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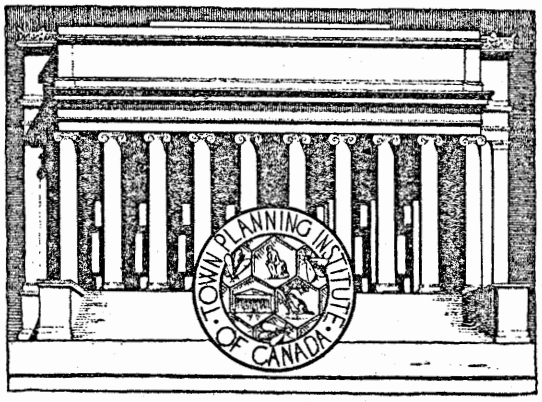
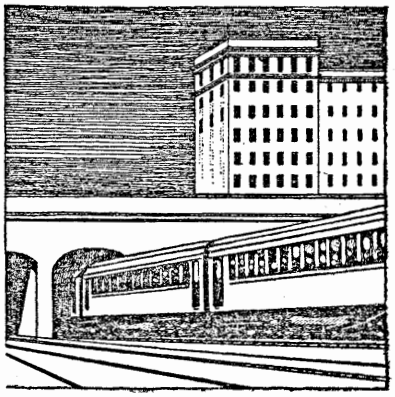
TOWN PLANNING





THE JOURNAL OF THE TOWN PLANNING INSTITUTE OF CANADA

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Town planning may be defined as the scientific and orderly disposition of land and buildings in use and development with a view to obviating congestion and securing economic and social efficiency, health and well-being in urban and rural communities

The present number of *Town Planning* consists of five papers which were delivered as town planning lectures at McGill University, Montreal. Later, they will be republished as McGill booklets for the advancement of Art and Architecture. Acknowledgment is here offered for the enterprise and public spirit manifested by McGill University and the University of Montreal in providing free public lectures on town planning topics. If Montreal should see the wisdom of preparing a comprehensive plan for its city and environs, much of the credit will be due to the universities of Montreal for opening their halls in the interests of town planning science and for the benefit of those citizens who wish to inform themselves on the subject. Possibly at no distant date the universities of Canada will see the wisdom of establishing chairs in town planning.

What it Means to Zone

Mr. Kitchen's paper entitled, "What It Means to Zone," cannot fail to impress fair-minded readers who have no axe to grind and are capable of looking at the subject from the point of view of pure science, that a new social science has been born which has for its object primarily and finally, the welfare, not only of property holders but of the entire community. Most towns have been arranged for the supposed benefit of real estate operators, but the lack of scientific method, even in this direction, has brought its nemesis in the paralysis of the real estate business itself, since order-loving people will neither buy land nor erect buildings where they have no security that their values will not be destroyed by jumble building.

There is much groaning among land dealers because land will not sell, but it seems to take a long time for the real estate fraternity to get at causes and realize that the present method of building towns carries a margin of something like 25 per cent of insecurity on property values on which no money can be borrowed, just because nobody knows how soon those values will be destroyed by neighboring atrocities. It is quite impossible to estimate the ill-will, exasperation and hatred that have been engendered in the minds of quite decent citizens against civic authorities and private manipulators of real estate in consequence of the injury inflicted upon them by disorderly building.

Zoning is the answer to the question how to avoid such injury and how to give a square deal to everybody. Town planning is applied good manners.

It is also a science, and the challenge of science is that men shall give sufficient brain energy to understand it before they condemn it. Practically every independent committee which has considered the proposed Ottawa Zoning By-law has shed its initial prejudices against any control of private real estate, before the logic, reasonableness and potentialities for public welfare revealed by the by-law.

Planning for Health

Dr. Grant Fleming, Managing Director of the Montreal Anti-Tuberculosis and General Health Society, recognized many years ago the service that town planning was likely to render to the cause of public health, in the inevitable stimulus it would give to the better housing of the common people. It is gratifying to have his imprimatur in an article on "Planning for Health" on the claim that town planning is a super-health act and to have the opportunity of assisting in the publication of his findings on the matter.

Where town planning has established itself—in the European countries—as a social science, accepted by the common intelligence as a necessity for public health and welfare and comparable to the science of sanitation and elementary education, the movement for scientific housing of the common people has followed as a natural corollary. Once scientific order is obtained in the *disposition* of buildings, in relation to each other, to the necessities of traffic, to the needs of the community as a whole and to the consideration of beauty, scientific humanism demands that slum dwellings shall come to an end and that room to live with sunshine, light, and air and room to play, shall be secured for the multitude of men and women who are doing the work of the world at little more than subsistence wages.

When the greed of money-making in land traffic and building materials becomes intolerable, some new methods have to be devised to escape the tyranny. In some leading cases of relief the supposed iron laws of political economy have had to be scrapped in the presence of a great human need. Groups of working men in England and other European countries bought comparatively large ares of land at agricultrual prices and reaped the land values they created by building sunshine cottages on town planning lines for their own use, as a co-partnership society. These were residential settlements purely, on improved lines, and the workers had to go outside their community to find their work. The Garden City movement followed, where still larger areas of cheap land were secured for the building of complete towns where industries would supply work for the people and all the activities of the developed town or city would be in operation. Again it was necessary and immensely advantageous to place the land under public ownership, so that the increasing values should be reaped by the people who created them, and not by clever speculators who knew how to capitalize the social needs and activities of a community. By this means the thousand problems of social settlement, and especially the paralyzing problem of high land values, were scotched from the beginning.

Escaping the Tyranny

Nothing shows more dramatically the emerging fact that when certain evils and oppressions in human society become intolerable, ways of escape have to be found, in the interests of public health and welfare, or human passion and indignation, created by the sense of injustice, take the way of violence and revolution. The housing of working families had become such a national disgrace in England that the nation has committed itself to a charge on the national exchequer and municipal taxes during the next forty years, of more than six thousand million dollars. Private enterprise had left the housing of the people in such a mess of profiteering incompetency that the nation had to take charge of the matter in the interests of national health and decency. The city of Birmingham could not borrow money from the banks for its housing projects at a reasonable rate. Birmingham established its own municipal bank. Letchworth and Welwyn, the two English garden cities, could not get bricks at reasonable rates, or houses built by private enterprise in sufficient numbers and at reasonable figures. They established brick works of their own and founded subsidiary housing companies. The same story could be told of other European countries and now, in the very home of laissez faire, the Governor of the State of New York is demanding large scale housing on land bought at agricultural prices and State credit for their building, because the high prices of land and the difficulty of obtaining money at reasonable rates for housing purposes have left two-thirds of the people of New York indecently housed.

Canada, with its immense open spaces, is still largely at the mercy of the land speculator, and the immense social significance of scientific housing and town planning has yet to break upon our consciousness and intelligence.

The United States is awake, not only to the social benefits of zoning, but to the larger movement of compresensive town planning, of which zoning is but a small part. The cities of the United States are realizing that there is a science of town planning which has power to shape their communities without crushing their working majority into sunless slums and dens of vice and crime, or flinging their industries all over their areas in sprawling messes of wasteful incompetency and without reserving their "beauty spots" and open spaces for the privileged

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WHAT IT MEANS TO ZONE

BY JOHN M. KITCHEN
Hon. Secretary-Treasurer, Town Planning Institute of Canada

Town Planning

The Town Planning Institute of Canada has decreed that:

> Town Planning may be defined as the scientific and orderly disposition of land and buildings in use and development, with a view to obviating congestion and securing economic and social efficiency, health and well-being in urban and rural communities.

Zoning

Zoning is that function of town planning which determines the relative disposition of structure to site, detailing uses, areas, heights, intervals and the occupancy of structure with a view to assuring adequate access of air and the rays of the sun to buildings to the measure of their occupational requirements, and ensuring health, efficiency and amenity to human beings.

To the measure of their deficiency the birth and death statistics are governed.

Andrew Wright Crawford, in the American Civic Association pamphlet "Zoning" says:

> The whole purpose of zoning is to encourage the erection of the right building in the right place. It protects the man who develops his property along proper lines against the man who develops his property along improper lines. Rightly understood, zoning means the substitution of an economic, scientific, efficient community program of city building for wasteful, inefficient, haphazard growth.

Edward M. Bassett, in the *National Municipal Review*, supplement on "Zoning," expresses a reciprocal relation when he says:

> The truth is that no man can make the best use of his own unless his neighbors are required to make such use of their own as not to injure others.

Zoning is the application of common sense and fairness provided in public regulations governing the use of private real estate. It is an honest effort to provide each district or neighborhood within a city, as nearly as practicable, with such protection and liberty as are essential in that particular district.

Zoning regulations differ in different districts according to the determined uses of the land, such as residence, business, or manufacturing, the regulations being the same for all districts of the same type.

Zoning is part of a city planning problem. It relates to the transportation system, including streets, street railways, automobile traffic, etc., railroad services, both freight and passenger, and water-borne commerce, if any. Further, it relates to public works, utilities, parks, schools and many special public and private undertakings.

There is frequently confusion in the public mind between the function of a building by-law and a zoning by-law. A building code deals with the technique of structure and the materials of structure, while a zoning code deals with the technique of conditions under which structure should be permitted. It has regard not only to the physical safety of the occupants but to the environmental conditions which affect the health of the people.

Justification for Zoning

The scientific and sociological basis of zoning is provision for the people of adequate sunshine and air, such provision being indispensable for the sustenance of health and efficiency, in fact, of the common welfare of the race.

Solar rays have properties of heat, light and chemical action, which bring comfort, preserve sight, and foster health by dispelling bacteria and disease.

Air is essential to human nutrition mainly by reason of its oxygen content, which, through bodily combustion, the lungs being the firebox of the body, brings heat and chemical reactions that fan the flame of life.

Mr. Barry Parker, the eminent English architect, of Letchworth Garden City, says:

> The tenant, probably, does not know that a typhoid fever germ will live for two years in a place where sunlight never penetrates, but cannot live for one hour in the sunlight. He, or she, has probably never realized the significance of the fact that a laboratory used for the cultivation of disease germs must have a north aspect. The tenant probably does not know that even in tropical climates, where, in the past, the aim has been to exclude sunlight from living rooms (with a view to keeping them cool), it has been found necessary to pass legislation, making it impossible for a wall to be built in such a way that it prevents the rays of the sun from reaching the base of another wall for at least a minimum of two hours a day. It has been learned that in tropical climates in particular it is to those places to which the purifying rays of the sun never penetrate where disease germinates and flourishes. It is not a question, merely, of comfort, but of healthiness and unhealthiness; briefly, the fact is that any room into which the sun never penetrates nor finds its way is an unhealthy room.

Professor East, of Harvard University, in his book, "Mankind at the Crossroads," says, with reference to an investigation into slum conditions:

> Where housing conditions were good and the home was clean and dry, the infant mortality was 105; where similar clean houses were damp

it rose to 127. In moderately clean and dry houses it was 158; in moderately clean and damp houses it was 171. Where houses were dirty but dry it was 162; where they were dirty and damp it was 204. Similarly, when the houses were classified on the basis of the water supply being inside or outside, the rates were 116 and 189 respectively.

Justification for regulating the proportionate area of a lot which may be built upon and the angles and dimensions within which construction may arise thereon, lies therefore, in the vital necessity of providing sunshine and air to the interior of the structure for the preservation of health and efficiency and for the maintenance of life.

Differences in the nature, density, intensity and duration of occupancy, or of work, determine the variations in restrictions.

As penetration of sunshine and air is the objective, its attainment involves a sufficiency of open intervals of dimensions increasing in ratio to heights.

To regulate the disposition and size of structures successfully, the angle of minimum light penetration should be determined and enforced.

This scientific view of the question, when recognized, will dispel the popular illusion that zoning, with its regulations for obtaining access of air and solar rays to human dwellings, is an aesthetic whim. When men come to realize that such regulations are really means to the maintenance of healthy human life, all opposition to them will disappear, and they will be accepted as the ordinary sanitary regulations are today, which a generation ago were looked upon as whims.

The haphazard manner in which cities have been allowed to grow and develop, without order or direction, has been repeatedly brought home to us through the ever increasing number of representations being made to civic officials on behalf of citizens for restrictions against encroachments.

These encroachments, either threatening or established, take many forms, such as stores, factories, garages invading residential districts; apartment houses locating amidst districts of select homes and very often being built up to the street and side lot lines, where the adjoining residences have observed setback lines and preserved ample front and side yard areas.

Such disregard of the welfare of community interests is manifestly wrong and socially unjust.

It is this stupid, wasteful jumble which zoning will prevent and gradually correct.

Legal Provisions for Zoning

Existence resolves itself into the living conditions of Home and Work. Home districts seem to reveal their physical attributes and social significance most clearly by degrees of density; Work districts by degrees of intensity.

Density of population and intensity of work conditions may be best controlled by restrictions of use, areas, heights and intervals of buildings, i.e., zoning, the legal provisions for accomplishing which vary considerably in the different provinces and in some are quite inadequate for the purpose.

Much can be attained by skilful recourse to Municipal, Health, Factory, Registry, Planning and Development Acts where such exist.

It is anticipated that planning and development acts fully providing for zoning will be forthcoming throughout the Dominion in due course. These will simplify procedure and enable the general public more easily to grasp the purpose and results of urban and rural planning, interplanning and zoning.

Classification of Uses

The use and development of land should be zoned into two broad fundamental classifications, Home Districts, subdivided by degrees of density, and Work Districts, subdivided by degrees of intensity.

From zoning standards of limitations in bulk congestion of structures, there devolves a coterminous restriction of relative occupational congestion under Health and Factory Acts.

This is the most effective method of obviating congestion in density or intensity.

Home Districts—Density

Zoning functions to preserve desirable living conditions and to rehabilitate those which are deficient.

In the relative congestion of dwellings and of their occupancy, density is the yardstick of their healthfulness, efficiency and of the amenity afforded, It also reveals their sociological import.

The use of land and buildings, as existing and permissible within Home Districts, should be zoned under three minor classifications, Minimum, Mediate and Maximum, according to the relative degree of density, thus:

HOME DISTRICTS

Minimum Density Districts

Individual detached single family dwellings with accessories on individual lots.

Mediate Density Districts

Semi-detached dwellings, duplex houses, multiple dwellings.

Maximum Density Districts

Apartment houses, flats, tenements, boarding and rooming houses.

Such restrictions may permit of the Minimum Density conditions obtaining within the designated Mediate, and likewise of the Mediate within the permissible Maximum, but never inversely, except as a non-conformity.

Work Districts—Intensity

Making a living is work in kind and degree. The term Work Districts seems therefore more generic and is susceptible of simple differentiation in degree of intensity.

As therefore, Work Districts display their activities to advantage by degrees of intensity, the use of land and buildings, as existing and permissible within Work Districts, should be zoned under three minor classifications, Minimum, Mediate and Maximum, according to the relative degree of intensity, thus:

WORK DISTRICTS

Minimum Intensity Districts

(Distribution)

Offices, stores and proportionate light industry, hotels.

Mediate Intensity Districts

(Storage)

Warehouses, light industry, motor service stations, public garages, repair garages, livery stables.

Maximum Intensity Districts

(Production)

Industrial plants, mills, factories, fabrication industries, lumber yards, storage yards.

Such restrictions should permit of the Minimum Intensity obtaining within the Mediate and of the Mediate within the Maximum. Home Densities, likewise, may be permitted within Minimum and Mediate Intensity Work Districts, but should in themselves conform to restrictions of area, height and also of exterior air and sunshine provisions inherent in their relative classification.

As dwelling within industrial areas is not healthy and involves in consequence a further needless limitation of certain industrial processes, the inclusion of a Home Density should be prohibited in a Maximum Intensity Work District, although exception may be made to the extent of accommodation for necessary caretakers.

A Mediate Intensity which is a related light industry accessory to a Minimum Intensity should be permissible therein, but should not be in excess of one-quarter of the floor space of the area of the building occupied by such Minimum Intensity.

Institutions—Disturbance

Institutions are organizations which function to promote, fulfil or express the abstract or the material cultural ideas of the race.

The relation of Institutions to living conditions may be well interpreted by degrees of disturbance.

The plan authority should determine any erection, construction or activity, as existing or as where proposed, to be an institution relatively as such in a minimum, mediate or maximum degree of disturbance, gauging the effect of its proximity or activity on the inherent or negotiable value and also upon the health, amenity or general character of the surroundings.

Institutions in a Home District should be subject to the restrictions of area, height, intervals and also of exterior air and sunshine provisions of the relative classification within which they may be situated.

Institutions in a Work District should in themselves conform to the restrictions of area, height, intervals and also of the exterior air and sunshine provisions inherent in their purpose.

Noxiousness—Deterioration

Noxiousness in zoning indicates any erection, construction, condition, activity or danger, disquieting, offensive or harmful to mind or body through the senses, or which in the nature of things or through the properties of matter or from aversion lessens values, efficiency or amenity.

Noxiousness is not a classification *per se*, but is a consequence of incompatibility in relation to environment.

An erection, construction, activity or danger which is acceptable in one district may be noxious in another. A public garage which is normal in a Mediate Work Intensity District would be noxious in a Home District.

Determination of the degree of noxiousness of a given structure, activity or danger should be by gauging the effects of its proximity on the inherent or negotiable value or on the healthfulness, efficiency, amenity or general character of the surroundings.

Height Restrictions

Height or area regulations should be coterminous with the various classifications. Primarily, the immediate vertical elevation of the outer wall of any structure should be limited to a height equivalent to the width of the street upon which it fronts, with the reservation that the erection may go higher if it or the upper part thereof is set back within a receding angle formed from the centre of the street allowance to the permissible coping height of such outer wall. This rule is taken to approximate a normal balance of public services being afforded the population which can be healthily sheltered in such structures, to its receiving adequate air and light, also to ensuring it sufficient circulation and transportation by such streets. This general rule is taken as the one best qualified to obviate congestion and relate equitably the use and development of the city lands to health, efficiency, and amenity.

Height regulations in their control of size enable also design to ultimate purpose, in adequate capacity and flow, of the sewers and mains below the surface.

Height regulations should be further restricted in residential districts, that of single family homes being restricted to a height equivalent to the width of the lot upon which the structure is located, but not in excess of forty feet, duplex and terraced houses to a maximum height of forty feet, and apartment houses to a maximum height of sixty-five feet.

Rear and side elevation heights, and the height of courtyard walls should be limited, respectively, by the depth of the rear or side yard and by the least dimension of the court, although all height regulations should be subject to the receding angle reservation.

Area and Interval Restrictions

Restrictions of the proportionate area of a lot which may be built upon and of the intervals within or without the structures thereon should be based upon affording adequate sunshine, light and air to ensure health and efficiency in living and working as may be conditioned for the permissible use of the structure. Details of areas and intervals should be stipulated in relative percentage and, where possible, in measurement and angles in relation to heights.

Minimum rear and side yard area and dimension regulations should be imposed on all conditions where light is essential to use and the control of the location of windows in side walls facing on side yards should be reserved under regulation, in order that there may be assurance of light penetrating where and as originally intended.

Non-Conforming Uses

Non-conformity is a status of density, intensity, institution or noxiousness obtaining within an area of greater restriction in permissibility. It may obtain by reason of pre-existence to zoning, as nominally indefinite, or as subject to opportunity, and persists largely by reason that laws are rarely retroactive.

Non-conformity should, in general, be restricted in permanency by limiting, to once only, structural renewals to 50% of the building values, exclusive of foundations, and by limiting conversion or enlargement of use to one of conformity.

Where a non-conforming status is detrimental to the general welfare of its surroundings, it should not be allowed to extend, enlarge, become aggravated or be renewed, for, where erections, constructions, activities or dangers of a non-conforming condition or use are of a degree detrimental to the general permissible character of a district, they constitute a species of noxiousness.

Non-conforming condition, use or activity should not be altered, enlarged, renewed, or converted to other condition, use or activity at the expense or to the detriment of a conforming condition, use or activity.

Procedure in the Preparation of a *Zoning* Ordinance

(1) The first step towards zoning is to make an examination and official record upon charts of the status of living conditions governing homes and work as existing at date.

For the purpose of simplicity, co-ordination and visualization, certain symbols and colourings should be conventionalized and used in the manner hereinafter set forth to allow of easy expression of the existing conditions and of such progression and combination of circumstances as may be expected and allowed to develop.

Zoning regulations are not devised to be retroactive.

(2) The second step is for the planning authority in consideration of the status revealed, to adopt zoning regulations of permissibility that will ensure health, efficiency and amenity in so far as may be to existing regulations and guarantee them in future development.

The restrictions as to the area of a lot that may be built upon, the intervals within and without the structures, the heights to which these may be built in whole or in part, the nature of and the uses to which structures may be put, and the density and character of occupancy thereof should be prescribed in official regulations and be displayed insofar as may be upon the official charts.

The aim should be, as far as possible, to make the regulations and restrictions of area, heights, intervals and the disposition of cubage (bulk) coterminous within the several home and work district classifications. This procedure eliminates the necessity of providing and preparing height and area symbols designating permissibility, likewise designating the coterminous regulation governing height and areas.

A consideration in determining permissible use of localities and structures is the adequacy of the public services as to:

(a) The location, curvature, grades and terminal adequacy of railroads.

(b) The direction, grade, width, surface and general carrying capacity of streets, thoroughfares and arterial highways.

(c) The capacity, frequency and speed of street railways.

(d) The size, character, capacity and pressure of water mains.

(e) The size, character, capacity and flow of sewers.

(f) The capacity of light, heat and power mains.

The official charts of status are the forecasts upon which will be based future permissibility and the by-laws necessary for the enforcement thereof.

(3) Thirdly, the charts and proposed regulations designing future permissibility should then be exhibited at public meetings for the perusal and attainment of the views and co-operation of interested parties, thus enabling revision by the plan authority towards amplification or elimination as the circumstances revealed may warrant.

The property owners collectively should, in so far as possible, be allowed, subject to the adequacy of the public services, to determine the permissible use of their related areas.

(4) Fourthly, when final approval has been given the determining charts and regulations, the by-laws should be enacted by legal authority.

Provision shoull be made for future appeal in respect of such revisions and alterations as the changing circumstances of time and development may warrant. It is obvious from the nature of the case, that even if a zoning ordinance were drawn with superhuman perfection, time and the natural growth of the community might show the need of modification The purpose of a zoning ordinance is not to stifle growth, but only to insure that, instead of taking

place sporadically and wastefully, it shall go on in an orderly way, in response to generally recognized needs and with due notice to all concerned.

It is not the desire nor the intention of the zoning authority to restrict districts without regard to the opinions or desires of owners of property located therein or affected thereby, but rather to control future permissibility as far as possible from the status of existing home and work conditions as delineated on the charts, they being considered a forecast upon which to base future permissibility.

Symbols

To enable the easy recording and recognition on zoning charts of the status and the permissibility in the use and development of land, a constructive system of basic classification symbolism was, after much study, prepared and adopted for Ottawa. This system is of such simplicity as to be easily comprehended by the most inexperienced, and its adoption had proved particularly successful and has expedited the field work to an extent beyond expectation. Its simplicity is such that written notes are practically eliminated from field work, the six basic symbols forming the system in the hands of an intelligent individual being such as to cater to almost every condition arising in the field.

The symbols used are a constructive multiple of a single stroke, those denoting Home Density or permissibility consisting of a single line, or a multiple thereof, according to the relative degree of density, and drawn diagonally downwards from right to left, while those denoting Work Intensity or permissibility are comprised of a similar simple line series, having the same relative multiplicity, but drawn diagonally downwards from left to right. The distance between the line groupings may be varied to suit the scale of the chart, upon which all symbols are superimposed normal to its horizontal plane, thus avoiding any confusion liable to arise from possible distortion of the plane of the symbol with reference to the chart.

The status of land and building as actually developed is indicated on the charts by applying the relative symbols to the interior portions of the lots, the permissibly classification for future development being indicated by the application of the relative symbols on the outer borders of such lots.

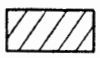
The symbols retain their definition under a wide range of scale and reduction and further permit of easy reproduction in black and white.

Non-conformity may be recognized where symbols on charts show a lesser restriction in status within a higher restriction in permissibility.

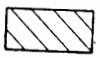
In addition to the line symbols, there has been adopted for use in the case of small scale maps a colour scheme graduated in co-ordination with the six basic home and work classification symbols, the colours of the solar spectrum being used for the purpose. This allows of the amplification of the chart symbols at a minimum of cost, as three of the six colours, being combinations of two of the basic spectrum colours, the six colours can be reproduced in three printings.

The nature of things and the inherent properties of each grouping are indicated in colours and symbols as follows:

HOME DISTRICTS

	Symbol	Colour
Minimum Density		Spectrum Red
Mediate Density		Spectrum Orange
Maximum Density		Spectrum Yellow

WORK DISTRICTS

	Symbol	Colour
Minimum Intensity		Spectrum Green
Mediate Intensity		Spectrum Blue
Maximum Intensity		Spectrum Violet

What Zoning Accomplishes

Zoning gives everyone who lives or does business in a community a chance for the reasonable enjoyment of his rights. At the same time it protects him from unreasonable injury by neighbors who would seek private gain at his expense.

Zoning will prevent an apartment house from becoming a giant airless hive, housing human beings like crowded bees. It provides that buildings may not be so high and so close that men and women must work and live in rooms never freshened by sunshine or lighted from the open sky. Zoning secures a healthy relation between living conditions in the home and at work.

Zoning will allow no one to put up a large apartment house overshadowing your home, stealing your sunshine, and spoiling the investment of years of savings. Nor is anyone at liberty to erect a noisy, malodorous public garage to keep you awake at nights or to drive you to sell out for half of what you put into your home. Zoning stabilizes amenity as due in social equity. Zoning amenitizes.

By zoning, waste of many millions of dollars from the scrapping of buildings in "blighted districts" may be eliminated. Zoning stabilizes efficiency and values as due in economic equity. If a city is zoned, property values become more stable, mortgage companies are more ready to lend money, and more houses can be built.

Zoning avoids the error of trying to apply exactly the same building regulations to every part of a city regardless of whether it is a suburban residence section, a factory district, or a business or a financial centre. It fosters civic spirit by creating con-

fidence in the justice and stability of the protection afforded. Zoning regulations differ in different districts according to the determined uses of the land for residence, business or manufacturing. Industry will be more efficient, as well as homes more wholesome, if kept generally separate. Separation need not mean great distances for the workers to travel. Concentration of uses and a fair apportioning of districts should reduce the amount and cost of all transportation and secure economies not only directly, for the worker, but indirectly in the costs of production and the marketing of goods.

Zoning is an elemental factor in obviating the congestion of buildings and concurrently of population and traffic.

Again, miles of streets, and sewers, and other utilities, such as are ordinarily built when land is subdivided for dwellings need never be constructed if we know that these areas will be devoted mainly to large factories.

Altogether, zoning will assure orderly growth and permanence in the development of a city, enhance the amenities of and insure healthy and sanitary homes for its citizens, prevent congestion both in home and commercial districts, maintain the negotiable value of land and buildings and eliminate the problematical installation of public utilities, such as sewer and water services, which, under haphazard development, are constructed on a basis of probable demand, the ultimate demands likely to be made upon them being commensurate with indefinite future development.

It therefore necesarily follows, that where extensive town planning of either a corrective or comprehensive nature is or is about to be adopted, the establishment and stabilization by zoning of those conditions obtaining in a city upon which the efficacy of town planning depends is indispensable.

PLANNING FOR HEALTH

BY A. GRANT FLEMING, M.B.

Managing Director of the Montreal Anti-Tuberculosis and General Health League

I desire to make clear the relationship between the health of a community and its environment, from the standpoint of a health worker.

A brief outline of the development of health work will give us the ideas that prevailed at different stages, and remind us of what was regarded as of paramount importance, and the reason for this regard, in the development of the work. Logically, this will bring us to the present-day viewpoint and to the relationship between town planning and health work as it can be considered in the light of our present day knowledge and experience.

National Health

Years ago Disraeli stated: "Public Health is the foundation on which reposes the happiness of the people and the power of a country." "The care of the public health is the first duty of a statesman."

The words of this far-sighted leader are as true today as when he voiced them in the British House of Commons. If we Canadians are to be a happy people, if Canada is to be prosperous and powerful, it is necessary that all things which contribute to the improvement of the public health should receive the attention of those who have the interest of Canada at heart.

Health, from the personal or individual standpoint, is a condition of well-being that increases our capacity to work, to play, to be happy and to be useful. It permits of the highest physical, mental and spiritual attainments of which the individual is capable.

Health should never be considered in a negative way. Freedom from obvious disease does not mean a condition of health. The one who has health is dition of well-being that has been described as "fit to live most and to serve best." Health is essentially a positive thing. Health as mere freedom from disease, is a standard of mediocrity; health as a quality of life, is a standard of inspiration and increasng achievement.

It need hardly be argued then, that, from the individual's standpoint, health is something to be desired. As it increases his happiness, his ability to work, play and be useful, then the only question should be—how is it obtained? Therefore, each individual has an interest in understanding and supporting town planning if for this one reason alone, that it is going to help him in obtaining and maintaining his health.

As the community is made up of individuals, it is of course true that what is good for the health of the individual must be good for the health of the community. Considering the subject from the community standpoint, it is readily seen that it is of national importance.

During the Great War, a fact which had been previously recognized, but understood by only comparatively few, was impressed upon practically everyone. The fact was, that a very large percentage of young men, those presumed to be at their best years physically, were found to be unfit for military service. Does anyone think that these same men had been fit for their peace-time civil occupations? It is quite true that certain physical disabilities are more disabling from a military than from a civil standpoint, but the far larger number of the disabilities revealed were such as would very definitely interfere with the man's ability to do his regular day's work in civil life.

Many surveys and studies of various groups have revealed this same condition. It is not limited to one country, or to one sex, or to one age group.

All this simply means that there is a large percentage of the manpower of this country not able to enjoy work and play, and not able to give a full day's work. The result is that they are not so useful and happy as they might be. Inasmuch as town planning will contribute its part, as we shall see, to improving community health, it deserves support because it will thus increase the national prosperity and make for a happy, contented people.

We, in Montreal, do need to bestir ourselves in regard to the health of our city. We have an undue proportion of deaths from preventable causes, with a corresponding number of cases. This is an index of the health of this city and points out the possibilities that are before us.

Beginnings of Public Health Work

Health work, though a comparatively new art, has passed through certain phases of development in its short life. Modern health work had its origin in England. It was part of the great humanitarian effort which attempted to overcome some of the unfortunate results of the industrial era. The creation of factories resulted in the rapid collection of large numbers of people in new centres which had no means of providing for them. The result was that conditions of living were terrible, and the work places were on the same level of filth, crowding and lack of ordinary sanitary decencies.

The first period of health work was dominated by the idea that disease was bred in filth. It was believed that all decaying animal and vegetable matter gave rise to poisonous gases, or, some thought, living germs, which were carried in the air and which caused disease in human beings. The health teaching of those days was—everything which smells bad is dangerous, and decomposition is the source of disease.

Believing this, the natural attack of the early period was against any and all dirt. The result was, that paving and cleaning of streets, garbage removal, installation of sanitary conveniences and sewers were the activity of the health departments.

All these things are desirable, comfort and decency alone demand them, and we have to thank the enthusiasm of these early reformers for many of the comforts that we enjoy today in the way of sanitary conveniences and the cleanliness of cities.

Although there were some important truths in the belief of this early period, and although their projects for civic betterment saved many lives and did much for human comfort and convenience, still there were several errors which were unfortunate as they have retarded the development of preventive medicine until the present day.

Their chief error was in the belief that disease breeds in filth instead of being merely carried in filth. Another error was that they did not understand that it is only dirt which has been contaminated by discharges from the human or animal body that is dangerous, and that dirt not so contaminatd has no relationship to disease. The other serious error was the teaching that diseases are air-borne.

These errors were unfortunate because they were so enthusiastically taught that the public have clung to them, thus increasing the difficulties of applying our modern knowledge. We cling to the opinion of our ancestors, even in the presence of the most convincing evidence, and the perpetuation of ancient errors has done inestimable injury to health by causing people to be indifferent to the newer and better things. This extreme conservatism is seen in all classes. We have only to remember how Pasteur was laughed at in the Academy of Medicine of Paris, and how tenaciously the doctrine of spontaneous generation of life was adhered to, to realize that "closed minds are found even in the educated group of mankind." t

The Second Phase in Health Work

The second phase in health work was dominated by the realization that there is a group of diseases caused by disease germs, and that these diseases are usually spread in a fairly direct manner.

Most brilliant results followed the discovery that part of this group are dependent for their spread upon certain insects acting as the transferring agents of the disease from man to man. The result is that all such diseases are controlled by the destruction of the particular insects acting as hosts. Malaria and Yellow Fever are controlled by attacking certain types of the mosquito. Typhus Fever is unknown where there are no body lice. Bubonic Plague is prevented by the control of rats whose fleas spread the disease.

It has been with those diseases which are spread directly from man to man, by what we call contact and droplet infection, that the results of control have been disappointing.

If we understand that it is the transference of disease germs from the sick to the well that accounts for the spread of infection, we appreciate the early hopes that were placed upon the results of quarantine. Unfortunately, as we have since learned, certain ones of this group of diseases are highly infectious before the commonly recognized symptoms appear, also that there are many unrecognized cases, to say nothing of disease carriers. We now appreciate that isolation and quarantine are of value, but that their value is limited by conditions whi. h quarantine regulations cannot control.

It was an appreciation of this fact that the success of isolation and quarantine was limited, and that the successful combating of communicable diseases depended largely upon the individual, which gave the impetus to what is now dominating the field of health work, and that is personal hygiene. By this term is meant what is individual and personal, as contrasted with the organized community as a unit.

This was also brought about by the extension

of the field of health work. There are many diseases which are preventable though not communicable. There are the specific diseases due to faulty diet, to occupation and so on. The campaign to reduce infant mortality found that the greatest need was to have every baby breast fed. All these and many other health activities depend solely upon the spread of certain health knowledge to the individual, and the practice of this knowledge by the people, for of course, the knowledge, unless applied, is of no practical value.

The pendulum has swung pretty far in this direction, and there has been a tendency to discount the value of community sanitation. This is particularly true of the United States. In England, the home of sanitation, they have clung tenaciously to the health importance of environment. Without arguing the matter, I think we may safely say that here, as in most things there is a happy practical medium which is nearest the truth.

Many Factors

Briefly summarized, we might state that health work essentially aims to secure removal of body wastes, to provide safe water, milk and food supplies, to limit the spread of infection, as far as possible, by isolation, quarantine and hospitalization, to immunize against disease, wherever possible, to destroy insect disease spreaders, to disseminate health knowledge throughout the community, to make it easy to put such health knowledge into practice.

One might truly say that the health worker is interested in every phase of individual and community life. This is quite true because every phase has some influence on health. However, what we must decide is what are the things which concern health and for which the health authorities are to be responsible. I have briefly listed these.

So as to be clear may I take as an example, food? As health workers, we desire, in order that the best nutrition may be maintained, that every article of food sold shall be unadulterated, and at a price which makes it attainable for the masses. But the responsibility usually assigned to health authorities is to see that such foods are safe for human consumption. The health officer is far more interested that milk, for instance, shall be free from all disease producing bacteria than that it contains a percentage of extraneous water.

Just one further example to make my position clear. Garbage in itself does not cause disease; it is offensive, also it is a breeding place for flies. The health interest in garbage removal is to prevent the breeding of flies which are a health menace, and also that general cleanliness, as exemplified in proper garbage disposal, means the special cleanliness that is essential to health. Therefore, while we do not feel that garbage disposal should be a responsibility of health departments, nor a charge against them, it is appreciated that it is one of those things which have an influence on the standard of living, which has an influence on essential health things, and so is important.

The Health Value of Town Planning

I will now attempt to point out how town planning will influence for good our planning for health, and in so doing I will keep to the essential health things chiefly, trusting that you understand, from what has been said, that we do not disregard the other factors, but leave them for consideration to those more directly responsible for them.

To my mind the most important contribution which will be made is that proper homes will be provided, in which people can live with health and comfort. The abolition of slum areas, the correction of over-crowding, and provision, instead, of real homes with elbow room for everyone.

We all appreciate the difficulties of correcting evils which already exist. Town planning has this great thing on its side which must appeal to everyone, that its chief object is to prevent the creation of evils. Because there are slums and over-crowding in certain areas, because there is a lack of breathing spaces, and because the streets are too narrow is no good reason for sitting back and allowing the same undesirable conditions to grow up in other sections of the city.

The Proper Home

What is the proper home? In the first place, it must be assured of its surroundings. If it is to be a home it must be situated among other homes. I think we can say that this results in the community spirit. The guarantee of the permanent character of a certain area which town planning offers will bring people of similar tastes into that area, which, in turn will develop a community spirit, the backbone of the social and health work of that area.

It will assure the quietness and the aesthetic surroundings which should go with a residential area. It cannot be demonstrated that noise and bad odors are directly injurious to health, but this we do know ,that rest and fresh air are essential to health. If, therefore, the noises are such that they disturb the whole neighborhood, if the bad smells are such as to make the people close their windows to shut them out, then it can be readily understood how desirable it is, from a health viewpoint, to prevent the occurrence, in residential districts, of the things which indirectly are prejudicial to health.

Now we all know that certain noises are produced of necessity in connection with certain businesses. Town planning wisely sets aside certain areas for such businesses and keeps them away from the residential area.

Every home should have space around it and should be accessible to park, playground, school and church. How else can this be assured than by thoughtful planning? These are health requisites because fresh air, play and recreation are health

essentials . What is the use of teaching that our children should play out of doors if there is no place provided where they may play? How may the older members of the household keep out of doors, in the fresh air, unless they have a small garden with which to occupy themselves, or a park in which to sit, or tennis courts, bowling greens, etc.? Town planning makes all these things possible. They must be done on a small community basis. A beautiful, large park miles away is of no help to the mother, with her young child whom she is seeking to keep in the open air, and who has no place, excepting the street, in which to keep him out of doors. Large parks and open spaces are good, but town planning assures small fresh air and play spaces for everyone by locating them close to where the people live.

Chief Factors of Health

Two of the essential health needs of everyone are fresh air and sunshine. During the past few years we have learned a great deal about both. We now know that fresh air has little relationship to its Oxygen and Carbon Dioxide content, but that it depends upon its physicial condition, meaning that it must be cool, in motion, and of the right humidity. We have also learned that the direct rays of the sun have a very definite effect upon body nutrition, in addition to their ability to destroy disease germs. Fresh air and sunshine must be secured for the home from outside, which means that there must be an open space around the house to make possible the entrance of air and sunshine to every room. This can be accomplished by planning, by preventing the crowding of houses, by providing streets of proper width and by preventing one land-owner from building so as to shut out light and air from his neighbors.

Town planning makes possible the carrying out of certain health rules, or rules of personal hygiene, such as sleeping in a properly ventilated room. For how can anyone practise this particular rule, no matter how much he may desire to do so, if his room is without a window, or if it is one of those rooms, dignified with the name of "alcove-room," or even if his bedroom opens onto a space that is merely a shaft of stagnant air. Such rooms are comparatively common in this city, which indicates that the present type of construction is perpetuating an undesirable and unhealthy type of home, and points out the need for action to prevent this.

Town planning assures the home of a water supply and a sewage system. Most of us may be ignorant of the lack of, and the condition of the ordinary sanitary conveniences in parts of this city. Looking at the reports of some of our nurses the other day, I found that in over half the homes visited during the previous days, the toilet was in a dark room. In one case, one out-door toilet accommodated six families.

Our standard of living has changed. We have attained a health standard unknown in the so-called "good old days." Certain diseases have been eliminated, the expectancy of life has been prolonged, the physical efficiency of the nation improved. These conditions we consider desirable, and if we are to maintain them and progress, it is necessary that everything reasonable be done to permit the masses to accomplish the very things which we urge them to do.

We *live* today. We have advanced beyond the time when the city of Boston, the home of American culture, passed a law forbidding the use of baths, excepting on physicians' orders, because they were considered as evidence of a luxury-loving, decadent race; or when John Wesley was told, in reply to his famous "Cleanliness is next to godliness," that sometimes "It is next to impossible."

If the home is to be a place where health is to be practised, if hands are to be washed before meals, if teeth are to be cleaned, if baths are to be taken regularly, if clothing is to be cleaned and so on, the facilities for carrying out all these must be made reasonably available. I suppose that when our grandmother wanted the pump at the kitchen sink, to save her from going outside, she was told that the outside pump had served her mother.

Planning for the Future

Town planning looks beyond the present—it provides for future development. It does not wait until there is danger of a water famine, it plans for adequate supplies. It realizes that there will be increased demands upon public services and that they must be thought of and planned for in advance.

Following the war, you will remember that there was launched, by the governments and voluntary health agencies, a movement to combat the venereal diseases whose ravages have been revealed by the war. What was revealed was their prevalence amongst the civil population, not amongst the soldiers as some still think. Those who have studied this problem realize that the fundamental things are not the provision of clinics for treatments, although these are, of course, necessary. The great need is for proper homes and recreational facilities. There is no chance for the development of the ordinary decencies of life where people live without privacy. There is no reasonable opportunity for the development of other interests to occupy the mind, to rest the body, or to take part in healthful pleasures in the crowded areas of this city as there should be to supplement the moral teachings of the church.

If we are to make the headway we should against these diseases, one of which was described by the late Sir William Osler as the "killer" of the race and the other as the "sterilizer" of the race, we must support this town planning effort, which will make for the securing of those fundamental home and recreational conditions that are to help materially to build up a generation free from this modern plague and all that it implies.

The Massacre of the Innocents

The preservation of child life is of national importance. In no place is this truer than in Canada,

for everyone agrees that we need more population, and that the best kind of population is the native born. It would seem that if there is a limited amount of money to be spent on building up the population of this country, some of that which is spent on immigration might better be diverted towards keeping alive the children born here. The backbone of infant welfare work is intelligent motherhood. Proper ante-natal and natal care, followed by intelligent care of the child.

A great effort has been made in this line. Remarkable progress has been made in reducing preventable sickness and deaths amongst the infant population. Much more remains to be done, however. In this city, out of every thousand infants born alive, 150 (approximately) die before their first birthday. What do these children need to keep them alive? Natural feeding, first, then, fresh air, sunshine and proper rest. As the infant is entirely dependent upon the mother for its needs, it follows that, after teaching the mother what should be done, we must make it possible for her to carry out our instructions. If the baby is to have sunshine and fresh air, then the home and its surroundings must be planned to make these available. If the baby is to have a bath, then water must be provided. If baby's food, as he grows older, is to be protected from flies, the breeding places for flies must be removed. There must be a place to keep the milk after it is delivered, if it is to be kept safe for the child. As he grows older, there must be some accessible place other than the street where he can play.

There is not a question of doubt but that environment makes possible the things that the infant and the child need for their proper physical development.

Tuberculosis is a House Disease

Tuberculosis has been so intimately associated with bad housing that it is frequently referred to as a house disease. Of course, it very largely depends upon what one considers bad housing. Any desirable dwelling may be made into an undesirable one by overcrowding. Dark rooms, rooms with no cross ventilation, courts and alleys where air and sunshine find but little acess are all definitely bad.

We must be cautious in drawing conclusions. There is no doubt that the death rate from all causes in one-roomed dwellings is much higher than in two-roomed and much higher in two-roomed than in three.

There was an exellent investigation made in Glasgow which covered 73,000 school children, and it was found that the children from one-roomed dwellings were far less fit than those from dwellings with several rooms.

But, as I said, we must be cautious in drawing conclusions. Why were these families living in one-roomed dwellings? Answer that question and you will see how many factors there are which must be taken into account before we can estimate even their relative importance in the health result.

While it is quite true that certain families would turn a palace into an unhealthy pig-pen type of place in a short time, and while it is quite true that other families will make a comparatively healthy dwelling out of a poor one, it remains equally true that the environmental factor has a tremendous influence and is often the determining factor on the mode of living of the vast majority.

Consider it from the standpoint of Tuberculosis. There is only one way in which we contract this infection. Whether or not the infection goes on to disease is practically determined by the physical fitness of the individual. What is the basis of such fitness? Rest, fresh air and proper food, with reasonable exercise and play.

Town Planning makes Health Teaching Practicable

Town planning is going to help the individual secure all of these, as we have pointed out. There is one thing I would like to say in passing, however, and that is, I believe any good cause is weakened by exaggerated claims. Town planning will not solve our health problems at one magic swoop, but it will assist. There are those who think that if we could only get the people spread out, have more open space and so on, disease will vanish. It will not. Rural deaths from tuberculosis and the infant mortality rates from the country do not compare favourably with the rates of cities where the money is spent on health work. The reason for this is that these things must go hand in hand with education. What we do feel is that town planning makes possible the application of health teaching, and that is saying a great deal.

There are certain points which occur to one which might be worth mentioning. The wider streets, the more rapid and comfortable transportation will relieve a good deal of nervous strain upon the public and the pedestrian. They will also make the country more accessible, make outings into the open spaces easier. It is impossible to evaluate such things. However, knowing the close relationship between mind and body, the interdependence of physical and mental health, there is no doubt that the things which take people into the open which brighten their lives with a change of scenery and a glimpse of nature, do really assist in the maintenance of positive health.

During the past few years a great deal of attention has been focused on nutrition and the correlated subject of diet. The reason for this is explained by the comparatively recent work of such men as Garrison and McCollum, who have unearthed the relationship between certain definite diseases and deficiency in diet of certain specific factors. There has also been an appreciation of the relationship of diet to the positive health of the individual, and its place in assuring proper growth and development in the young.

Town planning is going to do something to aid materially in securing the proper diet of the people. By providing yard space, it will encourage the back

garden with its yield of green, leafy vegetables—one of the most neglected essentials in our diet. Its plan will provide for accessible markets where the housewives can obtain vegetables and other farm products fresh and at the lowest prices.

Then the home will make provision for the proper preparation and storage of food. It is not to be expected that any woman is going to prepare meals as they should be prepared unless she has the facilities with which to do this. Every home must have a kitchen. A gas burner in the dining-living room is not reasonable provision for the preparation of a meal. Is it any wonder that in such dwellings the inmates live out of tin cans?

The home must be so constructed that there is reasonable space for the storage of food, where it can be kept clean, and protected from dirt and flies.

The Need for Country Footpaths

Another thing which has interested me is the provision of footpaths along the roads running out into the country. Walking in the open is one of the most, if not the most, healthful pastimes, but motors, at present, make walking in the country nearly impossible. If footpaths will remedy this, it will be a very splendid thing for the health of the community. This may seem a small matter, but it will not be considered as such by those who have enjoyed the footpaths in the old country.

To sum up, I would say that, in planning for health in any community, environment and sanitation must receive consideration. It is true that environment is not the specific cause of disease, nor has it the direct causal relationship to sickness and health it was once thought to have. The important relationship between environment and health is that environment makes practical the exercise of essential health habits, such as the securing of fresh air, sunshine, rest and play. Because the positive health of a community largely rests upon these, the importance of town planning as a health measure is incontrovertible.

THE PLANNING OF EUROPEAN CITIES

BY RAMSAY TRAQUAIR, M.A. (hon.). F.R.I.B.A.

The planning of three European cities will be discussed in this article, Paris, Berlin and Edinburgh. In each of these large planning schemes have been carried through. To-day all three are beautiful cities which owe much of their beauty to this deliberate planning of the past. Yet in all of them, miscalculations, or mistakes, were made; the original intention has not been carried out, or has, at least, been modified by changing circumstance, so that as much may be learned from what they fail to accomplish as from their success.

PARIS

The oldest of the three is Paris; it is a city founded upon a river ford. Even before Roman times the trade road crossing the marshes passed over the Seine by way of the island, and upon the island the boatmen formed a colony. A city grew where the traffic passing up and down the river crossed the traffic on the road. Under Roman rule the boatmen of the Seine formed a corporation, the corporation became a municipality, and today the arms of Paris display the ship which first created the city.

The origin is still shown in the famous "Grande croisée de Paris," the cross formed by the intersection of the rues Saint-Martin and Saint-Jacques, with the rue Saint-Antoine and Saint-Honore along the river. The city grew around this crossing, on the island and on both sides of the Seine, and, as it grew, it was enclosed in a widening series of fortification walls, each of which, as it was outgrown, left its trace as a street. So the plan of Paris is a series of concentric ovals enclosing a cross. This leads to centralization and concentration and Paris is still a highly centralized city.

In this respect Paris should be compared with London. The latter has grown from two separate cities, the commercial city of London and the Royal city of Westminster. It was from early times an open city; indeed Westminster was never walled. So to-day the approaches to London run to three centres, one at Westminster, one in the city and one upon the opposite side of the river, whilst the business centre is still quite distinct from the government centre, greatly to the advantage of London's traffic problems.

A small ring of old fortification can still be traced round the city of London. Paris has three such rings, Moscow three, and Berlin two. It is impossible for a modern city ever to free itself from the plan and conditions imposed by its past. The mediaeval skeleton of all these cities still controls the flow of their present traffic.

Paris, throughout the middle ages, grew without much street regulation. At the beginning of the Renaissance it was the most populous and one of the most congested cities in Europe. Not until the XVIII century was it surpassed in population by London.

Under the Italian influence of Catherine de Medici, the new Louvre was commenced in 1540, a rebuilding of the old Gothic fortress. In 1564 the building of the Tuileries was begun for Catherine, opposite to the Louvre but just outside the walls of the city. The two palaces were not connected for many years; indeed the work was only finished by Napoleon III. in 1852. But meanwhile the gardens of Catherine's palace were extended westward by one monarch after another to form a great pleasure ground stretching through the Champs Elysées

and the Place de l'Etoile to the Bois de Boulogne. This is the only formally planned quarter which Paris ever had.

The kings had never lived very much in Paris and, after the Fronde, they did not look with much favour upon the growth of the city. A series of draconic edicts were enacted from 1638 to 1784 forbidding building outside the city walls and even interfering with building within them. The reasons for these edicts were sanitary, fiscal and police. It was convenient to collect the heavy octroi duties at clearly marked points of entry. The city had grown to a size at which even the elementary sanitary precautions of the period were difficult to enforce, and, most important of all, it was getting ever more difficult to maintain order. The Paris mob was already feared. So growth went on very slowly and in no regular manner.

Henry IV endeavoured to introduce a little order inside the city. He built the Place Royale, now the Place des Vosges, as a place of residence for his courtiers, and the Pont Neuf, at the head of the island. For long the Place Royale was the most fashionable part of Paris, and to this day, with its arched entrance from the rue Saint-Antoine, and its shaded cloister, it is one of the most charming spaces in Paris.

But the formality of the Place Royale and the Tuileries gardens was exceptional. In general, Paris grew until the Revolution without any fixed plan. Louis XIV preferred to live at Versailles, where, on an untouched site, he was able to plan out a little town and a great palace according to the strict principles of Renaissance planning. The plan of Versailles has had a deep influence upon all subsequent schemes of lay-out. Originally probably derived from Italy it was so developed at Versailles as to constitute a new method. Backed by the prestige of the Roi Soleil, it spread over all Europe, and until the industrial revolution of the XIX century, it was the foundation of all city planning.

At suitable positions, not necessarily symmetrical, are fixed central points, *rond-points*, from which roads radiate, joining the *rond-points* and crossing one another to form a series of triangular or trapezoidal blocks. In a city these will then be filled in with a rectangular street system. It will be seen that this gives direct communication between the important points. Indeed, it has been suggested that the scheme originated in the chases cut through the Royal Hunting Parks and arranged to enable the hunt to "rendezvous" and to collect stragglers as early as possible. It is a system which provides very monumental places and long dignified vistas, but it has the disadvantage, from the real-estate agent's point of view, of making irregular sites.

The Versailles plan is a combination of the radial and the gridiron systems. The radical plan occurs as a natural plan in many cities, in Paris or in Rome, for instance, and the gridiron plan has been used by both the ancient Greeks and the mediaeval Europeans. But the two were deliberately brought together at Versailles and for the next two hundred years, city planning was dominated by the straight street and the Piazza. When Louis XV laid out the extension of the Tuileries gardens to the Bois de Boulogne, with the Place de l'Etoile and the Place de la Concorde, he followed strictly the Versailles model.

At the time of the Revolution, the general plan of Paris was chaotic. In 1793 a commission of engineers and artists reported upon the lack of coherence, the irregularity of communications and the inconvenience for business and traffic, the lack of open spaces and markets and the excessive narrowness of the streets. They prepared a plan to remedy these faults which was partially carried out by Napoleon. The rue de Rivoli, increased to the unprecedented width of seventy feet, the Place and Boulevard of the Bastille, the Place de l'Europe and a number of smaller connections on the north side of the city are the results of this work.

Between 1833 and 1842 the railways came to Paris. As usually happens in old cities they were unable to penetrate into the centre of the city where space was contracted and land values high. So the termini were set in a large circle on the outskirts, wherever they could be put at the least expenditure of money. A ring railway had accordingly to be constructed from 1851 to 1863, to connect them and to provde for through traffic. Eventually, of course, streets had to be widened and spaces opened to give access to the stations themselves, but the means for carrying people quickly in and out of the city are still poor and lead to congestion even in the wide streets. It has been said that London envies Paris her wide streets. Paris envies London the rapid traffic and ease of communication which enables her to do without wide streets.

The great alterations to Paris were made by Baron Hausmann, under Napoleon III, from 1854 to 1871.

Napoleon III owed his throne to street fighting and he was convinced that he would hold it by artillery, by rendering street fighting too dangerous for the mob. As he said in his instructions to Hausmann, he wanted streets "whose straight building lines were not convenient for the customary tactics of the local revolutions." During the street fighting of 1848 regiments of soldiers had been beleaguered in their barracks without possibility of relief for two days, because there were no convenient streets of access. Hausmann's alterations were in the first place strategic; they were police improvements on a large scale. But he saw beyond that and Paris derived immense benefits from his new sewer system, his lighting system, tree planting and ease of circulation. The new streets were uniform and harmonious but at an enormous cost. It is calculated that, in all, the alterations cost some two thousand five hundred and fifty-three million, seven hundred thousand francs. Exactly 2,553,668,424 fr.

This was partly met by the octroi duties, but of

necessity the greater part was capitalized on the new streets. The existing high values of the land were further enhanced by these great investments and this enforced, or at least excused, great height in the buildings. The rates of Paris went up some 500 per cent, real estate values were doubled and this had largely to be paid for by increased crowding.

Hausmann and Paris were not alone in this. In one form or another this policy has been repeated in almost every large city in the world. It leads to what has been called the "tenement house city" and will continue so long as men think that congestion and high land values are a sign of prosperity.

Paris shows how difficult it is to replan a badly laid out city. Even in London, where the great fire had utterly destroyed the heart of the city and building lines were for a moment obliterated, Sir Christopher Wren found it impossible to rebuild upon a considered plan. The individual owners insisted upon retaining their old properties and would allow of no adjustment of old boundary lines. Hausmann's attempt to replan Paris, backed by a powerful Emperor and carried through ruthlessly in the face of bitter hostility, was only partially successful, and it was very expensive.

Even at that the full plan was never carried through. But Paris is the classic example of a vigorous attempt to introduce order into an unplanned city.

BERLIN

The twin cities, Berlin and Koln, from which the present capital of Germany has grown, were founded in the beginning of the XIII century. They formed a single oval city on both banks of the river Spree, with broad streets and a regular square layout centering on church and market place. At the west end was the Grand Ducal Residence with its gardens. This is a usual type of early city in North Germany.

The plan of 1648 shows the mediaeval plan still unaltered. From the Residence a bridge across the arm of the Spree leads to a broad alley lined on either side with trees and leading to the Duke's hunting park, the Thiergarten.

The resemblance of this to the plan of the Tuileries' gardens is evident. The Residence corresponds to the Tuileries, the alley, now Unter den Linden, to the Champs Elysées, and the Thiergarten to the Bois de Bologne.

But, whilst Paris as a whole was allowed to grow with rather hindrance than help from its kings, Berlin was the object of continual care and planning. The soldier kings of Prussia were in continuous residence and were anxious to make their capital a model in all things.

In 1688 Friederich Wilhelm increased the circuit of the city walls and included suburbs on all sides within the new boundaries. On either side of Unter den Linden he planned out residential quarters, the Dorothea suburb on the north, the Frederich suburb, intersected by the long, straight Friederich Strasse, on the south.

At each of the three new western gates he placed a large market place. These still remain as the Pariser Platz, leading to Unter den Linden, the Leipziger Platz and the Belle Alliance Platz. The whole of the new area was placed under strict building regulations.

Great efforts were made to encourage building in this new town. Building material was supplied, plots were sold at very low rates, all on condition that construction was at once proceeded with. Colonists were attracted not only from Germany, but from foreign countries, so that by the time of Frederick the Great there were in Berlin large and flourishing English and French colonies. In fact, at about 1825 Berlin must have been a very pleasant habitation for some 200,000 people.

After this came the industrial period, and Berlin, like every other great city, began to grow rapidly. It was not allowed to do so unregulated.

In 1858 a plan was drawn up by James Hobrecht, under the authority of the Royal police. It was calculated that in about one hundred years the population would rise to some four millions, and provision was made for this number in extensions round the city. The calculation was very correct. Today Berlin has a population of three million and a quarter.

This was a very bold attempt to regulate the growth of a city, and, so far as I know, the earliest development plan in Europe. Cities had before this been laid out on ideal plans, but Berlin was the first city to lay down a plan for the future growth of the industrial population.

The plan was adhered to as closely as varying circumstances would admit. Individual speculation was discouraged and very rigid conditions were laid down for building. Under this rather drastic rule the outlying parts of Berlin are laid out with broad straight streets often with avenues of trees and grass plots in the centre. These splendid broad streets are however, lined by lofty tenement houses, six to eight storeys high, set back to back without gardens or space to the rear. The Berlin streets are all on the outside; the tentment blocks are insanitary and highly congested. As a result of congestion land values are high.

For this it would be wrong to blame the development plan of 1858, indeed but for this plan and the orderly development which it produced, the present evils would probably have been greatly accentuated. It seems agreed that the real cause is the very imperfect railway system. The means of getting to and from work are slow and limited, and, accordingly, the work people must live as near to their work and as near to the city as possible. Berlin lacks suburbs with quick, easy connections to the city. It has been calculated by a Berlin authority that the higher development of rapid transit in London, as compared to Berlin, has made possible an expansion of London to eight persons per build-

ing as compared to fifty in Berlin. Land values are accordingly lower, and housing conditions better because they are spread over a larger area.

Berlin is lacking in good radial communication; this lack causes congestion in the suburbs; congestion brings high land values and high land values prevent new railway lines from penetrating into the city. The planners of 1858 arranged to house four million people, but they did not realize that the four million would have to be moved every day to and from their work. Broad streets and a spacious city necessitate abundant radial communications.

EDINBURGH

We may now turn to a smaller city where the present form was dictated neither by mediaeval conditions nor by the policy of autocratic rulers.

The old city of Edinburgh lay upon the ridge sloping downwards from the royal castle to the abbey. Throughout the middle ages it grew along one long street. After the seventeenth century it began to increase slowly upon the south side where the ground is level and here slight attempts were made to plan squares as residential quarters. But until the middle of the XVIII century Edinburgh was a mediaeval city whose growth was the natural result of local conditions. It was quite a small town, yet already congestion was beginning to show itself in the centre. The side streets were narrow and dirty, lined by houses of inordinate height.

But Edinburgh was fortunate at this time in possessing a public-spirited town council. In 1764 the city purchased a large tract of land on the unoccupied north side and held a competition for the planning of a new suburb. Th result was the well-known plan of James Craig, according to which the New Town is built. In this manner Edinburgh left the mediaeval town untouched and built its Renaissance town outside it, under the regulation of its own city fathers.

Craig's plan consists of a central broad street, named George Street, after the reigning sovereign, terminating in St. Andrew Square and Charlotte Square and flanked by Princes Street and Queen Street. These three long streets are connected by cross streets. It is a Renaissance plan dominated by the straight street and the piazza but making no use of the diagonal or radial street.

At first there was great difficulty in getting the sites taken up. A premium of £20 was offered to whoever should build the first house; the new suburb was regarded as too far from town and as inconvenient for winter. However, by 1800 practically the whole of Craig's New Town was built, exactly as had been planned.

It was conceived and built as a residential suburb. The first buildings were severely plain and utilitarian but as the building advanced westwards the architecture improved. Charlotte Square, built in 1780 to 1790 from designs by Robert Adam, with St. George's Church by Reid, is one of the most beautiful small squares in Europe.

Between the New Town and the old lay a marshy valley, the remains of the old Nor Loch, used at this time as a market garden. This was a hindrance to persons passing from the suburb to the city so an embankment across it was made with the earth taken from the new foundations, and the "Mound" was built. Gradually the valley was improved and developed into Princes Street Gardens, now one of the principal beauties of Edinburgh. But it is interesting to note that building upon the south side of Princes Street was only stopped by the owners of the houses on the north side, who desired to keep up the value of the property. They fortunately had been given a "servitude" over all land between them and the city which enabled them to prevent all building on it.

The success of Craig's town led to further formal schemes Lothian's plan of 1829 shows a great extension of piazzas, circuses, squares and straight streets spreading to the west, north, and in the direction of the Port of Leith. This regular planning was made possible by the Scottish fencing system under which large estates were laid out on a definite plan, the lots leased on a perpetual lease with "servitudes" which guaranteed that the plan would be adhered to and the estate slowly developed on a scheme both of building and of use which the owners and the occupiers were bound to respect. We may compare it to a privately enforced zoning scheme. A considerable part of these schemes was carried out, resulting in large, dignified "places" and streets of a rather heavy and very formal character. Such building continued as late as 1830.

But Nemesis was waiting for our formal planners. Their ideal seems to have been an infinite extension of handsome residences for wealthy citizens. No provision was made for shops, workshops, factories or industries, and the industrial era was just commencing.

So the visitor to outlying parts of Edinburgh will occasionally find the stately terrace stop, terminating in a rough, wooden shack. Passing behind some dignified church he will find a chaos of tumble-down workshops. All over Edinburgh we find unfinished fragments of the formal schemes of 1829.

Then came the railroads. At first they were small and innocent.

In 1826 a line was opened from Edinburgh to Dalkeith, 15 miles.

In 1836 a line to Leith, 2¼ miles.

In 1838 a line to Glasgow, a long line of 46 miles.

The people regarded the railroads as a kind of improved stage coach. Edinburgh had now no closely congested centre, even the old town was a long, staggering affair. So, unlike the continental cities, Edinburgh allowed the railways to go right through the city and to penetrate to its centre.

Then trade began to increase and the railways showed what they could do. Uncontrolled, they wound in loops round the city, they blocked planning at all points, they monopolized huge areas, in

the wrong places, for goods' yards. The city did not waken up to what had happened until too late.

Paris and Berlin suffer from insufficient rail connections: Edinburgh often fears that she suffers from too much. Yet this has its advantages. The easy, rapid transit has enabled suburbs to be opened up at some considerable distance from the city and this has kept the price of land from rising to an extortionate height. For its population Edinburgh is a very much extended city with a most unusual amount of park and garden space.

The railways are, of course a part of the industrial deluge. Even if they had not come, the formal system of planning must have been abandoned. Cheap, small houses were wanted to accommodate the industrial workers and the city grew on speculative lines as fast as any American western town. Between 1830 and 1890 it increased about four times, without plan control, with no object save to provide a profit for the builders. Much of the land now occupied was now owned by charitable and educational trusts and these public bodies actually laid down the strange principle that they were bound to make the greatest profit possible from their land, without regard to general public advantage. If their particular charity profited it did not concern them that the city suffered.

So the old mediaeval city and the New renaissance city of Edinburgh today stand side by side surrounded by a modern industrial town, ugly, drab and hopeless. The mediaeval city will always have a picturesque and historic interest, the new town will always be dignified and spacious, but the industrial town is a huge slum in prospect, fit for little save some day to be destroyed. Beyond these, the scattered suburbs show that today a city does not need to be confined even by municipal boundaries.

In the three cities which we have looked at, we have seen examples of mediaeval, renaissance and industrial planning. We have seen too the evils which have invariably arisen, in mediaeval or modern times, from uncontrolled planning. The city of the future will probably be unlike any of these past cities, but we may be sure that, if it is to be a good place to live in, either for health, beauty or economy, it will require to be thought out and planned before it is built.

THE CITY AS AN ORGANISM

With Special Reference to Montreal

BY DR. C. A. DAWSON,
Montreal
Associate Professor of Sociology, McGill University

I am not speaking as a city planner but as a sociologist whose chief interest in such a matter is how the physical structure of the city affects the lives and social institutions of the people.

The cities I have in mind are the cities of the new world, whose major development was closely dependent upon the modern means of transportation. These transportation facilities have made possible not only a greater concentration, but at the same time a more mobile and shifting population, with attendant disorder in structure and behaviour. The growing pains of modern cities have become chronic and some of our pessimists believe them to be well-nigh incurable.

The City as an Expanding Organism

My topic, "The City as an Organism," suggests that the city is believed to have some sort of unity. To present this complex problem with some clarity, it is necessary to resort to at least the illusion of simplicity—to which even the physicists appeal in presenting their problems. As a device for presenting some of the main tendencies in city growth and unity, let me ask you to think of the city in terms of concentric circles, a device suggested by Professor E. W. Burgess of the University of Chicago. Each circle represents the successive zones or areas of the city's expansion, as it develops radially from the central circle.

1. The first circle is the central business district from which the city expands radially.

2. The second circle is the zone of deterioration surrounding the centre. This is an area of residence that has been invaded by the central business district. This is the so-called central slum, produced by the well-noted tendency of the city to die at or near its heart.

3. The third circle is the zone of the working men's homes, inhabited predominantly by skilled and thrifty factory and shop workers who have escaped from the second zone and are within easy access of their work.

4. The fourth is the area of exclusive residential districts with single family dwellings and high class apartments.

5. The fifth is the commuter's zone in which lie the suburbs and satellite cities within from 30 to 60 minutes of the central business district.

The city as I have suggested, tends to grow radially from the centre, each zone expanding and invading the next outward zone. If the area is used for a new purpose, new population groupings result and older groupings withdraw. In an early period the space occupied by these successive circles might well lie within the central circle in a large city. I suspect there are those now living in Montreal who can remember when this inner circle as it is today

contained all the concentric areas in the region between Sherbrooke and the river.

The Distribution of Distinctive Groupings in each Area

The expansion of the city may be viewed as a selective process which distributes individuals into occupations, and sifts groups into areas of residence. The result in our cities is a typical pattern which recurs with only minor modifications. Let us analyze these various zones more fully to see the nature of this oft recurring pattern.

1. Zone 1, the central business district, is the centre of the city, not geographically but financially, culturally and politically. It includes the retail, wholesale and financial districts. It is the centre of local and outside transportation with its central stations and great hotels. With its theatres, art, music and what not, it is the cultural centre of the city, as with its publicity, news and advertising, and its municipal buildings it is the political centre of the city.

This central area is characterized by high land values and great mobility of population. More than half a million of people enter and leave the central business district of Chicago in the course of a day. The middle of this centre again, if we conceive of such a centre in terms of highest land value is in the retail district with some competition from the centre of the financial district. I have considered the hotels, central stations and the very high land values at the intersection of St. Catherine and Peel-Windsor on the one hand and the tremendous movement of population at the corner of Bleury and St. Catherine on the other hand; and I have compromised with Phillips Square as the centre of Montreal.

2. Now turning to the second zone one notes that the demands made on the central area cause the invasion of the second circle by light-manufacturing and business. This gives an idea of relatively high land values and relatively low rentals in which the land is held speculatively for business requirements which usually make use of the site and not the buildings. Consequently, as residences, they are allowed to deteriorate. This section becomes a slum area, with a shifting, changing population, in which the social order gets broken up far in advance of the creation of a new order to take its place. It is the "city bad-lands," the home of the border drama and the burlesque show. Nearby, and often piercing the central district, you have "main stem" of the hobo, called by Nels Anderson in his book on the hobo, Hobohemia. This whole disintegrating area has its own characteristic groupings. It is the area of first settlement for the immigrant and one usually finds there several immigrant colonies. Here also are the rooming house districts, the Latin Quarter, where creative and rebellious souls resort. Hiding in this area of deteriorization are the underworlds of vice and crime. This is an area in which settlements, missions, artists' colonies and radical centres are each in their own way seeking to stem the tide of disintegration, obsessed with the ideal of a better world.

3. While the population groupings are more spectacular in the slum or area of disintegration, the distribution of groups is clearly evident in all areas of the city. Each area has its characteristic types of residence and of institutions that draw around them certain population elements. Economic ability, temperament, social taste and custom are indices of the social distance which partially isolates these groups from each other.

It is interesting to note that this third zone is the place of second residence for immigrant groups. They have succeeded economically; they have been disturbed by further deteriorization in the area of first residence; they have been pushed out by newer immigrants and they have moved to a more stable and wholesome community. While the sudden entry of many immigrants speeds up the junking process of the second circle, it also seriously affects the social adjustment in every succeeding circle.

Factors that Modify the Direction of the City's Growth in a Given Situation

I have said that ideally the expansion of the city may be graphically represented by a series of concentric circles as in diagram 1.

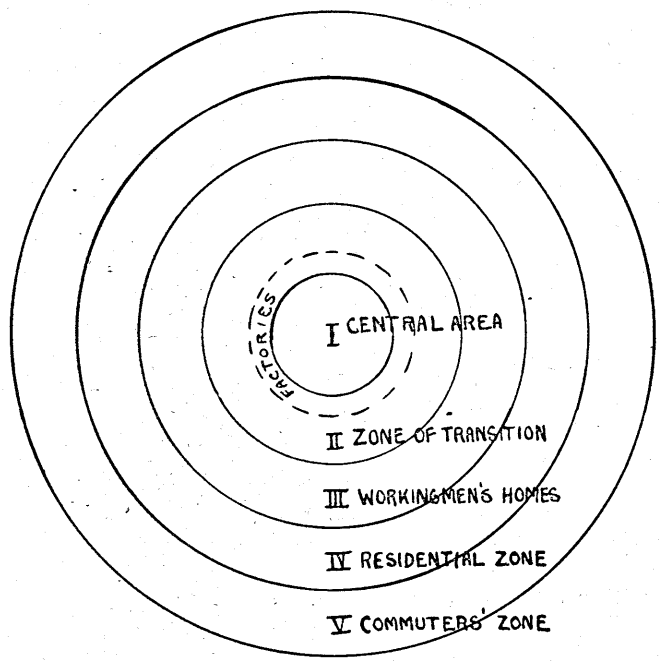


DIAGRAM I

There are, however, factors in every local situation such as rivers, mountains, natural lines of communication and the early position of industrial establishments which tend to press these circles out of their regularity in the growth of any city. Therefore, it is necessary to represent Montreal graphi-

cally by means of a series of concentric kidneys, as in diagram 2.

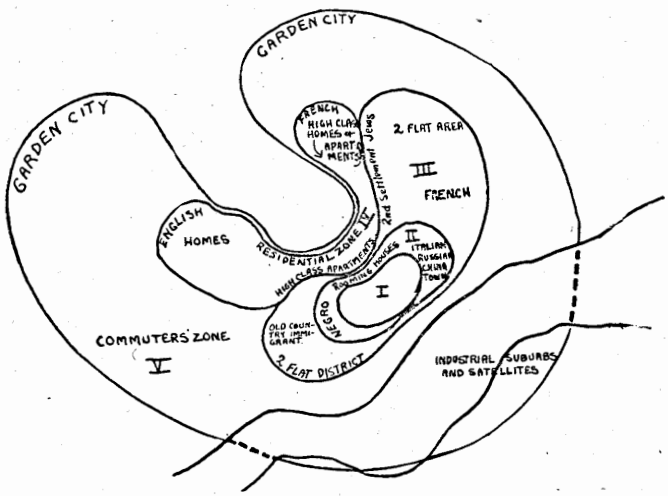


DIAGRAM II

This device shows the expansion of the city which has been squeezed between the river and the mountain and has also adjusted itself to other factors. But the main tendencies of expansion radially from the centre seem to hold true of Montreal.

The Structural Interdependence of the City

It is apparent from the preceding discussion that the city grows as a whole. Its areas develop in relation to each other; become adjusted to each other and tend to form a structural unity. The communities formed within each successive circle are closely dependent upon the central area. The outlying business districts are sub-centres dependent upon the main centre. In very large cities the sub-centre stores are representatives of down-town retail houses operating under another name. The feigned attempt to build up local neighborhood life by asking people to buy at sub-centres is really a means of selling goods, and little else; for these representatives of down-town houses have little actual interest in the local neighborhoods. The development of chain stores centrally administered is another example of centralized-decentralized business structure.

Certain forces are active in the decentralization of industry. Faced by high rents, lack of space and congestion in transportation, factories are moving outside city limits and producing satellite cities. Such outlying cities are dependent upon the services of the central business district for much of their labor supply and for the transportation facilities from the central city. Accordingly, they are specific parts of the city as an organism.

Furthermore, the people of the outlying areas make much use of clubs, organizations and institutions of the central area. The city as a whole makes use of its parks, recreational, social and other facilities wherever they are located, but the demands made upon the central district tend to be excessive in every city. We have seen too, that the decentralization of industry and residence still leaves a close relationship to the central area. Cities like Chicago have striven hard to foresee and prepare for the demands likely to be made upon the central business district. But as yet, the success has only been partial. The cost to the city of Chicago of the confusion, congestion, transportation delays and their effect on the cost of living, is estimated at $60,000,000 a year.

While sections and neighborhoods are interdependent, there is another type of interdependence that cuts across all geographical areas. I refer to the enormous specialization and divisions of labour in a great city. We are told that it takes 150 separate operations to make one suit of clothes. There are between 500 and 1,000 different occupations in a metropolis. This is what the economists mean by competitive co-operation. Each division of labour or occupation in some measure needs the services of the other divisions. The organic nature of the city is further demonstrated in the common use of tramways, telephone system, water supply and other public utilities.

About the interdependent physical structure and divisions of service in the city there develops an appropriate social structure that greatly extends the organic aspect of the city. Each natural area is bounded by transportation lines, commercial, industrial, vacant and water frontage. Such areas develop certain population types in respect to race, age, proportion of the sexes and standards of living. Hobohemia, for instance, has its characteristic institutions; is peopled by one sex, and within its confines there are no children. Racial communities have their own characteristics, social organizations, customs and attitudes. So also have the natural areas of Westmount, Outremont, and other sections. Each area with its own group traditions and sentiments plays a role in the total life of the city—a role related to that of every other area in respect to political and social life. Each area and group to some extent participates in building up a common understanding and set of agreements. These are social forces that direct the affairs of the city informally and formally and no city plan can proceed very far without taking them into account.

The City Organism and City Planning

"Spotty" and patchwork planning is futile, since the city grows as a whole in certain characteristic directions; is structurally and occupationally interdependent, and presents common social problems. At these points of rapid physical and social change, a chart presenting land values would indicate certain natural trends in city growth. Material gathered by public utility bodies in their attempt to forecast the direction and rate of city growth is of real value to the town-planner. The success of a city plan in Montreal will depend upon a thorough study of all the forces that determine the rate and direction of

the city's growth. The city left to itself grows naturally in certain directions, but grows wild. While every area suffers from the wild growth of a planless city, deterioration and change in the use of the land are outstanding in certain areas, as for example, the districts that circle the central and sub-central business districts. Maps charting poverty, crime, delinquincy, desertion, neglect of children and other forms of social failure are dotted most heavily in such districts.

A city plan based upon adequate study will not work against the natural forces making for city growth but will direct these forces in the production of more stable, healthy and wholesome neighborhoods. Such a plan can mitigate the central slum by aiding in the decentralization of manufacturing and by business, and by forecasting the needs of the expanding central district. It can prevent the shack-towns or slums at the circumference which are the most inexcusable of all ills in a city. It can help to bring to every area of the city more security and amenity of life by preventing industrial and commercial invasion. It can directly and indirectly aid the citizens in meeting some of the most urgent problems of housing, disease and disorder.

I hope that care will be taken to guide the growth of Montreal along the most natural lines towards its appropriate development and that this plan, as it is worked out, will take account of the forces and tendencies of growth resident in every area of the city and in the city as a whole. For cities which at first seem to be pure artefacts, with their checkerboard streets and angular blocks, are found on closer examination to be moulded by forces only partially apparent and they become something that no one foresaw or intended. The location of and constant reckoning with these forces will keep the growing city in hand.

TRAFFIC CONTROL BY REGULATION AND DESIGN

With Special Reference to Montreal

BY R. de L. FRENCH

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The Common Good

The street traffic in a city of any size today is made up of a multitude of units of different sizes and types progressing in different directions at differents speeds and using various methods of locomotion. There is the pedestrian, the horse-drawn vehicle, the pleasure automobile, the motor truck, the bus, the street car and the motor cycle, each with its rights and each generally with desires which conflict with those of other types. To reconcile these rights and desires so that each individual unit shall have fair treatment and the opportunity of developing the maximum possible efficiency under the circumstances, requires that each shall make its part of the common sacrifice. Such reconciliation is the essence of the problem of traffic regulation, a subject which has become of tremendous importance within the past 20 years, and one annually increasing in importance and magnitude. Thus, one phase of traffic control concerns itself with promoting the most efficient use of the streets. The other, and not less important phase, is safeguarding the lives and health of all street-users.

Street Congestion

Street congestion is not a new phenomenon, but, until the advent of motor vehicles, it was not a serious matter, except in a few of the largest cities of the world, and in relatively small sections of some of the smaller ones. London had been obliged to develop a very satisfactory system of traffic control long before the advent of the automobile. New York was also a leader in such matters by 1900. We read that in August, 1852, 3,035 omnibuses and 4,719 other vehicles passed Chambers Street on Broadway in that city during 13 hours. Assuming that traffic was evenly divided between the north-bound and south bound streams, this means that the headway between vehicles was only about 13 seconds.

Traffic Regulation and Better Planning

Traffic regulation, if perfect, should secure the maximum capacity from existing streets, but it cannot increase the capacity of a street over its ultimate. A point is finally reached where traffic regulation can do no more: then it becomes a question of increasing street capacity by some alterations in the street plan.

Relief in a congested district may be secured by various expedients, among which may be mentioned the following:

1. Establishment of one-way streets.
2. Removal of unnecessary traffic and the regulation of the loading and unloading of vehicles.
3. Establishment of by-pass routes.
4. Entire or partial prohibition of parking.
5. Rerouting of street cars.
6. Zoning.
7. Police traffic control.

Street capacity may be increased by:

1. Widening existing streets and the arcading of sidewalks.
2. Opening new streets.
3. Removal of street cars, by subways or elevated structures.

4. Double-decking and the separation of grades at busy intersections.

There are doubtless other means which may be adopted, either as temporary relief measures or for permanent amelioration, which are not mentioned in the two lists just given.

Causes of Congestion

Where parallel streets at reasonably close intervals serve substantially the same district, or have their termini close together, a good deal can be accomplished by designating them as "one-way" streets. Notre Dame and St. James Streets in Montreal are examples of the second type of one-way street, while the numerous short streets connecting them are examples of the first type.

Investigation in the congested districts of a number of cities has shown that in general much of the congestion is due to the presence there of vehicles which might be excluded without working much hardship. Through traffic will often choose the route via the congested district when it might equally well reach its destination by routes which may be slightly longer in point of distance, but which are perhaps shorter in point of time, were the public educated to use such routes. Tourist traffic passing through the city is a case in point. It frequently follows the main arteries, when it has no intention of stopping. The attempt to remove such traffic from mercantile streets will perhaps cause a complaint on the part of the merchants that it is an unwarranted interference with their business prospects. Where such attempts have been most successful, however, the volume of business done by the shopkeepers does not seem to have been much affected.

Vehicles unloading and loading occupy more than their fair share of the street in most cases. Not only do they interfere with other vehicles, but they frequently obstruct the sidewalks, and inconvenience pedestrians, the class of traffic which is regarded as deserving of the most consideration. It is not uncommon to find traffic regulations prohibiting loading and unloading of goods in congested districts during the busy hours of the day. Strictly speaking, using street space for such commercial purposes is unwarranted, and there should be no hesitation in forbidding it when necessary. Facilities for the receipt and delivery of goods should be provided on the private premises of commercial firms, and, for convenience alone, most of the larger firms have made such provisions.

Parking

One of the most troublesome problems with which we have to deal is that of "parking." There is no doubt that the motor vehicle owner is justly entitled to leave his car standing in the public street while he attends to his legitimate business affairs, but it is equally true that he is emphatically not entitled to use the streets as a garage, although the latter may be said to be almost a universal practice. On the other hand, unless the motorist has some convenient and safe place to park his car, he loses much of its value to him.

There is no objection to allowing parking at points where it will not interfere with the free flow of traffic, such as in open spaces of large area, like Montreal's Youville Square, or on certain streets where traffic is very light as is often the case in the residential districts, but there is every objection to permitting it at all on the busiest streets, or on the less busy streets while traffic is heavy. For example, it would not work unendurable hardship if motorists were forbidden to stop at all on St. Catherine street from, say, Papineau Avenue to Guy Street. There are plenty of cross streets available which could be used for the dropping and taking on of passengers. Whether or not parking, even for a limited time, should be permitted on these cross streets is quite another matter, which should be considered on its merits in each case. Clearing St. Catherine Street in this manner would greatly increase its traffic capacity, and should reduce street accidents there as well. There would be no halts in the traffic stream, save those due to the traffic regulations.

It is doubtful if the right to park rests on any substantial basis of legality. However that may be, some parking facilities should certainly be provided for the motor-using public. As has been said, the city may do something by permitting parking in certain areas, but it would appear that the motorist will have to do more for himself in this respect in the future than he has in the past. Already a start has been made toward the development of private parking areas in many of our cities, and it is in this direction that we must look for future alleviation of our troubles. Some authorities hold that the provision of parking space for tenants is as much a function of the owners of apartments and office buildings as is the supplying of adequate elevator service.

Occasionally, the rerouting of street cars affords some relief. It is claimed that a study of traffic conditions in the downtown district of Chicago showed that the rearrangement of street car routes would not only speed up other forms of traffic, but that it would greatly increase the efficiency of street car service as well. This is a factor well worth consideration, as it is estimated that street cars carry about 80% of the passengers carried by all vehicles using the streets, while they occupy less than 20% of the street area. The remaining 20% of the total number of passengers is carried by other vehicles, occupying about 80% of the street area.

Zoning

The effect of zoning on the volume of street traffic is indirect and not immediate. It seeks to regulate the use to which private property may be put, and to restrict the density of population. A comprehensive and well considered zoning ordinance will no doubt do much in time to relieve traffic conges-

tion, but it is bound to be years before any such ordinance can show noticeable results. What can be expected of zoning is (and it is important) that it will help to prevent our present traffic problems from getting worse and see to it that similar problems do not arise in districts not now congested.

Police Control

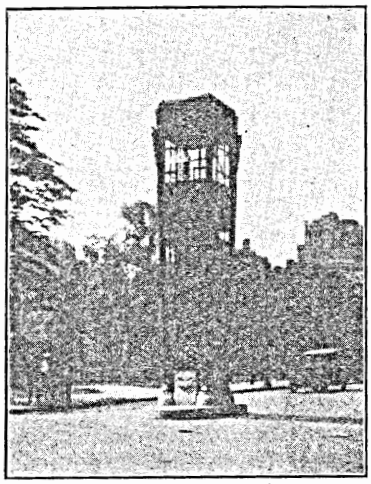
The principal reliance of those who are seeking to remedy present conditions of traffic congestion is placed in regulation and control, generally by the police authorities. Under this heading should be included all our traffic laws, such as those having to do with "left turns," parking, and so forth. A simple and satisfactory traffic code is a necessity in our cities, but it is not to be expected that any sort of legislation can provide capacity where it does not exist, as has already been pointed out. A traffic code can make it possible to utilize to the best advantage what we have, and is a potent help in reducing street accidents, which have become so common as to be regarded, in many cases, as quite unavoidable.

Traffic Boards

There is little question that the police department is the agency best fitted to enforce traffic regulations, but there is grave doubt as to its being the best authority to frame them. Cities which are experimenting with "traffic boards" seem to be of the opinion that such special commissions are more successful than the police departments which they in part displace. A traffic board should be composed of representatives of all those who have an interest in street use-engineers, street railway men, the fire department, the police department and others. It should be provided with a trained leader, and its first work should be to make a comprehensive survey of traffic conditions, which should include information as to the volume, character, origin and destination of traffic, the growth and distribution of population, the street plan, street hazards and the like. Such data are absolutely necessary, and upon a careful study of them a suitable code can be framed. The code must be flexible. It is perhaps wise therefore, to arrange that alterations in it may be made by the board without reference to the city government, always, of course, safeguarding the right of appeal.

Traffic Codes and Signals

The object of all codes is the same—to keep traffic moving at the maximum safe speed. The principal obstructions to rapid progress of traffic are the street intersections, and it is here that traffic police are usually stationed. They may be assisted by mechanical signalling devices of various sorts, sometimes quite elaborate, or they may depend on manual signals entirely. Each officer may handle traffic as he thinks best, subject to certain general rules, or traffic spread over many blocks may be handled from one central station, as is the case in Fifth Avenue, New York, and Michigan Boulevard, Chicago. As far as the writer is aware, all traffic is now handled on the "stop and go" system, which needs no explanation.



Fifth Avenue, New York, Traffic Tower

The Platoon System

It has been suggested that the "platoon system" might prove to be more efficient. According to this scheme a vehicle would join a platoon when it turned into a thoroughfare in which the system was in operation, and it would remain with this platoon so long as it remained moving in that street. The size and speed of the platoons, and the spaces between them would be so regulated that they would not interfere with similar platoons moving in the cross streets, and that neither column of platoons would be obliged to halt for the other column. Thus, traffic in both thoroughfare and cross streets would be in constant motion and there would be no delays. The platoon system looks very attractive on paper, but the practical difficulties in working it out in actual operation are so great that it is doubtful if it could be made to give the service of which it seems to be theoretically capable.

The regulation of existing traffic is a science in itself which will have to have expert attention and care if it is to be even moderately successful. A system which gives fair service in one city may be quite unsuited to another.

The Impossible Situations

When traffic has reached a volume which makes it apparent that no regulation, even the best, can cope with the situation, it becomes necessary to look about for other means of meeting the conditions. This is the position in which most of our cities find themselves to-day, at least with respect to some of their principal streets. There appear to be two methods of meeting the conditions, first, to increase street capacity, and second, to reduce traffic.

Increased street capacity may be had through widening, almost always an expensive procedure as

it involves the condemnation of abutting property, and the taking of its most valuable portion. Occasionally we find a street with sufficient unused area within its boundaries to allow of widening at reasonable cost. For example, a strip of lawn between curb and walk may be added to the pavement, but such favorable conditions are rare.

Arcading

It has been suggested that a portion of the abutting lots might be thrown into the street area and used for sidewalks, while permitting the owners to build to the curb line on the second floor, producing an arcade. This scheme has actually been carried out in Philadelphia and in New York, where the new building of the New York Telephone Company provides for arcaded walks. The original sidewalk area is, of course, added to the pavement width.

New York Telephone Co's Building, New York, with arcaded sidewalks

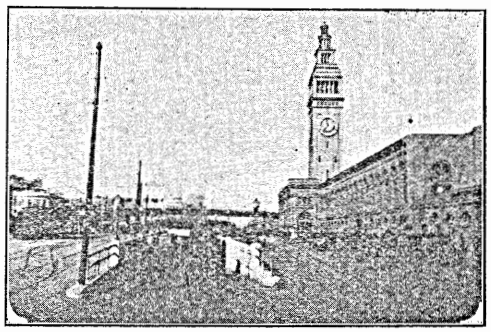
New Streets and Subways

As an alternative to widening, new streets may be considered. These, too, are expensive, if they are in or near the congested area, where property values are high, but it sometimes happens that streets driven through property at some distance from the seat of the difficulty will afford much relief, especially if they make a by-pass route possible.

The removal of street cars from the street surface will afford some relief, but is, of course, a very expensive proceeding. Boston set the pace on this continent by building the original subway under the Common, and routing cars formerly using Tremont Street through it.

The building of two-storey streets has been suggested, and in one case, at least, it has been carried out,—the South Water Street improvement in Chicago. San Francisco has relieved congestion in front of the ferry terminal at the foot of Market Street by building a vehicle subway at that point so that vehicles wishing to cross Market Street may do so in ease and safety.

Detroit has embarked upon a plan of "superhighways" radiating in all directions from the city. In the thickly settled areas these will be virtually double-deck streets, as the street cars are to be taken care of by subways. In the outskirts of the city, the street cars will rise to the surface and occupy

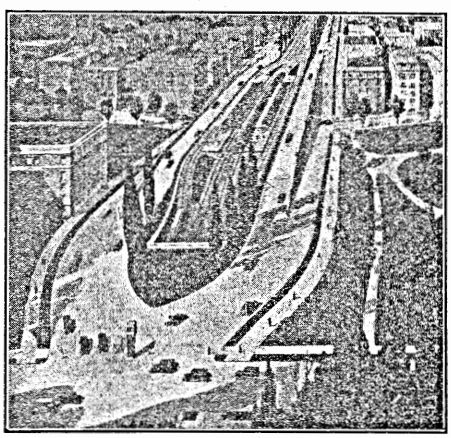


Vehicle Subway, foot of Market Street, San Francisco.

a reservation in the centre of the street. Grade crossings of intersecting streets are to be avoided as far as possible, although there will be arrangements so that traffic on cross streets may reach the superhighways at fairly frequent intervals.

Need for Planning

With the experience of the past twenty years behind it, it would seem incredible that any city would allow its new streets to be laid out in a manner which practically prohibits their future widening except under the same handicaps which face us at present. A wide street is not necessarily as expensive as might be thought. The cost of real estate is, of course, about proportional to the width, but that is a minor item in the case of outlying districts, where owners are frequently glad to donate property, or at least sell it at very reasonable prices in return for the enhanced value of their holdings and the convenience of good street accommodation.



Detroit "Super-highway," showing junction between two-storey and single-level portions

Because a street is wide is no reason for paving its entire width—pave as little as may be required for the traffic and leave the rest of the street area in lawn and trees for future widenings.

All methods of increasing traffic capacity are expensive, but they are necessary in many cases. The citizen has to face the music of paying the bill for the mistakes and lack of foresight of his forefathers, and unless the present generation pays more attention of the street plan of its cities than it seems disposed to, future generations of citizens will be faced with the same problems.

Decentralization

To the writer it appears that the only real and permanent remedy for our traffic problem lies in decentralization. To-day, merchants and manufacturers generally feel that they must be in the heart of the city, or in some particular section of it. No doubt access to markets and shipping facilities and to those who supply the raw materials has much to do with this feeling, but this nearness may be in distance only, owing to the very congestion which it sets up. A good deal of this feeling is due to habit and custom. There is no real reason why one of our metropolitan banks or trust companies or insurance concerns *must* be in St. James Street. Numerous other lines of commerce would be equally happy in locations out of the thick of things, and some of them have come to realize this fact. Of late years there has been a steady drift of big business to the outskirts of the cities and even to the smaller towns. Such locations have advantages which more than outweigh those of the central areas, with their congestion and high property values. Any town planning, any taxation scheme, any legislation which will promote this decentralization is a step in the right direction. The writer firmly believes that the metropolitan cities of the future will be far different from those of today, and that the chief difference will be that they will be less congested and much more decentralized.

(Continued from Page 2)

few who can afford to buy them from some enterprising "realtor."

The New Science

The scientific spirit of this scientific age is at last turning its attention to the creation of a social science whose name may be Euthenics (beautiful order), Civic Design, or may for some time to come be called City Planning or Town Planning.

Learning from the Past

Professor Ramsay Traquair contributes, under the title, "The Planning of European Cities" three interesting studies of mediaeval, renaissance, and industrial planning. From these studies, he states, quite as much can be learned from the failures of scientific planning as well as from the partial successes achieved. So long as men think, he concludes, that congestion and high land values are signs of prosperity the same mistakes in planning will continue to be made.

The So-Called Natural Growth

Dr. C. A. Dawson describes in diagrammatic form the natural history of the development of such cities as Montreal, and sees clearly that the so-called "natural growth" of towns and cities is a very wild kind of growth which leads inevitably to much social mischief and inefficiency.

Traffic Control as Things Are

In "Traffic Control by Regulation and Design" Mr. R. de L. French, Professor of Highway and Municipal Engineering, taking cities as they are, dicsusses a number of temporary relief measures by which traffic can be regulated for the public convenience. These agonized efforts to keep traffic moving at some pace and to mitigate to some extent the waste of time involved and the danger to life are but the index of the fact that the nineteenth century way of building towns is obsolete and that men are needed on city councils and public bodies who recognize the fact and are prepared to plan for the future welfare of the whole community and not simply for the benefit of land owners who wish to squeeze every drop of profit out of their holdings. If city officials were not so often land dealers themselves they might be more willing to pay some attention to the fact that land manipulators are, after all, something less than one per cent of the community, who usually manage to see that, whatever taxes are aimed at them, somebody else pays the bills. The mistakes of the past in planning streets might be to some extent condoned, in view of the unforseen development of motor traffic, but the repetition of them in face of the manifest need for changing methods is inexcusable. In Ottawa a magnificent building has been erected opposite to Parliament House with the building line carried to the same street frontage of fifty years ago, making a narrow bottle-neck to one of the chief entrances of the Capital and necessitating at no distant date the destruction of buildings which might otherwise serve their purpose for half a century. One building is a theatre with no provision for the motor traffic created by such an institution.

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