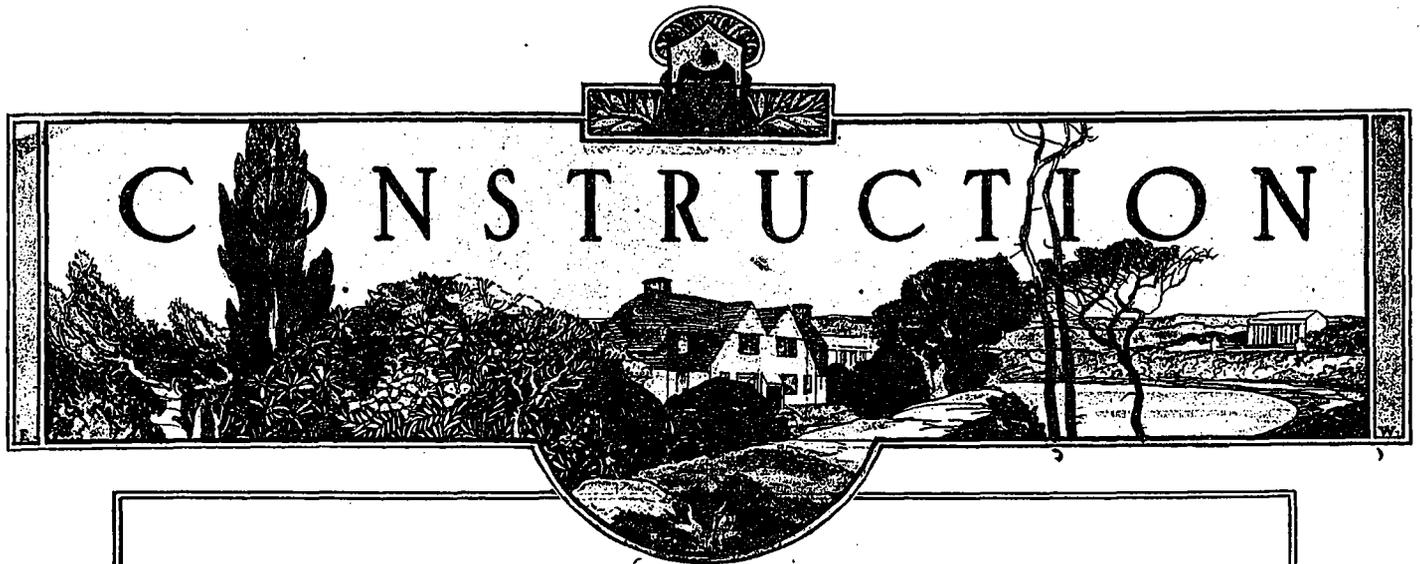


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MONTREAL

NEW YORK



LONDON,
VIEW FROM
BUCKINGHAM
PALACE.



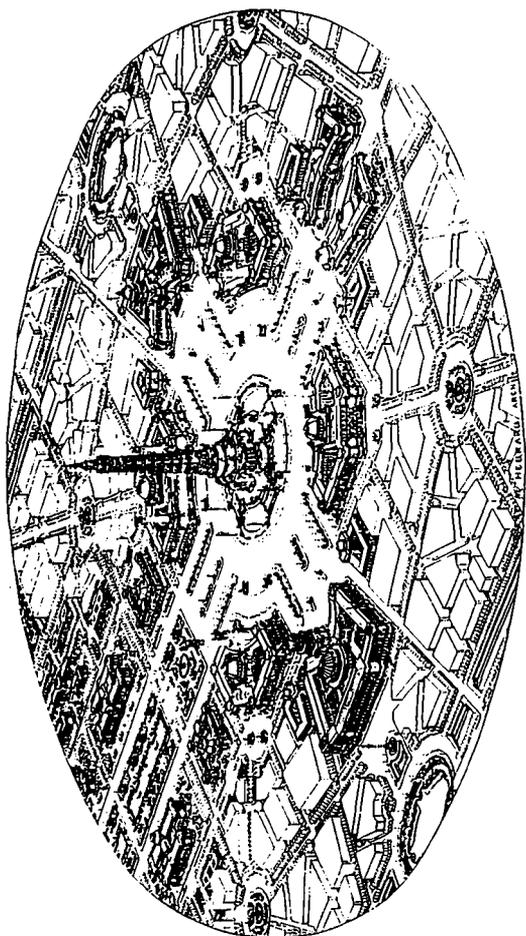
War and its dire results as well as its complement of peace—Loss to all phases of art and the physical condition of the various peoples.

WAR is rampant and judging from present conditions the sane man of yesterday has proven the unknown quantity of to-day. Europe thinks of revenge or self protection and turns its back to the terrible suffering attached thereto. The high moral attitude of the most civilized nations in the world has proven little less than a mask which conceals the studied plans of ambition, power and conquest. Kill and destroy will be the slogan, but at what an irreparable loss to all mankind. Much of the art which sprung from an age of truth will doubtless become a thing of memory. Ruthless devastation will rob us of our best examples of painting, sculpture, and architecture. As former ages cried out in vain against similar crimes so we must abide by the results, no matter if we are destroying the monuments of our sires; demolishing the very life of our present culture, and robbing the future of the great and ennobling works of God, produced by the hand of mankind. To attempt an expression of the dire results to follow is beyond our most acute imagination. As in art so in the morale of the people. Trade may reach its normal after years and years of struggle but the moral and physical level may be lowered to such an extent that the remnant will never be able to bring it back to the present standard. But why dwell on the pessimistic phase, for there is a bright side even though it comes with widespread sorrow. If the warring nations struggle until they are completely exhausted then we will undoubtedly see the dawn of peace. No more will the people spend their millions for dreadnaughts and armored air cruisers but rather will the revenue go to the betterment of those to whom it rightfully belongs. No more will cruel grief eat out the very heart of civilization but the homes will burn with the fire of love and contentment. Money will cease to be our god and once more we will work to the uplifting of all human kind and the present forced condition of slavery among all men will be eradicated and our very best will come forth on account of a freedom which springs from the desire to work for art's sake.

Canada's outlook after the present war—The calm attitude assumed by large business organizations—Our duty to create sane conditions at this crisis.

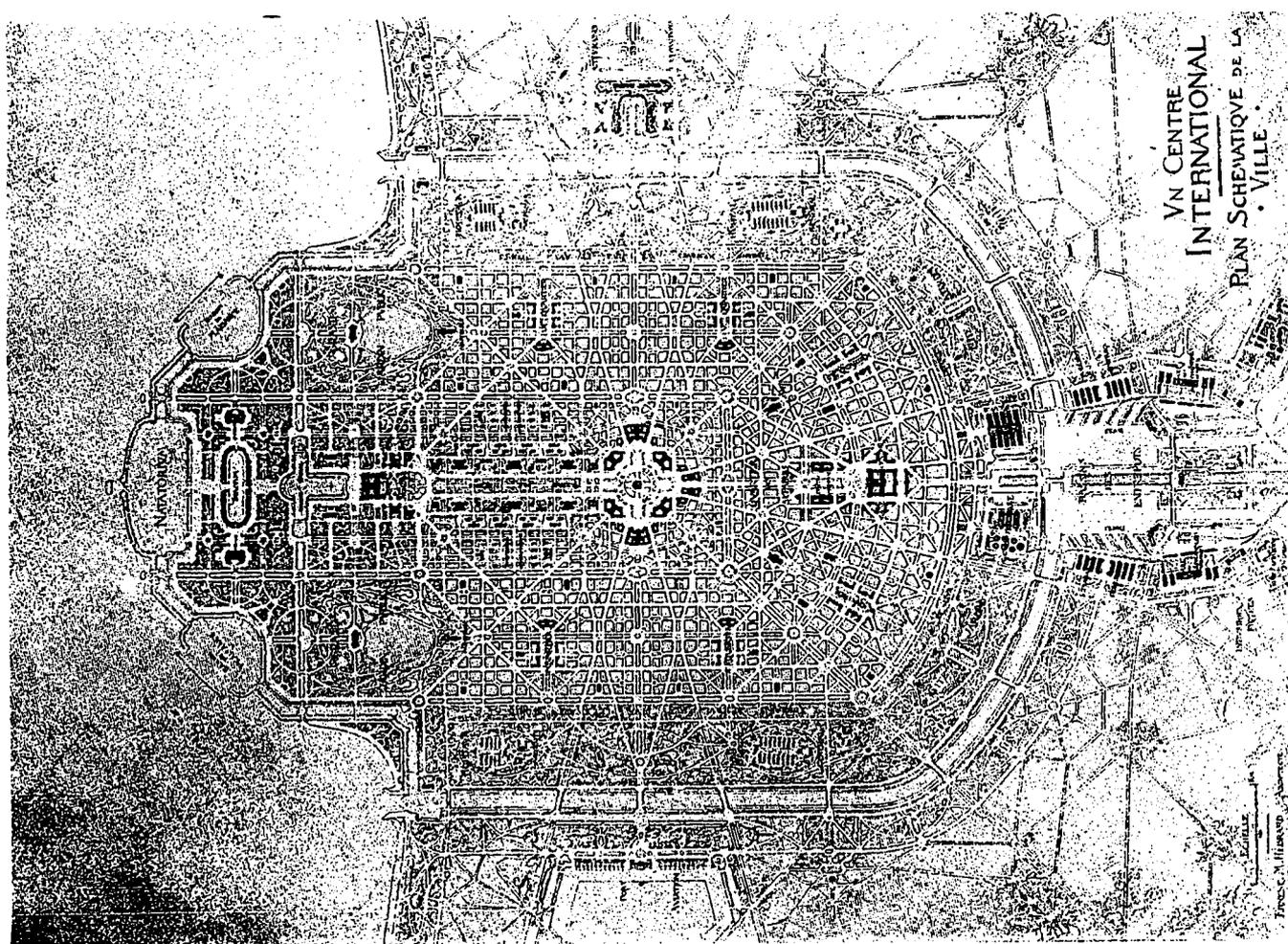
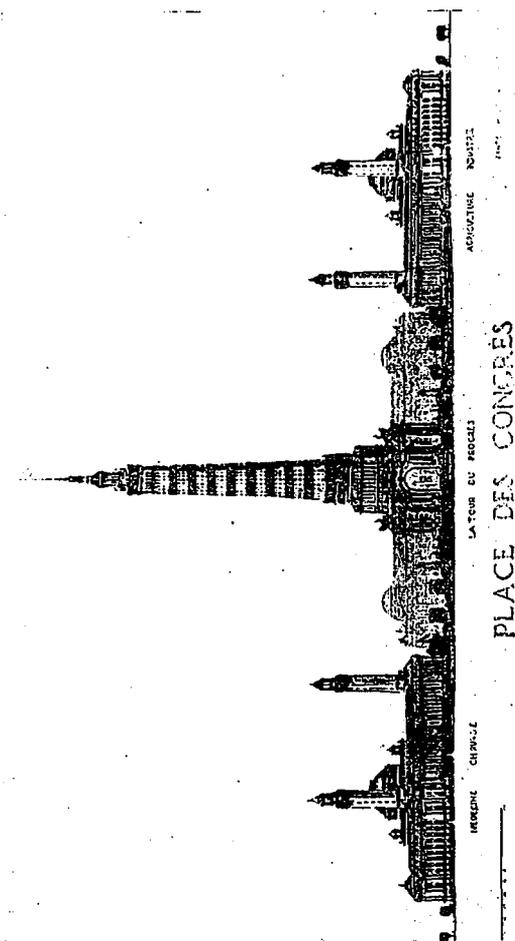
THE frenzied excitement caused to the various industries and business concerns by the present war is gradually changing to a calm and serious meditation as to what it will mean to Canada's progress. The first thought was to become most pessimistic and bring the country on the verge of a panic, which state of affairs was quickly remedied by prompt action of the government and the various large financial centres. As a result we have gained time to analyze the causes and figure out as much as possible the future results. Appreciating the fact that no country will benefit more than England and her Colonies, many houses which were panic stricken at first are once more working under normal conditions, while others are confident that all business will receive an added stimulus. The report of the *Architects' and Builders' Journal*, London, is worthy of quoting in this connection, and ought to be most reassuring: "Most of the replies we have received from architects, builders, builders' merchants, and others, as to the war's immediate effects on trade are decidedly optimistic. 'Business as usual' is their general tenor. For example, Waygood-Otis, Ltd., say: 'We consider it the duty of all business houses to proceed, as far as possible, as though war did not exist. This we are doing.' Other firms give such encouraging reports as: 'We have not made any alteration in our establishment on account of the present war crisis, all our jobs are proceeding normally.'"

At such a critical period we must unite in a consistent endeavor to push ahead. Let us grasp the spirit of one of Canada's largest industries which will use their surplus fund in making and storing, if necessary, the product which they manufacture. Canada and the States are self supporting which is in itself a safe basis upon which to work. In addition to this we have the markets of the world opened as never before, and with slight modifications the trade of nations inimical to our best interests can become an added asset. We can fight for the upholding of our noble traditions as well by carrying on our business relations similar to those in times of peace, as well as by bearing arms.



THE TOWER OF PROGRESS.

AN INTERNATIONAL WORLD CENTRE
CONCEIVED BY H. C. ANDERSON AND
EXECUTED BY M. JEAN HEBBARD.



UN CENTRE
INTERNATIONAL
PLAN SCHEDULETIVE DE LA
VILLE

Protecting Residential Districts

LAWRENCE VEILLER*

DOES the constitutional right to life, liberty and the pursuit of happiness include those important considerations which our English cousins in their recent town-planning legislation refer to as the "amenities"?

This is a question which many people are beginning to ask themselves in America.

It is only in very recent years that we have been conscious of the necessity of doing something to protect our citizens in the enjoyment of the right to lead a quiet, contented, rational existence and bring up their families free from the noise, discomfort and nerve-racking atmosphere which generally surrounds our industries.

Heretofore we have gone along in a truly American fashion of mixing up in a haphazard way business and residential districts without regard to the rights of others or the welfare of the community.

But during the last few years in a few of our larger cities we have awakened to the folly of this disorderly and thoughtless method of living and are beginning to ask ourselves whether these discomforts of living are really necessary after all.

I must frankly confess that we have cast somewhat longing eyes at the shores of Germany and wondered whether there was something so essentially different in the atmosphere of Germany and America that it would be impossible for us to engraft upon American civilization the well-established principle of zoning that has been in operation for a generation or more in that country.

"A man's a man for a' that," and it has seemed to some of us that there was not such an essential difference between the human characteristics of the German and the American as to make it a frantic imagining or Utopian dream for even us in America to expect that the time might come when we might insure to our citizens the right to live in a peaceful and untrammelled atmosphere. When one comes to consider it, after all it is not the most rational method to employ, the method that we have heretofore followed and considered as the only method, namely, of mixing up in a heterogeneous mass the places where our people live with all sorts of objectionable industries.

I think if we frankly search the records we shall find that this is not really, after all, a new impulse, but only a wider realization of a very desirable consummation to be sought after.

From the earliest days even in America those of us who have not been especially enamored of noise and of a hurly-burly life, have sought so

far as mere man could, acting alone and without the powerful support of government, to control his own neighborhood and protect the little home into which he had put his earnings (or the large, luxurious mansion into which he had put somebody else's earnings, as the case may have been) and where he expected to bring up a family and live for the rest of his life.

And so we find for many years in America an effort through private covenant, or what is popularly known as property restrictions, to secure the result desired.

Unfortunately this method, which has been followed to a greater or less degree throughout all parts of the country, has not proved entirely satisfactory; being a private arrangement between private individuals and being only a mutual agreement or contract, it has proved to be easily dissolvable. Furthermore, in many of our states the courts have held that property restrictions imposed some years back by the then owners of property are no longer binding and of effect when the neighborhood conditions have changed and when the succeeding property owners have desired to dissolve the terms of such agreement.

So it is not strange, with the increasing difficulties of city life, that men have turned to other methods and endeavored to see whether they could not find a means by which the right of a man to the enjoyment of his property in peace and quiet might be saved to him and his family and not be easily invaded.

Private covenant having proved ineffective, the use of the police power of the state has finally been sought.

How far the police power will stretch in America is still a question to be decided. One thing is certain, it will not extend beyond what the engineers call "the limits of elasticity."

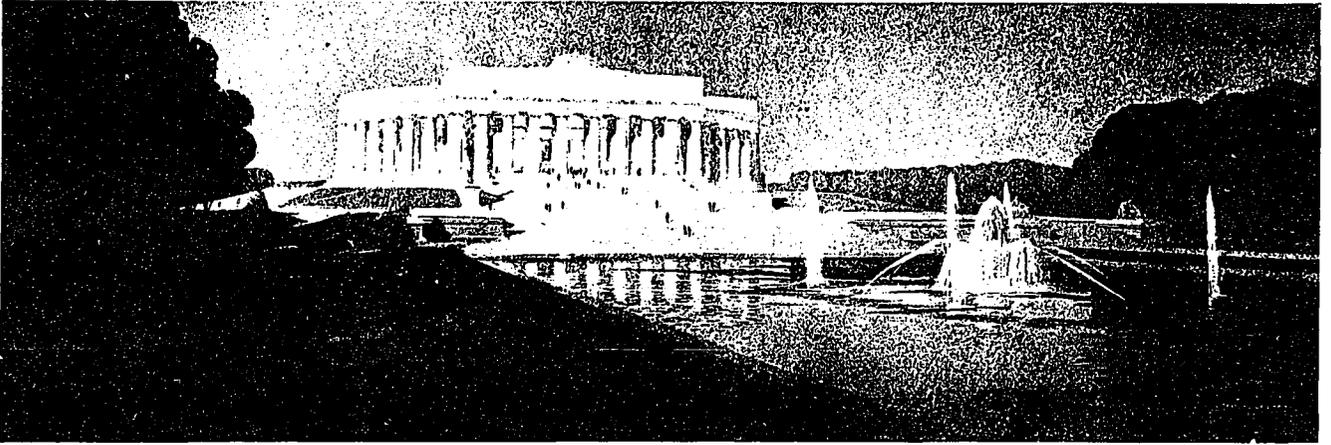
But just how far *will* it stretch? What can we do in America, with our constitutional limitations, to conserve to property owners and to dwellers in our cities the right to live in a peaceful, quiet, secluded neighborhood free from the invasions of business and of industry and with the amenities of civilization?

That the police power cannot be stretched to cover merely aesthetic considerations is clear from the decisions of our courts.

How far, then, may it extend?

Our most eminent jurists agree in the opinion that it may extend to almost infinite reach so long as it clearly includes matters which affect public health, safety, morals or the general welfare, provided always, of course, that the exercise of such power be a reasonable one.

*Secretary National Housing Association.



PERSPECTIVE VIEW OF LINCOLN MEMORIAL, WASHINGTON.

As yet no one has sought to define the meaning of that important term "general welfare." It is a most important one for those interested in progress. I take it to be the American equivalent of our English city planners' "amenity."

What Has Been Done in the United States.

Such efforts as have been made in the United States to extend the use of the police power in this direction have all been within the past few years, the earliest attempt having been in the state of California five years ago. Here in 1909 the first effort to establish residential districts and to exclude therefrom certain industries was made in the city of Los Angeles.

In the year following a similar attempt was made in Michigan, in the city of Grand Rapids, and more recently, viz., in 1913, there seems to have been an epidemic of regulation of this kind, the States of New York, Wisconsin, Minnesota and Illinois having all passed legislation of this nature.

So far as I can ascertain, all these various attempts were made in an unrelated way by each State, without knowledge of what the other was doing; in fact, in most cases I believe without knowledge of what California had done four years previous. And we all furnished that

delicious illustration of fancying ourselves pioneers blazing new trails and then discovering afterwards that we were only following in the footsteps of earlier adventurers.

The limitations of this meeting permit me only to *outline* some of the distinctive features of these different schemes.

California Leads the Way.

The Los Angeles ordinance differs in many respects from the districting plans of other cities in that it lays the greater emphasis upon the establishment of industrial districts, whereas the schemes embodied in the laws of other States concern themselves with residential districts. The difference, however, after all, is chiefly a question of emphasis.

The entire city of Los Angeles, with the exception of two suburbs, is divided into industrial and residential districts. In addition to the industrial districts there are what are termed "residence exceptions"; in other words, small spots where certain unobjectionable industries are permitted.

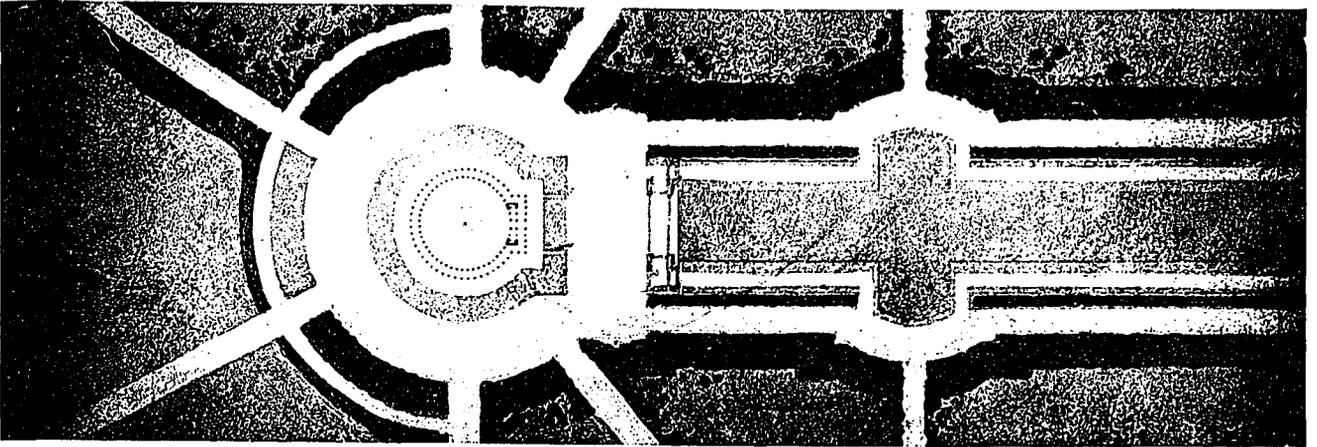
The industrial districts vary greatly in shape and size. The largest has an area of several square miles and measures five miles in length and two miles in width. The smallest district comprises a single lot. As a whole the industrial districts are grouped in one part of the city. The "residence exceptions" are small, with the exception of one which is about a half mile in area. None of them covers a greater area than two city blocks, and in many cases each does not occupy more than one or two lots.

The line that is drawn between the industrial district and the residential district in the Los Angeles scheme is that all kinds of business and manufacturing are permitted without restriction in the industrial districts, while in the residential districts certain specified businesses of a distinctly objectionable nature are prohibited. Those industries which are not enumerated in the prohibition are permitted.

In the residential districts all manufacturing but that of the lightest kind is forbidden, but less offensive business and manufacturing



STREET IN ROCHESTER.



PLAN OF LINCOLN MEMORIAL, WASHINGTON.

establishments which are excluded from the residential districts may be carried on in the "residence exceptions," which seem to be a sort of "twilight zone" between the two extremes.

The Law Retroactive.

A distinctive feature of the Los Angeles scheme is that certain industries, even if already established in the residential district before the district is created, are to be excluded; that is, it becomes unlawful to maintain these industries even though they may have been in operation for many years before the district was created.

Among those excluded are the following: Any works or factory using power other than animal power in its operation, or any stone crusher or rolling mill, machine shop, planing mill, carpet-beating establishment, hay barn, wood yard, lumber yard, public laundry, wash house, coal yard, briquette yard, riding academy, or any winery or place where wine or brandy is made or manufactured.

So much for the California enactment. As it is the only one which has been tested in operation through any considerable period of time and is also one which has been tested in the highest State courts, it assumes especial importance for the rest of the country.

It differs in a number of marked respects from the attempts that have been made in other cities, and before discussing the limitations of such statutes and the essential principles to be observed in formulating them if they are to be sustained by our courts, it may perhaps not be inappropriate to briefly state what has been done in the other states.

In Michigan in 1910 the Common Council of Grand Rapids, without any specific authority from the legislature, passed an ordinance establishing residence districts, and subsequently this ordinance was amended by creating additional residence districts. The validity of the ordinance was attacked in the courts, and the Superior Court of Grand Rapids held that the ordinance was unconstitutional and void, among other reasons on the ground that "such ordin-

ance constitutes a taking away of the property of relator without due process of law, in violation of the provisions of the Fourteenth Amendment of the Constitution of the United States."

As the court did not advance any reasons for reaching this conclusion, and as the case was not carried to the highest court, and the whole issue was affected by the fact that the Common Council had received no specific grant of police power from the legislature to enact an ordinance of this kind, this decision is of no great value to us except as indicating some of the things *not* to do in grappling with this problem.

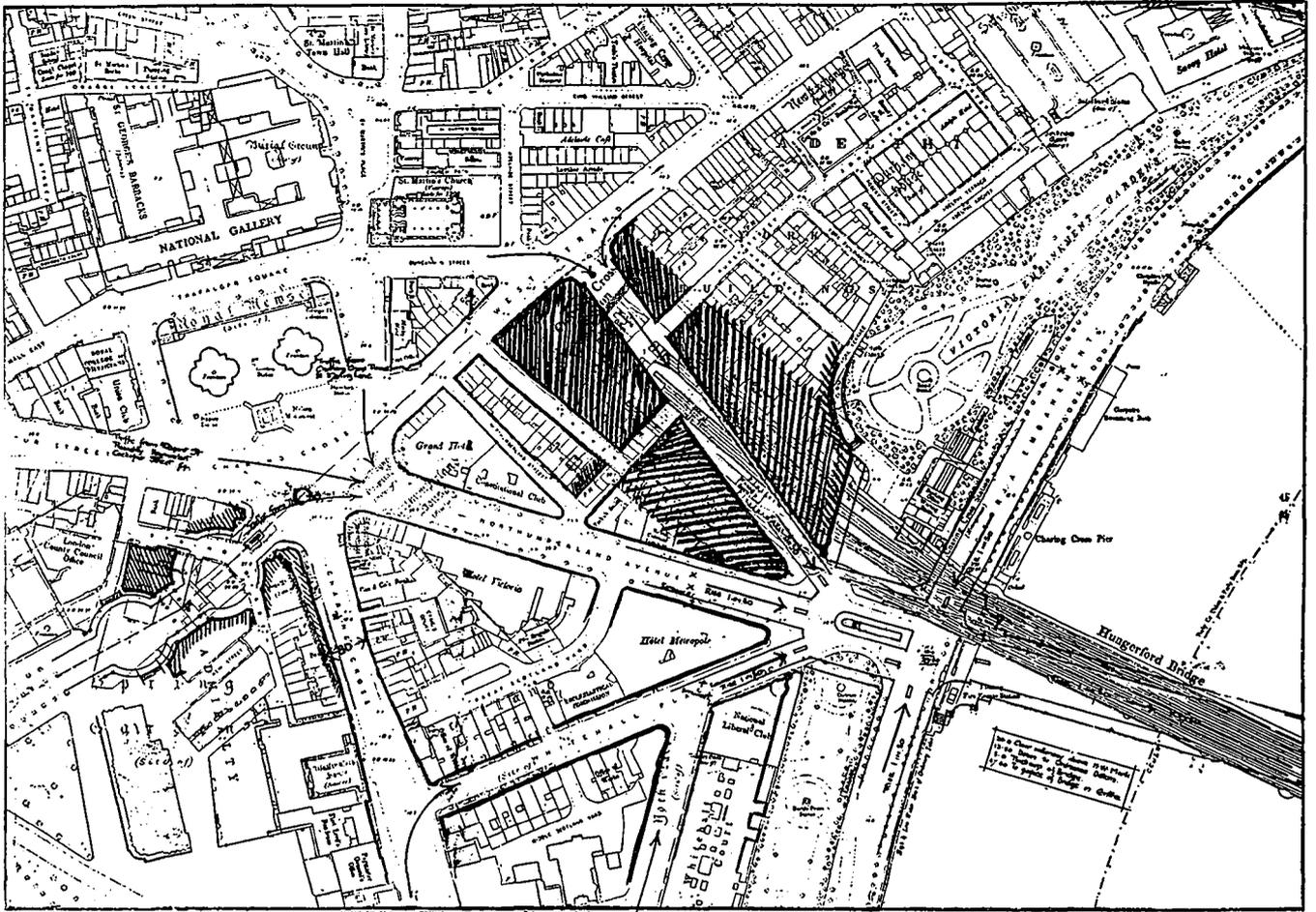
The Wisconsin Act.

The legislature of Wisconsin in 1913 (Chapter 743) passed an Act authorizing cities of 25,000 or more to set aside exclusive residential districts. The Act thus affects the cities of Milwaukee, Green Bay, La Crosse, Madison, Oshkosh, Racine, Sheboygan and Superior. Part of the Act reads as follows:

"The Common Council in cities of . . . 25,000 or more are authorized to set apart portions of such cities to be used exclusively for residential purposes, and to prohibit the erection and maintenance of factories, docks or other



STREET IN PASADENA, CAL.



RE-ARRANGEMENT OF CHARING CROSS AND MALL APPROACH. STATION AND BRIDGE TO BE REMOVED AND NEW VEHICULAR BRIDGE TO BE ERECTED.

similar concerns within such districts. Such cities may in like manner restrain the encroachment of business houses upon purely residential districts, require the consent of the majority of land owners and residents of such districts, once improved, before such business is permitted on such streets, and make as low a unit as one block. The power granted may be exercised upon the initiative of the Common Council or upon the petition of ten or more residents in the district or block to be affected." And the Act goes on to say that "the enactment of ordinances excluding factories, docks or other similar concerns from residential districts shall be a final and conclusive finding that factories operated in such district are detrimental to the health, comfort and welfare of the residents of said city."

We understand that under this power the city of Milwaukee either has recently or is about to establish a number of residential districts. Neither the Act nor the ordinance has as yet been tested, so far as we are able to ascertain.

Minnesota Follows Suit.

At about the same time that the State of Wisconsin was acting, the State of Minnesota was taking similar action. The legislature of that State in 1913 passed an Act (Statutes 1913,

Chapter 420) empowering cities with a population in excess of 50,000 to establish exclusive residential and industrial districts. This law therefore applies to the cities of Minneapolis, St. Paul and Duluth. Acting under authority of this law the City Council of Minneapolis on February 28, 1913, passed an ordinance establishing certain residential districts. So far as we can ascertain, the validity of this ordinance has not as yet been tested.

The State of Illinois in the same year also passed an Act empowering cities to establish residential districts and exclude therefrom certain other classes of buildings, but this was vetoed by the Governor upon an opinion from the Attorney-General that such an act would be unconstitutional.

As a resident of the effete East, I would not for a moment have you believe that these important efforts in the cause of progress have come only from the Far West or Middle West.

New York State Acts.

At the same time that Wisconsin, Minnesota and Illinois were acting, the Empire State of New York was taking similar action. In the Housing Law for Second Class Cities (Chapter 774 of the Laws of 1913) will be found a similar plan for the establishment of residential dis-

tricts. In that Act a plan is provided for the establishment of "residence districts," and the erection of any building other than a private dwelling or two-family dwelling in such districts is prohibited. The residence district may be made as small as one side of a city block.

Acting under authority of this law the cities of Syracuse and Utica have passed ordinances establishing such residential districts. Here, too, so far as can be learned, no attempt has been made to test the constitutionality of this provision, though many "sea-lawyers" have rendered horseback opinions, or perhaps it would be more appropriate to say sea-leg opinions, that any such scheme is unconstitutional.

The great city of New York has also taken similar action within the last two months, the legislature of 1914 having passed an enabling Act authorizing the Board of Estimate and Apportionment of that city to divide the city into districts and to regulate the use of buildings in each district on a different basis. A commission is to be appointed by the local authorities of New York City to determine the boundaries of districts and to work out the details of this plan.

Canada the Pioneer.

It would be inappropriate in this presence for me to attempt to discuss what has been done in the Dominion of Canada along similar lines, except to say that I am informed Canada took action in this direction nearly five years before the United States even thought of it. As early as 1904 the legislature of the Province of Ontario amended the Municipal Act by adding thereto a new section known as Section 541-A.

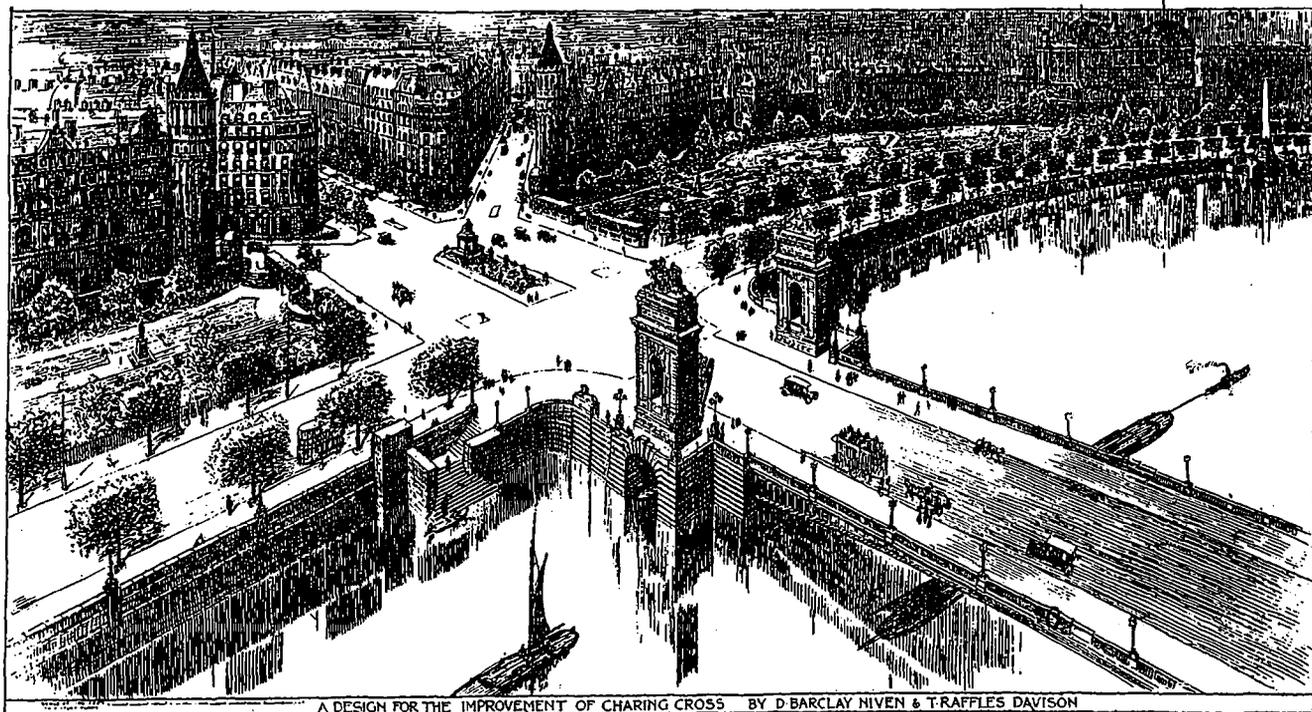
This authorized the Councils of cities and towns by a two-thirds vote of the whole Council to pass and enforce such by-laws as they might deem expedient . . . in the case of cities only "to prevent, regulate and control the location, erection and use of buildings as laundries, stores and manufactories"; and later on from year to year the scope of the Act has been enlarged so as to apply also to "stables for horses for delivery purposes, butcher shops, blacksmith shops, forges, dog kennels, hospitals, or infirmaries for horses, dogs or other animals."

It was also provided that the location, erection and construction or use of any building in contravention of any such by-law might be restrained by injunction proceedings at the instance of the municipality; and it was further provided that none of the above provisions should apply to any buildings then erected or used for any of the purposes mentioned so long as their present use continued.

In 1912 this provision was extended by empowering cities having a population of not less than 100,000 to "prohibit, regulate and control the location, on certain streets to be named in the by-laws, of apartment or tenement houses, and of garages to be used for hire or gain."

Acting under authority of this law, the city of Toronto in 1913—and I imagine also even during the present year—has passed a number of by-laws of this nature.

If we include also the general enactment in the building code of the city of Baltimore, State of Maryland, by which it is provided that no permit for the erection of any building may be given by the local authorities without the approval of the Building Inspector and the Mayor that its erection will not increase the fire hazard,



A DESIGN FOR THE IMPROVEMENT OF CHARING CROSS BY D. BARCLAY HIVEN & T. RAFFLES DAVISON

depreciate the surrounding land values or have a disadvantageous effect upon the general welfare of the residents in the immediate vicinity, we have included in our summary of the enactments on this subject all those which the writer, using the most diligent effort, has been able to get track of.

Essential Principles Involved.

What, it may be asked, are the important considerations to be borne in mind in seeking in America to utilize the police power to regulate the character of neighborhoods and to protect citizens in the enjoyment of residential districts free from the invasion of objectionable industries or occupations, and how can we so formulate our enactments that they will not be subject to adverse decision by our courts?

It will be seen from a study of the different enactments that have been described that they

lowed and specific industries are enumerated.

It has become an axiom, however, in legislative experience, that specific enumerations are extremely dangerous, for the very simple reason that the enumerator is apt to forget many points which should be enumerated and may possibly include in the enumeration things which are subject to attack. The California law illustrates this admirably.

In the Los Angeles ordinance it will be recalled that where the objectionable industries prohibited in the residential districts are enumerated we find among other things "any winery or place where wine or brandy is made or manufactured."

The question at once suggests itself, why exclude brandy and permit whiskey?

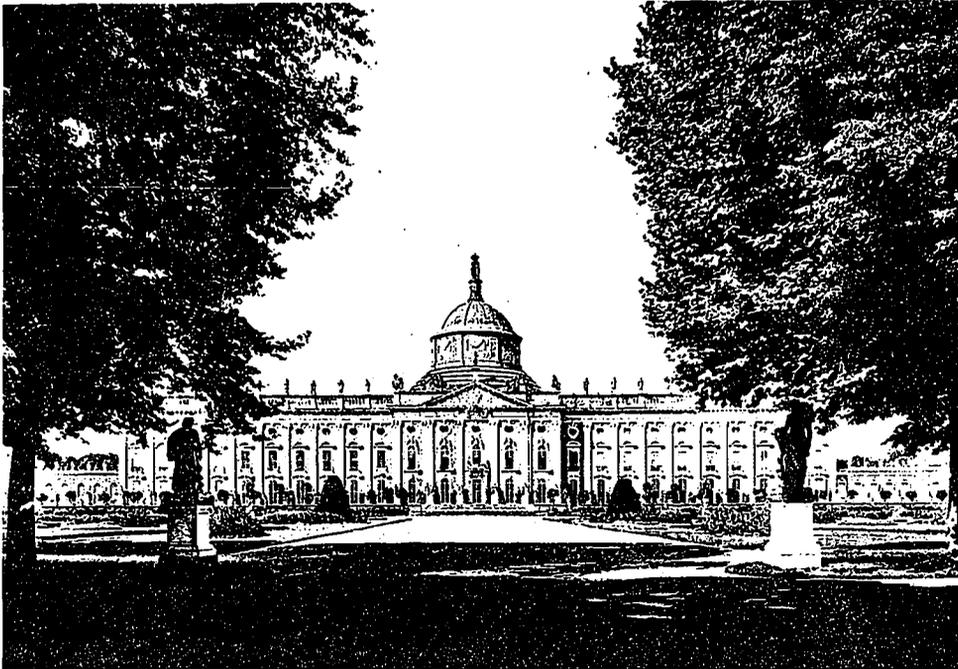
It may be that the author of the law had his individual preferences, but we submit that this should not be a controlling consideration!

Viewed from any point of view, the California enumeration or any enumeration has its weak points. How are we to treat under such a plan the case where a man has invested his money in an attractive dwelling with the idea of permanently living there for the rest of his days; then suddenly he finds his property values injured, the whole character of the street endangered, because someone has chosen to construct a small retail store in one of the houses? One store of this kind leads to another, and within a short time the residences are driven out.

The plan of enumeration would not cover such a case, unless the very general description were used of any place where anything is sold, but that would be too sweeping, as many important business transactions are consummated in private residences.

The writer questions also whether it would be possible in all cases to show that all of the industries enumerated in the Los Angeles enactment are in themselves dangerous to life, health or safety or injurious to the general welfare.

In the New York Second Class Cities Law everything but private dwellings and two-family dwellings and private garages or stables at the rear of the lot is excluded. In this Act no attempt is made to enumerate objectionable industries or objectionable uses of property in residential districts, but all uses other than for

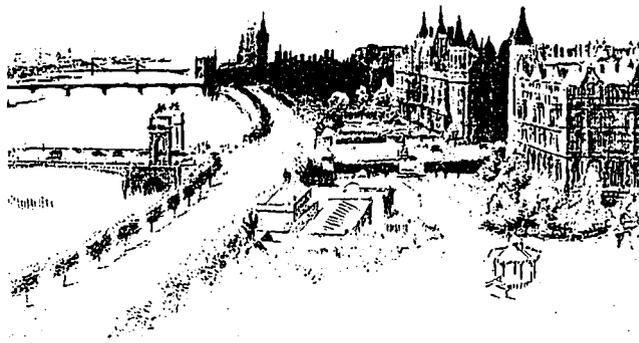
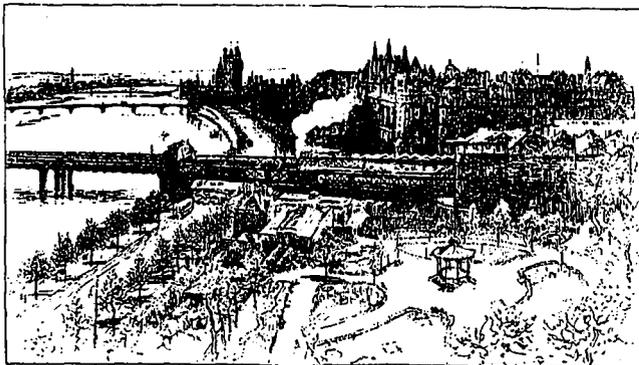


NEW PALACE AT POTSDAM.

differ in many respects and in some essential particulars.

In the first place, should we limit the industries or uses which we exclude from a residential district to certain specified ones that may be enumerated in the statute, or shall we prohibit all industries in our residential district and forbid there any use other than for purposes of residence?

In the California law we find that only those industries are excluded that are enumerated, and presumably only those are enumerated which the authors of the law believe can be shown clearly to be objectionable from the point of view of public health, safety, morals or welfare. In the Minneapolis ordinance and in the Milwaukee ordinance the same principle is fol-



EMBANKMENT GARDENS, LONDON, PRESENT CONDITION AND FUTURE SCHEME.

purposes of residence are by the Act itself excluded.

The Problem of the Multiple-Dwelling.

An important feature of this scheme which should not be lost sight of is carried out in the New York law, namely, the exclusion from strictly private-residence districts of huge multiple-dwellings such as tenement houses and apartment houses and hotels.

A similar objective was evidently at the base of the more recent Toronto enactments, as the ordinance of that city applies to the prohibition of tenement houses and apartment houses and public garages and stables.

None of the statutes which have been cited, neither the ordinance of California nor the laws of Wisconsin or Minnesota, will be of any value in the effort to keep apartment houses, tenements and hotels out of private-residence districts, as the laws of these States simply give to the local authorities in the cities affected the right to differentiate residential and industrial districts. The multiple-dwelling, either apartment house, tenement house or hotel, is of course a residential use of property, and such a building could not therefore be excluded.

It is of very great importance in many of our rapidly developing cities to keep apartment houses and hotels out of the private-residence districts and to discourage so far as we legally can the erection of multiple-dwellings. Notwithstanding its manifest convenience and great advantage from many points of view, the multiple-dwelling is unquestionably a source of detriment to the development of any city and interferes greatly with proper social conditions and the development of true civic spirit. A city cannot be a city of home owners where the multiple-dwelling flourishes.

Of course there are cities such as New York and some of the older Eastern cities where the multiple-dwelling is the chief type of house that we can expect to find at the present day in the future development of the city. Here, therefore, it will be necessary to distinguish between the prohibition of multiple-dwellings and the

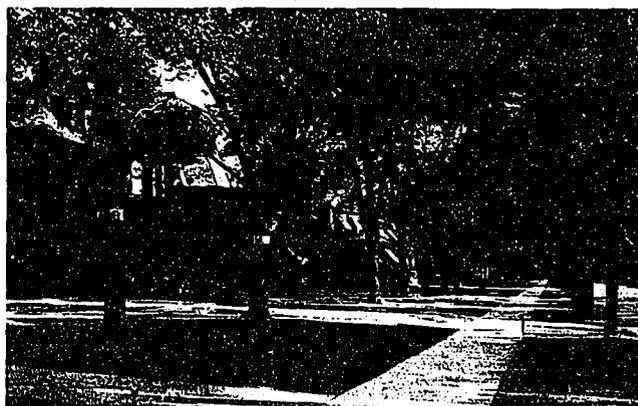
prohibition of industries. In working out regulations for New York City, for instance, the local authorities will undoubtedly have to deal with this somewhat puzzling question.

Thus we see there is a wide variance in the practice of the West and the East. Which is the better course to follow?

It depends very largely on how far we want to go. If we want to keep a residence district strictly for residence purposes, the method employed in the New York law is more likely to accomplish the result than the method employed in the Los Angeles, Milwaukee and Minneapolis ordinances.

From the point of view of sustaining such an enactment in the courts there is much to be said in favor of the latter provided the industries enumerated can be clearly shown to be injurious to health, safety, morals or the general welfare.

It is interesting and significant to note that the enabling Acts in all three States, namely, Wisconsin, Minnesota and New York, are couched in very broad terms and empower the cities affected to exclude from residential districts practically all buildings other than those used for residences.



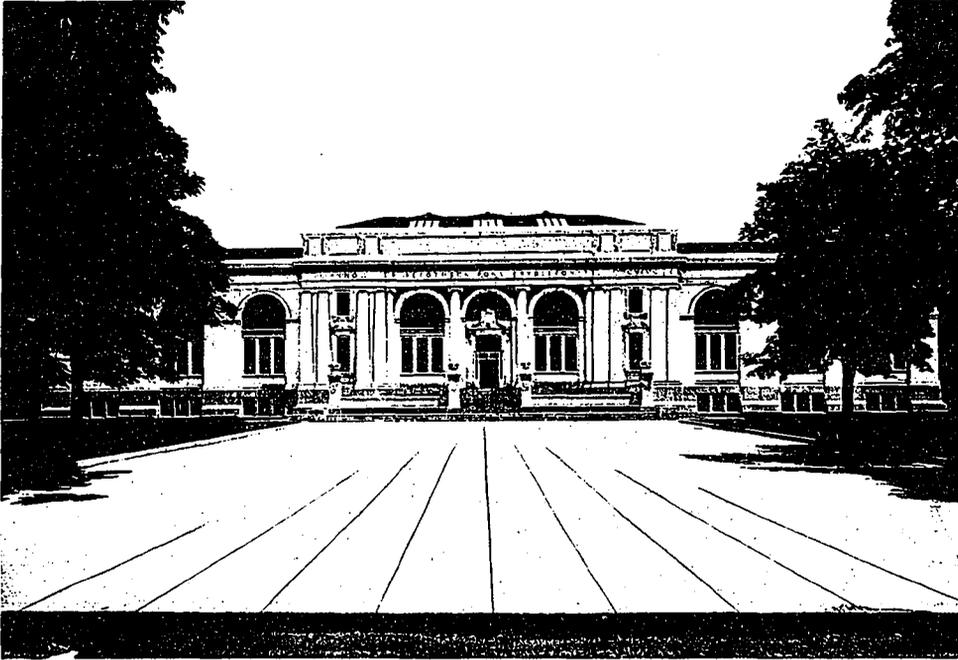
STREET IN BUFFALO.

Shall the Law be Retroactive?

The next question which confronts us, and one which is of great moment, is, shall our statutes be retroactive? Shall we reach back into the past and disturb industries or uses of

property which have been maintained for many years past? In other words, shall we, after a given date, no matter what the conditions, exclude from a newly created residential district all industries or objectionable uses to which property may be put?

This has been the method employed in Cali-



PUBLIC LIBRARY, COLUMBUS.

fornia. It is also the method employed in the Milwaukee and Minneapolis ordinances, but it should be noted that these ordinances in excluding certain industries from residential districts are limited solely to those industries which can be shown to be objectionable from the point of view of public health, morals or the general welfare.

Having, however, once enumerated these industries, they may not be maintained in the residential districts, no matter whether the industries were located there before the district was established or not.

The New York law does not go so far. It does not seek to affect anything but the future. It accepts the principle that, where a district has already gone and industries are well established, it is futile to attempt to save it for residential purposes.

It has seemed to the writer that we would have a far better chance of sustaining such enactments in our courts—certainly in our eastern courts, which are more conservative than those further west—if we limit the enactment to the future and do not seek to attempt to interfere with vested rights and interests already well established in the enjoyment and use of property for industrial and business purposes.

The Property Owner's Right to be Heard.

A third consideration of great importance is,

how far the residents and property owners of the district affected by the restriction shall determine whether such restriction shall apply. Here there are two elements of danger.

If the law permits the decision to rest solely with a majority of the property owners affected, there is likelihood of its being set aside by the courts on the ground that one group of property owners cannot deprive another group of property owners of the right to use their property in such way as they may wish.

On the other hand, we must be on our guard not to place the determination of this question solely in the local legislative body or permit it to act without giving the property owners whose interests are affected an opportunity to express their views and have some voice in the determination of the question at issue.

It is apparent, therefore, that both of these elements must be considered. The restriction to be valid must either originate with or have the affirmative approval of a substantial majority of the parties in interest whose property is affected. It must also have the approval of the Government, that is, of the local legislative body.

Geographical Boundaries to be Small.

Another important consideration from the practical point of view, if not so essential from the side of the legality of our plan, is that the plan shall be a workable one and that the geographical boundaries of the district affected shall be such as to give a scheme that will not unduly stop the progress of a city nor interfere with the development of business where business development is necessary and desirable.

It is because of the recognition of these considerations that it has been found necessary, as I understand the experience of Germany also indicates, to make the unit of the district extremely small. As has been already pointed out, in California the unit has sometimes been a single lot, and this is the case in some of the German cities.

For American practice the best unit seems to the writer to be one side of a city block. Anything larger than this is bound to cause trouble. It will not do to make the entire city block the unit of our residential district, because it is well recognized that we have in many cities condi-

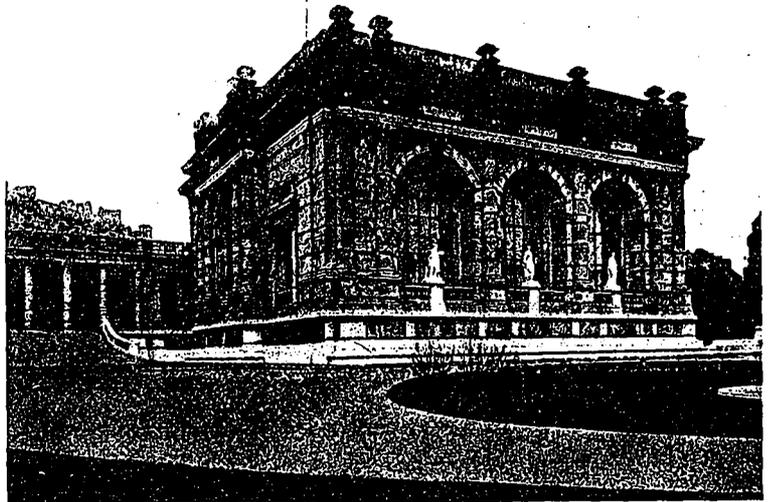
tions where one side of a block located on some broad avenue is best adapted for business purposes; in fact the only development that could be appropriately and profitably made at a given time on such a location is of that nature, whereas the other three sides of the block may be located on distinctively residence streets, and the most appropriate use for them is a residential one.

With the unit thus limited to one side of a block, it is possible to give to each part of a city the special treatment that it needs,—business in one case, residences in another.

Another important consideration from the point of view of workability is that the plan shall be flexible so that the industrial progress of the city may not be checked. It ought to be possible, therefore, to have the restrictions that are imposed removed or removable by as simple a process as the one by which they are imposed, and even in a residence district where the restrictions are in full force and effect it should be possible, especially in those cases where all industries are excluded, to permit certain industries with the consent of a substantial majority (two-thirds or more) of the owners affected and where the establishment of the industry is also approved by the local legislative body.

Attitude of the Courts.

Thus far the plan to establish residential districts has been tested in but few cases. The Los Angeles ordinance—the most drastic of all, and the pioneer as it happens—has been tested in three important cases, all of which went to the highest court in the State of California, the Supreme Court of that State. In all these cases the law was strongly sustained. The cases are



THE MUSIC GALLERY, PARIS.

important ones. They are known as
ex parte Quong Wo (161 Cal. 220; 118 Pac. Rep. 714).
ex parte Montgomery (163 Cal. 457; 125 Pac. Rep. 1070).
ex parte Hadacheck (132 Pac. Rep. 589).

In all of these cases the court took so broad a view of the police power and laid down principles of such far-reaching moment to all American cities that one is tempted to quote at length from these decisions, but limitation of time does not permit. Those who are interested in this subject will find in the references cited a most interesting study.

In the first case, that of *Quong Wo*, the issue involved was the right of a Chinese laundry to be maintained in the residential district. The laundry had been there for many years before the district was established, but the court held that the industry could no longer be maintained.

The *Montgomery* case involved the right of a lumber yard to be maintained in a residential district. Here again the ordinance was sustained and the lumber yard discontinued.

In the third case, the *Hadacheck* case, the industry involved was that of a brickyard. Here the petitioner was able to show that the land contained valuable deposits of clay suitable to the manufacture of bricks and much more valuable for brickmaking than for any other purpose, that the owner had through the entire period of his ownership used the land for this purpose and had erected on it the kilns, machinery, etc., necessary for such manufacture, and that the brickyard had been established at that location for a number of years prior to the establishment of the residential district.

Notwithstanding this strong position of the industry affected, the court held that it could not be maintained longer in



THE WALTERS MUSEUM, BALTIMORE.

the residential district and that the ordinance was valid. In its decision the court said that the police power was not only for the suppression of nuisances, but that "it extends to and includes the regulation of the conduct of all business and the use of property to the end that public health or morals may not be impaired or endangered."

These striking and important decisions, sustaining and broadening our conceptions of the police power, have been a source of great comfort and encouragement to the writer of this paper, who, however, has had his buoyant optimism somewhat diminished upon being informed by some of his legal friends in the East that it is not safe to follow the decisions of the California courts, as they are not esteemed highly by the legal fraternity. We trust that this may prove to be a sectional and narrow view of fundamental principles of human liberty.

The Canadian enactments, I am informed, have also been tested before the courts as to the validity of the by-laws, which have in each case been sustained, though no case has been of sufficient importance as yet to warrant its being carried to the higher courts. In the United States no case has gone to the United States Supreme Court.

So much for the decisions sustaining laws of this kind. Two adverse decisions have also been had. The one in the case of the Grand Rapids ordinance already referred to and tested only by a local court, and a more recent decision with reference to an ordinance of this kind enacted by the city of Chicago without specific grant of power by the legislature, where an effort was made to prevent the establishment of retail stores in a residential district under the general nuisance power (Ill. Supreme Court, *People v. City of Chicago*, 103 Northeastern Reporter, 609).

To Sum Up.

I think it must be evident to the unprejudiced observer, from a consideration of the above facts, that a new use for the police power has been discovered and that it is possible to protect residential districts from the invasion of objectionable industries and to preserve to the

inhabitants of those districts the enjoyment of their homes and property under rational conditions of human existence.

In seeking legislation of this kind, however, there are certain important considerations which should be followed if we wish to succeed.

First, we must have a broad enabling grant of power from the legislature authorizing the individual city or a group of cities to establish residential districts.

Second, we may prohibit outright in such residential districts all uses of property except for strictly residential purposes, or we may enumerate certain industries that we desire to have excluded from such districts.

Third, if we desire to exclude large multiple-dwellings such as tenement houses, apartment houses and hotels from private-dwelling districts, we must so draw our enactment as to exclude everything other than private dwellings or two-family dwellings, or we must exclude such multiple-dwellings by specific enumeration.

Fourth, wherever we make any specific enumeration of industries that may not be permitted great care must be taken to enumerate only those which can be shown to be injurious to health, safety, morals or the general welfare.

Fifth, it is better not to make our laws retroactive, but to concern ourselves only with the future development of the neighborhood.

Sixth, we must not place the final determination with regard to the establishment of districts solely in the hands of the property owners affected, nor on the other hand must we leave it solely to the local legislative body. Both elements must have a right to be heard in the determination.

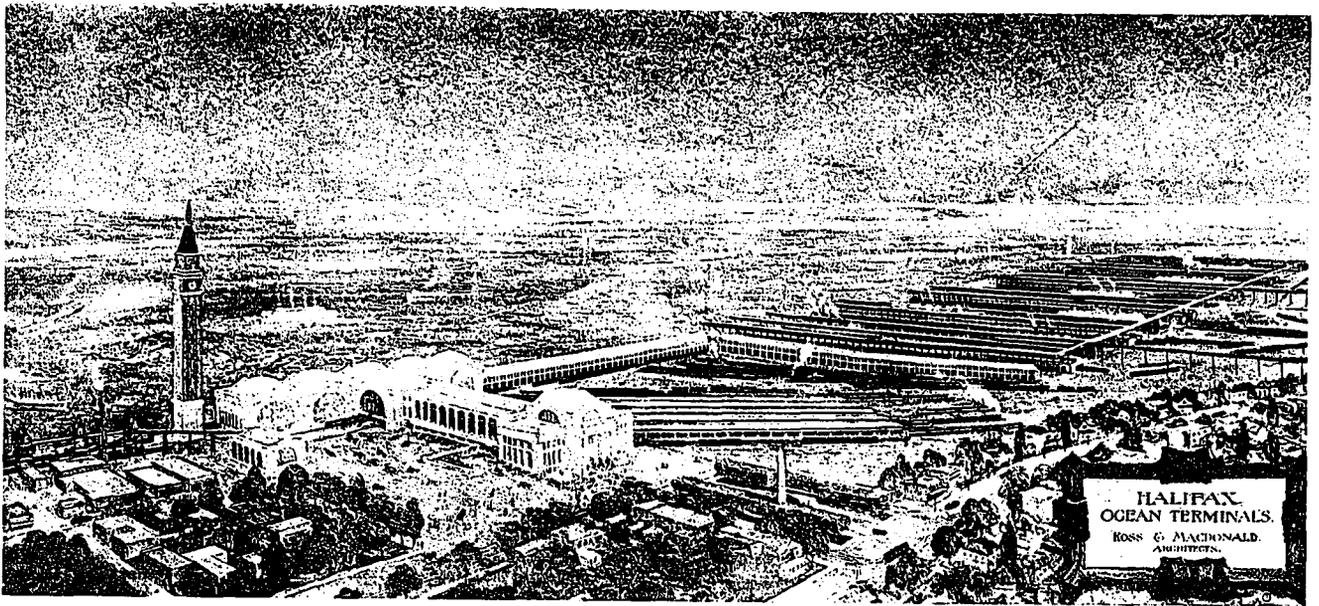
Seventh, the geographical boundaries of the district must be small so as not to interfere unduly with the commercial development of the city.

Eighth, the plan of operation must be flexible and the restrictions imposed removable by as simple a process as the one by which they were imposed.

If these considerations are followed it is believed that laws of this kind can be made even judge-proof.

WHAT CITY PLANNING IS.—City planning is an effort to promote urban efficiency by the closest practicable adaptation to function in the city's every part. Such adaptation involves pleasantness of aspect because the city serves life and is a home as well as a workshop, and it involves physical and social fitness as well as commercial and industrial efficiency, partly because there could not be maximum economic efficiency, without such aids.—*Charles Mulford Robinson.*

WHY CITY PLANNING PAYS.—However varied and successful the industrial activities of a city, the basis of its continued prosperity and the most vital community dividend which its manifold energies are producing is a citizenship content with its standards of working and living. It is good business to increase directly this community dividend. It is good business to decrease the cost of maintaining and extending the city's plant by putting an end to wasteful processes.—*Flavel Shurtleff.*



Halifax Ocean Terminals

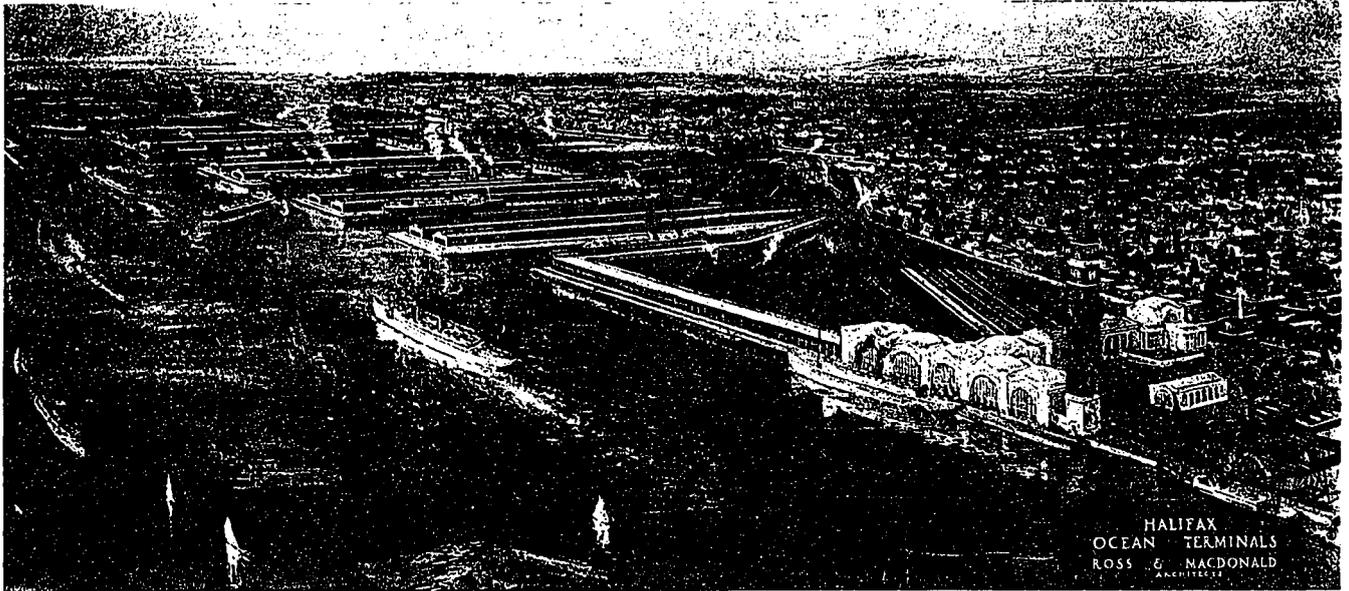
GENERAL preliminary plans in connection with the new ocean and railway terminals at Halifax have been submitted by the architects, Ross & Macdonald of Montreal to the general manager of the Canadian government railways. These plans illustrate the general arrangement for the handling of passengers and freight and the facilities provided for the transferring of passengers, baggage, mail and express to and from railway trains and steamships as well as for the provisions for the handling of local Halifax city traffic.

The general scheme consists of a passenger station building in the shape of a large letter "T," the foot of the "T" being at the shore end, and the head at the steamship landing stage. The shore end of the building provides accommodations for the local Halifax traffic and contains ticket offices, baggage and parcel checking rooms, restaurant and lunch room, women's and men's retiring rooms with toilets, and provision on the upper floors of the building for office space required by the railway and steamship lines. This portion of the building which will be known as the Halifax City Station will face on a plaza located between South and Tobin Streets, the plaza extending from Pleasant Street east to the front of the station building about 400 feet in depth. A place for cabs is provided on the north with access to baggage checking room and to ticket lobby. Passengers on entering the building will find all the facilities they require for transacting their business, after which they may pass on to the train concourse or train waiting room.

The general plan provides a landing stage approximately 2000 feet long, which is divided into three parts, the northerly third being set apart

for the active handling of passengers baggage, mail and express, the remaining two-thirds being devoted to the handling of cargo. It is upon this northerly end of the landing stage that the top position of the "T" shaped building is placed.

Passengers disembarking from steamships, will enter the building at the second story level. Passengers' baggage will be discharged at the same level and will be distributed in the usual way for customs examination. After baggage has been passed by the customs and then checked by the railway company it will be transferred to the floor below by means of chutes or elevators to a distributing baggage room from where it will be routed to cars according to destination. Mails will be discharged directly from the steamship to the lower level of the steamship passenger building to a distributing mail room from where they will be transferred to cars according to destination. After passengers have landed and passed their baggage through the customs they will enter into a booking hall containing ticket offices for the railway and steamship lines. Here they may obtain railroad checks for their baggage, secure their tickets and attend to other matters of transportation which they may find necessary. They will then pass into the train concourse or train waiting room, which room connects the steamship station with the Halifax City Station and forms the stem of the letter "T" as stated above. The train concourse is designed for the common use of the Halifax city traffic and the steamship passenger traffic. The floor of this room is placed on a level with the second story of the steamship passenger building, and is also level with the ticket lobby floor of the Halifax city station. The



passengers' platforms of the train shed are placed at a level between the train concourse and the baggage room beneath. All stairways have been eliminated between the train concourse level and the passenger platforms, the people reaching the platforms by means of easy inclines. Separate tracking platforms for baggage trucks are provided and these connect with the baggage room beneath the train concourse by similar inclines but separate from the passenger inclines thus avoiding all confusion between passengers and baggage.

Large provisions are made for the large number of immigrants which are expected to come through the Port of Halifax while detention rooms and offices are provided for the various Government officials connected with the immigration work, as well as separate lounge rooms, lunch rooms, sleeping rooms, toilet rooms etc.,

for the immigrants themselves. These rooms are not directly connected with the other portions of the station building.

The general arrangements contemplate the erection of a separate power house for the furnishing of heat, light and power for all the buildings connected with the terminal project, a grain elevator for the handling of grain from cars to steamboats and large track provisions for handling of freight to and from the pier sheds.

The construction of the sea walls of the landing stage and the first pier has been let and the work is now under construction. The architects are at present preparing plans for all the work in connection with the buildings to be placed upon these piers. The use of local materials is contemplated as far as possible, including granite, sand-stone, brick and concrete.

CITY PLANNING AIM AND PROCEDURE.—City planning is the name given to the science and the art of providing for the most practical and agreeable development of a city or town. It would prevent the recurrence in newer districts of the mistakes of the older. It would profit by that which time has proved worth while in the experience of any city. It would diagnose the troubles of a community from all points of view; social, political, economical, esthetic. It would prescribe the remedy best suited to the particular needs of the case, with a view also to preserving the individuality of the community. It would determine the relative urgency of the various needs, and plan a consistent programme of procedure covering every phase of the subject. It would concentrate on these matters in turn and get concrete results.—*George B. Ford.*

CITY PLANNING.—City planning is the orderly adaptation of all parts of a city to their proper function. It involves governmental foresight and control. The logical essentials of city planning are: 1. The districting of the city into zones in which buildings may be of various heights or number of storeys, and cover a varying proportion of the site; i.e., the determination of the cubage or volume of buildings. 2. Street construction and surface and subsurface maintenance. 3. The provision of cheap, safe, rapid and comfortable means of transportation for passengers. 4. The restriction of the location of factories, and the provision of means of handling freights and of docks and harbors in coast towns. 5. The reservation of sites for parks, playgrounds, open spaces, public buildings, etc. 6. The incorporation of adjacent territory.—*Benjamin C. Marsh.*

Rapid Transit

Provision for Future Rapid Transit: Subway, Elevated or Open Cut, and Their Influence on the City Plan

JOHN VIPOND DAVIES

THE title assigned to me as the subject of this paper introduces such limitations that it is necessary to some extent to break away from a strict adherence to it in order to obtain a little perspective which one is unable to get at close range.

The term "Rapid Transit" itself, as applied to the great problem of city passenger transportation, has come to be used with the idea that it will provide the solution of all the difficulties of travel incident to the concentration of population in the great cities, while it is essentially only one element in this great problem. The title of this paper, "Provision for Future Rapid Transit," etc., appears to indicate that the city plan under consideration has not yet reached a point where so-called rapid transit is necessary or essential, and that, therefore, the actual need has not yet been reached; consequently, it would appear that to consider such a subject, the logical way must be to obtain the conditions that have been reached in great cities which have attained a position requiring such facilities, and to work backward through the development period in order to arrive at what should be considered for the future needs of an embryo city.

The development of all big cities of the world has been dependent on transportation. The early cities were, with hardly any exception, built on waterways where the water furnished the means of transportation, and even in the development of New York City, the original city plan was laid out with the east and west streets running between the North (Hudson) River and the East River at frequent intervals, because the means of transportation was by those rivers, and the increased facilities for inter-communication from side to side were considered of superior importance to the longitudinal movement which it was then believed would always remain upon the waters of the North River and East River.

When we consider that the first practical locomotive engine (The "Rocket," built by George and Robert Stephenson) made its first trip on October 6th, 1829, and that the first railway operating as a common carrier (The Liverpool & Manchester Railway) was opened January 1st, 1830; and that Fulton's first steamboat was only built in 1807, we can appreciate how short a time it has been since this whole question of modern transportation has come forward for consideration.

At the present time, and entirely apart from water transportation, there have developed various classes of the transportation business, and these various classes are inseparable and cannot be considered in any way excepting in their relation one to the other.

It is not the purpose of this paper to consider at all the question of freight transportation, but at the same time, that portion of a railroad's business is inseparable from the operation of what is commonly known as the "steam railroads," irrespective of the fact that in a number of instances, owing to local conditions in and about big cities, steam is being replaced by electric power for operating purposes. Nevertheless, the so-called steam railroad is as different in its characteristics from the so-called rapid transit proposition as the latter is in turn distinct from the surface street railroads. It is the primary function of the steam railroad to connect the populous centre with the outside world, thus providing the means for subsisting, and supplying a concentrated population in a limited area, and the steam railroad brings the city into touch with the outer world and brings the outer world to the city, and yet at the same time such steam railroads can, and must continue to, handle a very large share of what is usually described as rapid transit business, and such rapid transit service is one of the functions of the steam railroad within suburban territory.

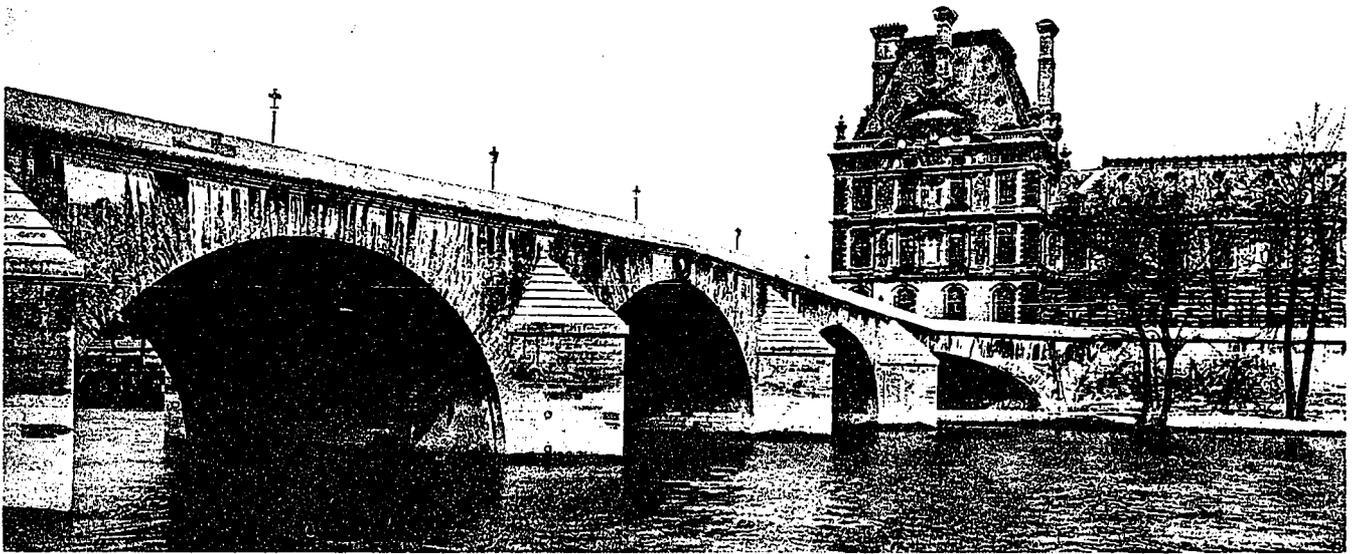
The function of the street surface railroad is that of distribution within limited areas of the population, and as the population spreads and the distance and time for distribution become greater, it is obvious that a point is reached in the evolution of a city when some means of quicker and more rapid handling of passenger service becomes necessary, in order to extend the radius and area of the urban district for distribution of the population over a greater territory.

It is well, at the outset, in considering a subject of this kind, to understand clearly what transportation is to a community and no statement will make this more clear than to say that in countries like Canada and the United States the investment in, and magnitude of, the business of providing and operating transportation facilities are second only to the agricultural industry, and far in advance of any other industries whatsoever; and while this applies to countries like Canada and the United States, it ap-

plies far more so in countries where agriculture is of less importance than it is on this continent.

Our very existence depends on transportation and the ability of our cities to expand under modern conditions of business necessities as the first requisite, passenger transportation, and obviously in every great city the amount of time consumed in travelling by each individual to and from his place of business, constitutes an excessively large percentage of his total day. There should, therefore, be allowed only a reasonable portion of the day for the actual travelling to and from the place of business, and the average speeds of transportation by the different classes of transit facilities, given herein-

have been laid out in the beginning on a definite plan, has proven that what was anticipated on the original layout to be the commercial centre of the city, has developed very differently. There is, however, one thing which is certain and that is that the centre of development of the commercial district of a city will be permanently fixed by the transportation facilities which can be provided to the district, as only by such transportation facilities can the commercial population of a city be daily moved inwards and outwards, and in order, therefore, to retain a commercial district within a city, it is of prime importance to provide it with all the various classes of transportation service which will en-



PONT ROYAL, PARIS.

after, will be instructive and helpful in arriving at an understanding of the territory which can be properly served by a street surface system before there becomes any necessity for the introduction of rapid transit service. A city in its beginning is merely a village, and as the original owner of the property has to give up a certain land area for the first thoroughfares, and as the town expands more and more land has to be given or acquired for public necessities of streets, the problem which we most have to consider in connection with the rapid transit proposition is not so much the original planning of the village, but the replanning after the city has grown to such proportions that its residents consider that they have reached the period at which they are entitled to more and better transportation service. This is the case when the travelling distance and the time taken in daily travel by an adequate mass of resident and commuting public, warrant the heavy expenditures necessary to produce such facilities. It is impossible in the early days to prophesy what the development of a city will be, and Washington, which is one of the few cities of the world that

able it to attain that position and to retain it with all the changes which may come about in the city's development.

In the early days of a city's growth real estate may be of comparatively little value, and yet to provide broad streets and open spaces in the early days of such a city's development may be a very costly thing in the end, and it may prove very much cheaper and most satisfactory to wait until the growth of a city has proved its necessities and then, at higher prices, purchase such rights of way and property as are needed for replanning purposes, than in the first instance for a community to burden itself with an investment for such purposes, even at a comparatively small price, and carry the interest charges on such an investment throughout the city's growth. This is conspicuously illustrated by the fact that if the \$24, which was paid by Governor Minit to the Indians for the whole Manhattan Island, could have been invested at compound interest, it would have now reached a value of over \$400,000,000.

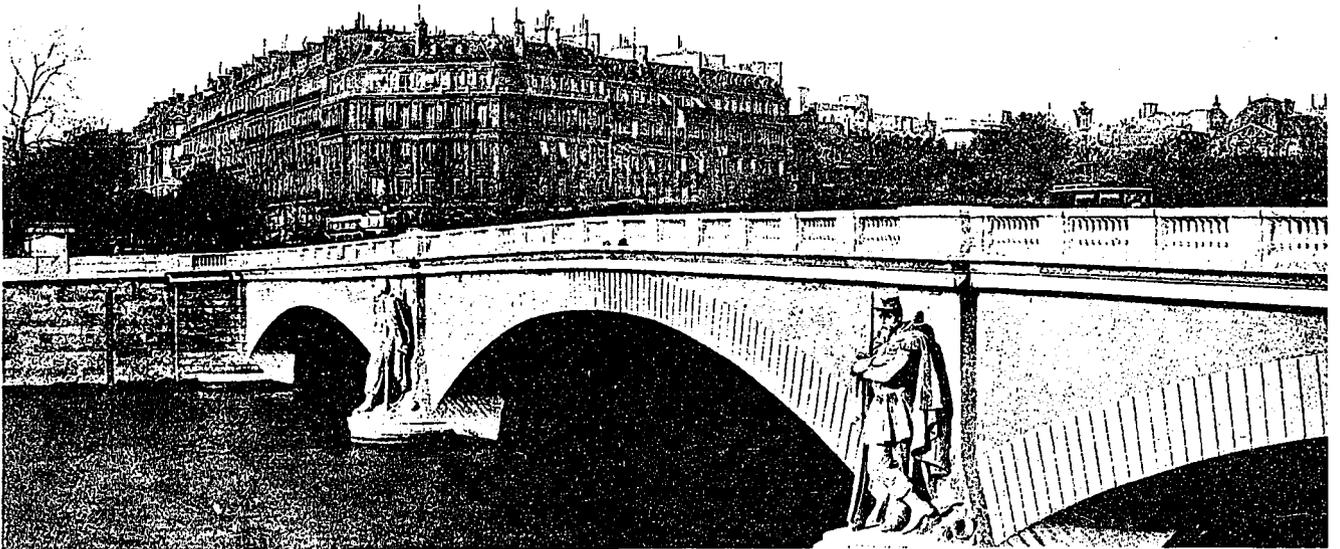
In the evolution of a great city it sometimes occurs that districts in different localities, often at considerable distance apart, by reason of racial characteristics, business relations or

otherwise, necessitate direct inter-communication in no way related to the commercial centre, and consequently the provision of through arteries of travel connecting such districts, becomes desirable, for which no anticipatory city planning will have provided. The general and usual necessity, however, for rapid transit is undoubtedly on radial lines to and from the commercial district and the outlying residential or manufacturing districts, although, as population distributes there becomes a necessity for such service across these radial lines, though there is not the same urgent necessity for high speeds of operation.

Because the development of a grown city has proved its original plan to be inadequate, it is not by any means an indication that such planning or development has been haphazard. One of the troubles with us is that we are trying to solve in a decade the whole transportation problem of cities which have required hundreds of years to build up.

There is no question that for any of the various types of structures to provide rapid transit facilities, broad and straight streets, passing

work. In Europe they had a different proposition, for when these steam railroads were built the cities were already old and established, and there was present assurance of business accruing. Consequently, in Europe, the railroads were for the most part constructed on masonry viaducts above the grade of streets or on solid embankment. Had such expensive methods been necessary here, the roads might never have been built and many of our big towns would have remained villages. The proper treatment of these grade elimination problems is very complicated and largely dependent on local topographical conditions, but the treatment of such should have prior rights over any new development solely for rapid transit purposes, because the steam railroad problem is less elastic and much more limited by operating and construction conditions than a purely rapid transit road handling passenger service. In any case, in the reconstruction of such steam railroads in relation to the replanning of a city of the first rank, they should never be considered for installation of less than four operating tracks; so as to enable them to take their place in the evolution of



PONT DE L'ALMA, PARIS.

through the commercial centre of a city, are not only of great advantage, but they are practically essential and necessary, both for the growing necessities of the surface traffic and for the installation of such structures as are needed for the later rapid transit facilities.

In the more detailed consideration of the types of structure for providing for rapid transit, the presence of the original steam railroads on private rights of way at surface grade, must not be lost sight of. They have been the means by which the village has arrived at the rank of a city and attained the dignity of having under consideration the question of rapid transit, and one of the first necessities will be the treatment of, or reconstruction of, that steam railroad. All our large cities are actively engaged in that

the rapid transit needs, and the structures should, as far as possible, be by masonry viaducts or in open cut, whether the depressed line remains open or is covered over. If steam engines operating through service are requisite factors, then the improvement should be open, but if it is of sufficient magnitude to warrant installing electric power, then a covered subway is desirable. At the same time, elevated steel structures have been successfully used and for the Atlantic Avenue Improvement in Brooklyn (Long Island Railroad), owing to the inability to finance a subway throughout, I devised a composite scheme, taking advantage of the topographical conditions existing, in part subway

and in part elevated railroad, which has worked well. In this connection it is worthy of note that it does not necessarily follow that adjacent property will appreciate in value by such elimination of grade crossings. These improvements are of immense value to a community and reduce risks of personal damage and remove necessary, but real, nuisances, but in the case of the Atlantic Avenue Improvement in Brooklyn, or Railroad Avenue, Jersey City (Pennsylvania Railroad), or numerous other such instances, there has been little evidence of any real property improvement.

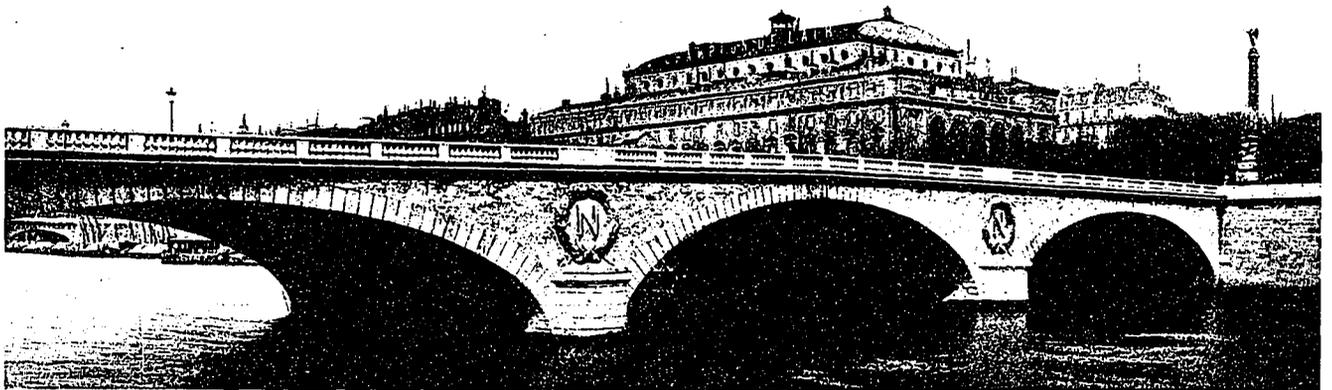
The provision for new rapid transit railroad construction, whether undertaken by public funds or by private capital, must be considered on practical lines with consideration of the cost and value of the types of construction, concentration of population, and general topography of the city and territory to be served.

Generally speaking, it can be assumed that a properly built railroad track, whether on the surface, or viaduct or steel structure, or in sub-way, is capable of doing only the same passen-

ture alone without equipment, say \$500,000 per mile of double track, would have to haul at a 5-cent fare, 910,000 pay passengers to pay interest charges on its expenditure for that structure, and, if equipment were included, would have to haul probably 1,400,000 pay passengers per annum.

It will help materially in this consideration to have clearly stated the approximate relative costs of producing different structures, and the following figures are given as average costs for construction of structures and the installation of structural equipment, but without power or rolling stock. They do not include the value of property for rights of way or easement and are given on the basis of constructing a double track railroad in each case, although reduced to the cost per mile of single track:—

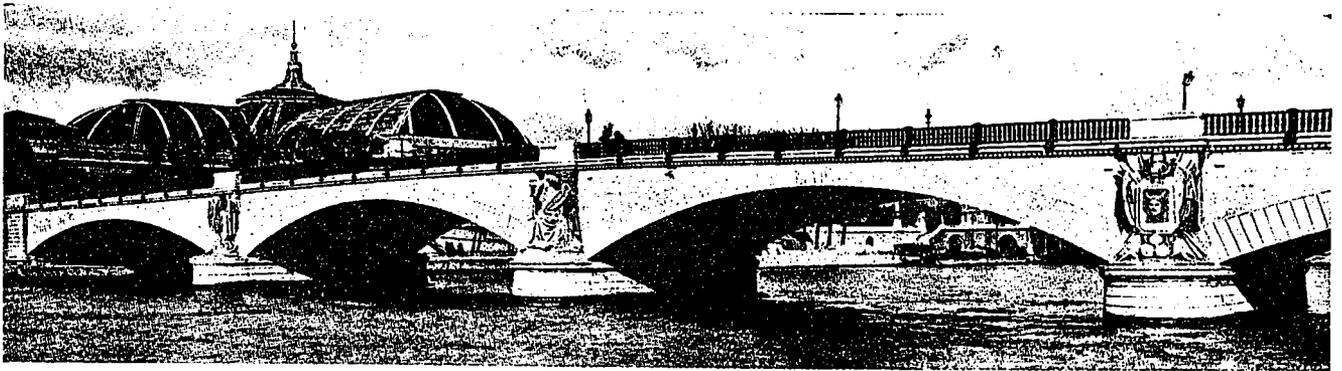
Types of structure	Cost per mile of single track.
Trolley railroad in suburban district, either on public roads or private right of way where no paving is required; complete with overhead	



PONT AU CHANGE, PARIS.

ger business, or, in other words, can serve to operate the same number of persons per hour; and, further, that the operation and maintenance, including depreciation and all other charges, will, if a road is doing a reasonably full business, use up about 45 per centum of its gross income; the remaining 55 per centum being available to pay the interest charges on the capital invested. It, therefore, can readily be seen how important it is with light traffic, to keep the cost of construction and equipment low, considering that for a complete operating structure, such as the Interborough Rapid Transit Subway in New York, consisting in part of subway and in part of elevated structure, it is necessary to haul more than 2,000,000 pay passengers per annum per mile of single track to meet fixed charges for structure and equipment; or, as an illustration, a road which would cost, for struc-

trolley construction, track bonded; all in operating condition	\$ 25,000
Trolley railroad on city streets, including asphalt or granite block pavement for width of tracks and 2 feet outside of tracks; complete with overhead trolley construction, track bonded; all in operating condition	41,500
Underground trolley railroad in congested streets of a city, including necessary pavements, conduits, etc., and with reasonable allowance for changes of subsurface improvements:	
New York	126,500
Washington	48,500
Elevated railroad of a type and for the loading permissible to meet requirements of Public Service Commission; complete with stations,	



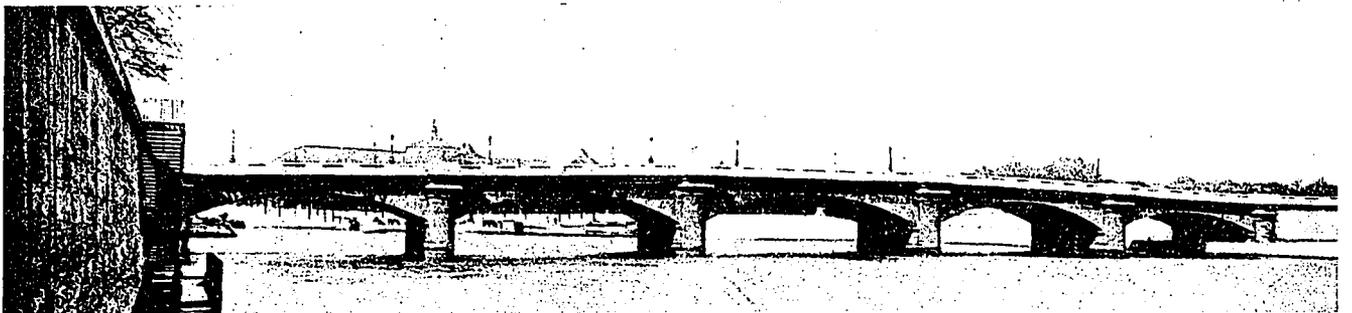
PONT DES INVALIDES, PARIS.

contact rail, ties and track; averages	113,000
Railroad in open cut similar to Sea Beach Railroad of Brooklyn Rapid Transit Company in Brooklyn where work is executed with steam shovel and with concrete walls; averaging cost of bridges and stations as part of the cost; complete with contact rail, ties and track; averages	225,000
Railroad on masonry viaduct filled in with stone ballast, similar to structures now being erected on Queen's Boulevard from Queensboro Bridge to Greenpoint, on Long Island, New York; complete with stations, contact rail, ties and track; averages . .	330,000
Subway such as the 4th Avenue Subway in Brooklyn where work is unaffected by subsurface improvements, where the digging is easy and can be done with steam shovel and under typical ideal conditions, complete with structural and track equipment; averages	402,000
Subway such as the Broadway Subway now being constructed in New York City, where the work is very difficult and involves extreme interference with subsurface improvements of all kinds, the support of street surface, trolley car tracks, underground trolley construction, etc.; complete with structural and track equipment; averages	1,190,000
Iron lined tube tunnels under waterways or below water level; complete	

with structural equipment and track; averages 2,700,000

In connection with the above table of costs, the difference in the first cost of constructing improvements in a city like Washington, where the soil is advantageous to excavate, where the streets are broad, and where there is no difficulty in changing subsurface improvements, is in marked contrast to the cost of executing similar work in a city like New York where the material to be excavated is most difficult, where the streets are congested, and where there are numerous and extensive subsurface improvements to be cared for.

In the matter of speed of operation of improvements under these varying conditions, it is well to bear in mind that for street surface railroads in congested portions of great cities, the average speed does not exceed 8 miles per hour. In the less dense districts of a city this speed is increased to 11 or 12 miles per hour, but the average speed for street trolley railroads in cities will not exceed 9½ miles per hour. Similar electric trolley service in outlying districts on private right of way will average somewhere between 12 and 15 miles per hour. Local service on elevated railroads or subways or in open cut, with stations approximately 1,200 feet apart, will operate at an average speed of about 15 miles per hour. Express service on subway or elevated railroads or in open cut, with express stops spaced about 2 miles apart, will operate at an average speed of about 25 miles per hour, while steam railroads operating



PONT DE LA CONCORDE, PARIS.

rapid transit suburban service, with stops at longer intervals, have an average operating speed of 30 to 35 miles an hour, depending on the district served and the frequency of stops.

The spacing of stations on any type of rapid transit railroad is an important factor as affecting train operation and development of the district. The demand by operating railroad officers, in the interest of the general travelling public, is to increase the length between express stops and so increase the average speed, and, at the same time, to throw increased and more

1. *Tube Tunnels*: In cities where the underlying soil is sand, clay, silt, or other water-bearing material, below tidal or river levels, or under conditions where construction must be carried on without breaking the surface of streets, tubular tunnels, usually carrying a single track within each tube, are built by use of a shield and the lining constructed of cast iron or steel segmental plates. This type is used also for passing under rivers or waterways where no other type of structure is equally advantageous. The great advantages consist in the ability to



PONT DE ALEXANDER III, PARIS.

equitable burden on to the local lines. On the other hand, the constant demand by real estate promoters is to ruin the entire high-speed express service by introducing frequent stops on the express lines, thereby, to a large extent, reducing the express service to a little better than is provided by the local trains.

For the best operation and to stimulate growth in outlying districts, no high-speed service should have stations at nearer intervals than 2 miles, and preferably 3 or 4 miles, in the territory immediately between the concentrated commercial centre and the outlying suburban sections.

The increase in travel in relation to the population of cities, as illustrated by New York, indicates the growing necessity for constantly increasing facilities by all classes of transportation service. In New York City in 1860, by all means of public conveyance, there were only 43 rides per head of population per annum. In 1870 this figure had increased to 100; in 1880 to 150; in 1890 to 230; in 1900 to 247; in 1910 to 322; and the most recent figures indicate about 360 rides per head of population per annum during the last year. Somewhat similar figures hold good for Paris, London and Chicago, and to a large extent this increase has been occasioned by the increased transportation facilities provided for the public.

The various types of structures which have been developed for rapid transit service include:

construct on any alignment without breaking through the surface, so that work may be carried on in crowded districts with entire ignorance on the part of the public that any work is in progress. The type has, in operation, practically all the advantages the subway has, and is a self-contained structure, having excessively thin walls and consequently can be utilized in narrow thoroughfares and in the worst conditions of soil, and, under those conditions can be made strictly watertight.

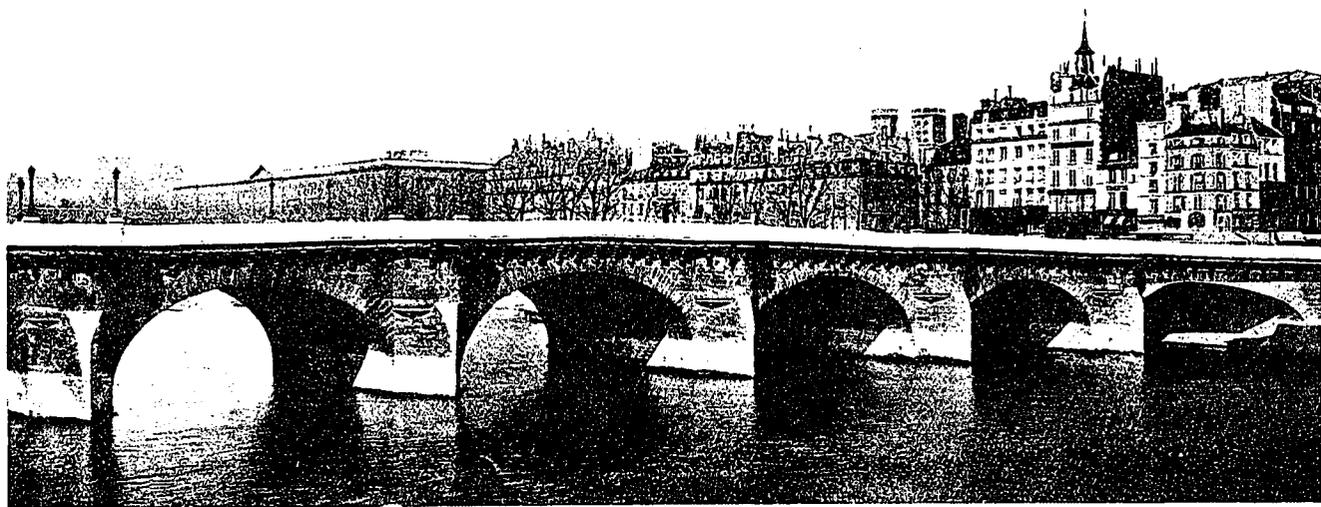
2. *Subways*: By subway is meant construction in the open of a railway below surface grade and the structure covered over so as to restore intact a continuous street surface. According to the difficulties of construction, this type may be more or less expensive, but even in the cheapest form, with ideal conditions, the cost of producing such structures is so great as to warrant its being used only in districts where the population has reached a condition of practical saturation, or in commercial districts where the population has to enter or leave in large numbers. There is no doubt that the subway provides ideal means for conducting transportation under such conditions where the cost can be afforded and where the volume of traffic warrants. It is exempt from all difficulties due to climatic conditions. The equipment is protected and there are no interferences from exterior conditions. The surface of the ground or of the streets remains intact and is free for any development required for street conditions. The extension of subways into deep level tunnels provides almost

endless possibility for the development of rapid transit to the utmost limits of the city's growth, as tunnels may be constructed in tiers, one below the other, and irrespective of local surface topography; and, as a matter of fact, can be located without regard to street locations by passing under private property upon easements for transportation purposes only. Before this point is reached it may be necessary to evolve a better understanding as to the value of easements at depths below the surface where the surface property is not in any way interfered with or disturbed, which will enable a railroad to acquire such easements at reasonable cost and expense and thereby enable it to construct lines for high speed rapid transit service at reasonable expense. In the ultimate growth of the greater cities these lines will become of increasing advantage, as thereby means can be provided for stations in congested districts, and, by dipping down to considerable depth, such a railroad can be extended to the suburban district for many miles without coming near the surface to interfere with any other development, and so produce a truly express rapid transit service.

3. *Open Cut*: The open cut method of construction of rapid transit facilities necessitates gravity retaining walls and construction at a depth which will permit highways to be bridged over such open cut. This method of construc-

posed to and interfered with by extreme conditions of weather. One great advantage of this type of construction over an elevated railroad is the comparative quietness with which the railroad service can be operated, and since the modern electric motor and railroad car have reached a point reasonably near perfection, the elimination of any further noise is a most desirable feature, and is one of the directions in which engineers are now working to improve transportation facilities. The extension above the retaining walls of an open cut structure of solid fences, reduces the noise effect so that an electric train operating in the open cut is quite unnoticeable. Such a structure, however, must of necessity be located on private property.

4. *Viaducts*: As above stated, the development of viaducts with masonry and solid fills, was the earliest type of construction of steam railroads through European cities. As applied to a street, it is very questionable whether it is a desirable type of structure, as the masonry and piers have of necessity to be very massive, and unless the street is of extreme width, it forms a serious obstruction to the ordinary surface uses of such a street. A masonry structure, properly designed, may be artistic and improve materially the appearance of a thoroughfare if it is broad enough, but for a private right of way, such a masonry structure or solid embankment, with bridges for the intersecting streets,



PONT NEUF, PARIS.

tion has been used extensively in many cities and places for the elimination of grade crossings of existing railroads. It has an advantage over a subway in the matter of first cost due to the fact that usually such work can be constructed with steam shovel, if on private right of way or where the intersecting thoroughfares can be obstructed. There is an advantage in this type of rapid transit facility in that it gives to passengers natural light and fresh air, which is not the case with subways. At the same time, in northern climates, there is the disadvantage of being ex-

posed to and interfered with by extreme conditions of weather. One great advantage of this type of construction over an elevated railroad is the comparative quietness with which the railroad service can be operated, and since the modern electric motor and railroad car have reached a point reasonably near perfection, the elimination of any further noise is a most desirable feature, and is one of the directions in which engineers are now working to improve transportation facilities. The extension above the retaining walls of an open cut structure of solid fences, reduces the noise effect so that an electric train operating in the open cut is quite unnoticeable. Such a structure, however, must of necessity be located on private property.

5. *Elevated Railroads*: The elevated railroad, constructed of steel, serves a function which it would be difficult to replace. The first cost of such a structure is reasonable and its application to surface conditions is remarkably easy.

A solid track floor of reinforced concrete increases somewhat the cost, but reduces the noise and probably reduces somewhat the cost of maintenance. The principal objection to a steel elevated structure has been due to the fact that many of these structures have been erected on very narrow streets where the structure itself comes within a few feet of the houses on either side. In a broad thoroughfare and as a structure axial to the street, there is very much less objection to this means of providing transportation. To the traveller this mode of transportation is particularly desirable, since he gets the full benefit of light and air while travelling. Notwithstanding the usual objection to these structures, the record in New York and Brooklyn has been that property values have appreciated and have maintained their appreciation to a greater extent than nearby and adjacent properties where no such elevated structures exist, so that it can only fairly be assumed that there is no material property disadvantage in the construction of such an elevated railroad. The great function served by the elevated structure is to enable a railroad to be constructed which does not interfere with the use of the street surface and provides rapid transit operation at the smallest cost, and thereby enables suburban districts and districts of light population to obtain the advantages of rapid transit service which they could not hope to obtain if the alternative was the construction of subways or masonry viaducts.

Let us grant that close access to the congested sections of a city is necessary by the steam railroads doing rapid transit passenger service. Then equally the urban and suburban rapid transit service must likewise come into that close touch also. These means of transportation through the heart of a grown city must be provided, for the most part, within the limits of streets or public property, and such streets must be both numerous and wide. This may be best appreciated when we think that on completion of the present plans there will be entering the point of New York between Chambers street and the Battery, no less than thirty-four single track lines of rapid transit railroads.

When we consider that the ground plan of the central portion of practically all great cities was determined before these modern means of transportation were invented, it is no wonder that no provision was made for them in the plans. The consequence has been that these facilities, being provided after the city has developed along the lines of its original plan, necessitated the construction of such facilities either over or under existing thoroughfares, or on additional paths on purchased property, requiring the demolition of buildings or other structures along their routes. This has been an expensive and incon-

venient method of providing such facilities, not only due to the inconvenience during construction, but to the fact that all business has to adjust itself to these changed conditions, and the provision of each new railroad changes by its operation all the previous conditions of development, and in itself, and due to its operation, necessitates reconsideration of the entire subsequent problem.

The former Rapid Transit Railroad Commission of the City of New York endeavored to lay out sufficient rapid transit routes to provide for the city's needs for all time to come, but these lines were scarcely laid on the map before it was necessary to amend and change them, adding additional routes where needed and abandoning other routes which under no circumstances could be woven into an adequate system.

To develop a city plan for future needs of rapid transit must presuppose the provision of such property, as may properly be needed for such development, in accordance with one or other of the types referred to above. During the city's period of growth the existing steam railroads will have been amply adequate for the long haul and rapid transit business, and such street surface lines as growing necessities demanded will have been provided and expanded as occasion required for the general local distribution of the business; and the question arises when will the period of the city's growth warrant other development of rapid transit service, either by private or public capital. No city, so far, has attempted such development whose population has not exceeded a million; and several of those cities which have tried it have found the attempt unprofitable to the investor though doubtless advantageous to the owner of real estate. Looked at in whatever way, whether from the point of view of investor or taxpayer, this is essentially a business proposition and should be considered on a business basis. The introduction in the past 15 years of electric power for propulsion, has advanced greatly the rapidity of such developments. New York started in 1875 when its population, now included within the territory of the Greater City, was 1,700,000, to build elevated railroads, operated with steam locomotives, by private capital, and for years they were a financial failure. Brooklyn followed suit at a later date, about 1885, and managed to survive for several lean years until the territory served grew and extended and the saturation of population reached a point where the income was adequate to pay returns on the investment. Numbers of cities have worked out plans whereby the street surface railroads can be taken off the surface through the congested sections of the city, with considerable benefit to the public and with largely improved average operating speeds, but not always with profit to the in-

vestor. No two cities or propositions are alike and each must be considered on its own merits.

Looking to the future, a city must, therefore, provide in its early growth such broad main arteries, radiating from a central district, as will be adequate to care for such transportation facilities as are needed. As the city grows and extends it is the better fitted and able to carry the burden of providing the broader thoroughfares in the various belts for the constantly growing necessities, and always bearing in mind that as the rapid transit facilities need to be increased, the modern motor truck and automobile traffic on the surface is constantly putting more and greater burdens upon the thoroughfares themselves, which have to be cared for.

The problem we confront is not so much city planning as "city re-planning," to care for changing conditions as well as growth and development. Such re-planning should aim, as far as possible, to provide not only for the usual convenient rectangular plan of streets but also for the broad avenues passing through in various directions the commercial district of the city. The re-planning should, so far as possible by such provision of thoroughfares to accommodate rapid transit facilities, aim to increase the area of that commercial district as much as possible so as to eliminate to the greatest degree, consistent with easy conduct of business relations, the fearful congestion in small areas which exists in London and New York and makes the rapid transit problem so difficult of solution. Easy and quick transit facilities are the only means whereby this desirable result can be obtained.

In considering the period of a city's growth

when such facilities are to be provided it must be remembered that the investment must include not only construction but also equipment, which item may amount to from 50 per centum to 100 per centum added to the construction cost, and that the earnings must pay interest on the aggregate expenditure; consequently, there must be sources of concentrated traffic and changes in the passenger load (short haul) in order to yield adequate returns. To obtain this result the more surely, a balanced load obtained by a haul passing through a commercial district to terminal points at opposite ends of a city, is most desirable. This was illustrated best by the extension of the first subway in New York to Brooklyn, by which the traffic was increased vastly, out of all proportion to the increased mileage.

The streets of our great cities to-day are what they were before motor vehicles and power transportation were invented, and we have adequate widths on our main thoroughfares for the surface uses, and yet the public seem to expect that these new conditions can be met and solved at once, although no engineer would be willing to prophesy what the transportation means and methods will have advanced to in the next 20 years. Our problem requires procedure on true engineering lines, with careful working out of plans for each city on its own particular merits and for its individual needs, without political or private real estate interference and influence; bearing in mind that so far as cost will permit it is desirable to eliminate any obstructions in public streets, but if such are necessary to meet the case, that there is little objection if the thoroughfares are broad and commodious.



NORMAN SHAW
MEMORIAL AT
NEW SCOTLAND
YARD, LONDON.

DESIGNED BY
W. R. LETHABY.
MODELLED BY
HAMO THORNYCROFT.

CONSTRUCTION

A JOURNAL FOR THE ARCHITECTURAL
ENGINEERING AND CONTRACTING
INTERESTS OF CANADA



FREDERICK REED, Editor

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CURRENT TOPICS

OWING to the unsettled conditions due to the European War, it has been regretfully decided to postpone for an indefinite period the Seventh General Annual Assembly of the Royal Architectural Institute of Canada, which was to have been held at Quebec, Que., on 21st and 22nd September, 1914. Alcide Chausse, Hon. Secretary.

* * *

VANCOUVER CIVIC CENTRE, 1914.—The committee appointed by His Worship Mayor Baxter invite competitive designs for the development of the proposed Civic Centre. Premiums amounting to \$500.00 and \$250.00 will be awarded to the designs placed first and second respectively. The award will be made by independent experts, whose decision shall be final. All designs must be delivered not later than November 30th, 1914. Programme of competition and plans may be obtained from the Secretary, Vancouver Civic Centre Committee, care of Board of Trade, Vancouver, B.C.

UNTIL quite recently it was believed to be impossible to make cement water-proof. The Ceresit Company, however, now claims to have a mixture of cement which is absolutely water-proof and has given some rather remarkable demonstrations of the efficiency of its material. The most spectacular of these tests will be made in the Palace of Machinery at the Panama-Pacific International Exposition where the company is erecting a beautiful temple of the Water God Aquarius. The temple is surmounted by a spraying fountain and the water-jets will cover the dome and fall into a hidden gutter along the base of the top and then down the hollow supporting the columns. These are faced with glass on four sides so that the water passing down the cement tubes may be plainly seen. The structure is composed entirely of the Ceresit mixture and the company claims that it will be able to prove to the millions of Exposition visitors that the cement is absolutely water-proof.

* * *

"Massachusetts is still bending a thoughtful brow over the ruins of Salem. Everybody agrees that the one thing which contributed most to the spread of the fire was—shingles. House after house burst into flame the instant the rain of sparks touched the tinder-like shingle roofs. A dry, weathered shingle makes about the finest kindling known. In a closely populated town, a brisk wind carries flames over shingle roofs as fire sweeps over sunburnt prairie grass. The Bay State is using the Salem fire to start a strong argument against shingles. It will do the rest of the country no harm to listen."

The above is an excerpt of an editorial appearing in *The New York Evening World*, and calls for serious attention from everyone. Of the few unaffected buildings within the fire-belt practically all were covered with asbestos roofing. It should prove a potent factor in the use of fireproof shingles handled by the Canadian H. W. Johns-Manville Co., Ltd.

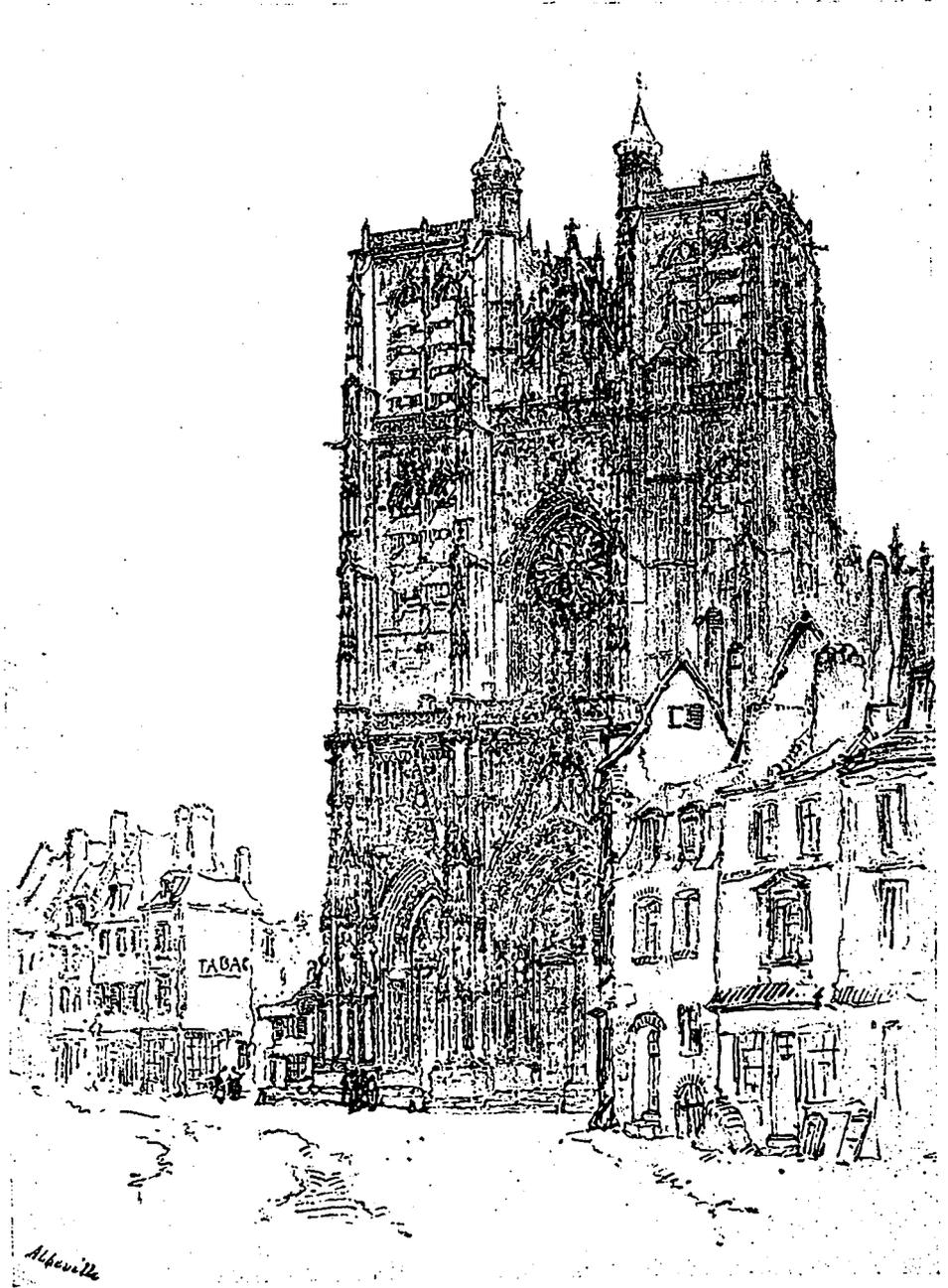
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