THE WESTERN LAND GUIDE

Volume I. No. 2. } Monthly. DETROIT, MICHIGAN, JUNE, 1883. In Advance. { $1.00 per Annum. 60c 6 mos., 10c a copy.

Office of Publishers, 88 Griswold St., Detroit.

Entered at the Post Office at Detroit, Mich., as second-class matter.

LYMAN G. WILLCOX, CHARLES B. HOWELL, } Editors and Proprietors.

HON. WILLIAM AUSTIN BURT.

The highest eminence ever attained in the history of land surveying in any country, was reached, in his life time, by the man whose name heads this article. In this first article of a series which we intend to publish in successive numbers of the GUIDE, upon surveying, we shall endeavor to give an outline sketch of his life, with special reference to the crowning glory of his career, the invention of the Solar Compass. By this invention he linked together in mystic, yet practical and useful bonds, the gross material things of the earth with the subtle sunbeams as they trembled in the air in their swift earthward journey from the sun. Franklin brought the lightning from the clouds, but Burt, in his thought, traveled the almost infinite distance to the centre of our solar system, and availed himself of influences thence emenating, to aid the pioneers of our civilization, the land surveyors in the performance of their exacting and arduous labors.

HON. WILLIAM AUSTIN BURT.

Other surveyors before him had met the difficulties in the way of satisfactory surveys, found, in part, in the local disturbances of the magnetic needle, especially in mineral regions. But none before him seem to have made any earnest effort to meet and overcome these difficulties. He met them, grappled with, and overcame them in a way that has vastly benefitted science, greatly stimulated the thought of civil engineers and surveyors, and rendered plain and practical the work, which, in some localities, was little else than guess work. Tke government has been benefitted by this instrument in the saving of vast sums of money, which surveys would have cost under the old system, in excess of what they have cost, and in the systematizing of surveying in a manner that has attracted the attention of the world.

Wm. Austin Burt was born in Worcester, Mass., June 13th, 1792. In 1798 he removed with his parents, Alvin and Wealthy Austin Burt, to Montgomery county, New York. There were no public schools there, but so eager was the boy to know what was iu the world around him, that at 14 years of age he had mastered surveying as then known, and had gained much knowledge of astronomy. He worked on the farm during the day, and at night studied by the aid of a pine kuot into the "small hours." At 17 years of age he removed with his father's famlly to Erie county, N. Y., which was then in the "far west." In 1813 he married Phœbe Cole. He performed creditable service in the war of 1812. A little later he engaged in mercantile pursuits. In 1817 he made a journey as far west as St. Louis, doing jobs of surveying along the route. In 1822 he removed to Michigan. He first built a saw-mill at Auburn, Oakland county. He next sought employment as a surveyor of Mr. Fletcher,a government surveyor. Not succeeding, he bought a tract of government land in Washington, Macomb county, and in 1824 moved on to it. From 1824 to 1833 he was engaged in mill building and local surveying. In 1826 and 1827 he was a member of the Michigan Territorial Council, anddid much towards inauguratingthat great improvement, the Lake Superior Ship Canal. From 1831 to 1834 he was county surveyor of Macomb county. In 1832 Gov. Geo. F. Porter appointed him district surveyor. About the same time he was appointed postmaster at Mt. Vernon, Mich., and held the office for 24 years. In 1833 the U. S. Surveyor General appointed him a U. S. Deputy Surveyor for the district north-west of the Ohio, He at once went to his field northward of Fort Gratiot on the borders of Lake Huron.

Mr. Burt found what all surveyors had previously discovered, that the variation of the magnetic needle led to inaccuracy in surveys.

The ordinance of congress of May 20, 1785, provided that "The geographer and

surveyors shall pay the utmost attention to the variation of the magnetic needle and run and note all lines by the true meridian."

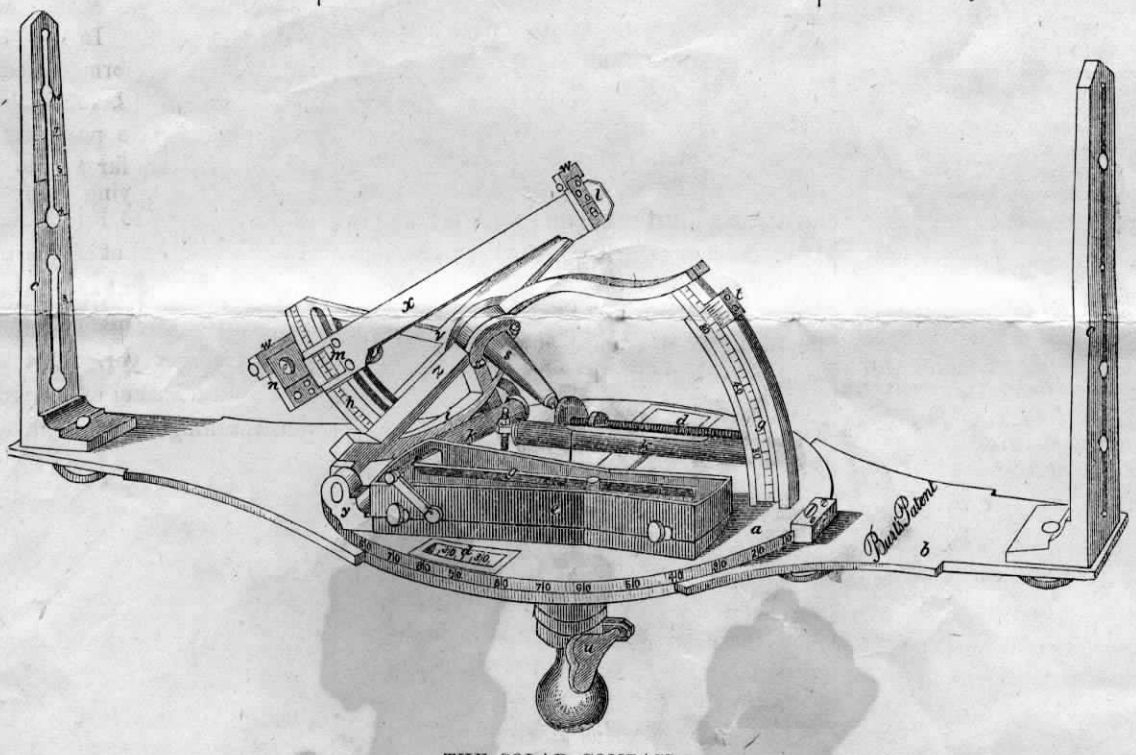
It was found in practice that this nice theory could not be carried out. Following the variation of the needle and noting lines by the true meridian led to the survey of tracts of trapezoidal form. On May 9, 1786 this part of the ordinance was repealed, and surveyors were authorized to note lines by the true meridian as near as might be.

Mr. Burt did what other surveyors had not done, discovered a remedy for the variation of the needle. He thought that if the local disturbances which led to these variations could be overcome, surveyors might be much more accurate than they had been, and this led at length to the invention of the Solar Compass, by which the courses and distances are controlled by influences far beyond the reach of terrestrial disturbances.

In 1835, he exhibited a model of this compass to a committee of the Franklin Institute at Philadelphia, the first scientific body of this country, and was granted a Scott's legacy medal. On December 14, 1840, he exhibited to the same institute a perfect solar compass, for which he received the highest commendation. In 1847 he wrote a manual for the use of the sol-ar compass. In 1851, he visited the World's Fair in London and received a prize medal for his solar compass from Prince Albert, President of the Royal Commission.

The Solar Compass is an astronomical instrument. The sun is utalized in working withit, although surveyors well versed in astronomical science sometimes use other planets. In the use of the comon surveyor's compass, the only means available to determine the azimuth, or the true meridian, was an observation of the transit or the elongation of the Pole star at night, which could only be done on a clear night. Surveyors often, to secure good work, cut down trees and erected stakes, which was very laborious and expensive.

Various causes led to the deflection of the magnetic needle. Among them are local cause, hid in the earth's crust, heat and cold, cloudy weather, and the heat or magnetism of the body of the operator. Often the pivot on which the needle swings would become blunt the and needle not traverse twice alike. The Solar Compass is independent of the needle, although it is constructed with one, and itsuse is valuable in magnetic forces and recording the variation from the true meridian.



THE SOLAR COMPASS.

On account of the facility and accuracy attainable by the use of the Solar compass, in determining local attraction of the magnetic needle, in defining angles, as well as other advantages, to be derived from its use, the late Dr. Douglas Houghton, geologist for the state of Michigan, conceived the idea of connecting the linear and geological surveys, and, by contract with the Commissioner of the General Land Office, under date of June 25, 1844, undertook the survey of a section of country, full of mineral wealth, bordering on the south shore of Lake Superior, and when nearly completed, came to a sudden death by drowning in Lake Superior, and with him were lost valuable facts and data, in connection with this survey; but enough remained to show the value of the work done, which fact acted as an incentive to the further prosecution of this kind of work, (to some extent) inaugurated by him. Consequently the Surveyor Generals having this district in charge, required of their depnties additional work in obtaining specimens of rocks and minerals and recording their locations upon the lines and other points. This work was mainly done, especially on the exterior boundery lines of townships, and the most difficult subdivisions of these townships, by the inventer of thr Solar Compass and his sons, often under very difficult, laborious and, in many cases, hazardous circumstances to life and limb.

From many testimonials as to the work of this compass we refer to one or two.

Said Sir John Herschel to the inventor in 1851: "I have long since understood the elements of the Solar Compass but could not see how they could be carried out mechanically. It has fallen to your lot, Sir, to not only conceive the necessary astronomical elements, but also to carry them into practical effect mechanically."

About 1850 the Commissioner of the General Land Office adopted the Solar Compass as the standard instrument to be used whereever there are local disturbances of the magnetic needle. The late Hon. John Wilson, the Commissioner of the General Land Office about this time, said of this inslrument, that Burt "seized a sun-beam as it fell and compelled it to point out the magnetism and polls of the earth, and thus determine the latitude, teue meriuian, azimuth, variation of the magnetic needle, and local time, a mode of surveying independent of the magnetic needle."

LAND AND LAW DIRECTORY.

ILLINOIS.

CHICAGO.

HORACE C. BENNETT. Attorney, 130 Dearbon and 99 Madison streets.

MICHIGAN.

DETROIT.

ROBINSON & FLINN. Attorneys and Dealers in Pine Lands. 14 and 15 Moffat Building.
L. G. WILLCOX. Attorney and receiver. U. S. Land Office. 7 Burns Block.
STEPHEN MARTIN. Real Estate. 25 Walker Block.
P. M. KINSALLA. Real Estate. 15 Bank Block.
GEO. F. BEASLEY. Attorney. 11 and 12 Hough Block.
CHAS. B. HOWELL. Attorney. 15 Bank Block.
DAVID PRESTON & CO. Bankers. Dealers in Land Warrants and Land Scrip. Campau Block.

CHEBOYGAN.

GEO. E. FROST. Attorney.

PETOSKEY.

DART & CALL. Attorneys at Law.

WASHINGTON, D. C.

ELLERY C. FORD. Mining and Land Law a specialty. Seven years in charge of Mineral Division General Land Office. Box 416.
WM. J. JOHNSTON. Attorney for Land and Mining Claims; had twelve years of official experience.
SICKLES & RANDALL. Attorneys at Law. Land and Mining Cases and Contests.
W. K. MENDENHALL. Land Attorney. Mining Claims a Specialty.

MINNESOTA.

DULUTH.

J. H. PRESSNELL. Land Attorney and dealer in Pine Lands. Special attention to business before the U. S. Land Office.

HOWARD.

THOS. R. BRIGGS. Attorney at Law.

LITCHFIELD.

CAMPBELL & PETERSON. Attorneys at Law.

MINNEAPOLIS.

CAMPBELL & ODELL. Attorneys at Law.

NEW YORK.

TROY.

JAMES R. TORRANCE. Attorney at Law.

OHIO.

CLEVELAND.

CASKEY & CALHOUN. Attorneys. 218 Superior street.

OFFICIAL LAND DIRECTORY.

INTERIOR DEPARTMENT.

Secretary of the Interior.—HENRY M. TELLER.
Assistant Secretary.—M. L. Joslyn.
Chief Clerk.—George M. Lockwood.
Appointment Division —Chief, James F. Hood.
Disbursing Division —Chief, R. Joseph.
Land and Railroad Division —Chief, Z. B. Sturgus.
Indian Division – Chief, R. V. Belt.
Pension and Miscellaneous Div.—Chief, George Ewing,
Stationery and Printing Division —Chief, Amos Hadley.
Document Division.—Chief, John G. Ames.
Private Secretary.—Edwin P. Hanna.
Assistant Attorney General for Interior Department.—Joseph K. McCammon.

EXAMINERS OF APPEAL CASES IN THE OFFICE OF SECRETARY OF THE INTERIOR.

URIAH J. BAXTER, Michigan.
NATHANIEL S. HOWE, Massachusetts.
SAMUEL W. RITTENHOUSE, D. C.
FRANK L. CAMPBELL, Ohio.
N. B. LOVERIDGE, Michigan.

GENERAL LAND OFFICE.

Commissioner.—Noah C. McFarland.
Chief Clerk.—Luther Harrison.
Law Clerk.—Harry C. St. John.
Recorder.—Seth W. Clark.
Principal Clerk of Public Lands.—M. E. N. Howell.
Principal Clerk of Private Land Claims.—William H. Walker.
Principal Clerk of Surveys.—Oscar Hinrichs.
Railroad Division.—Chief, J. Dempster Smith.
Pre-emption Division.—Chief, Henry Howes.
Swamp-Land Division.—Chief, Sardis L. Crissey.
Accounts Division.—Chief, J. W. Donnelley.
Mineral Division.—Chief, Joseph Tyssowski.
Timber Depredations.—Chief, A. G. McKenzie.
Principal Draftsman.—G. P. Strum.
Receiving Clerk.—G. N. Whittington.

U. S. SURVEYORS GENERAL.

J. W. Robbins, Tucson, Arizona.
W. H. Brown, San Francisco, California.
N. H. Muldrum, Denver, Colorado.
Cortez Fessenden, Yankton, Dakota.
M. Martin, Tallahassee, Florida.
William P. Chandler, Boise City, Idaho.
James Lewis, New Orleans, Louisiana.
Martin S. Chandler, St. Paul, Minnesota.
J. S. Harais, Helena, Montana.
C. C. Powning, Reno, Nevada.
David V. Stephenson, Plsttsmouth, Nebraska.
H. M. Alkinson, Santa Fe, New Mexico.

OEFICIAL LAND DIRECTORY,

U. S. SURVEYORS GENERAL.

J. C. Tolman, Portland, Oregon.
F. Salomon, Salt Lake City, Utah.
W. Mc Micken, Olympia, Washington Territory.
E. C. David, Cheyenne, Wyoming Territorry.

Names of Registers and Receivers will follow in due time in tdis Directory.

Since the introduction of the Solar Compass into the public surveys great changes have been effected (and still there is room for more) in the mode of doing the work. Before its introduction the field notes of the surveyor were as bare and sterile, as some of the plains of the west are said to be in productiveness, of facts relative to the character of the survey, its mineral, geological, or topographical character, and the plats, generally, were a blank piece of paper checked up into squares and numbered to indicate the sections or townships, with here and there a stream, Indian trail, swamp or lake indicated upon them.

Immediately upon its introduction the surveys began to improve under the direction of its author. The variation of the needle was often takeu and recorded, and tn 1840, the first year it was used upon the public surveys, the line of no variatioo was traced and established by it in the Northern Peninsula of Michigan, and a map of the same returned with the field notes, and more minute details of the survey recorded. In mineral, rocky, hilly and mountainous districts the topography was more carefully observed and sketched upon the plats; specimens ef rocks and minerals were taken and their location noted, whether on the line or at a moderate distance from it. Very valuable iron and copper mines were discovered in the Northern Peninsula of Michigan by its use. From 1844 to 1846 13 valuable and extensive iron deposits were discovered. So powerful was the attractive force of some of these deposits that they exerted an influence on the needle for a distance of six miles, and were thus traced out by their constantly increasing force of attraction. And all this was accomplished while the Solar compass was, as quietly as the sunbeam that fell upon its lens (to give it power), establishing the boundary line coinciding with the true meridian. The iron deposit thus discovered is to-day, the greatest iron producing mine in America, if not in the world. By this timely discovery of these iron deposits, and their development, in connection with the coal mines of Pennsylvania and Ohio, America is now able to lead the world in the production of iron. The largest and most productive copper mine in the world (the Calumet & Hecla) was discovered, we are creditably informed, by the same means, viz., the Solar Compass, in the hands of a civil and mining engineer, while locating a highway, who was directed to the vein, no outcrop being visible, on comparatively level ground, by the unusual deflection of the needle. While copper does not attract the magnet, the Solar Compass first discovered, in the Upper Peninsula of Michigan, that trap rocks did attract the needle, and that copper veins in conjunction with sedimentary and trap rocks, also attracted the magnet, probably from galvanic currents along the line of junction.

Hence the discovery of the greatest copper producing mine in the world by the use of the Solar Compass. It is believed by those best informed on the subject, that through the use of the Solar Compass, the general development and prosperity of the country has been materially hastened and enhanced, and the surveying system very materially improved.

The inventor, during the time of perfecting and introducing his compass into the public surveys, instructed and fitted his five sons and other surveyors, so that they could share with him in the introduction of his instrument, and also, to meet the demand for such service by the Government, his sons participating, more or less, in the improvement and perfection of the compass, as suggested by its use in the field. In order to have the compass constructed under his own eye and supervision, he established, with their assistance its manufactory in Detroit, under the firm name of Burt & Baily, and it is believed that here the compass reached its greatest perfection; but without reward pecuniariarily. During the time the inventer and his sons were connected with the public surveys the price paid by the Government for the surveys then made was altogether inadequate for the character of the work done, much of which was not required by instructions, but needed in this new field, and as an advance in the character of the pvblic surveys. By close economy, hard work, early and late, and coarse fare, a very small saving over expenses was generally made, although it was often scarcely appreciable. The country was thickly wooded, swampy, hilly, and often broken and rocky, with tangled thickets to encounter, and so cold and snowy that nothing could be done in the

winter, and all the work had to be done five or six hundred miles away from the source of supplies. The average price paid for this work was six dollars per mile, while the price paid for a similar character of work, averages twelve dollars per mile.

The Solar Compass was invented so early in the history of land legislation, that the greater portion of the surveys have been made since it began to be used. It is estimated that when all the government surveys have been completed, it will have lent its aid in the survey of eighty per cent. of the area of all the states and territories, or of over 1,500,000,000 acres.

Notwithstanding the fact that the Solar Compass has saved the government millions of dollars, and rendered our surveying system well nigh perfect, neither was the inventor in his life time, nor have his heirs since his death, been able to obtain, either a renewal of the patent, or a moderate sum as a small return for the priceless benefits received by the government as the fruits of the genius of the remarkable man of whom we write. Bills of relief have passed one branch or the other of Congress several times, but have failed to become a law, although Hons. Alpheus Felch, D. C. Leach and others, did yeoman service in support thereof when in Congress.

During 1855 Mr. Burt compiled and published a manual called "A Key to the Solar Compass, and surveyor's companion," a highly valuable book, without which the Solar Compass is a deep mystery to, at least, the average surveyor.

His son, John Burt, in 1878, published a pamphlet entitled "A History of the Solar Compass," from which we have liberally drawn in writing this outline sketch.

Judge Burt labored earnestly and intelligently in an effort to improve nautical instruments so they would be as useful at sea as the Solar Compass is on the land. The result was that he invented the Equatorial Sextant. Lieutenant Maury of the Navy, ordered several for the use of the government. Some of these may be seen at the National Observatory at Washington, and the Naval Academy at Annapolis. But he was cut down in the midst of his labors before perfecting this instrument.

The Equatorial Sextant will show, without computation, but by simple reading off, the latitude, hour, angle, and azimuth, at any time of day, thus giving at once the position of a ship at sea, with the aid of a chronometer.

He died at his home in Detroit, August 18, 1858, as he had ever lived, an honest man, a Christian in the truest sense, and one whom the world will never forget for his great inventions and fidelity to every trust reposed in him. His son Alvin is deceased. Four sons are still living, viz, John, Austin, Wells and William, honored members of the several communities in which they respectively reside.

MICHIGAN.

Among all the states and territories of our country in which is located any considerable portion of public lands, perhaps no state presents greater general advantages than Michigan. In special branches of agriculture, such as extensive grazing grounds, and mammoth wheat fields, other sections, especially the plains and prairies of the Great West, excel. But in diversified products of the soil, in fruits, wool and dairy products; in stock breeding, cattle, horses, and sheep, on an individual scale, which enables each owner to personally superintend and direct his own business, and which after all, measures the true development of the state and individual prosperity, Michigan ranks among the first.

The average size of the cultivated farms of the state is a trifle less than 100 acres, so the large land owner is not, in Michigan, a shadow which overhangs and darkens, and too frequently blights the labor and prospects of the smaller farmer. Small farms give greater scope to personal industry, and lead to more thorough cultivation, less waste of products, better markets, better society and schools, more churches, better homes, and more general enterprise than is possible under a system of great landed proprietors.

Michigan is practically divided into three distinct sections. First, the southern part of the Lower Peninsula, comprising the portion south of the latitude of Grand Rapids and Port Huron, and extends south to the Indiana and Ohio state lines, 64 miles, with a breadth east and west, on its northern line of 198 miles. This part is the oldest settled and constitutes at present, the leading farming section. Of course the public lands of this division have long since passed into the hands of private owners.

Second, the northern division of the Lower Peninsula, extends from about the latitude of Grand Rapids and Port Huron, north to the Straits of Macinaw, a distance of 198 miles. This portion of the state is newer, and contains 220,000 acres of government land, subject to preemption, homestead, or cash entry.

There are also lands belonging to the state which are for sale by the state, and are of three classes; swamp lands, school lands, and college lands.

The swamp lands were ceded by the general government to the state for the purpose of drainage and reclamation. These lands, though designated as swamp, are found when drained to be among the very best farming lands in the state. They are offered with few exceptions for $1.25 per acre. They are also subject to homestead entry in lots of 80 acres or less. There are about 200,000 acres of swamp land undisposed of.

The state has yet in its possession about 350,000 acres of school lands. These are held at $4 per acre and are sold on time if the purchaser desires.

The college lands are a grant from the United States for the benefit of the Agricultural College. They were carefully selected and are held at $5 per acre. The grant consisted of 240,000 acres, of which about one-fourth is still unsold.

There are in addition to the above government and state land, Railroad and Canal lands held as follows:

The Flint & Pere Marquette railroad has about 100,000 acres which are held at from $5 to $10 per acre.

The Grand Rapids & Indiana, railroad has about 500,000 acres, and are sold at from $3.50 to $7.50 per acre.

The Jackson & Lansing railroad has about 340,000 acres which are held at from $2 per acre upwards. This division of the state contains more than 26,000,000 acres, and there is no section of the United States of the same extent, which contains fewer acres of waste land. Almost the entire uncultivated portion of this magnificent area is covered with noble forests of valuable timber. Oak, elm, ash, hickory, beech, maple, hemlock and pine, interspersed with almost every variety indiginous to the latitude constitute one of the grandest displays of forest growth to be found in the world. The surface of this entire area is undulating, and in but few places broken. There is not a mountain in the district, and scarcely an acre that may not be tickled with the plow.

The timber is of incalculable value, and constitutes one of the principal sources of the great wealth of the state. The whole region is delightfully watered with running streams