lines.

The discrepancies arising from converging of Meridional lines and inaccurate chaining are shown in the duplicate sections along the rivers surveyed from the *Fifth Principal Meridian*, and in the duplicate townships in Missouri and Arkansas given as follows: Townships 17 and 18 N. Range 12 W. in Arkansas, and Townships 48 and 49 N. Range 15, 16 and 17 W. in Missouri.

The following explanation of *Duplicate Township Numbers* around Boonville, Missouri, and the survey which places fractional Township 48 N. on the north side of fractional Township 49 N. in Ranges 15, 16 and 17 W., will suffice to show the cause of duplicate Township or Section numbers wherever they may occur, viz: By reference to diagram 45 (Missouri State map) the survey establishing fractional Township 49 on south side of river can be traced by the heavy black lines, as follows: The surveyor ran from *Fifth Principal Meridian* west, between T. 39 and 40 N. thirteen ranges to *Guide Meridian*; thence north to Missouri River; thence west on *Standard line* between T. 44 and 45 N., from which Townships 45, 46, 47, 48 and fractional T. 49 in Ranges 15, 16 and 17 W. were surveyed north to the river.

The survey of fractional Township 48 north of the river was as follows: The surveyors ran from *Fifth Principal Meridian* west, between T. 46 and 47 N. eight ranges; thence north and west as shown on Missouri State map by heavy lines to T. 56 N. Range 20 W. From *Standard line* between Townships 52 and 53 N., Townships 52, 51, 50, 49 and fractional Township 48 N., in Ranges 15, 16 and 17

W., were surveyed south to the river, the lines of which are about one mile too far north and three miles too far west to correspond with the surveys on the south side of the river. This discrepancy was caused partly by inaccurate chaining and partly from the converging and diverging of meridional lines. The townships bordering on the south side of the river (as a rule) are less than six miles wide, while those on the north are correspondingly more than six miles wide, those on the south side of the river having been surveyed from a standard line north to the river, while those on the north side were surveyed from a standard line south to the river. (See diagram 32 for converging and diverging of meridional lines).

The jogs in the ranges and the duplicate sections along the Missouri River in the western part of the State are shown in Higgins & Co.'s large sectional map, by numbering the sections in the north and south parts of the same townships, the jogs in which are about three miles to the west on the north side of the river.

See large sectional map of Missouri for shape of T. 51 N. R. 31 W.; also for section numbers in Taney and Howell counties, the former county containing townships about ten miles and sections about four miles in length; the latter contains a range over seven miles wide (which is a very rare occurrence west of the Mississippi River). The odd shaped surveys in Townships 22, 23 and 24 N. Range 20 W., and Ts. 21 and 22 N. R. 10 W. were caused by the survey being made from the lines established in Arkansas and closing on lines established from standard lines in Missouri. (See heavy black lines on maps, pages 120 and 129, Part II., for standard lines).

The duplicate sections along St. Francois River in T. 21 N. R. 9 E. were caused as above described. In Township 10 N. Range 3 W., Jackson County, Arkansas, there are three fractional sections of the same number, caused partly by inaccurate surveys and partly by the fact that the surveys west of the river were made from the Guide Meridian between Ranges 9 and 10 W. instead of connecting across the river from the *Fifth Principal Meridian*. (See Higgins' large sectional maps of Arkansas and Missouri for irregular surveys above mentioned)

MISSISSIPPI STATE MAP REFERENCES.

Mississippi was surveyed from five different initial points. (See State map, page 143). The numbers on section lines in diagrams 49 and 50 show order of subdivision of the townships into sections.

INDIAN TERRITORY NOTES.

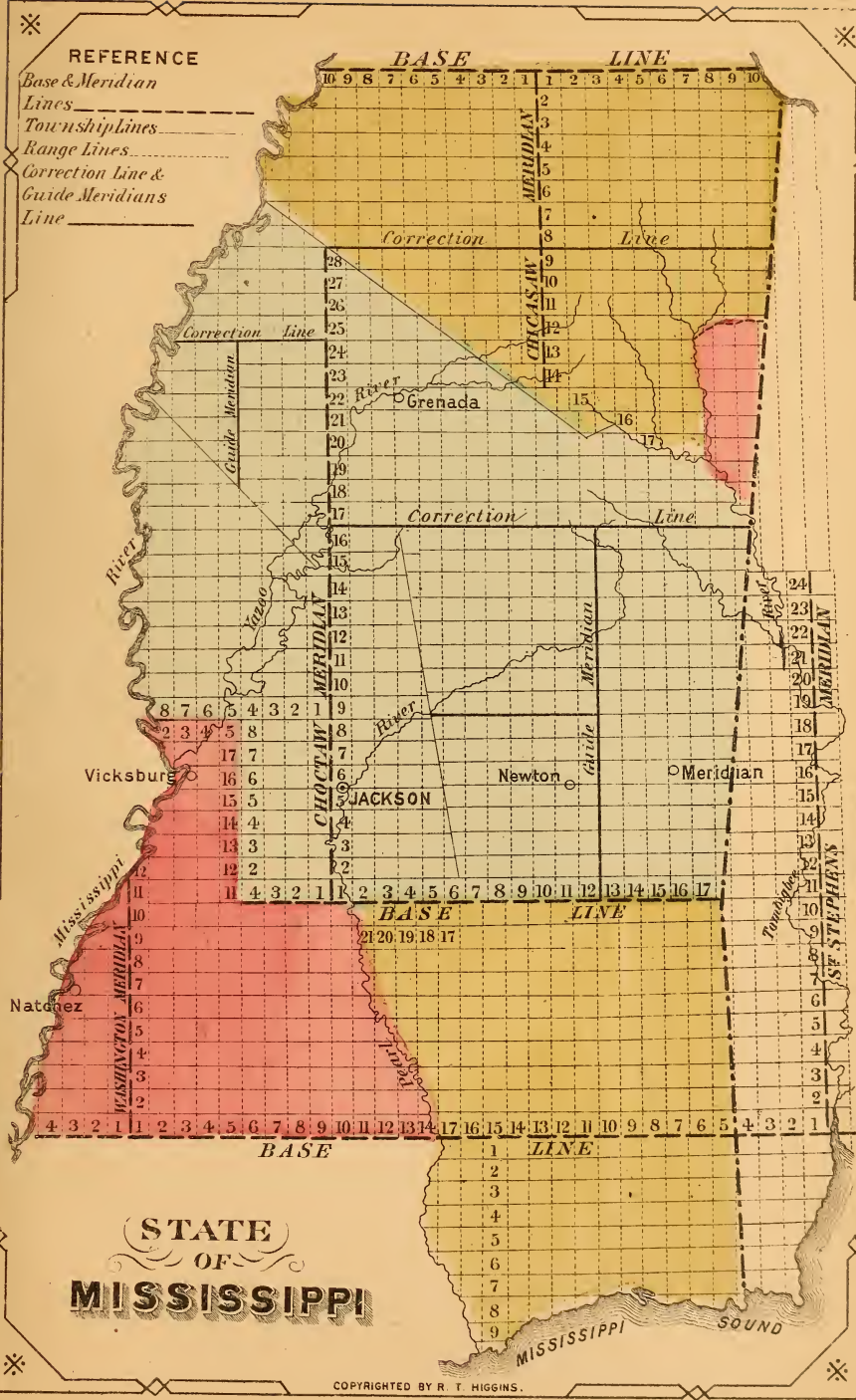
The Indian Territory has been partly surveyed by Government from the Indian Meridian. (See map on page 150). The object of the survey seems to have been for a division of the lands to the *Indians* in severalty; for no portion of the *Public Domain* has been subdivided into quarter and quarter-quarter sections, with corners established on the ground, except the following described parts of the Territory, viz: Townships 1, 2, 3, 4, 5 and 6 N. in Ranges 8, 9 and 10 W., and Townships 1, 2 and 3 in Range 11 W. have been surveyed into 160 acre tracts (quarter sections), and the following reservations have been subdivided into forty acre tracts (quarter-quarters), viz: Pottawatomies, Sac and Fox, Quapaws, Peorias, Ottawas, Wyandottes and Senecas

PUBLIC LAND STRIP.

This strip of land lying north of Texas, west of Indian Territory, south of Colorado and Kansas, and east of New Mexico, is surveyed from the Cimarron meridian. (For extent of surveys see map on page 151). It is not opened to settlement, and is called "no man's land."

REFERENCE

- Base & Meridian Lines
- Township Lines
- Range Lines
- Correction Line & Guide Meridians
- Line



(STATE)
OF
MISSISSIPPI

DIAGRAM

No. 49

Congressional Township

IN
MISSISSIPPI

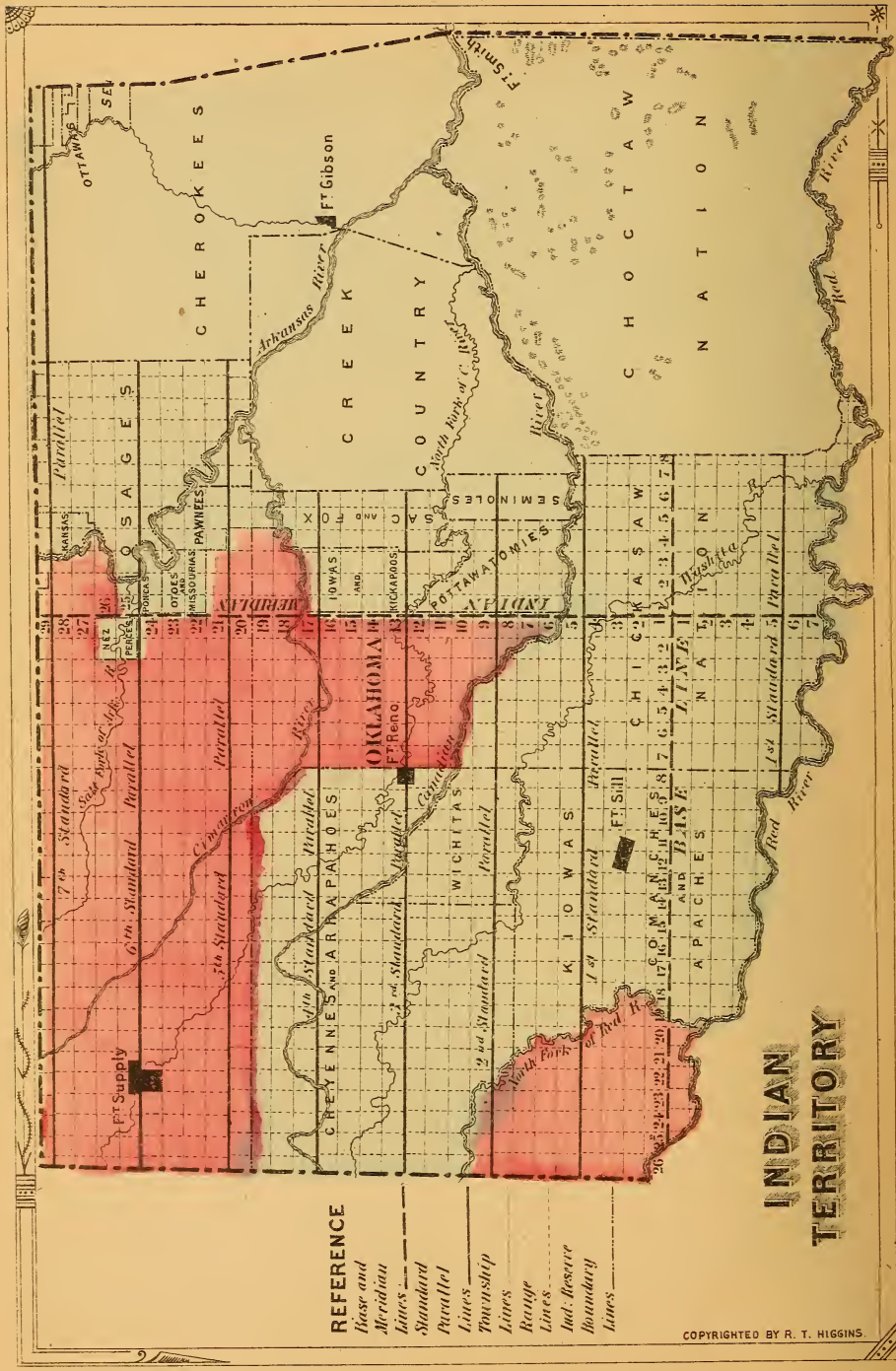
Explanation on Page 142

T 17 N, R. 7 E, Choctaw Meridian

Township		(North)						Line				
WASHINGTON (West) MERIDIAN	6	16	5	17	4	38	3	29	2	60	1	Line
	14	15	18	37	40	59						
	7	15	8	19	9	36	10	41	11	58	12	
	11	12	20	35	42	57						
	18	19	17	21	16	34	15	43	14	56	13	
	8	9	22	33	44	55						
	19	7	20	23	21	32	22	45	23	54	24	
	5	6	24	31	46	53						
30	4	29	25	28	30	27	47	26	52	25	Range	
2	1	27	29	49	51							
31	1	32	26	33	28	34	48	35	50	36		
Township		(South)						Line				

REFERENCE

Section Line 26
 Section Number 480
 Order of Subdividing township



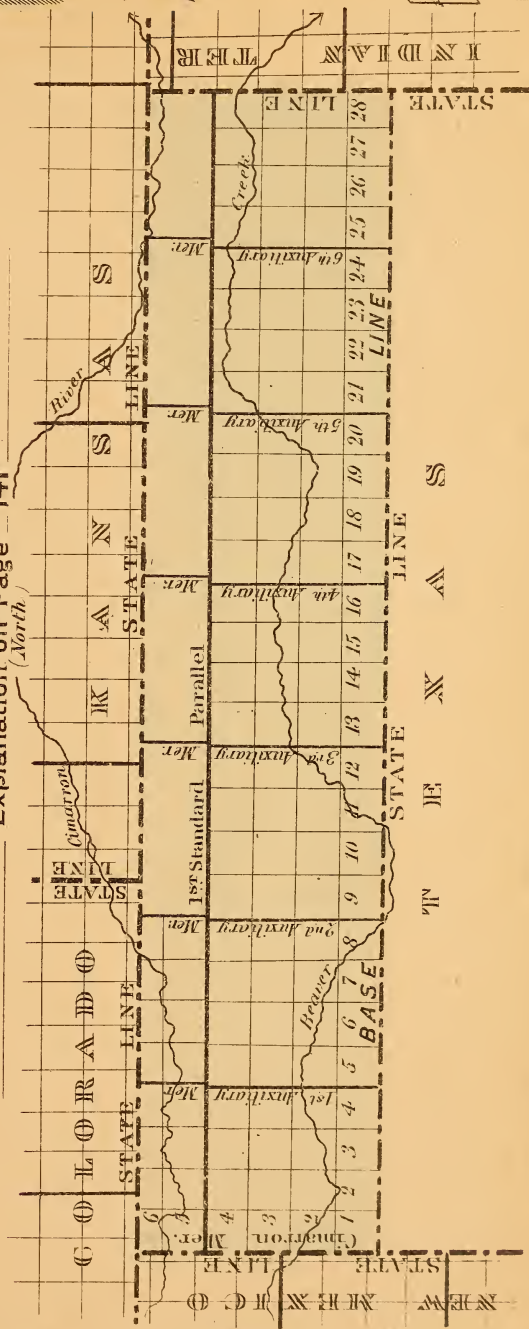
REFERENCE

- Base and Meridian Lines
- Parallel
- Township Lines
- Range Lines
- Ind. Reserve Boundary Lines

INDIAN TERRITORY

PUBLIC LANDS

(Lying North of Texas & West of Indian Territory)
Area about 5,388 Square Miles or 3,672,640 Acres
Explanation on Page 141



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