The Value of a Topographical Survey in Planning a Street System

By JOSEPH W. SHIRLEY.

If the area under consideration is as flat as a pancake, and as barren as a desert, then a topographical map would hardly be necessary as a basis on which to design a system of streets. Otherwise, very surely, such a map would be found most worthy of consideration. Indeed, if the landscape gardener, engineer or architect—all coupled with the same adjective—were asked, in all likelihood their answers would tell in no uncertain terms that such a map is indispensable for a "sane" study for development purposes. The word "sane" has been quoted because, undoubtedly, by far the larger area of built-up property has been constructed without access having been had to such information as is incorporated in topographical surveys. But now they are few who will point with pride to such results achieved without the aid of an accurate picture of previously existing natural conditions. Indeed, the kindest expressions that can now be used concerning such haphazard layouts is that their projectors did what they could with insufficient preliminary information.

Expanding a Street System.

This view is now firmly held by all intelligent property developers, so that without more ado concerning the negative phase of the subject, one may turn to the positive merits and the method of procedure and operation. With this end in mind, some little account of what has been done in Baltimore concerning the expansion of the street system in an area of about seventeen square miles which was annexed to the city in 1888 may be of interest. This area is officially styled the Annex, and when incorporated within the city's boundaries only a very small percentage of it was at all "improved,"—to use that flimsy expression,—the greater portion being rural in character.

Prior to annexation, however, following the old custom, the County Commissioners had laid down a street plan over this area, and the northwest corners of street inter-sections were marked on the ground by stone monuments. These streets, as might be surmised, were of the rectangular system and crossed hill and dale, irrespectively, by the proverbial shortest distance between two points. Shortly afterwards a growing feeling was manifested that the street plan was far from satisfactory, and inasmuch as sentiment had crystallized on the need of a topographical survey on which to base plans for a sewerage system in the Annex as well as in the old city, it was deemed well, before officially adopting the County Commissioners' design of streets, to await the completion of this new map.

The topographical survey of Baltimore was made on the scale of two hundred feet to one inch, with contour intervals of five feet. The map consists of thirty-four separate sheets, each covering one square mile of territory. The basic work was of a high order of precision, being founded on the United States Coast and Geodetic Survey's form of triangulation, and all other branches involved were just as carefully and as accurately developed. The result is that Baltimore possesses a map of an order probably higher than that of any other city similar in size in this country. On this map is still being planned Baltimore's newer street development.

Aid of the Topographical Map.

What has probably been the greatest factor tending to narrowness—considered in more than one sense of the word—in the upbuilding of our cities, is the lack of consideration paid to the scope of the area affected. In other words, very frequently small layouts are in themselves well formulated, but their elements do not bear proper relationship to the city as a whole, and when the surrounding neighborhood becomes more dense in development, it is found that the component parts do not form a systematic whole. This fault can, to a great extent, be foreseen by the aid of good topographical maps, for from such a mathematical picture can be visualized fairly well the routes that are likely to become arteries of traffic. It can be seen where the ridges and the water-sheds occur; the comparative difference in elevation of all important locations; the natural drainage lines of each neighborhood, and a host of all important data—for, indeed, in this map there is before one a miniature replica of existing conditions.

What guides a street system—its backbone—is the thoroughfares, the first object naturally being to provide for through traffic. In many instances one will find that the old turnpikes leading into town are good routes of travel, and when considered as the diagonals of a spider-web and connected by cross street routes, a most desirable arrangement is obtained. This ideal condition, of course, can seldom be accomplished, as there are too many natural and man-made obstacles with which to contend. But right here is where the topographical map will aid one to see the light of reasonable construction. Where nature has shown us so clearly that for any particular section curvilinear streets are desirable, the folly of the checker-board system can be seen.

Aside, however, from the broad general view which a topographical map affords, one is aided greatly by having at hand a mass of surveying data from which the details of grade and alignment can be studied to a remarkable extent. Of course, the greater in proportion the scale of the map is to reality, the more will such details be available; but as this scale is enlarged, so is the expense of obtaining such a map increased. In Baltimore the scale adopted—1:2,400—gives fine results and affords a happy adjustment between expense and detail.

Take a section of virgin territory under consideration. Assume that it is already traversed by some street of importance, and that the study is to develop a system of residential streets. After considering many sketches and free-hand designs, and generally following the method of the architect in his preliminary studies, a pattern is finally chosen on which to apply the acid test of gradient—the amount of cut and fill required on each of the streets. Of course the experienced engineer will have a general idea of the amount of such work necessary while he is establishing his lines, but he is naturally looking for the best information along this line that he can obtain, and he will now test his judgment from profiles and cross-sections. These latter studies are obtainable direct from the topographical sheets, and the entire operation corresponds to and takes the place of the old reconnaisance surveys. After this it is a process of shifting and adjustment, until, finally, the best general layout is arrived at.

Such, in brief, is the method of procedure in laying out Baltimore's street plan.—American City.

ELECTRICALLY PROPELLED FIRE ENGINES.

Fire chiefs throughout the country are watching the results and performance of electrically propelled fire trucks and engines in the cities where they have been adopted. The many obstacles that present themselves in changing of horse drawn to motorized apparatus of a large fire department are such that the utmost care must be used to secure that method of propulsion for apparatus that will give speed, reliability and efficiency together with ease and economy of operation. In these points the advantage of the electric over other methods of propulsion is fast establishing itself, according to a report of the Electric Vehicle Association of America.

The first storage battery driven fire engine in America came into existence in 1912, when Engine No. 217 of the New York Fire Department was converted into an electrically propelled apparatus.

The experience of Philadelphia with electric fire apparatus has been most successful. Two years ago the first step was taken, a first-clas steam fire engine weighing 10,500 pounds, horse-drawn, was equipped with an attached two-wheel storage battery tractor. The excellent performance during the tests made in the congested traffic zone induced the bureau to convert two smaler class steam fire engines, horse-drawn, to battery tractors, also the two-horse-drawn, high pressure hose waggons to storage battery apparatus.

In Baltimore, Md., one engine of the fire department is equipped with a storage battery tractor, which is regarded as the most reliable and economical apparatus in the whole department, and one that can always be depended upon.

Akron, Ohio, owns a 65-foot aerial truck equipped with an electric tractor which, at a demonstration of speed and climbing grades, went up a 13 per cent grade when carrying a full complement of men and equipment, and attached to the truck at the rate of 11 miles per hour, and on level streets the tractor propelled the truck at the rate of 26 miles per hour without any trouble or showing in the least any loss of power.