THE CITY SCIENTIFIC

George B. Ford (Biographical note)
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The version that the engineering journal published was extracted from a paper presented at the fifth annual meeting of the National Conference on City Planning, held on May 5-7, 1913 in Chicago. Ford's claim that "city planning is rapidly becoming as definite a science as pure engineering" seems ludicrous now, but at the time it reflected the thinking of many planners who sought to shake the image of planning as mere civic beautification.

Except on the aesthetic side, city planning is rapidly becoming as definite a science as pure engineering. In city planning there is, above all, the necessity for a careful analysis of the conditions.

It is becoming more and more obvious that the best way to secure a city plan which will be lastingly satisfactory from all points of view and really comprehensive is to put the work in charge of several experts, one an engineer, one an architect, and one, perhaps, a social expert. This group of experts must work together from the start and consult continually with regard to each feature and phase of the city plan.

By such co-operation and by standardized procedure it is possible to determine within a comparatively short time a plan which is not only the best for to-day but which is so elastic that any changes during the next fifty or one hundred years can be fitted into it with virtually no loss or alteration.

In emphasizing the scientific side of city planning I do not wish to administer a snub to the aesthetic side. Both phases are necessary to the complete city. The problems of convenience, of health, and of efficiency are matters of science, while the things which foster our own delight in the city and which impress the stranger within our gates come within the range of the aesthetic. The development of both should go on side by side, the practical a little in advance, because it most nearly affects our life and well-being. The aesthetic to stand the test of time must follow the lines laid down by the practical interests of the community.

In the science of city planning the whole city is our laboratory. All its facts and symptoms are more or less under observation, but the expert city planner soon sifts the significant from the less important. Experience has shown to the expert that the significant facts must be collected under the following heads: Streets, transportation of people; transportation of goods; factories and warehouses; food-supply markets; water supply and sanitation; housing; recreation; parks, boulevards and street planting; architecture; laws; financing, methods of paying for improvements.

STREET WIDENING AND EXTENSION In any given city before we begin to gather our data it is imperative to have clearly in mind the various types of street use. We must further determine what is the ideal street arrangement or street cross-section for each of these types under various conditions. Highway engineers are pretty well agreed upon such types. We have our units of sidewalk width of 2 ft. per person, we have our units of roadway width of 8 ft. per vehicle, and we know that for so many slow-moving vehicles passing a given point in a street per hour we need so many units of width in order to prevent congestion, and that so many swift-moving vehicles demand so many units, that so many heavy trucks demand so many units, and that the varying combinations of these demand a certain definite number of units of width in the street. We know that wherever possible it is desirable to segregate the different types of traffic and put the swift-moving automobiles on a street by themselves, and the slow, heavy trucking on another street by itself, and the street cars and ordinary vehicles on still a third street; but where we cannot realize this ideal the more nearly we can approximate it the better.

The first tool we need in gathering our data is a set of complete up-to-date surveys and maps of all existing and proposed streets, together with their cross-sections and surfacing. We must have, also, contour maps--if possible, models, so we can visualize grades.

The next tool we need is a set of historical maps or graphs of the city made at periods from ten to twenty-five years apart. These will give us a basis for determining the tendencies of growth of the city.

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Next after this general data it is necessary for us to know the existing use of the streets at all of the critical points in the city, both at street junctures and in the centers of important blocks. Traffic counts should be taken simultaneously by one tabulator to each item of all the different kinds of traffic passing the given point--the pedestrian traffic in each direction on each sidewalk the light horsedrawn traffic, the heavy trucking, the swift-moving automobile traffic and the street-car traffic, all in either direction. On corners this becomes multiplied several times, so that on important corners it has been found necessary to have as many as thirty-two men at once in order to tabulate simultaneously a correct count of the traffic passing these points. Furthermore, this tabulating should be done on various typical days under different weather and temperature conditions. and also on some day of exceptional stress when the movement of large crowds taxes the street to the utmost.

By tabulating and comparing these figures at any given critical point with the standards and ideals as to street use we can see at a glance whether or not this street at this point is doing its work efficiently, whether it is overburdened or underburdened. If a given street is working under capacity and a neighboring street is overtaxed, we can study means of diverting some of the traffic from the second street to the first, either by traffic regulations or by cutting through a diverting channel. As to whether or not cutting through this diverting channel is good economy is a question which we will discuss later.

LIMITATIONS In case a given street is overtaxed and there is no parallel street through which traffic can be readily diverted then we can study the comparative advantage of widening the existing street or of cutting through a new street to take part of the traffic. In the first place, we should bear in mind that in widening a street there is always a point beyond which a street becomes too wide to be efficient, because the two sides are so widely separated that people hesitate to cross the roadway. Then we must consider carefully the cost of widening the street, including all details, and see if the gain through avoiding congestion of traffic and the gain to business on either side of the street will warrant such widening. To be more explicit, counts should be taken with a view to determining the loss of time to pedestrians and to the various forms of traffic due to congestion and blocks caused by the narrowness of the street. This loss of time multiplied by the money value of the time of the people involved and by the time interest on the capital tied up in vehicles and their loads will give us a definite figure. The aggregate of these figures for the year will sometimes reach amazing totals. If we then consider what capital on a 5 per cent basis this yearly waste represents anyone can judge for himself whether the saving to the citizens warrants

the cost of the improvement. If the cost of widening the street proves to be unwarranted, the next problem is to see whether the traffic can be diverted through parallel side streets, and if these are not wide enough whether they can be widened to good advantage. If these do not work out, then we should consider the desirability of cutting through new streets or extending existing streets in the neighborhood parallel to the congested street. The same method of testing the desirability of these solutions can be applied in each of these cases.

Every critical street corner must be analyzed to see where traffic goes, what proportion crosses and what proportion turns the corners. If a large percentage turns a given corner it is obvious that a cross-connection between these streets would relieve that corner. The desirability and value of such a cross-relief can be determined in the same scientific manner as street widening.

Now, all of this development of our plans is purely scientific and the best way of doing it can be as well determined now as through a process of sifting over a long period of years. The aesthetic enters in only to a slight degree. In a case where slight shift in the axis of a new street or the widening of an old street on one side instead of the other would give us a vista of some impressive building, due cognizance should be taken of this, provided it does not call for an unwarranted increase in the cost of the improvement and does not otherwise invalidate the practical reasons for the original solution.

The same general principles apply in the case of transit, transportation and sanitation as in the case of street widening. The same scientific investigation, analysis and deduction and the same definiteness in determining the best solution of the problems are now possible and feasible.

HOUSING Housing can be roughly divided into two main divisions, i.e., improvement of housing in already built-up sections and the providing for housing in new sections. In either case experience has developed working standards as to sanitation, lighting, air and convenience. and has given us the minimum below which it is criminal to go.

The obvious first step in any given city is to make a survey of existing conditions. It is important to have maps showing the distribution of the population, locating at a glance the congested districts. Other maps showing the location of each kind of habitation, with the increase of that type during each of a number of previous years, will determine the

tendency of growth both as to direction and as to kind of dwelling. Then a number of typical blocks, including in particular some of the worst, should be investigated with an intensive survey to discover the amount, character and location of housing conditions which fall below conditions in the center of the city the determination of the best way of housing people in suburban areas and the relative distribution of such people with a view to their number per acre in any given district will have a marked influence on the relief of such congestion: Furthermore, the creation of desirable housing areas on the outskirts will tend to pull people away from the congested districts, and these would be accordingly converted into commercial districts, with a corresponding effect on the desirable width of streets and sidewalks in these parts of the town.

When it comes to the planning of new areas the whole problem can be worked out as scientifically as in the case of street widening and extension. Investigation will show just how many people can afford to spend a maximum of $10 a month for rent, how many $15 per month, how many $20, etc. It will show where they work and how far they ought to live from their work for the maximum efficiency.

Investigation will also show the cost of land throughout the city and the relative desirability of different sorts of land for housing use. With these figures of cost of land, of the number of workers for a given wage and with figures as to place of work all plotted on the maps of the city we can determine accurately what type of streets, what type of lot and block unit and what type of house should be built in a given locality in order to be best suited to the needs and means of the normal inhabitant of that locality. For example, on the highest priced land near the factories it is possible that tenements are the only economical solution. On land a little further away it is possible that houses in rows are the best solution. On other property the single house or the two-family house will be the best solution according to the habits and demands of the community. For each of these types of house experience has standardized the types of streets, blocks and lot units which from all points of view give the best results. In the case of the tenement it consists of many not too wide streets, running north and south, with the tenements in rows only two rooms deep, with north-and-south open spaces between them. In the case of the house in rows it consists of a corresponding north-and-south arrangement, with lots more or less on the Philadelphia type. In the case of the two family or one-family houses it consists of an arrangement of plots from 50 to 75 ft. deep and from 30 to 40 ft. wide, with such variety in direction and line of streets as aesthetic consideration may dictate. In each of these cases, however, the problem as to the width of roadways, sidewalks, grass plots, etc., must be worked out with a view both to

present lot cost and to future convertibility when the character of the neighborhood may change.