

CONCLUSION

Many grade crossings have been eliminated by road relocations, more than 100 crossings have been eliminated by grade separation structures, and over 200 flasher signal installations (Fig. 11) have been made by the State Highway



Fig. 11. Modern flasher signal. Notice reflectorized signs.

Department since its formation in 1919, in addition to the work of this nature done before that date. In spite of all this work and while we may all be proud of our progress in Indiana, bear in mind that there are still several thousand unprotected grade crossings in the state, several hundred of which are located on our State Highway System.

Normal Federal Aid funds for the fiscal years of 1937, 1938, and 1939 and additional appropriations for the fiscal years of 1938 and 1939, to be used exclusively on this type of work and to require no matching with state funds, assure us that this work will be carried on in the near future. However, it will be many, many years before the need and desirability of this kind of work ceases to exist, if it ever does.

ESTABLISHING AND PRESERVING SECTION CORNER
STONES

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It is a well-known fact, as established by courts, that, in all deeds of conveyance of lands, lots, or parcels of land, cor-

ners or monuments take precedence over distances; that distances take precedence over acreage; and that the acreage recited in a deed is last in consideration. Hence we can realize the significance and authority of monuments.

Whenever monuments are placed in any scheme of land subdivision and those monuments are described in the conveyance of such lands when sold, they thereby acquire a perpetual and controlling significance. It matters not how frail and temporary a monument may have been—a mere peg stuck in the ground—if it did at the time designate a particular point in the boundary of the tract, and if such monument is recognized in the deed, its position controls the location absolutely. In any subsequent survey for the location of the boundary, it becomes supremely important to identify with certainty the true position of such monument. The field notes of the original survey, or any description of the boundaries in the deed, or the area called for, have no weight in determining the position of the lines and corners as against the *certain* identification of the monuments, also recognized in the conveyance. What the conveyor sold and the purchaser bought was a certain fixed tract of land which should have been marked at one time by visible notes that are material evidence of the original position of the monuments. But since errors in surveying are not uncommon, and since the supposed area of the tract is computed from these field notes, neither the area nor the description by course and distance, called for in the deed, are allowed to hold as against the proved location of the original monuments, also called for in the deed.

Surveys are always subject to revision and correction. A monument once set and used in a conveyance cannot be changed, even though its position is not what it was intended to be, or not what it is said to be in the written description, without the free consent of all parties concerned. There is therefore an inviolability and absoluteness of control in recognized monuments which does not pertain to any surveys or to any descriptions or areas dependent on surveys.

Whenever a corner is once established legally, that is, after proper notices have been served according to law, if no appeal is taken within three years, it remains as a permanent marker for all future uses. The law provides that, when a corner is established or perpetuated, there shall be deposited in the proper place a stone or other durable corner, that the surveyor shall enter in his field notes one or more bearing trees, if there be such, the species, size, course and distance thereof, (and if there be no trees, he shall deposit one or more stones as witness to said corner), all of which proceedings shall be entered by him in a book to be kept for that purpose.

As has been said before, a corner thus established should remain fixed if no appeal is made within three years from the time it is established. The statute says, "The survey of

such surveyor shall be prima facie evidence in favor of the corners so established and the lines so run"; but an appeal may be taken. The object of the statute was to make such survey prima facie evidence during the time in which an appeal could be taken and perhaps pending an appeal when taken; but when no appeal is taken, the survey becomes conclusive after the time limit therefor. Otherwise such survey settles nothing that may not, upon a new survey and without any appeal, be unsettled. A new survey may doubtless be had, not for the purpose of establishing the corners, lines, or boundaries as an original survey, but for the purpose of relocating or perpetuating the corners, lines, or boundaries established by the original survey, when they have become obscured or lost.

LOST MONUMENTS

When monuments, once established and used in conveyances, afterwards disappear or are lost, they cannot be re-established as an absolute authoritative control by any survey or agreement of surveys. Nothing but consent or acquiescence of all of the parties in interest, or a judgment of the court, can replace a lost monument. Surveys and the judgment of the surveyors are valuable evidence in determining where the original monument was placed, but the surveyor has no right or authority to replace or re-establish a lost monument with a more permanent mark, or to certify to its position unless he can find some trace. By virtue of a full description of his work, the new monument may be legally recognized as having all the authority of the original. But any location of a monument based on the field notes of the original survey even in conjunction with other well-authenticated monuments a considerable distance off, cannot serve to "establish" such monument. It serves only as so much evidence, to be taken in connection with all other evidence, material and personal, such as fence lines, acknowledged boundaries, testimony of witnesses, etc., which evidence may and often does outweigh the evidence furnished by the survey. In such cases, the surveyor is an expert witness engaged to interpret the original field notes and to find where they would place the lost monument. But inasmuch as the original field notes may not have agreed with the actual position of the monument, any number of resurveys or agreement of resurveys cannot of themselves be so conclusive evidence of its original position as to prevent an appeal to the court.

The making of resurveys, which is the principal business of the land surveyor, whether in city or country, consists largely in the search for and satisfactory identification of corners, marks, boundaries, and other visible objects which have all of the force and authority of monuments. The proved experience and degree of expertness and reliability of the par-

ticular surveyor doing the work will, of course, affect the value of the resurvey as compared with the other evidence furnished as to the monuments themselves.

In view of what has been said, we cannot too strongly emphasize a most diligent search for old monuments before new corners are established. If witness trees were originally marked when the survey was made many years ago, we are not apt to find them standing. However, this is no reason why we should not make a search for their original position. With the bearing and distances to the witness trees given, oftentimes one can set a transit near the supposed position of the corner and, by setting the bearing and measuring the distance, and by little digging, sometimes determine where the stump and roots have decayed, even though the first tentative position of the tree may be some few feet distant therefrom.

A few years ago, while digging for a corner in a public highway, we were directing our efforts by digging in line with the fence lines. This corner was the common corner to four land owners. After some two or three hours effort, we began to search for an old witness stump (the corner had been established in 1877); after finding definite signs of it, we set the transit over the stump remains, reversed the bearing, measured the distance, and, after about one hour's digging, found the old stone $4\frac{1}{2}$ feet under ground and about four feet south of the corner as indicated by the fence lines of the land-owners.

Relocating corners nowadays is rather a matter of main strength and awkwardness than scientific knowledge. Don't get tired of using the pick and shovel! A survey of the general location may indicate that natural or artificial fills may have been made of as much as 4 to 8 feet, if the corner was established 50 or 75 years ago. Finding a lost corner after one or two days' digging will give you more prestige in your neighborhood and among your constituents than designing a large bridge, a concrete pavement, a sanitary sewer, or any big engineering project. When you are elected to office, most of your constituents vote for you on account of your reputation as a surveyor, not as an expert engineer.

PERMANENT MARKERS

After finding and perpetuating a lost corner, it is emphatically necessary that a permanent marker be deposited, whether a new corner is to be established or an old one perpetuated. Examples of more permanent markers include an iron pipe, axle, or bar, 3 to 6 feet long, driven well into the ground surface. The government now uses an iron pipe filled with concrete with a brass cap riveted on top with identifying mark, and with the lower end of the pipe split to form a base.

Corners are frequently destroyed in the construction of new highways, and, because of the neglect of the surveyor,

are not properly replaced and witnessed. Then, when occasion arises to find the corner again, a good highway may be materially damaged and hours of valuable time spent in trying to find it. Sometimes the surveyor and the construction engineer are one and the same person. In saying this I am speaking with a very guilty conscience. Not only are county surveyors guilty of this neglect, but state highway engineers are also guilty. When state highways are constructed in a county, complete field notes of corners, relocated and established, should be transmitted to the county surveyor's office. Such corners are frequently of vital importance to the interested persons.

LOW-COST STABILIZED SURFACES

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One of the problems of the highway engineer is that of developing a satisfactory low-cost road surface to take the place of the ordinary gravel road, which is unsatisfactory for modern traffic and expensive to maintain. To meet the requirements, this intermediate type should be moderate in both initial and maintenance cost.

There is a large mileage of gravel-surfaced county roads, as well as some state trunk lines carrying a moderate amount of traffic, which can not be paved within a reasonable time because of a lack of the necessary funds. In some instances, the type or volume of traffic would not warrant the construction of a high-type pavement. Development of a method of improving these roads by building up and stabilizing the existing surface, thus salvaging the large investment already made in gravel roads, is desirable from an economic standpoint.

Various bituminous materials as well as calcium and sodium chlorides are being used in stabilization work. Our work in Livingston County has been mainly surface stabilization with the use of bituminous materials, such as slow-curing asphaltic oil, medium-curing cut-back asphalts, and tar mixed on the road with a densely graded, local, bank-run gravel. Thus far, we have built the surface on an ordinary gravel base without any special treatment to stabilize the base. We would prefer to build a bituminous surface on a well-stabilized base but our road funds are limited and our roads are carrying the traffic without excessive maintenance cost. To meet future conditions, there is the following possibility in connection with our slow-curing oil surfacing. If and when traffic increases to the extent that the base is inadequate and maintenance cost becomes excessive, we can scarify the oil mat and a sufficient depth of the base and mix in enough new oil or other bituminous material to provide a stabilized base on which a new wearing-surface can be laid. The roads we have surfaced carry