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THESIS

Survey of 80 A. Farm

F. H. NICKLE

1903



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THESIS

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SUPPLEMENTARY
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IN BACK OF BOOK

Dear Mr. [unclear] [unclear]

THESIS.

SURVEY OF 80 A. FARM

by

F. H. Nickle

1903

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THESIS

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Survey of 80 acres of farm land W.1/2 of S.E. 1/4 of section 10, Tp. 4 N., R. 5 W., Principal Meridian of Michigan.

~~Standard for testing chain.~~

Established a 100 ft. standard near the residence of J. B. Nickle, Hoytville, Mich. on the above stated farm. To establish this standard, I proceeded as follows:

Compared a 100 ft. engineer's chain with the standard at the Michigan Agricultural College, and found the chain to be 1.2 inches too long. Placed two 6" x 6" x 4' sound oak timbers vertically in the ground with the tops flush, and approximately 100 ft. apart; then drove a bolt in each timber and marked the 100 ft mark upon the bolt heads, by comparing the 100 ft. chain tested at M. A. C. and making allowance for the error of 1.2". Also placed a smaller timber midway between the 100 ft. marks for use in testing a 50 ft. chain.

Investigation of section corners.

Collection of evidence.

Received from the state land office, Lansing, Mich., a copy of the field notes of the original government survey made in 1827 by Orange Kisdom, surveyor. Made investigation for monument at the corner of sections 14, 15, 11, and 10, but could find no trace of the land marks as stated in the field notes of the original survey. Spent considerable of time in digging at the intersection of roads where I thought the monument would be located, but found no indications of the original monument except a decayed log which according to an old settler had be placed along beside the monument.

Made investigation for 1/4 section post between sections 10 and 11, but could find no evidence of witness trees as stated in notes of the original survey. Located approximately by line fences where the monument should be and dug down in the middle of the road, and found an iron bar 1" x 1" inside of a 3" tile. Suspended a plumb bob di-

rectly over the bar, and removed the bar and tile: underneath these, I found a circular spot of different colored earth which I concluded was the remains of the original stake as it was directly below the plumb bob. Then placed the bar and tile carefully back in the original position, and drove a small wooden stake directly over the monument for future reference.

Investigated 1/4 section post between 10 and 15, and found the top of a large stone at the intersection of fences and road. This stone was, according to J. B. Nickle, placed directly over the original monument by county surveyor Davis in 1867 (was never recorded). The stone was originally marked by a cross on the highest projection, but unfortunately, the portion bearing the cross became exposed to traffic, and was chipped off. I placed another cross upon the stone where I thought it should be and feel confident that it is not in error more than 1 1/2". This stone is at the S. W. corner of the 80 acres under consideration,

and is station C for all leveling and contour work.

Made no further investigation for monuments at section corners, but concluded to assume one of the boundary lines, of the above stated 80 acres, as a meridian.

Investigation of land corners.

At the S. E. corner in the middle of the road, found a tile shaped piece of crockery placed there by Davis, country surveyor. Took the center of the same as the land corner.

At the N. E. corner. I found a 4" x 5" oak post drove at the intersection of the fences. At the N. W. corner. I found a small stake at the intersection of the fences.

-- Leveling --

Locating stations.

Located all stations by means of rectangular coordinates, dividing the entire 80 A. into 50' squares. Assumed east and west line between S. W. and S. E. corners as

axis of abscissae and N. and S. line between S. W. and N. W. corners as axis of ordinates: the origin being monument at the S. W. corner.

Points on the axis of abscissas are designated by O, A, E, C, etc., and on the axis of ordinates by C, 1, 2, 3, etc. Thus to locate sta. H - 18, we would find it 400 ft. E. and 900 ft. N. of sta. O or the origin.

All fields are approximately rectangles, and hence measured the boundaries of the field and set poles 50 ft. apart parallel to the fences and corresponding to stations along the axes. Thus for the rodman to locate any station, it was necessary for him to line himself up with the proper poles. This method proved very satisfactory and convenient as all the stations were located on E. and W. lines; thus the rodman would start out at Sta. O - 10 and walk directly toward the corresponding pole on the E. side of the field, stopping every 50 ft. when in line with the N. and S. poles and allowing the leveler to take a reading. The stations

would read in field notes, 10 - 0, 10 - A, 10- 15, etc.

Elevations

All elevations were taken with transit on engineer's level; special care being taken to keep the instrument in adjustment. All readings on turning points and bench marks were taken carefully to the nearest 0.001 of a foot, and all those of regular stations were read to the nearest 0.1 of a foot, with leveling rod placed directly upon the ground. In some cases this necessitated the scraping of snow off the station.

Bench marks

Took as principal B. M. cross on stone window sill, N. window on the W. side of brick residence of J. B. Nickle. Assumed datum plane as 20' below principal B. M. and recorded all elevations in field notes to correspond to this datum plane, but to avoid negative heights, at the N. end of the 80 A., I changed the datum plane to 30' below B. M. All elevations on map are recorded with reference

to this plane.

Checks.

I carefully established minor B. M.'s at various points on rocks, stumps, etc., and took readings on those as often as convenient to see if the elevations remained the same for each new elevation of the instruments. The greatest error was 0.048 ft. and most elevations kept within 0.005 ft.

Maps.

Map No. 1 shows locations of buildings and fences, dimensions and acreage of the fields, and boundary angles. No. 2 gives the elevation at the corner of each 50 ft. square. No. 3 shows contours for each difference of elevation of one ft. plotted with respect to elevations shown on map No. 2.

Copy of Field Notes.

Measurement of Boundary Lines.

of W. $\frac{1}{2}$ of S.E. $\frac{1}{4}$ of Sec. 10.

Dec. 23 - 1902, 2-4 P.M. Weather, cold.

Chainman Head, - H. H. Williams.

" Rear, E. H. Nickle.

Tested 50 ft. chain and found 0.017 ft. too short.

Chained E. from S.W. Cor. to S.E. Cor. and set stakes every 50 ft. Marked 1st. A., 2nd. B., etc.

Set all stakes 25 ft. S. of line to avoid highway.

Last stake No. 2 + 28'

Correction for chain = 0.43 ft.

Corrected distance = $1328 - .4 = 1327.6$ ft.

Chained S. from S.E. Cor. to N.E. Cor. setting stakes every 50 ft. marked 1, 2, 3, etc. Offset stakes 5 ft E. of line to avoid fence.

Last station, 52 + 42.4 ft. Dist. = 2642.4 ft.

Correction = 0.88 ft.

Corrected dist. = $2642.4 - .9 = 2641.5$ ft.

These notes are complete
in Field Book No. 1.

Sample

Copy of Field Notes.

Traverse of $W \frac{1}{2}$ of S.E. $\frac{1}{4}$ of Sec. 10, with engineers transit.

Deflection Method.

Inst. Sta.	Index	Ver. A	Ver. B	Magnetic Bearing.	Calculated Bearing.	Jan. 2-1903	5 hours.	Misty & cold.	Observer.
50 ft. E. of S.W. Cor.	0°	0'	0'			Inst. - Large Gurley Transit.			F. H. Nickle.
	90° 0'	13'	14'	N. 0° 0'	N.	Inst. over nail, in line between S.E. $\frac{3}{4}$ S.W. corners.			Flagman, - H. H. Williams.
						corners. Made plates read 0, and sighted on pole at S.E. Cor., plunged telescope and sighted on pole 50' E of N.W. Cor. Also set an intermediate pole in line.			
7' N. $\frac{3}{4}$ S.W. E. of N.W. corner.	179° 30'	30'	29'	N. 89° 50' E.	N. 89° 46' E.	Line, through woods, between N.W. and N.E. corners. Oriented inst. plunged telescope and sighted on pole at N.E. corner.			

See Field Book No. 1 for complete Traverse

Area of W. $\frac{1}{2}$ of S.E. $\frac{1}{4}$ of Sec 10, Tp. 4 N. R. 5 W.

Principal Meridian of Mich.

All distances in feet.

Station	Bearing	Dist.	Latitude		Departure		Bal. Lat.		Bal. Dep.	D.M.D.	Area.
			+N.	-S.	+E.	-W.	+N.	-S.	+E.	-W.	
S.W. Cor.	N.	2641.25	2641.25				2641.47			0	0
N.W. Cor.	N. 89° 46' E.	1330.90	5.22		1330.89		5.22		1330.27	1330.27	+ 6.9440
N.E. Cor.	S. 0° 4' W.	2941.50		2641.50		3.07		2641.29		3.07	2667.47 - 7045.561.8
S.E. Cor.	S. 89° 46' W.	1327.60		5.40	1326.59			5.40	1327.20	1337.20	- 7.366.9
		8241.25	2646.97	2646.90	1330.89	1329.66	2646.69	2646.69	1330.27	1330.27	2 / 7.095989.7

Area in sq. ft = 3,522,992.3

" " acres = 80.875

Error in Lat. = 0.43 ft.

" " Dep. = 1.23 ft.

Error of closure = 1 in 6325

Copy of Field Notes.

Location of Buildings by Triangulation.

Established base line AB . Jan. 3. '03 1-3 P.M. cold & rainy
 200 ft. in length. Sta. A. mid-way between S.E. $\frac{3}{4}$ S.W. corners. Inst. -- Large Gurley Transit.
 Sta. B. 200 ft. E. of Sta. A. Both Inst. - Man. - F. H. Nickle.
 in line with S.E. $\frac{3}{4}$ S.W. corners. Standardized 100 ft. chain.
 Base line in centre of highway

Inst. Sta. Index. Ver. A. Ver. B. Direction

A	57°30'	3'	3'	R.	Sight on N.E. Cor. of brick on
B	29°0'	3'	4'	L.	S. side of road.
A	32°30'	18'	19'	L.	Sight on S.E. Cor. of basement
B	34°0'	1'	2'	R	barn. (36'E. x 32'N.)

Notes cont. in Field Book No. 1.

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