

Three methods were used in checking the live load moment effects. One was to figure the arch by the theory of elasticity, augmenting the moments of inertia at each point by those of the lower chord section horizontally below it, and computing the moments by the ordinary theory of elasticity. A check was to leave the upper arch chord out of account altogether and figure the floor system as a stiffening truss according to the same theory that would be used in figuring the stiffening truss of a suspension bridge. The floor system was found to be entirely stiff enough to resist the live load moments without counting upon the arch chords at all except to bear up the floor system.

The third method was to figure it as a truss bearing up a moving load from panel to panel. As each panel is considered, an imaginary diagonal is drawn in and the tension upon it is found. The bending moment on the upper and lower chords, resulting from the removal of this imaginary diagonal, is then computed.

## Letter to the Editor

### LAND DEVELOPMENT, TRANSPORTATION AND HOUSING

Sir,—In Mr. Thomas Adams' communication to the Building Industries Conference at Ottawa, reported in your issue of December 5th, he says: "As builders you are aware of the important connection between the method of developing the land—including the method of planning and constructing the streets—and the building operations which you carry on. It is perhaps unnecessary, therefore, for me to point out how important it is that any organization which may be set up to deal with the question of housing, should also take into its purview the question of land development in relation to housing, and such problems of local transportation as have a direct bearing on housing."

#### The First Consideration

I doubt whether builders in Canada have realized the importance of this matter; but it is certainly the first question that should be considered before housing on any extensive scale is carried out under federal, provincial or municipal control. There are three standards which have been sanctioned by long custom in American and Canadian cities, but which have a deterrent effect on the economical development of land for building purposes. They are a standard width of street, a standard depth of lot and a standard street car fare.

That some width of street should be defined as the minimum width is wise and necessary; but that all streets should be made of one width, irrespective of their purpose, is foolish and wasteful. A short street serving residential property does not need to be the same width as a main thoroughfare between two cities or the principal business street of a town. It is occasionally true that in a city subdivision some streets are made wider than others; but because they do not form part of a well-considered plan, the increased width is often land wasted.

In Vancouver, for instance, Fourth Avenue was widened from 66 to 80 feet to accommodate a double car track, and also paved to form a main thoroughfare, at a cost of \$132,758 for widening alone, whilst Fifth Avenue, an 80-foot street, remains unutilized. Similarly Hastings Street East was widened and improved from 66 feet to 86 feet, at a cost for widening alone of \$120,350, whilst Pender Street, 244 feet to the south, remains a 99-foot street and an earth road. The capital expenditure wasted by these two examples of a defective city plan would be sufficient to build 100 homes on each street.

By saving on the width of the less important roads, greater width could be given to the main arteries, and by enforcing a building line the requisite air space between buildings could be better preserved.

Few realize that on the ordinary standard rectangular system, generally 33 per cent. and sometimes 40 per cent. of the area of the land is taken up by streets, nor is it realized how under modern planning great economy in this regard can be obtained, thus making it possible, by saving on the cost of land and land development, to spend more money on the home itself.

Take, for instance, a standard sub-division, as in Ward 8 of the city of Vancouver. Sixty per cent. is available for building, 38 per cent. is taken up by streets and lanes, and 2 per cent. utilized for school and park sites.

#### Division of Available Areas

Compare this with modern planning for industrial development. The average of seven industrial developments carried out by Mr. John Nolen, town planner, Cambridge, Mass., shows 58.5 per cent. available for building, 25.7 per cent. taken up by streets, and 15.8 per cent. in school and play sites; whilst in the Sawyer Park development at Williamsport, Pa., described as the nearest approach this country has to the best English Garden City development 63.5 per cent. is available for building, 21 per cent. is occupied by streets, and 15.5 per cent. for school and play sites. It is surely better to economize in the width of the streets, and to devote the area saved to school playgrounds and parks, rather than have unnecessarily wide streets, expensive to construct and maintain, and then expect them to serve as the children's playground.

When we come to consider the second standard named, a standard depth of lot, we find it equally illogical, extravagant and foolish. Lots, of course, vary in depth, but in a standard rectangular development are generally 100, 122, or 132 feet deep, depending partly on whether or not a lane is provided.

If 132 feet be adequate for the mansion of the rich man, it is evidently too much for the cottage of the working-man; and yet 132 feet may be quite inadequate for many public buildings or industrial workshops. When housing is considered as a national problem, it is generally industrial housing that is in mind, and it should not be overlooked, if single houses are to be erected, that a lot 33 feet by 100 feet is infinitely better to secure a sanitary and economical home than a lot 25 feet by 132 feet; and yet both take the same area of land.

It seems a strange failing of the people on this continent that they have been content to accept a method of subdividing land for town and city development, devised by our grandfathers, but proved to be quite as inadequate to meet modern conditions as would be the locomotives they built if set to haul the "Imperial Limited" train to-day.

It is time we stopped planning our cities with a ruler and a square, and laying out our streets to the points of the compass regardless of the contour of the ground. City planning is a complex problem, quite beyond the province of the real estate agent; and upon the success of a city plan depend many economic and social questions.

#### Standard Street Car Fares

The third standard, a standard street car fare, may at first sight appear to have little relation to the housing question; but a little investigation in almost any city will show that it has had a great effect on the economical development of land. The tendency of the standard street car fare has been to congest the population at the terminals, and leave an undeveloped territory in the centre; and the greater the distance travelled on one fare, the greater has usually been the effect.

The reasons for this migration are too numerous to enumerate here, but the result has been in most cities that roads, sewers, watermains and other public utilities have been extended to provide for the population so diverted, and in other cities it has meant that a large population has been placed just outside the city limits and left unprovided with the sanitary facilities and not subject to the same building restrictions, forming a very serious problem when the time comes that the district has to be absorbed in the city.

The effect on the middle zone has been to leave it only partially developed, and yet subject to high taxation caused by roads and other accommodation carried through it to