Methods of Perpetuation of Indiana's Section Corners

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INTRODUCTION

The county surveyors of Indiana, as required by Indiana law (Chapter 319, Acts of 1965) are responsible for checking, establishing or reestablishing, referencing, preparing and maintaining records of the original government survey corners used in describing property. A copy of this law is included as Appendix A to this paper. Many of the corners mark the alinement of county roads, city streets, and highways and most are buried beneath the surface of these roads, streets, and highways. Section 4 of the "Perpetual Corner Records Act of 1965" states that ". . . commencing on January 1, 1966 and in each calendar year thereafter, the county surveyor shall check and establish or reestablish at least five percent of all the corners originally established in the county by government surveyors, so that within twenty years or less all the original corners will be established or reestablished . . . ". This means that as of December 31, 1969, the location of 20 percent of the corners originally established in any county in Indiana by government surveyors must now be firmly established. Section 2 of this act prescribes that records must be on file concerning each corner also.

Compliance with this act by many county surveyors is difficult. Most of the difficulty stems from two sources which are closely related. One is the lack of knowledge of the average citizen, including the county commissioners, of the importance of the original United States public land corners. The second reason is the budgetary limitations, even in counties where the importance of such corners is recognized.

Recognizing the practical problems involved in carrying out the requirements of the "Perpetual Corners Records Act of 1965" the surveying and mapping staff of the School of Civil Engineering, Purdue University proposed that a study be made to investigate current practices of establishment, referencing, and record keeping. As a rsult of this study, recommendations could be made which would permit adoption of uniform procedures and record format throughout the state. This would be in a form of an engineering bulletin on the subject and a

slide-film informational presentation showing the problems involved in perpetuation of Indiana's section corners. The slide-film presentation could be used to educate busy county commissioners on the importance and problems of corner preservation.

In 1966 a questionnaire was distributed by the Indiana Society of Professional Land Surveyors concerning the status of compliance with the perpetuation act. A copy of the questionnaire is included as Appendix B to this paper. A summary of the results obtained from forty-four returned questionnaires is of interest. The results were:

1. Approximately 41% of the counties have an active, realistic perpetuation program underway.
2. Approximately 64% of the county surveyors attempted to comply with the law by requesting budgeted funds for compliance with the law.
3. Approximately 58% of the county surveyors who requested funds had them cut entirely or at least to some extent.
4. Approximately 59% of those requesting funds for perpetuation had personnel qualified to do the work if funds were budgeted for it and 54% of them had time or would make time to get the job done.
5. Approximately 73% felt that a preparation of a professional presentation explaining the importance of the perpetuation of corners and the necessity of additional funds to do it would be of considerable value. Approximately 73% felt that this presentation should be directed toward the county council and 27% toward the general citizenry.

At the January 1968 annual meeting of the Indiana Society of Professional Land Surveyors, Professor Curtis passed out another questionnaire concerning the corner perpetuation problem. Thirty-three county surveyors answered it. Approximately 58% felt that they had a satisfactory program underway in their country. Eighty-five percent felt that a surveying bulletin or manual would aid them in their work, and 61% were of the opinion that a slide-film informational presentation would be of value to them.

In January 1969 the Indiana Society of Professional Land Surveyors allocated $2,000 in their budget to help support the project proposed by the surveying and mapping staff of Purdue University as proposed by Curtis and McEntyre. In March 1969 the Indiana County Surveyors and County Engineers Association allocated $500 to help support this same project. This support is greatly appreciated. The

investigation was commenced in August 1969. It must be empasized that in the original proposal for this project it was estimated that to complete it in the summer of 1969 would require a minimum budget of $4,000 not including publication costs.

The fact that personnel, employed full-time in other positions must be utilized to conduct this investigation, prevents rapid progress. The initial results of the investigation have been a great source of satisfaction to the investigators. At present the offices of eight county surveyors have been visited. The counties visited included Elkhart, Jasper, Kosciusko, Lake, LaPorte, Newton, Porter, and White. It is definitely felt that we should pursue this investigation to a conclusion as soon as possible. The investigators are even more convinced of the value of such a study. The county surveyors interviewed have responded enthusiastically to its goals and have been most cooperative. Monies expended for this modest start include $85 from the ISPLS allowance and nothing at present from the Indiana County Surveyors and County Engineers Association allowance.

DISCUSSION OF VISITS

It would be impossible to summarize here the specific details of our eight interviews. The county surveyors were most cooperative and frank; the visits with each of them were informative. There is a definite need for a far more complete coverage before a formal summary or manual is composed. It would be advantageous if a larger amount of time were available to accomplish our objective more quickly.

After considerable thought it seemed logical to present this discussion relative to specific areas. The areas chosen were: (1) old records available, (2) monumentation used with some cost figures, (3) witness corners, (4) equipment, (5) records kept, (6) status chart (in office), (7) work completed, and (8) general. Every attempt will be made to present the highlights in each area and to keep the discussion brief.

Old Records Available

In general, copies of the original public land survey plats and field notes were available for research in each county. Of the eight counties visited only one did not have the old public land records available and one had no perpetuation program at all. One county had all the original field notes in typed form. Three of the counties had copies of resurveys which were made, some in WPA days; these notes proved to be quite useful.

Monumentation and Cost

The topic of type of monumentation used arouses much interest. If funds are available there are good markers commercially available. Some county surveyors, due to the cost aspect, had to utilize items available locally.

Precast concrete posts, 5 in. x 5 in. x 42 in. were used as corner monuments in the field in one county; a ⅝-in. rebar is centered in the post to mark the exact point. This bar is recessed on top with an aluminum cap set over it. The cost of the material for each post is estimated at about 60 cents; the aluminum caps cost 26 cents. Labor of forming and placing would have to be added to obtain the cost of the corner and placing it. This county also used these same posts with ½-in. rebars for witness corners; the letter W was cast in the top and one side of the monument in this instance.

Railroad rails, three to four feet long, are used for corners occurring in the field in another county; the exact point is chiseled in the top. The cost of each rail is about $1.50.

Another method is using a cast marker with appropriate lettering which has a short stem projecting from its base. This stem is forced into a pipe, three feet long, which is set in concrete. The special markers used in this instance cost $1.10. The total cost to place the corner and two witness corners for this method is:

Manufactured markers	$3.30
Two iron pipes	0.14
1 bag ready-mix	1.40
Gas and oil for drill	0.06
Labor	30.25
Vehicle	4.85
Total	$40.00

Roads are handled differently. One county has a special design, consisting of a 10-in. pipe 12 in. long, with a lid which it uses on asphalt roads. This is placed over the marker with the lid bolted on. If it is covered again it may be found easily with a dip needle. The cost of this special protective pipe is $32.

For roads another county uses a cast-iron utility box which it places over a monument in an asphalt road. The box has a lid, but risers may also be applied to it to increase its height in case of added thickness. The cost for a box is $12.50.

In pavement in one county, a brass marker is connected to a 42-in.

steel rod to mark a corner in a road. The cost of the brass caps are 90 cents each in lots of 100.

Some county surveyors used copperweld pins in roads. The average cost quoted was $13 each.

Witnessing Corners

As a general rule each county surveyor attempts to set a minimum of three witness corners for each corner. Material used for witness corners are:

1. Material in area
   a. Stone with cross
   b. Tree
   c. Fence post
2. Precast concrete posts
3. Concrete post poured in hole on site
4. Iron pipe

In general, bearings are compass bearings or given generally such as southwest or northeast. All counties attempt to place a witness corner in a protected place such as a fence row, hedge row, or near a guy line. Two counties have metal triangular markers which they place on metal posts; wording such as "Survey Marker Nearby" is lettered on the sign.

Equipment

Of the seven counties interviewed four used basically hand labor, that is pick, shovel, and hand auger. Two had Skill hammers, one with a rotary drill. One county had a Cobra (approximate cost $1,000) with special attachments such as a cold chisel, spade for dirt, and a drill for concrete. All surveyors interviewed felt that mechanical equipment would increase the number of corners established.

One county had a vehicle for the office of the county surveyor. They also had a special tool box for their corner perpetuation equipment which included the Cobra. Their equipment included a small mortar box in which they mixed their concrete (sackcrete) on the site.

Records

The topic of record keeping is the one most difficult to discuss. Several good ideas have been initiated among the counties.

It is here where considerable thought must be given so that accurate records of the location of corners are *readily* accessible in the future.

In general the smallest breakdown in the record system is the section. The section corners are coded by some systematic procedure so that they may be identified. Figures 1 through 5 show samples of the systems adopted to index corners. A systematic means is then used to file these records so that they can be readily obtained. The intent often is to allow a sheet to be removed and a copy furnished to a person requiring it. Most counties are keeping an index card file, generally by section, on which current information is kept.

One county uses the range line number as a controlling means in its index, such as Range Line 21. Corners on the particular range line are given symbols and are indexed in this manner. A sample form is shown in Figure 6.

This represents a very incomplete summary of record keeping. It should be an area thoroughly covered in the proposed manual.

Status Chart

The counties, in general, do a good job of keeping a status chart. The counties used Highway Commission Maps, County Road Maps, and matched U. S. G. S. quadrangle sheets as their base for the status map. The status of corners were then shown by pins stuck in the corner location on the map; pins were color-coded to designate the status of the corner.

Work Completed

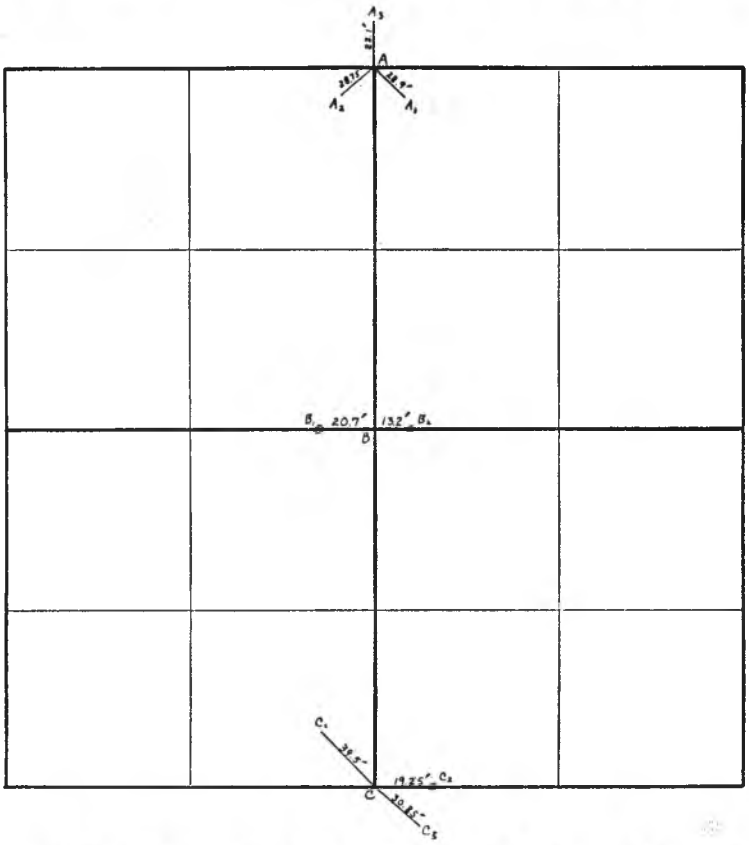
The work completed in the counties visited varies from none to 80 percent of the section corners. Three of the counties felt that they had no program. These counties were doing piecemeal work on well referenced corners or posting corners which were relocated by the state highway department, private surveyors, and the like. Two of the counties are marking satisfactory progress to this time. Five of the eight counties are receiving little if any support from their county in the program. It would seem that every attempt possible should be made to educate county commissioners on the importance of the county perpetuation program.

General

We are moving into the stage where it behooves all concerned to review and fix basic definitions. County surveyors who are not sure of the definitions of lost, obliterated, and found corners should review them. All of us should assure the fact that we know the pertinent Indiana laws as to how corners, once determined or lost, are to be re-

CORNER STONE RECORD PAGE NO. 49

Township UNION Section No. 20, T 26 N, R 3 W



A = BRASS PLUG NW Cor NE¼ SEC. 20, T 26 N, R 3 W July 17, 1968

A_1 = NEAR SIDE CONCRETE POST

A_2 = NEAR SIDE CONCRETE POST

A_3 = NEAR SIDE CONCRETE POST

B = BRASS PLUG NW COR SE¼ SEC. 20-26-3

B_1 = NEAR SIDE CONCRETE POST

B_2 = NEAR SIDE CONCRETE POST

C = BRASS PLUG SW COR SE¼ SEC 20-26-3

C_1 = PK NAIL IN POWER POLE

C_2 = NEAR SIDE CONCRETE POST

C_3 = PK NAIL IN POWER POLE

Fig. 1. This figure illustrates one method, using a combination of graphical and descriptive methods, to maintain corner records. This procedure allows reproductions to be made available at office of the county surveyor.

SECTION ____ TOWNSHIP ____ RANGE ____

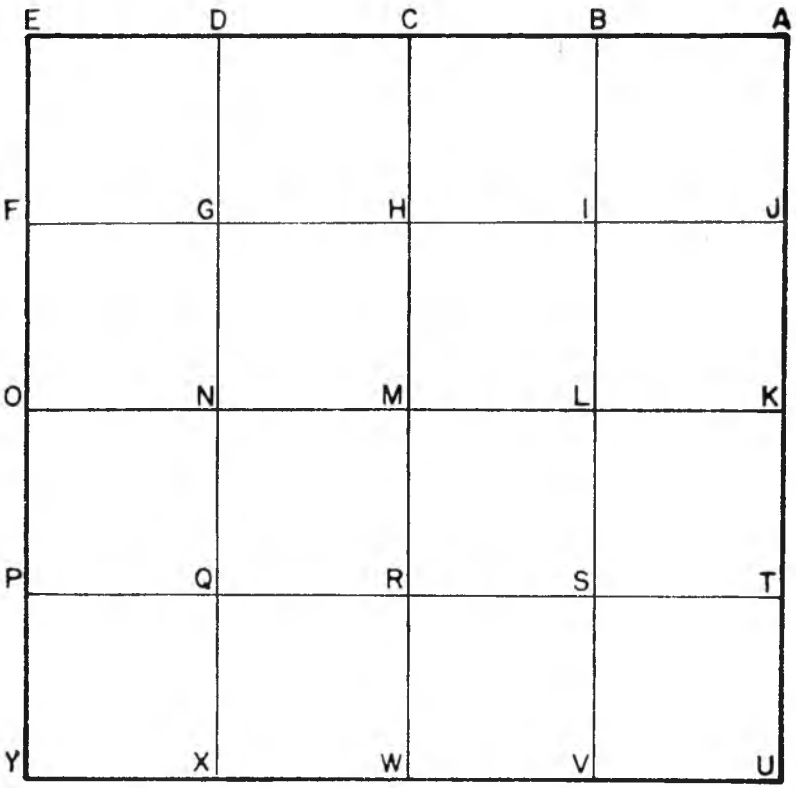


Fig. 2. This figure is a sample of coding the corners of a typical section, such as section corners and quarter-corners. A separate sheet can be used to give data concerning a particular corner in a specific section, such as the S¼ corner, Sec 12, T2N, R3E, 2nd PM, which is coded as "W" under the sheet tabulating data for this specific section.

located. In particular "no stone should be left unturned" in an effort to find an original corner.

SUMMARY

Initial studies have revealed that the corner perpetuation program is not progressing as it should. The majority of county surveyors have expressed a continued interest in having a study made whose end results would be:

1. Publication of a manual proposing uniform procedures for corner perpetuation and uniform record formats throughout the state.
2. Informational slide-film presentation directed toward county councils, showing the importance of and the problems involved in corner perpetuation.

The study mentioned above has shown a wide divergence of the progress of the corner perpetuation program in the individual counties visited (eight at present). The counties visited were most cooperative and have many good ideas involved in their corner monumentation and record systems. It would be most advantageous for all counties to share these ideas.

Our objective should be a manual which would insure that the final results of our perpetuation program should be a set of correct, near permanent, well-referenced, and efficiently recorded corners.

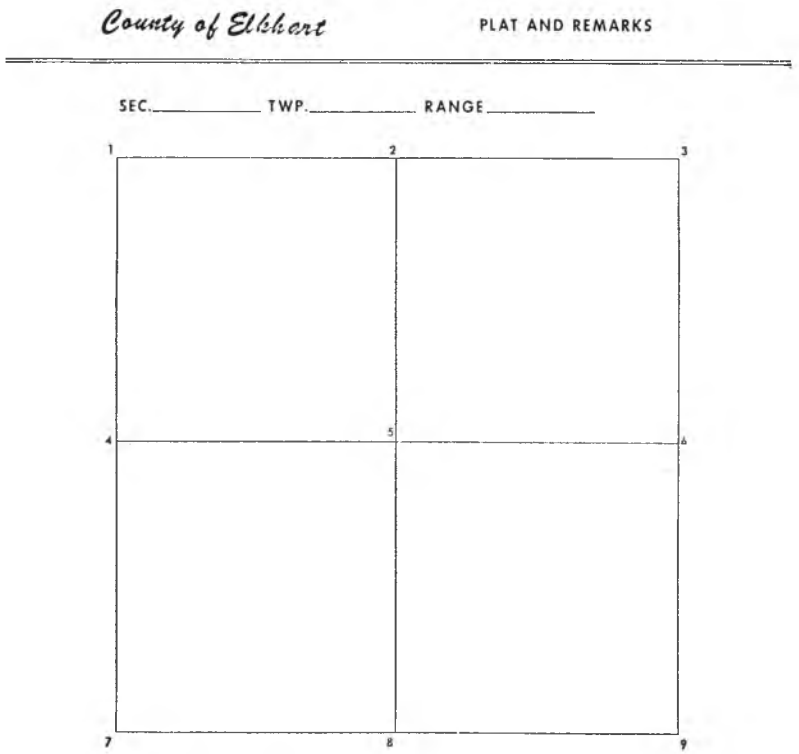


Fig. 3a. This illustrates another instance of coding the corners of a typical section. A separate sheet, illustrated in Figure 3b, is used to tabulate information for a specific corner, such as 5 (center quarter-corner).

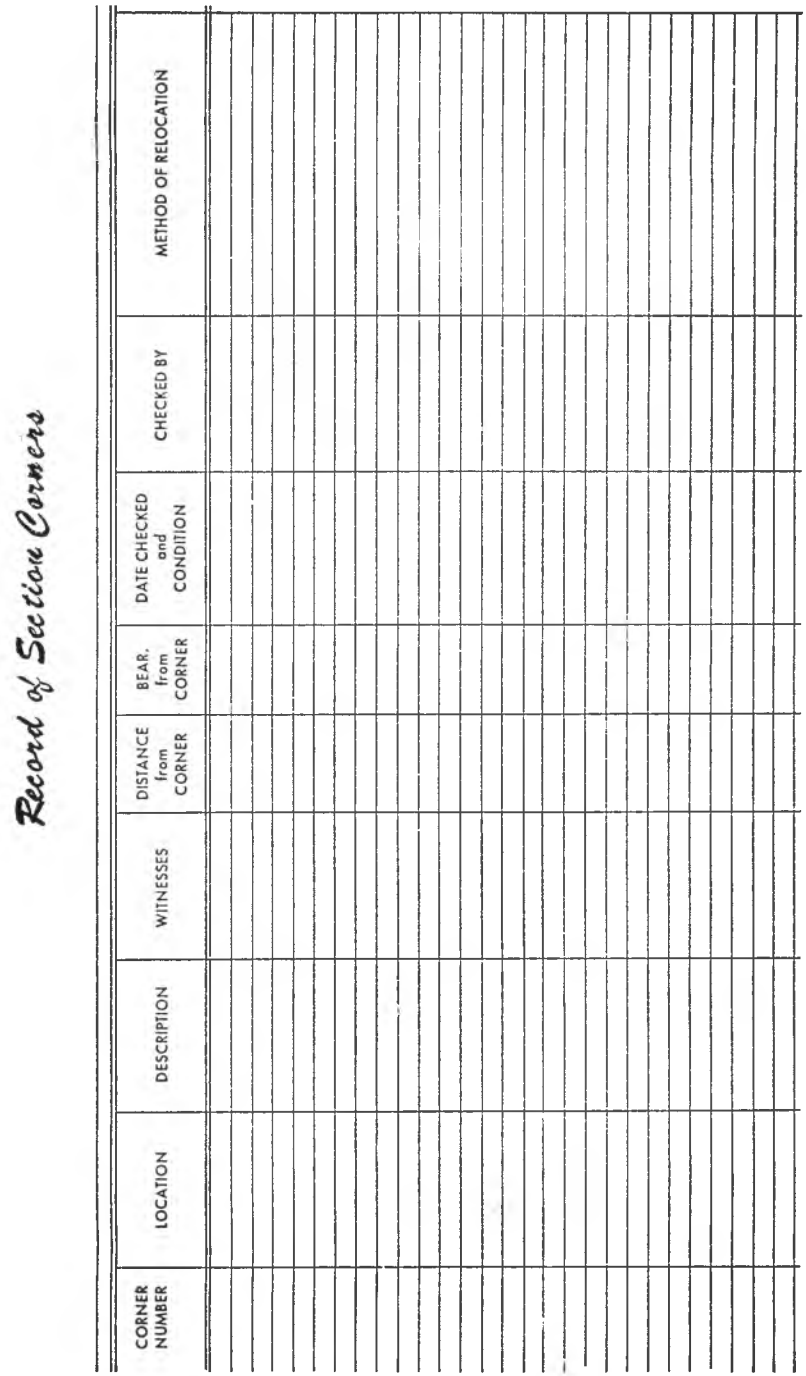


Fig. 3b. This figure illustrates the type of record sheet which is kept in conjunction with the corner code system illustrated in figure 3a. This procedure allows reproductions of this record sheet to be made available at the office of the county surveyor.

SECTION_____TWP_____RANGE_____

NORTHWEST SECTION CORNER			NORTHEAST SECTION CORNER		
Model	Bearing	Distance	Model	Bearing	Distance
#1			#1		
#2			#2		
#3			#3		

SOUTHWEST SECTION CORNER			SOUTHEAST SECTION CORNER		
Model	Bearing	Distance	Model	Bearing	Distance
#1			#1		
#2			#2		
#3			#3		

NORTH QUARTER CORNER			SOUTH QUARTER CORNER		
Model	Bearing	Distance	Model	Bearing	Distance
#1			#1		
#2			#2		
#3			#3		

WEST QUARTER CORNER			EAST QUARTER CORNER		
Model	Bearing	Distance	Model	Bearing	Distance
#1			#1		
#2			#2		
#3			#3		

Fig. 4. This is a sample of an entirely verbal description of corners and their location. This procedure allows reproductions to be made at the office of the county surveyor.

LAKE COUNTY, INDIANA
SURVEYOR'S OFFICE

Corner Record File
Act of March 12, 1965

INDEX: C – 26

RECORD OF MONUMENT COMMON TO:

CORNER	SEC.	TWP.	RANGE
NE	30 -	35 -	9
NW	29 -	35 -	9
SE	19 -	35 -	9
SW	20 -	35 -	9

REPORTS				
DATE	SURVEYOR'S NAME	WITNESSES	CORNER MON.	REMARKS
	W. P. A.	#1 N. 32° 45E. 35.45' #2 S. 47° 00E. 41.53' #3 N. 37° 30W. 36.65'	CONCRETE MON. BRASS PLUG	
8 22 66	L. C. S.	#1 N.37°10'W. 36.75' #2 N.33°15' E. 35.46' #3 S.02°03' E 30.00'		4 NAIL SET 2' APART WIT. RE-SET
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		
		#1 #2 #3		

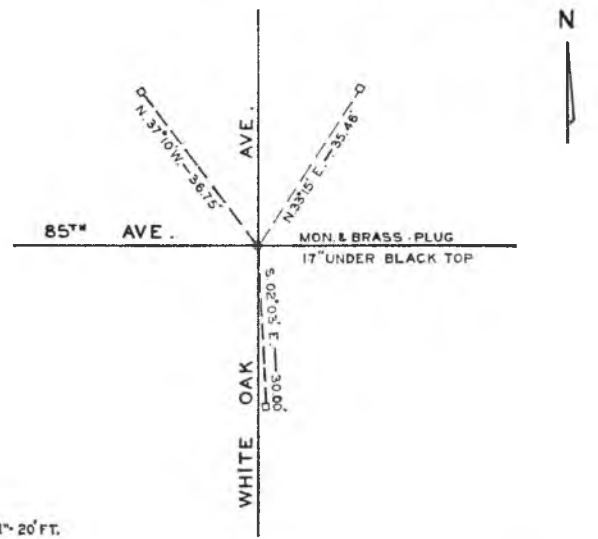


Fig. 5. In the method illustrated here the number of a range line is used to designate that line, that is range line 21 would be coded line 21. Corners along that line could be coded by letters, such as A, B, C. This sheet illustrates records for corner "C" on line 26. This procedure allows reproductions to be made available in the office of the county surveyor.

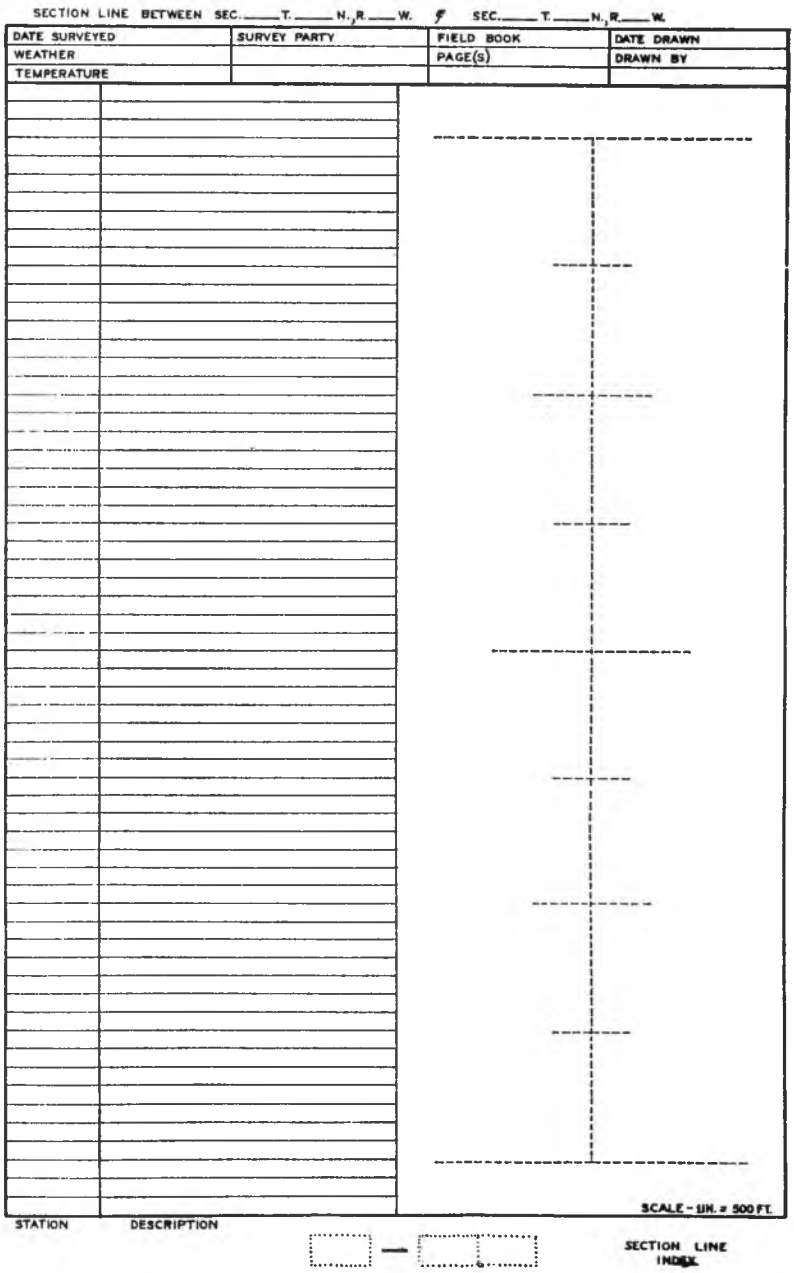


Fig. 6. This is a sample of a sheet showing a range line used to index corners. The long dashed horizontal lines are section lines. Corners occurring along range line are letter coded. This sheet is used in conjunction with the sheet shown in Figure No. 5 and reproductions could be made at the office of the county surveyor.