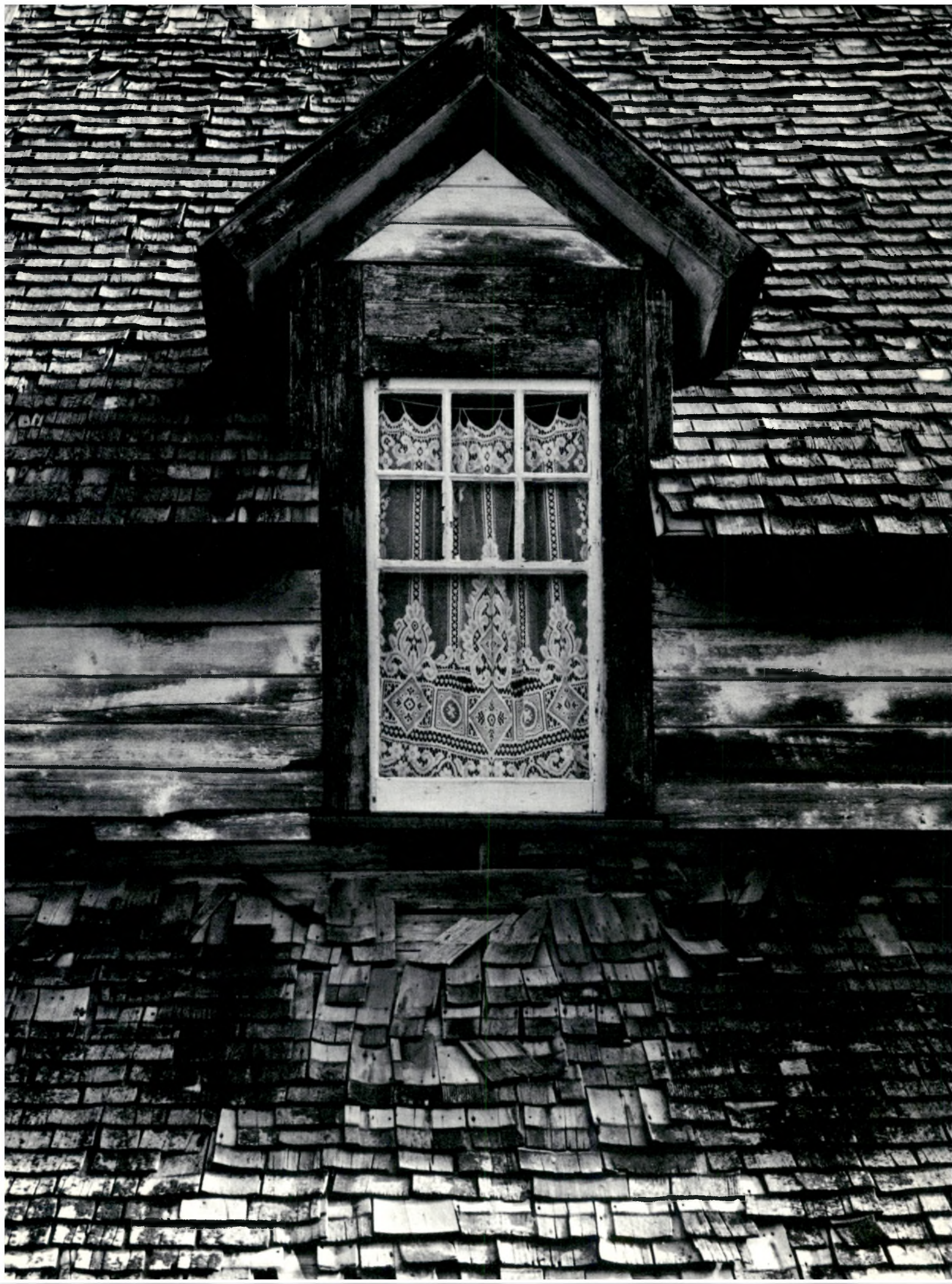


# habitat









# habitat

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Central city traffic congestion has been a vexatious problem for almost everyone and will probably get worse. The author has developed a simple model showing what happens to traffic volumes when a traffic-attracting establishment is dispersed.

The "middle age" group from 6 to 14, comprise children who are particularly active and vibrant. They need lots of space to express themselves, they want to assert their independence, and they want the right environment in which to develop their minds and muscles. This can't be done on the streets, running between cars or climbing over garbage cans.

Constitué par diverses personnalités du CEFAT, ce dossier sur l'aménagement régional concerne principalement le Québec. Son intérêt général dépasse toutefois le cadre provincial et il n'est pas exclu que cette étude soit parcourue avec profit d'un océan à l'autre.

The advance of industrial development into the Canadian North has left in its wake a problem breed known as squatters. And, with their indifferent attitude to the requirements of land tenure, "Squatters have cast a shadow upon the Canadian frontier."

This four-million square mile territory has enormous reserves of many of the commodities needed by modern technology. The Soviet Government has plans to tap these reserves and populate the area which, in many respects, is like Northern Canada.

Front Cover/Couverture extérieure: Margrit Stutz

Inside Cover: Detail of an old house at Pioneer Village on Highway 16 near Edmonton.  
NFB photo by Ronald Solomon

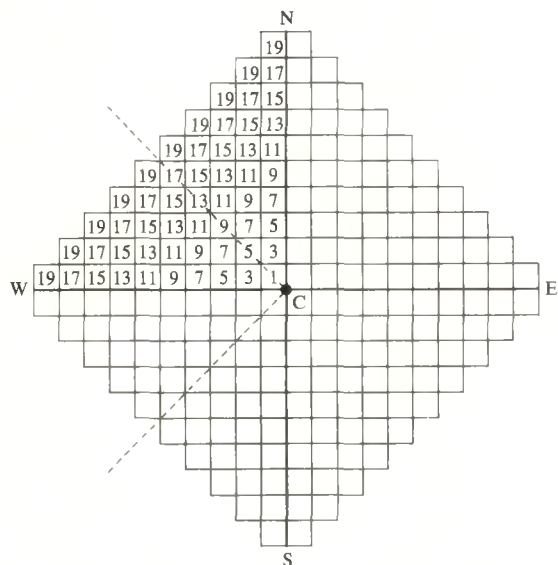
Couverture intérieure: Détail d'une vieille demeure au Village des Pionniers, sur l'autoroute 16 près d'Edmonton.  
Photographie: Ronald Solomon

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# Dispersal, Traffic Volumes and Urban Growth

by D. J. Reynolds



The dispersal of traffic-attracting establishments can aid in the solution of urban traffic problems. Many cities plan for and encourage dispersal for this reason. But what is the process of dispersal, what are the ways in which it operates and how are estimates made of its quantitative effects on urban traffic volumes? It is important to know because urban growth and the pressures of traffic on the road systems of Canadian cities are likely to become more severe in the future, and any aid that can be obtained from dispersal is likely to be useful.

## A Simple Model of a City

To trace out the effects of dispersal on traffic simply and clearly it is necessary to devise a simple model of a city, because an existing city in all its detail is far too complex for this purpose.

To meet this requirement, the model illustrated in Fig. 1 has been devised. It consists of 220 car owning families each living in a square lot or block of unit area, with a square grid system of roads consisting of 2 main highways NS and EW, and a grid system of access roads to each lot and to the main highways. With such a model it is relatively easy to vary layout and to calculate manually the travel distances and the volumes of traffic arising from any given lay-out and pattern of journeys.

If, for example, each family carries out a round trip to an establishment in the centre once per day by car by the shortest route, the traffic volumes resulting from this will be as shown in Fig. 1, and will total 2860 car units per day, the units being units of length, equal to the side of each square lot.

## The Effect of Dispersal of Establishments Attracting Traffic

There are in fact two main kinds of dispersal to be considered; i) the dispersal of establishments which retain their size and continue to attract journeys and traffic equally from all over the city; ii) the breaking down and dispersal of establishments over the city with only localized travel patterns to them.

### i) Dispersal of a Single Establishment Attracting Traffic from all over Town

To discuss the dispersal of a single establishment which retains its size and attraction, consider an establishment which attracts traffic from the whole area and whose location is gradually moved out block by block from downtown, say towards E in Fig. 1. By summing the increments in distance by those who have to travel further and the decrements in distance by those who have to travel less, it is possible to calculate the resulting traffic volumes as in Table 1.



Figure 1. Urban Model of 220 Families and Transport Volumes in Car Units Resulting from Round Trip to Centre. (One quadrant illustrated only.)

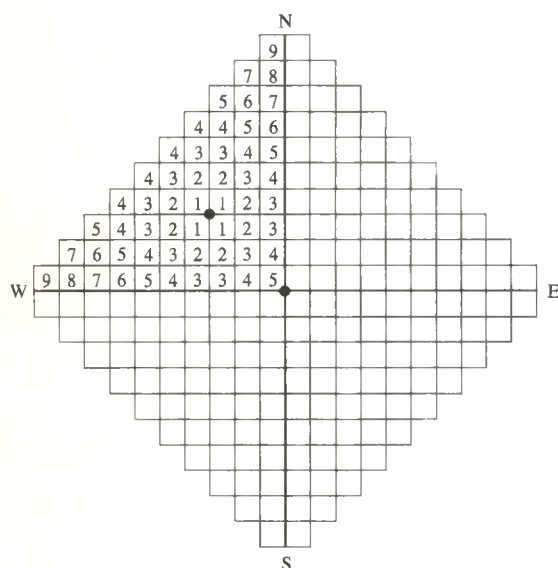


Figure 2. Round Trip Traffic Volumes in Car Units to Establishment Located at Point ● (One quadrant illustrated only.)



Table 1  
Round Trip Traffic Volumes From a Dispersed Point P From Whole Urban Area

Distance of Point P from centre in units	Total Traffic Volume Car units	Ratio
0	2860	1.00
1	2900	1.01
2	3016	1.05
3	3200	1.12
4	3444	1.20
5	3740	1.31
6	4080	1.43
7	4456	1.56
8	4860	1.70
9	5284	1.85
10	5720	2.00

It can be seen from Table 1 that as point P is moved from the centre to the perimeter, total traffic volume increases although at first dispersal has little effect on total traffic volumes. For example, if the point P is moved to 4 blocks from the centre or about 40% of the distance to the perimeter, total traffic volumes are only increased by about 20%. However, traffic volumes grow at an increasing rate until they are doubled by a location on the perimeter.\* This shows clearly that the dispersal of an establishment which attracts traffic from all over town is likely to worsen the traffic situation, but that modest dispersal will have a very small

effect and may be worth while on the grounds of better layout and land use in the centre.

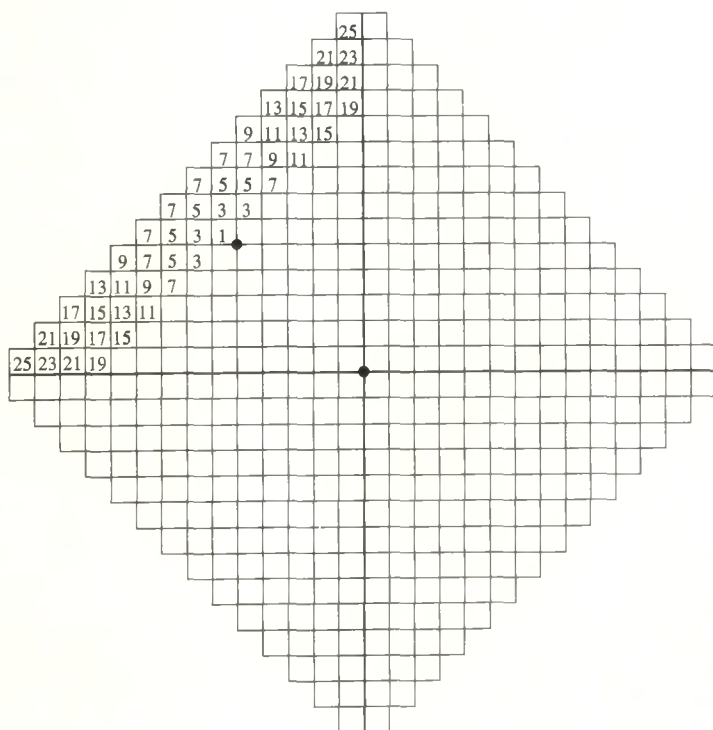
\* This results to some extent from the layout of the model. For a circular city, for example, traffic volumes would only increase by 70% if a single attractor were moved from the centre to the perimeter.

## ii) Breaking Down and Dispersal of a Single Establishment to Each Quadrant

An alternative to the retention and dispersal of a single establishment is to break it down into 4 and locate each portion at the centroid or "centre of gravity" of each quadrant of the town. The centroid, and the point that gives minimum total transport costs for all the blocks in the quadrant, is shown thus in Fig. 2 and is approximately 4 blocks distant from the centre. The total round trip traffic volumes to that point are also shown. For the quadrant illustrated, traffic volumes amount to 225 car units, and for the whole town to 900 car units. This compares with 2860 car units for the central location of a single establishment. Thus, breaking down and locating a central establishment in each of the 4 quadrants will reduce traffic volumes to 31.5% of their former level, a reduction of no less than 68.5%.

So it is clear that dispersal of this kind can have a large potential effect in reducing traffic volumes although, of course, such a dispersal may reduce establishment efficiency and narrow the users' and workers' ranges of choice. Such a

Fig. 3. Growth from 220 to 420 Families and Resultant Increase in Traffic Volumes from Round Trips to Point ● (One quadrant illustrated only.)



Traffic Volume on Main Roads NS and EW	2152 car units
Traffic Volume on Feeder Roads	708 car units
Total	2860

dispersal assumes that both users and workers may “marry up” closely with their relevant establishments and this may not always be possible. Even so, the potential reduction in total traffic from dispersal of this kind seems considerable.

#### Distribution of Traffic Between Main and Feeder Roads

An important factor in considering dispersal and traffic volumes is the distribution of traffic volumes between main and feeder roads. With the superior standards of the main highways for through traffic (for example, rights of way and lack of turns and intersections) it can be expected that traffic will use them whenever they involve no greater distance than feeder roads, consequently traffic volumes on them will be heavy. The feeder road system, however, must be comparatively large in length (in order to give access to many houses) and of a certain minimum width (to avoid such problems as passing) and is thus more likely to operate with excess capacity. For example, if we consider Fig. 1 and the main highway WC, all traffic within its area of influence (area within the dotted lines) will tend to head straight for it for the EW or horizontal component of their journeys. This will result in the following traffic volumes within the dotted lines—total traffic volume on WC 538 car units, total traffic volume on feeders 177 car units. Multiplying by 4 to cover the whole settlement, we have the following distribution:

Thus the main highway system, accounting for a maximum of 20% of road length will carry 75% of total traffic, whilst the feeder roads with at least 80% of road length will only carry 25% of total traffic.

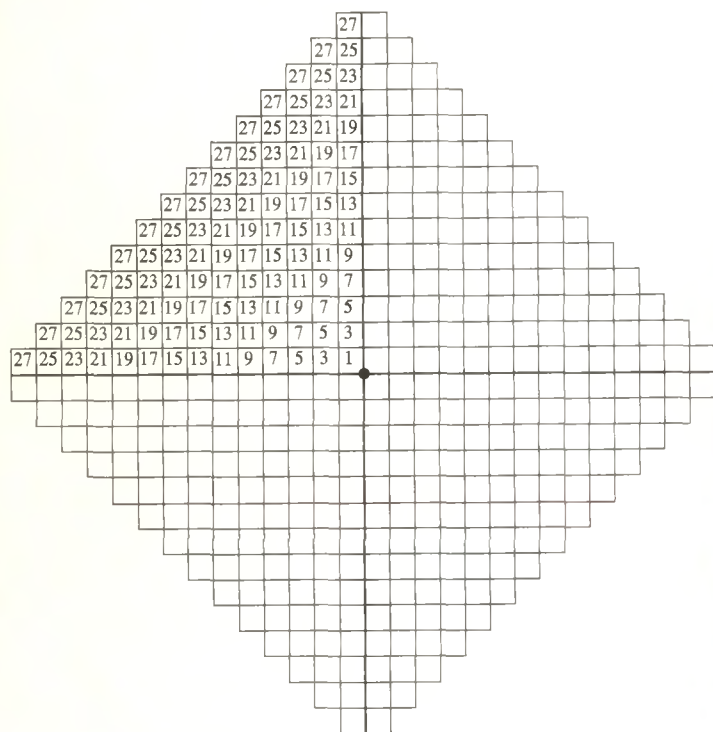
As opposed to this, for the case of dispersal to each quadrant (illustrated in Fig. 2) it can be seen that all the travel to the dispersed establishments (900 car units per day) will take place on the feeder roads, so that the comparison between a single central establishment and 4 establishments dispersed to the quadrants will be as follows.

Table 2  
Round Trip Traffic Volumes for Trips to Central Establishment and to 4 Dispersed Establishments

	Single Establishment	4 Establishments
Traffic Volume on Main Roads NS and EW (car units)	2152	0
Traffic Volume on Feeder Roads (car units)	708	900
	2860	900



Figure 4. Urban Model of 420 Families and Traffic Volumes Resulting from Round Trip to Centre.  
(One quadrant illustrated only.)



So it can be seen from Table 2 that not only does dispersal to each quadrant greatly reduce overall traffic volume, but it completely eliminates traffic from the main road system at the cost of a modest increase in traffic over the feeder roads, and these would have a fair amount of spare capacity.

This does not prove that dispersal to the 4 quadrants is worth while or indeed possible, for loss of efficiency or in-consumer choice may result but it does show that the potential traffic gains from such a dispersal are very great.

### Urban Growth and Dispersal

The greatest urban traffic problems and the greatest opportunities for dispersal are likely to occur when urban areas are expanding in population and size. What then is the process of urban growth and the possibilities for dispersal and the effects on traffic volumes?

To simulate the growth of a city it will be assumed that the settlement grows from the size and layout illustrated in Fig. 1 (220 families each carrying out a daily round trip to the centre) to approximately double its population and size or 420 families, a 91% increase. It is also assumed that the corresponding growth in establishments will take place;

a) dispersed to the 4 quadrants or,

b) at the centre, with the additional families attracted to them.



The increment in traffic volumes represented by the dispersed situation a) is summarised (for one quadrant only) in Fig. 3, in which it is assumed that all additional families carry out a daily round trip to point●. The increment in traffic volumes from this pattern of growth and travel amounts to 600 car units per day for the one quadrant, and 2400 car units for the whole settlement, all taking place on the feeder network, giving the following comparison before and after growth has taken place.

Table 3  
Traffic Volumes in Car Units Before and After Growth from 220 to 420 Families

	220 families travelling to centre	420 families travelling to centre and to 4 quadrants
Traffic Volumes on Main Roads		
NS and EW Car units per day	2152	2152
Traffic Volumes on Feeder Roads		
Car units per day	708	3108
Total	2860	5260

It can be seen from this comparison that although population has increased by 91%, total traffic volume has only increased by 84%, consisting of no increase on the main roads, but a more than four-fold increase on the feeder road system. This may lead to some problems as the traffic flow

at a typical point on the feeder road system will be almost as great as on the main road system. However by dispersing the growth in establishments to the 4 quadrants, a substantial increase in urban population and traffic can be accommodated without any additional traffic on the main road system.

To complete the comparisons it remains to be seen what would occur if urban growth took place without any dispersal of establishments. This situation is illustrated in Fig. 4 which shows the traffic volumes arising from the settlement of 420 families, each making a daily round trip to the centre.

Summing these traffic volumes for the whole town and assigning them between the main roads and feeder roads,\* we find that total traffic volumes equal 7700 car units, of which 5760 (75%) take place on the main roads and 1940 (25%) take place on the feeders. Summing up these comparisons between a centre-oriented settlement of 220 families, a centre-oriented settlement of 420 families, and a part-dispersed part-centre-oriented settlement of 420 families, we find that total traffic volumes are as in Table 4.

Table 4  
*Traffic Volumes in Centre-Oriented Settlements of 220 and 420 families and in Part-Dispersed Settlement of 420 families*

	Centre-oriented settlement of 220 families	Centre-oriented settlement of 420 families	Part-dispersed settlement of 420 families
Traffic Volumes on Main Roads NS and EW, Car units	2152	5760	2152
Traffic Volumes on Feeder Roads, Car units	708	1940	3108
Total	2860	7700	5260

\* On the basis that users will always prefer main roads to feeders if no greater distance is involved.

It appears from Table 4 that a 91% increase in population with the settlement remaining centre-oriented will increase traffic volumes by about 170% on main and feeder roads alike. The part-dispersed, part-centre-oriented alternative will only have an 84% increase in total traffic, the whole of the increase taking place on feeder roads which can be expected to have spare capacity. Thus, it is clear that in adjusting to urban growth, the dispersal of establishments attracting traffic can have a considerable effect in reducing the growth of traffic and diverting it to roads with spare capacity.

## Summary and Conclusions

The conclusions that seem to result from this brief, simplified analysis and model of urban dispersal are as follows:

- 1 If a single central establishment attracting traffic from all over the city is dispersed from the centre, total traffic volumes to the establishment will tend to increase. However, a modest degree of dispersal from the centre will only have a very small effect on total traffic volumes.
- 2 The breaking down and dispersal of establishments from the centre to the 4 quadrants of the city reduce total traffic volumes very substantially, particularly those on the main road system. But such a dispersal carries the risk of possible loss of efficiency and an effective narrowing of the ranges of choice of consumers and workers.
- 3 The greatest opportunities for dispersal, without loss of efficiency and narrowing in ranges of choice, occur when urban growth is taking place. If the establishments sustaining urban growth are dispersed to the 4 quadrants, growth can take place with a modest growth in total traffic volumes and with little or no increase on the main road system. If the establishments sustaining growth remain centralised however, the growth on total traffic will be very substantial and will continue to be concentrated on the main road system.
- 4 Because of the possible effects on traffic volumes of the dispersal of establishments attracting traffic, it seems that land use and planning factors can and should play a more prominent part in land use transport studies.



The third of a series  
**Children and Space**  
by Polly Hill  
The "Middle Age" Group  
Six to Fourteen





"Where did you go?"

"Out."

"What did you do?"

"Nothing."

"Out" and "nothing" are words that describe the private world of 6 to 14's.

On a farm, "out" might be the field, the barn, the woods. "Nothing" might be damming a stream, working with the animals, building a tree house.

What of the child in our urban society? What of the whole age group of 6 through 14? The years boys and girls of healthy normal development roam farther from home—seek more independence, prefer the world of their peers but at the same time are hungry for the skills, knowledge and understanding beyond it. What do we, as adults, do to plan for this age group?

The solution in Canada seems to be erect large chain-link bull pens with asphalt surfaces and bolted down ironmonger contraptions with purposefully unmoveable parts—or sometimes just plain empty surfaces for ball games, I guess, what else?

Another solution is to organize. Structured activities are offered of all types—pee wee teams of hockey—football, cubs, brownies—lessons in everything from judo to recorders. Worthy as they may be, most of these activities differ little in presentation from the adult directed school world where the 6 to 14 spends six hours of every week day.

Camps, day camps, summer playground programs—plus welfare projects where inner city children are bussed to beaches and picnic grounds fill an important role. But only a few are structured and programmed in such a way to meet the "out", "nothing" need that these children express as they strive for independence, identity and mastering of skills.

Most town planners in Canada, architects and landscape architects are adult oriented. Their concern is how it looks, property enhancement, resale values, easy maintenance, transportation patterns and, first and foremost, where to park the car.

None of these matter in the least to a 6 or a 14 year old. A beautiful park, no matter how rustic and natural it is, is useless for digging, building huts, keeping animals and escaping adult surveillance.

Why do so many architects and landscape architects miss the boat? Is it because they are adults and forget, or because the adults pay the bills? Often they design a jolly fort for kids to play in—tower, peep holes and all, forgetting that the one they themselves remember so fondly, is the one they built out of scrap lumber on an empty lot or in nearby woods.

If you can't do it, make it, change it or manipulate it, then your attention won't be held for long—that is if you're of school age and have any healthy initiative. Photo/National Playing Fields Association, England.

Any healthy school-aged child with a vestige of interest preserved in him will want to work, make, change or manipulate the things he has to play with.

What are some of the solutions? How can we meet the needs of this particular age group, keeping alive their sense of adventure, curiosity and creativity?

Schools have been forced into architectural change, new direction in design has emerged resulting in open plan schools, experiments with flexibility, sliding walls, expandable as well as changeable space, interest centres as opposed to egg crate classrooms is the new trend.

Inside, the school reflects change—but when they move outdoors they seem to run out of ideas and money—all that is there are the acres of parking lots and trim shrubbery and the same old playing fields.

### School Design

School design is not our focus here. The complex requirements of school programs are a study in themselves but one thing that should be stressed is the interest of putting schools and their land to round the clock and round the season community use.

All school buildings should therefore plan a community school age and early teen room that does not have to double for anything else. It should have a concrete floor with a centre drain where paint, clay, glue, acid can spill without cause for alarm.





There is great delight in experimenting with art materials, especially when it can be done without either the compulsion or competition often found in the school setting.

Work benches, "lockable" tool and supply cupboards are all that are necessary plus sufficient space to work with wood, to repair bikes, make radios and tinker with electronics. Some equipment like a jig saw, lathe, simple printing press, perhaps a kiln, extend the play and work of this age group, and, as in Denmark, the more dangerous or expensive equipment can be behind chain link dividers that control its use but leave the rest of the room free for unsupervised activities.

The organized activities for this age such as dancing, arts and crafts, cubs, brownies, and of course adult community use can all double in school space. But this "practical arts," "junk room" or "club work room" should be incorporated in any new design.

The most important part of its concept is to keep it rugged, make it functional and large enough for gang meetings and give it; if possible, direct access to the outside.

### Community Centres

Group space like this should be supplied in fancy community centres—one room for the 6 to 14's where the rules are minimal for safety and health and the simplicity of the environment conducive to the exuberant, often sloppy experimentation essential to creative expression.

Indoor space for the 6 to 14's should be provided in all housing projects, just as pre-school children need a place of their own. With a little careful planning, school age

and teen age space can be combined because often (thank heavens) the urge to make, tinker and repair lasts well into the teens. Only a listening place, a guitar playing area and dancing space needs to be added as kids grow in size and change in social needs. The "souping up" of the interior should be pre-teen made and constantly changing.

In one very tough neighborhood in London where the teen-aged vandals had constantly wrecked the younger childrens' clubquarters, they were allowed to use it after 8.00 p.m. only on condition that they raised the money for the insurance and paid for all breakages. When they became part owners, so to speak, they took care of the property and did not destroy it.

In a large housing project in Denmark, recreation facilities were divided into three sections: a low building housed a pre-school setup for day care and half-day classes, whilst various pre-school play lots were sprinkled in every apartment cluster. For the 6 to 14 year old's there was an additional playground with a beautiful but simply designed recreation centre containing room for art, music, drama, wood working together with basement for rough work and welding. Also for this age group all school playgrounds contain high climbing apparatus and building material of the semi-adventure type such as block boards and interlocking logs.

The teens occupied part of the high rise community building, sharing workshop and craft facilities with the over sixty age group. However, they had their own separate pad as a club room. The whole was a remarkable combination of old and young and the timing of use was perfect because the rest of the adult and family use areas were not overburdened with teenage demands.

### Huts or buildings on playgrounds

Another important indoor space that can be provided is the simple hut-type structure placed in a park or adventure area. In Denmark and England I saw these in a wide range of designs, from the expensive permanent stone structure to a shack partly built by the children. In our climate we need indoor space to get maximum use from our playgrounds during winter months.

Again, a rough large meeting room, bathroom and perhaps a leader's office and ample lockable storage space are essential for a full program.





"Out" and "nothing" activity such as this would find a much better outlet in a real adventure playground.  
CMHC photo/Betty Taylor

### Art programs indoors for the 6-14's

Art activities that are loosely structured for the 6-14's are a wonderful way of reaching this age group—helping to develop skills (and therefore self-respect) without the compulsion or competition often found in a school setting.

The delight in experimenting with art materials, such as paint, wood, wire and stone, clay, as well as participating in creative drama and music of all kinds from steel bands to combos and guitar groups, are activities that meet with enthusiasm, if carefully guided and not over-structured. In one free drop-in centre in Toronto the children made rules that no one could join who didn't "work," it didn't matter what at, but "goofing off" and disturbing the peace was discouraged by the kids themselves.

However, just having somewhere to go, unharrassed, a place for the endless pre-teen talking or cards, chess, monopoly, darts, has its merits. Some programs, especially those that are run in schools, provide a quiet space for homework and sometimes even special tutoring is provided in an atmosphere that is warm and accepting.

The Drama Centre run by Brian Way in London, England, makes a policy of loosely organized groups. Creative drama is an experience, it's the doing that's enthralling, no production is anticipated so that attendance becomes a matter of individual mood, come when you can, don't if you don't feel like it. Progression in creative drama is, and should be, entirely personal and even a rank beginner can fit into a group activity at his own level without detriment to the others.

Funding programs for this group is done in many ways. Some are staffed with volunteers with material scrounged, some are fee supported, others are publicly financed. The important thing is to assess the needs of this age group in each community and offer facilities to all children, not just those who can afford to pay.

It is imperative for public bodies to realize that proper facilities and challenges for the 6-14's are a tremendous saving for the future, not only in money but in human resources. It is prevention in its most practical and realistic sense—for children of the poor, the rich and the middle class as well. If programs are based around the school with the club room or separate hut provided all income levels attend and this factor is an important ingredient for successful 6-14 programs.

### Ideal Outdoor Space for 6-14's

The Adventure playground falls into two categories: The real Adventure Playground and what, for want of a better word, will be labelled The Semi-Adventure Playground. The best place to start is at the beginning with the way-out, the true junk yard waste material or Adventure Playground.

In the 1940's, C. Th. Sorensen, in Denmark a famous landscape architect, noted that children "seemed to prefer messing about in junk yards and building sites and developing their own brand of play with waste objects they found there"<sup>2</sup> rather than playing in carefully designed playgrounds. The idea of the first "waste materials" playground was developed in Emdurp, a suburb of Copenhagen.

Here, under the inspired direction of its first play leader John Bertelsen, the idea was born that has served as an inspiration to Switzerland, Sweden and the United Kingdom and now, to a certain extent, the United States—although all are significantly





A semi-adventure playground answers the problems of maintenance, variety and adventure. When supervision is available shovels, units blocks and so on are brought out of storage under the hillocks. Photo and site: The Estee and Joseph Lauder Playground in Central Park, New York.

different in their organization and emphasize the importance for us to provide the adaptations needed for Canada.

First, an adventure playground is a protected area. It is protected either by a high fence, by land mounding or by trees from offending the aesthetic sensibilities of the adults on the outside. The fence is also needed, not only to keep the children in—but out, when supervision is not available. However, some playgrounds in Denmark have only a sign giving the leader's times and adding "Children are welcome at all hours, but since this is their playground, please take care of it."

Emdurp's Skrammelegeplade, is placed right in the middle of two-storey, low-cost housing units. It is a track of land that has been sunk six feet below street level with a sloping bank tastefully landscaped with rose bushes and shrubs rising five feet from the sidewalk, thereby concealing the play area by an 11 foot screen.

Inside is an open space for group games, turfed rather than asphalted, and on the left a village of huts marked off in plots by wooden stakes, mostly being demolished for the winter and cleared for rebuilding in the spring. Near the hut area—which, incidentally, is attractive and sprinkled with

trees and flowers the children planted themselves—is a large stone incinerator and open fireplace.

On the right, what was once a simple storage and meeting hut, has now developed over the years into an attractive but still economically designed recreation centre with playroom for pre-schoolers, an art room with magnificently designed storage cabinets, a tool room with masses of identical shovels, pitch forks, saws, etc, and a simple theatre and store room that opens its walls to become an open air amphitheatre.

Emdurp has become subtly over organized, compared to the freer, more delightful chaos I saw in other settings in Denmark due, I gather, to the personality and conviction of its present leader. It stands as a warning to play leaders; that adults' need for structure and tidiness can inhibit the creativity of 6 to 14's if they are not careful.

### Adventure Space

The actual shape of adventure space is immaterial, but it should be no less than a quarter of an acre and no larger than an acre and a half.

In Denmark, some adventure playgrounds avoid being directly over-looked by apartments in various ways, often by separation of a rolling field, some by a tall wooden fence and evergreens, others by

being delightfully embedded in a wood within a park—yet all were in easy walking distance for high rise apartments, both low income and luxury units. One playground, in fact, was placed on a busy city street close to low, single-family dwellings, and was provided with a high, attractive sculptured fence enclosing it.

In the U.K. adventure playgrounds are often on temporary sites in urban renewal areas and the lease of the land may only be for five or ten years or, as in an experiment in Ottawa, when the land was loaned by a contractor, for as little as eight months. This particular program was hampered by not having indoor facilities or proper fencing to protect the children's creations from a destructive gang that presumably, were older kids. But even with these limitations, an adventure village sprang to life in a matter of days, with many positive results.

### Supply Dumps

Some space in all adventure playgrounds should be left free for dumping left-over building materials and junk. The truck can back right up and deposit its fascinating cargo—usually just in a heap.

### Hut Area

Some "building sites" on playgrounds can be neatly marked out in streets with plots staked out, others may be haphazardly placed—wildly so.

Some huts might be very neatly constructed and obviously detailed with loving care, others tacked together and constantly changing, stone and brick as well as wood can be used.

### Climbing Activity

Often fantastic climbing towers are built with the obvious aid of grown ups and, when constructed with telephone poles or railway ties, they supply the solid structure for slammed together platforms, ladders, swinging ropes and fascinating slatted swinging bridges supported on cables or ropes—also the three rope bridge; a centre one to walk on, and two to hold to on either side. Genuine Commando nets also are fastened in such a way as to give real challenge.

Lady Allen of Hurtwood invented a handle-bar attached to a pulley wheel that runs like mad from a high tower to the ground level carrying a dangling child beneath it.





Make a perch and sit on it—before the basics are finished. Site: Ottawa Adventure Village. CMHC Photo/Don Moher.

There are ropes that swing from one platform to another or across mounds in Tarzan fashion and they all supply these children with the real challenge they need and develop their muscular dexterity.

Insurance conscious North America looks with horror at these structures, clicking its tongue about safety. But there is ample child development evidence that children take risks within their own capacities and it's not related to age groups. A well co-ordinated five year old will blithely scale a structure that a timid eleven year old will not attempt. Also statistics on adventure playgrounds show a much lower accident rate than on standard playgrounds—Lady Allen says that in the ten years operation in the U.K. no one has ever laid a claim.

In Ottawa's adventure village the Band-Aid supply was quickly exhausted the first week but later, as the children took care, a pronounced drop in minor casualties was noticed. Could it have been that children are immune to the usual often unnecessary, cautionary admonitions of adults but when they realize that there is no one to hover over them and real dangers exist, like rusty nails, flimsy construction and so on, they begin to take responsibility for themselves?

### Water

Water, in areas lucky enough to have a creek, combine all the creative play that inspires, but water from hoses, improvised shoots or sprays can provide fun in the summer, plus pailfuls needed for animals, mud construction, mixing cement, paint and other ingredients. Wading and splashing can also be supplied by improvised tubs and ditches.

### Animals

Every adventure playground must have animals; goats, chickens, sheep, guinea pigs, gerbils and rabbits. One fascinating spot in Denmark has a "rabbit avenue" with elaborate to simple hutches on stilts lining a path on both sides and providing shelter for 20 to 30 rabbits. The hutches are constructed by those interested and who also take turns with the care.

### Fire

A marked feature of each adventure area is the fire. Often it is just a pit in the ground, sometimes it is an incinerator built like a hearth. The fire is used for both burning refuse and social functions—weiner

roast, baking potatoes, making bread, which I gather would be like hard tack.

At one place, the Danish children wound dough around a long wooden pole and then baked it on the coals. Often they just stood and watched the fire burn with the same absorbed fascination that any open hearth fire provides.

### Growing Things

Gardens are another feature of the full adventure playground, plots of land are designated and in some areas flowers and vegetables intermingle according to the tastes of the young gardeners.

### The Leader

A full out adventure playground has to be supervised because leadership is necessary to realize the full potential of this type of play environment—not because of any dangers.

The role of the leader is different from the role most other recreational centres require. He, or she, is there as a helper, gives assistance when asked and refrains from offering it when not—rides herd on the tools, devising with the children ways and means of keeping them from disappearing. In Notting Hill

Gate playground a piece of clothing is exchanged for a hammer or saw in summer when the building activity is at its height. Another device has been to sign up for a tool kit, thus being responsible for returning it intact. Some playgrounds have painted all tools bright colours to distinguish them from the tools children bring from home.

This adventure playground in Denmark seems to specialise in delightful chaos. A child-made skyscraper is in the rear and in the foreground a new shipment of junk has been dumped at random.

The greatest role of the leader is being a friend, advisor and good listener and through this attitude group activities may develop with responsibility allotted among the children. For some of the very tough areas of London, volunteers aid the leader as numbers sometimes swell unexpectedly to an uncontrollable degree.

One volunteer in London was a lady who came with a large knitting bag full of needles and wool. By the end of the afternoon, a group of little girls were clustered around on the ground learning to knit.

Trips, games, occasional movies, drama shows and special events are all part of a well run adventure playground. All should be loosely structured and planned with, and for, this middle age group. In some playgrounds, teams of children help on projects for the aged and other worthy causes, such as repair work or special community clean-up bees, raising money from shows or making things for sale.

### Other Ages and Adventure Playgrounds

Pre-schoolers can also use adventure playgrounds during school time when the indoor space is inadequate and there is some protection from rusty nails and hidden dug outs.

Older children are also definitely attracted to adventure playgrounds. Keeping them out often invites vandalism, but inviting them to help, asking them to use the premises at night under a special organizational set-up of their own, often develops into a very vital program for those between 15 and 20 years old.

Detailed descriptions of adventure playgrounds can be found in Lady Allen's book *Planning for Play* and also helpful work sheets on setting up adventure playgrounds have been worked out by the London Adventure Playground Association. Although costs are tabulated in pounds sterling, these sheets are extremely helpful.<sup>3</sup>





When real dangers exist, such as rusty nails and flimsy construction, the children take responsibility for themselves. Site: Ottawa Adventure Village. CMHC Photo/Don Moher.

### Organizing Adventure Playgrounds

Methods of organizing adventure playgrounds need special mention. Each country does it differently. Some are almost totally supported by a combination of federal and municipal grants, others are primarily funded by private donations. All need community committees that will be a support to the playground and a hard-working supplement to the play leader. Members of the committees need to be drawn from parents and neighbours of children using the space.

Hopefully, parks and recreation committees will recognize the new direction in recreation for this age, and its value, and experiment with adventure playgrounds in densely populated areas, perhaps on a temporary basis, like portable class rooms that can be erected and moved when the needs change.

### Adventure Playgrounds attached to Schools

In British Columbia real strides have been made in trying to have adventure playgrounds built on school property. Powell River District Schools have been experimenting with a playground attached and now other areas in Kamloops, Vancouver, North Vancouver, Coquitlam, West Vancouver and Chilliwack have similar plans. This is an important source of support for adventure playgrounds especially if developed by all educational authorities. The area around a school is ideal for these purposes and can be controlled as well as being central for the children. There would be less aimless running about at recess and a more productive outlet both for muscles and mind, to say nothing of the after-school and weekend use of this premium property.

A stream, with a real rowboat secured in 8 inches of water. The sand areas and building logs in the rear have multi-purpose play possibilities. The single purpose wooden tunnel had the least appeal in the whole playground. Site: Children's Creative Centre Expo '67. Cornelia Oberlander, Landscape Architect. Photo/H. D. Bancroft.

### The Semi-Adventure Playground

All this leads to the possibilities of semi-adventure playgrounds. Too often these are passed off for the real thing, but they should not be dismissed as just weak imitations. Often they are the only appropriate solution to a particular play problem.

At Expo 67 the semi-type of playground was used. Instead of being an empty lot created by the children, it was beautifully landscaped by Cornelia Oberlander of Vancouver, and it was artfully designed to contain the greatest variety of manipulative materials.

The child population at the centre changed every hour and this meant some adaptation, for instance the tree house had to be built by adults. Nevertheless, it was the right height and offered several ways of climbing in and out of it, as well as being simple enough to stimulate imaginative play. A stream with a row boat in it had much more play value than a wading pool, as well as having extra sand space. Small mounds (they were all there was room for in the 60' x 120' space available) were used to provide surface variation and they became so hard that they had to be re-turfed during the summer. Racing up, slithering along or sliding down the simple wooden slide, crawling through the cave-like structure, all added variety to the space available.

The most popular material was wood, especially logs, boards and 2 x 4 blocks that made houses big enough to get into, often several storeys high.

Landscaping space for 6 to 14's can be done by moulding the land to give variety and allowing its use in summer and winter.





The garden plots are on the left in this beautifully coordinated area which allows good space for both wheel toys, sand and water play. Under the trees, which are not shown, is a spot for quiet reading and some table games. This picture is taken from the tree-house. Site: North Shore Neighbourhood House, N. Vancouver. Cornelia Oberlander, Landscape Architect. Photo/Selwyn Pullan.

In addition building high climbing-towers with ropes and swinging bridges can be artistically arranged so as not to offend the adults and still present a real challenge to the children.

Streams, small lakes and fountains with moving water have more play value and are more attractive than wading pools which, for this age, really need to be swimming pools.

Sand can be attractive and should be spaced to allow room for the bigger bodies of this age group. It should be near water, a simple hose pipe is enough, and storage should be provided for some of the sand equipment that extends sand play (not moulds please) but shovels, pails, spoons, sieves, funnels and simple trucks. Sand play is often considered more appropriate for pre-schoolers but in practice fantastically elaborate projects are often devised by this middle age group.

Blocks, boards, fitted logs, rope, tarpaulins, all provide in part of the fun of making-it-yourself. It is not quite as good as nails and scrap lumber, but has very nearly the same play potential.

Some semi-adventure playgrounds fence off a small area where a hut building program can go on in a modified way. Some use a work bench and small pieces of scrap wood with hammers, saws and nails that

will inspire "make your own boats" or dump-truck projects and thus extend the sand and water play opportunities. Of course, tools used in these projects need to be stored and respected, but if they are properly stored and only available when supervision is near, it doesn't present the much feared mess.

Another aspect of the semi-adventure playground is garden space. It can be landscaped in such a way as to be kept fairly neat, and here brick edgings and a good top soil help.

Shrubs, trees and surfacing depend a great deal on the elaborateness of the project, but children will respect pleasant surroundings if the maintenance is kept up. As Lady Allen admits, the minute the area runs down, the public will abuse it more, children included. The use of shrubs and hedges is often an attractive way to define areas in semi-adventure playgrounds.

### Playparks

In England it was found that the beautiful, natural parks were not adequate for this age group so that playparks are set in their midst, some as free as real adventure playgrounds, others being of a more semi-adventure type, but all supplying as much manipulative material as possible.

Huts on stilts in the background provide indoor play space on top and further space underneath. Simple play structures can easily be added in order to present more challenges. Photo/National Playing Fields Association, England.

### Unsupervised Play Space or The Danger of Going Back to Square One

This is a very real challenge to landscape architecture and one that is far from solved. The developer is usually willing to allot this type of space to children and wants it free as much as possible from maintenance problems. Thus they bolt everything down, use play sculptures and the sterile sort of arrangements that bring us right back to square one—the iron-monger's era with curves now, instead of angles. Arvid Bengtsson of Sweden has tackled this problem and promises some solutions in his new book.<sup>4</sup>

The whole idea of play space for this middle age group is undergoing a change as adults come to grips with the fact that children, even as young as eleven and twelve feel "turned off," and seek pleasure and kicks from artificial stimuli or unlawful acts, while those younger often run in packs looking for adventure, or even just relief from an intolerable adult world.

If in planning for this age our only aim is to keep them off the streets, we've missed an opportunity and denied a challenge.

*In the last article of this series, I will talk about some examples of family-type play space in other countries, and of plans for "Ontario Place" in Toronto where a three acre area will be devoted to the newest directions in recreation for children of all ages. I also intend to suggest some of the things we need to do to organize for action for the children of Canada who cannot yet speak for themselves, especially for this neglected middle age that likes to go "out" and do "nothing."*

1 Robert Paul Smith, Book "by the same title", W. W. Norton & Co. N.Y.

2 Lady Allen of Hurtwood, *Planning for Play*. London, Thames & Hudson, 1968, 140 pp. Thomas Nelson, Don Mills, Ont.

3 For information about these sheets write to the Editor.

4 Bengtsson, Arvid, *Environmental Planning for Children's Play*. London, Crosby, Lockwood and Son Ltd., 1969.





# 1 2 3 4 5

## Région et habitat

## L'évolution récente du problème des disparités régionales au Québec

## Les bases culturelles de l'aménagement du territoire

## Contrôle de l'environnement et urbanisation

## Le québécois et la forêt

Les textes présentés dans ce numéro sont dus à Messieurs: Marcel Bélanger, géographe, professeur à l'Université de Montréal\* Pierre Cazalis, géographe économiste, professeur à l'Université Laval\* Yvon Dubé, ingénieur forestier\* Georges Gantcheff, ingénieur, Docteur es Sciences (environnement)\* Guy Dubreuil, Directeur du département d'anthropologie de l'Université de Montréal.

## Les problèmes d'aménagement du territoire au Québec

La Sous-Commission Québécoise pour l'aménagement régional présente, dans une série d'articles, l'essentiel des idées émises lors du programme d'éducation permanente de 1969 du Centre d'Études et de Formation en Aménagement du Territoire<sup>1</sup> sur les problèmes d'aménagement du territoire au Québec.

La Sous-Commission Québécoise est composée de Madame Andrée Lajoie, juriste; Mademoiselle Danièle Routaboule, architecte paysagiste et urbaniste; Docteur Julien Denhez, médecin de santé publique; Charles Carlier, urbaniste et topographe; Jean Bérard, ingénieur forestier; Pierre Cazalis, géographe; Henri Dorion, géographe et avocat; Robert Hirsch, économiste; Yvon Dubé, ingénieur forestier; Jean-Jacques Jasmin, agronome; Guy Dubreuil, anthropologue et psychologue; Georges Gantcheff, ingénieur, docteur es sciences (environnement); Pierre Larouche, ingénieur en circulation, ingénieur civil et urbaniste; Jean-Bernard Racine, géographe; Georges Robert, urbaniste et planificateur régional; le coordonnateur de la Sous-Commission étant Marcel Bélanger, géographe.

L'équipe responsable du programme d'éducation 1969 du CEFAT bénéficiait ensuite de la participation de messieurs Hubert Charbonneau, démographe; Charles Perrault, ingénieur métallurgiste et industriel, membre du Conseil Économique du Canada; Paul Gadbois, agronome; Gérald Fortin, directeur du département de sociologie de l'Université Laval; Georges Célestin, économiste et mathématicien, conseiller permanent de l'Organisation des Nations Unies en planification régionale; Jacques Gauthier, ingénieur forestier; Gilbert Tarrab, Docteur en psychologie.

Il est évident que le modeste espace consacré à ces thèmes ne permettra que d'aborder certains des éléments essentiels des problèmes d'aménagement se posant à notre société.

Cette série de prises de position, se poursuivra dans le numéro de mars-avril d'Habitat.

<sup>1</sup> Centre d'Études et de Formation en aménagement du Territoire (CEFAT) 1055, Beaver Hall, Montréal 128.



On fait souvent appel, à propos d'expansion économique, à la notion de région, que l'on désigne par là l'unité de regroupement des initiatives locales en vue du développement (conseils économiques régionaux) ou que l'on envisage la régionalisation de politiques destinées à favoriser l'expansion économique des régions pauvres.

En revanche, rarement les problèmes d'habitat sont-ils examinés dans une perspective régionale : les conseils économiques, d'ailleurs inexistants dans les régions les plus urbanisées, sont essentiellement préoccupés de développement tandis que les lois de rénovation de l'habitat sont strictement conçues dans le cadre d'opérations municipales. Pourtant l'habitat, c'est-à-dire le cadre architectural et urbanistique dans lequel vit une population, apparaît profondément lié à l'organisation régionale; il l'est par le fait d'une géographie industrielle qui aboutit à la concentration des hommes et à l'urbanisation générale du territoire; il l'est également par le biais de ces « régions de participation » qui restent à faire et sans lesquelles les problèmes d'habitat ne sauraient trouver leur solution. De sorte qu'il faut bien admettre qu'un profond décalage s'est instauré entre l'habitat et l'organisation régionale.

Plus sensible au Québec qu'en bien d'autres milieux industrialisés, ce décalage est essentiellement le fait d'une discordance entre les espaces humains issus de civilisations rurales et les espaces économiques issus de l'industrialisation. Alors que les espaces économiques évoluent très rapidement en fonction des transformations techniques, les espaces humains faits de comportements et d'attitudes ne se transforment qu'avec lenteur, au rythme des mentalités collectives. Il en résulte de multiples problèmes qui sont, par exemple, au Québec, celui de zones-refuges septentrionales basées sur la colonisation, celui d'une industrie montréalaise essentiellement fondée, au départ, sur la présence d'une main-d'œuvre rurale à bon marché, celui d'un pouvoir politique québécois longtemps « ruraliste » par son inspiration et désaccordé au mouvement d'urbanisation; problèmes dont la solution ne peut être que celle d'une unité retrouvée entre espaces humains et espaces économiques.

Et c'est ici, précisément, que s'impose le thème de réflexion « région-habitat » qui nous occupe. En effet, les problèmes qui se posent aujourd'hui ne sauraient être résolus sans un modèle d'organisation régionale qui tienne compte d'exigences à la fois humaines et économiques, dont la satisfaction définirait

un habitat optimal. Réalisée autrefois dans le cadre d'une civilisation rurale dont l'organisation en « régions naturelles » définissait à la fois un cadre d'activité et un cadre d'habitat, cette adéquation peut être aujourd'hui redécouverte, croyons-nous, par le moyen de « régions de participation » venant s'articuler aux vastes continuités urbaines créées par l'industrialisation, c'est-à-dire par le moyen de « régions humaines » dont la cohérence prendrait appui sur des problèmes communs et qui seraient dynamiquement reliées à l'organisation économique régionale par le biais de structures politico-administratives créant à leur échelle la rencontre des pouvoirs publics et des initiatives « citoyennes ». La structure régionale ainsi atteinte serait assurément complexe et elle ne saurait se satisfaire d'un découpage simple, sur le principe de découpages municipaux de taille plus grande.

Ainsi seulement peut-on espérer l'avènement d'une véritable civilisation urbaine dont nous sommes encore éloignés. Car, admettons-le, si les conditions de notre vie sont aujourd'hui effectivement urbaines, les aménagements dont nous nous accommodons tant bien que mal sont le plus souvent demeurés « ruraux » dans leur conception; à bien y réfléchir, il y a une inertie des formes d'aménagement absolument extraordinaire, de formes qui nous viennent tout droit de l'antique civilisation rurale : persistance absolue du rang québécois depuis les origines jusqu'à nos jours malgré l'urbanisation des campagnes; répétition indéfinie du lot quadrangulaire urbain; retour à la maison rurale par la banlieue moderne, retour que justifie la fuite de constructions quadrangulaires juxtaposées dont le seul principe urbanistique a été celui de la concentration plus ou moins grande de logements en fonction des densités. En fait, seuls les centres de nos villes les plus importantes, où la cherté du terrain créait des conditions particulières, ont été l'objet d'une réflexion et de l'invention de formes nouvelles.

Mais voici que se sont aggravées les conséquences d'un divorce qui risque d'être fatal aux valeurs permanentes de notre culture et voici que le progrès même de notre espace économique, de plus en plus exigeant du point de vue de la qualité humaine, apparaît menacé: il y a dans cette conjoncture le gage d'un redressement. Encore faut-il que soit comprise l'absolue nécessité de « régions de participation », beaucoup plus fondamentales pour notre avenir que ces « régions de développement » auxquelles une fausse problématique de l'aménagement du territoire risque de nous réduire.



Dans son essence autant que dans ses manifestations phénoménologiques la réalité régionale québécoise ne paraît pas avoir évolué au cours des dernières années. Aussi le tableau que nous en brossions naguère<sup>1</sup> reste-t-il aujourd'hui valable; les traits dominants en sont de fortes disparités de répartition de la population, donc de densité et de charge humaines des disparités dans l'intensité de la mise en valeur et dans les revenus, une opposition, dans la plupart des secteurs de la vie économique, sociale, culturelle entre l'axe Montréal-Québec et les régions périphériques du Québec habité. Se perpétuent, en outre, la fragilité d'un réseau urbain écrasé par Montréal et, à un degré moindre, par Québec, de même que des inégalités de polarisation qui laissent plus de la moitié de l'œkoumène québécois hors de l'influence directe d'un centre urbain qui en organiserait la vie économique. Autour du pivot montréalais, voire de l'axe du Saint-Laurent moyen, l'espace de notre province reste donc décentré, déséquilibré, atrophie.

Pourtant, le problème des disparités régionales au Québec baigne aujourd'hui dans un contexte différent de celui qui présidait à nos débats jusqu'au milieu de l'année '68, et si la réalité régionale elle-même n'a pas encore évolué de façon perceptible, il est permis de penser que quelques facteurs d'évolution y ont été récemment introduits.

### I—La multiplication des organes et des opérations d'aménagement

Les deux manifestations les plus spectaculaires sont sans contredit la création du ministère de l'Expansion économique régionale, au niveau fédéral et la transformation de l'ancien Conseil d'orientation économique du Québec en un Office de planification, au mandat plus vaste et aux moyens supérieurs, semble-t-il.

Spectaculaire aussi, quoique de portée spatiale plus limitée que souhaitée, l'initiative législative conduisant à la création des trois communautés urbaines de Montréal, Québec et Hull.

Rappelons enfin qu'à différents niveaux de gouvernement se poursuivent ou viennent d'être amorcées des tentatives plus techniques, donc moins glorieuses, que les précédentes, mais qui constituent des éléments fondamentaux d'une politique globale d'aménagement du territoire; citons pour mémoire :

- la poursuite de l'inventaire canadien des terres, y compris l'inventaire des espaces à vocation touristique;
- l'intensification des efforts du ministère des Affaires municipales, en vue de regrouper les municipalités que la logique et la saine gestion suscitent depuis longtemps;

- les interventions croissantes du ministère de l'Industrie et du Commerce en matière de promotion industrielle, efforts appuyés par les travaux d'un centre de la recherche industrielle;
- à l'échelle régionale, l'affermissement de plusieurs conseils économiques régionaux, qui constituent des cadres de participation et des outils d'animation indispensables au succès de toute politique ou mesure de développement régional;
- au niveau local, la multiplication des projets de rénovation urbaine, en dépit des contraintes croissantes imposées aux finances municipales par l'augmentation des taux d'emprunt;
- sur le plan sectoriel, enfin, la systématisation des mesures contre la pollution des cours d'eau, la multiplication des opérations de reboisement ou d'aménagement polyvalent de la forêt, la multiplication aussi des projets d'aménagement d'espaces récréatifs...

Sans doute faudrait-il tempérer l'optimisme que peut inspirer une telle énumération de jugements de valeur fondés sur l'analyse critique des projets ou sur celle des premiers résultats des opérations. Du moins convient-il de marquer une certaine satisfaction pour le moment du fait que celles-ci et ceux-là se réclament des concepts, plus ou moins clairement perçus, de l'aménagement du territoire, et qu'ils témoignent du besoin de plus en plus manifeste d'une authentique géographie volontaire pour l'ensemble du territoire québécois.

### II—La multiplication des ouvriers de l'aménagement

Il est encore trop tôt pour définir précisément les facteurs de la prise de conscience des problèmes liés aux disparités régionales ou aux déséquilibres intra-urbains. Il semble qu'au Québec l'accroissement des taux de chômage et des disparités de revenus en aient été les symptômes le plus durement ressentis.

Des spécialistes venus de tous les horizons scientifiques (leur nombre reste insuffisant, et il faudra améliorer leur qualité) permettent déjà non seulement de déceler les déséquilibres dont souffre l'espace québécois, mais encore d'en mesurer l'ampleur, d'en découvrir les causes principales et de jeter les bases de solutions à long terme, voire même d'établir des schémas primaires de plans de développement à court ou moyen terme, comme pour le territoire-pilote du Bas Saint-Laurent ou pour le Saguenay-Lac Saint-Jean.

Ainsi, en un domaine où, il y a quelques années, les travaux et les écrits de quelques universitaires, urbanistes et hauts fonctionnaires étaient accueillis dans l'indifférence, et parfois avec ironie, œuvrent aujourd'hui quelques centaines de spécialistes de l'organisation de l'espace, de la conservation des ressources biophysiques, du développement communautaire, de l'enseignement, de la santé, de l'administration municipale... *La croisade pour le développement régional et l'aménagement de l'espace global n'est pas terminée, mais il convient maintenant de réorienter le gros des énergies vers l'élaboration de politiques et de solutions concrètes, plutôt que vers le recrutement et l'animation d'ouvriers de l'aménagement.*

En effet, la multiplication des organismes locaux, régionaux ou nationaux, celle des organismes sectoriels, ou encore les efforts en vue de l'éveil de la conscience politique en matière de déséquilibres régionaux ne conduisent pas nécessairement à la solution véritable des problèmes globaux. Tout au plus apportent-ils des éléments de solution, limités dans l'espace autant que dans leur influence sectorielle. Aux organismes de tous niveaux qui assument aujourd'hui la responsabilité d'opérations limitées et aux hommes qui y œuvrent généralement avec la foi des défricheurs, il faudra donc désormais offrir des politiques globales d'aménagement, nationales ou provinciales, qui seules peuvent guider et coordonner des efforts qui paraissent aujourd'hui anarchiques et d'une efficacité médiocre.

### III—Les conditions de la lutte contre les disparités régionales au cours des prochaines années

La phase de réalisation des conditions préalables à un développement régional systématique s'achève donc. La lutte contre les disparités régionales exige maintenant la poursuite de quatre objectifs :

- la *détermination d'une politique globale* de développement régional et urbain, dans laquelle s'inséreront les plans régionaux et locaux;
- la *détermination*, en fonction de cette politique générale, de *priorités* en ce qui concerne les opérations à lancer aux différents niveaux;
- pour la mise en œuvre de ces programmes, le *déblocage de crédits* plus importants que ceux dont l'aménagement du territoire a disposé jusqu'à maintenant;
- la mise en œuvre, enfin, d'un *programme de formation de spécialistes* des problèmes régionaux et urbains, en fonction de l'essence même de ceux-ci et non plus des exigences propres des diverses disciplines.



### 1. Pour une politique globale de développement régional et urbain

Les expériences du BAEQ, du CEROQ, de l'Office de développement régional de l'Etchemin... ont parfaitement montré la fragilité de plans régionaux qui ne s'insèrent point dans une politique globale provinciale et fédérale, de développement et d'aménagement.

Cette exigence vaut autant pour les régions situées au cœur d'une économie nationale, comme l'axe Québec-Windsor, que pour les zones dites marginales, au sens géographique du terme : si celles-ci souffrent d'indigence, celles-là souffrent plus encore de l'entassement des activités et des hommes, du moins en souffrent-elles à plus haut prix.

Élaborer des plans régionaux ou urbains en l'absence de toute référence à des plans globaux se justifie exceptionnellement au tout début d'un processus de planification spatiale. Il en était ainsi du Québec au seuil des années '60, ou même lors de la mise en branle de l'expérience du Bas-Saint-Laurent/Gaspésie. On s'étonne que la situation ait à peine évolué au terme de cette décennie. Certes, tout était à faire : création des outils de travail tels que comptabilités nationale ou régionales, inventaires des ressources biophysiques et humaines, transformation des structures d'encadrement, tant administratives que sociales, recrutement des équipes d'aventuriers des sciences humaines ou des sciences de la terre qui osèrent explorer des terrains nouveaux selon une méthodologie et un esprit totalement ouverts à la collaboration interdisciplinaire...

Peut-être y avait-il justement trop à faire et trop peu d'hommes pour tenter l'aventure particulièrement au niveau des superstructures nationales pour qu'on ait eu le temps de tracer les lignes principales d'un plan de masse à l'échelle du Québec, voire du Canada. Mais, quelles que soient les contraintes, il est fondamental aujourd'hui de répondre à cette exigence, qui est d'ordre technique presque autant que politique.

L'Office de Planification du Québec, le ministère de l'Expansion économique régionale et maints comités interministériels en fournissent maintenant l'occasion; il n'est pas de contrainte qui soit assez forte pour en retarder encore longtemps l'échéance.

### 2. Pour la détermination de priorités opérationnelles

A vouloir poursuivre des objectifs trop nombreux ou trop ambitieux avec des moyens limités, on risque de sombrer dans l'inefficacité. A fixer de fausses priorités, par ailleurs, ou à n'en point fixer du tout, on perpétue les déséquilibres sous le couvert de tentatives spectaculaires mais peu rentables pour l'ensemble de la communauté.

Face à la gravité des problèmes urbains, qui affectent 80% de la population de la province, on accorde trop souvent à des zones marginales peu peuplées et pas plus mal loties que les grands centres urbains, des priorités douteuses quant à des « missions » qui eussent assurément été plus rentables ailleurs.

Heureusement, le vote des trois projets de loi sur les communautés urbaines de Montréal, Québec et Hull, et les discussions auxquelles ils ont donné lieu, ont transféré l'attention des spécialistes et de l'opinion publique des problèmes, réels mais marginaux, des régions périphériques et rurales vers ceux des zones métropolitaines, dont l'ampleur n'est pas encore bien mesurée. Le jour n'est plus loin peut-être, où le débat s'élargira à la dimension du couloir urbain Québec-Montréal, remplaçant ainsi l'aménagement des deux espaces métropolitains qui en occupent les extrémités dans son cadre fonctionnel véritable.

### 3. Pour des ressources financières plus importantes au bénéfice des aménagements urbains

Il va sans dire que les meilleures politiques d'aménagement et les choix les plus judicieux des priorités opérationnelles exigent la mise à leur disposition de ressources financières adéquates.

Ce fut notamment une source d'étonnement que la raréfaction des affectations budgétaires en faveur des projets de réaménagement urbain. Il importe plus ici de relever le paradoxe d'une telle décision que de procéder à sa critique formelle.

### 4. Pour la formation plus systématique de spécialistes en aménagement régional et urbain

Si la solution des disparités régionales passe avant tout par l'élaboration de politiques globales et par le choix de priorités opérationnelles centrées sur les villes, elles est liée aussi, quoiqu'à un moindre degré, à l'intensification des efforts en vue de la formation de spécialistes de tous niveaux et de toutes disciplines.

En ce domaine, le goulot d'étranglement actuel est de deux ordres : d'ordre quantitatif, d'abord, alors que les organismes d'aménagement,

dans les régions, au provincial et au fédéral, offrent plus de postes qu'il n'existe de candidats satisfaisant aux conditions objectives d'engagement; d'ordre qualitatif, en second lieu, puisque ceux-là mêmes qui remplissent ces conditions objectives ont rarement été formés aux concepts propres de l'aménagement global. Bons spécialistes d'une discipline, ils ne sont pas toujours sensibles à la multiplicité des paramètres qui entrent dans un phénomène de déséquilibre régional, non plus qu'aux soucis de disciplines voisines qu'intéresse le même phénomène.

Il est sans doute difficile de former un type d'aménagiste qui soit à la fois homme de spécialité et homme de synthèse. Du moins doit-on offrir à l'étudiant la possibilité de s'initier aux langages, aux concepts, aux méthodes des spécialistes avec lesquels il devra faire équipe dans l'œuvre d'aménagement. La formation interdisciplinaire est facilitée aujourd'hui par le décroisement des départements universitaires. On devra systématiser cette orientation, afin de quintupler le plus rapidement possible le nombre de jeunes spécialistes aptes à s'intégrer aux équipes d'aménagement.

De mieux en mieux perçues, de mieux en mieux analysées, faisant l'objet de tentatives de solution de plus en plus nombreuses, les disparités régionales ne se sont guère résorbées au cours des dernières années, en raison de la dispersion des efforts, de l'absence de politiques globales d'aménagement qui eussent constitué des cadres de référence pour les expériences régionales ou sectorielles, en raison aussi de la faiblesse relative des moyens financiers mis à la disposition des organismes régionaux. Le petit nombre des spécialistes engagés dans l'élaboration des plans régionaux ou urbains, de même que la jeunesse de l'expérience de nombre d'entre eux n'ont pas permis d'apporter à la municipalité anarchique des expériences et des opérations de réaménagement les correctifs d'une coordination spontanée.

C'est donc à l'encadrement de ces expériences et de ces hommes que doivent dorénavant s'attacher les gouvernements de croissance, de développement et d'aménagement, assorti du choix de priorités opérationnelles favorisant les centres urbains autour desquels sera organisée la totalité de l'espace québécois.

<sup>1</sup> Voir : Bélanger, Marcel, *l'espace québécois*, dans *Le Québec face à l'aménagement du territoire*, Québec, 1967, pp. 115-127.  
Cazalis, Pierre, *Disparités régionales et régions fonctionnelles au Québec*, même ouvrage, pp. 129-143.



Qu'il le veuille ou non, l'aménagiste pratique une morale, applique une idéologie, réalise une culture. Qu'il l'accepte ou non, il est aussi l'instrument d'une morale, d'une idéologie, d'une culture. Au Québec comme ailleurs, l'aménagement du territoire ne peut être utile et dynamique sans respecter et favoriser les tendances profondes tant de la culture humaine que des cultures particulières où il s'exerce.

Cette idée n'est pas nouvelle. Elle fut en fait appliquée par presque toutes les sociétés humaines préindustrielles. Comme l'écrit Pierre George, « Toute collectivité humaine se projette sur une portion de l'espace terrestre, qui, sous des formes différentes, sert de support à ses activités » (George, P., p. 23). Il n'existe en effet aucune société humaine connue qui n'ait, à des degrés divers, humanisé l'espace habité et exploité. Un campement bochimán, une bourgade iroquoise, un enclos africain, un rang canadien-français, sont autant de matérialisations d'une vision particulière du monde et de la société, d'une conception morale de l'existence, d'un système de valeurs culturelles. Chaque société perçoit et découpe l'espace selon les modes de vie et selon les postulats socio-culturels qui lui sont propres: espace familial, espace substantiel, espace ludique, espace sacré, espace féminin, espace masculin, espace irréel des esprits, espace dangereux... Chaque espace possède ses fonctions spécifiques et est réservé à des groupes ou à des individus bien déterminés selon leurs statuts. En général, les petites sociétés isolées qu'on appelle « primitives » ou « paysannes » se caractérisent par la stabilité de leurs structures sociales et de leurs valeurs culturelles, cette stabilité se reflétant dans un découpage et une stratification à peu près immuable de l'espace ainsi que dans la clarté des représentations mentales de cet espace. C'est notamment le cas des sociétés ayant atteint un seuil satisfaisant d'adaptation écologique et n'ayant pas subi de fortes perturbations extérieures. Ainsi organisé, l'espace devient phénomène culturel.

Comme la plupart des autres phénomènes culturels, il s'enracine dans la psychologie la plus profonde de la société. Il en vient ainsi à paraître « naturel », voire sacré, s'identifiant absolument à la vie des individus et des groupes, tout comme la langue, les croyances, les modes de vie. Ainsi considéré, l'espace est un bien sacré qui appartient autant aux groupes sociaux qu'aux individus qui en font partie. Cela semble s'appliquer tant aux habitants des petites communautés rurales qu'à ceux des taudis des grandes villes.

Vu dans cette perspective, l'aménagement du territoire atteint l'une des racines essentielles de la culture et de la psychologie humaines. Il peut, à ce titre, devenir éminemment moral et positif lorsqu'il s'inscrit dans le sens des

valeurs de la société qu'il prétend traiter, mais aussi éminemment immoral lorsqu'il nie ces valeurs. L'anthropologue traditionnel, qui concevait justement une culture comme le bien inaliénable d'une communauté ou d'une société, jugeait condamnable toute forme d'intervention étrangère susceptible de la modifier. Cette éthique professionnelle soulève bien des sarcasmes à cause du romantisme évident qu'éprouve l'anthropologue à l'égard des sociétés exotiques. Mais il n'en demeure pas moins vrai que la disparition rapide de ces cultures prive l'humanité de richesses humaines dont elle eût pu bénéficier. Quoi qu'il en soit, l'anthropologue peut mieux que quiconque mesurer l'ampleur des catastrophes humaines causées par diverses formes de colonialisme qui s'apparentent souvent à ce qu'on appelle maintenant l'aménagement du territoire: construction de villes minières, fondation de plantations sucrières ou bananières, relocation de groupes humains, divisions géo-politiques arbitraires des tribus. En quelques années seulement, des cultures entières sont disparues, des sociétés ont perdu toute signification, des hommes se sont laissés mourir ou se sont révoltés. Dépouillé de sa culture, l'homme perd son humanité. Il devient imprévisible.

Analysés rétrospectivement, ces événements paraissent tragiques parce qu'on en constate aujourd'hui les effets négatifs. Mais, la nature humaine n'ayant pas changé depuis l'avènement du colonialisme, les cultures humaines subsistent toujours, n'est-il pas possible que des erreurs semblables soient encore commises, non plus peut-être au nom du colonialisme, mais au nom du progrès? Or, l'aménagement du territoire, qui fait de plus en plus partie des cultures occidentales, repose sur une prémisse occidentale: le progrès.

Qu'en est-il du Canada français dans ce contexte?

Le Canada français ne fut jamais ce qu'on crut ni ce qu'on voulut qu'il fut. Durant le régime français l'administration royale, quoique sensible aux profits de la traite, prétendit instaurer en Nouvelle-France une féodalité paysanne couronnée par une classe de seigneurs dont le pouvoir et le prestige devaient servir de fondement à l'organisation de la colonie. Cependant, le commerce des fourrures et l'attrait des villes contrecarrèrent très longtemps la réalisation de ce rêve. À la faveur de la pauvreté relative de la plupart des seigneurs, et, semble-t-il, d'une profonde aspiration à l'indépendance de leurs censitaires,

l'égalitarisme devint très tôt un des éléments essentiels de l'idéologie rurale de la colonie. Ainsi, dès le départ, la Nouvelle-France déviait des voies qu'on lui avait tracées.

Il en alla de même pour l'habitat. Au début du régime français, il n'existait vraisemblablement aucun plan précis de distribution géographique des seigneuries. Pour des raisons d'ordre écologique, celles-ci s'échelonnèrent graduellement le long du Saint-Laurent et furent divisées en rotures par bandes plus ou moins régulières et perpendiculaires au fleuve. Lorsque les autorités coloniales décidèrent d'instaurer un nouveau schème d'établissement, il était déjà trop tard. Talon traça le plan de trois villages groupés: Charlesbourg, Bourg Royal et Petite Auvergne. Chacun de ces villages devait rassembler les maisons autour d'une petite commune ronde. Derrière les maisons devaient s'étendre les champs d'environ quarante arpents, de sorte que chaque habitant pourrait vivre à la fois sur sa terre et dans une agglomération. De nouvelles terres furent plus tard mises en réserve pour d'autres villages du même type. Tel fut le premier essai d'aménagement du territoire au Québec, mais il demeura lettre morte, sauf à Charlesbourg. Il n'y eut d'ailleurs jamais plus de six villages de plus de cinq cents habitants avant 1960, quatre d'entre eux se situant près de Montréal et le cinquième étant justement Charlesbourg (Harris, C. H., pp. 176-179).

L'habitant canadien s'était donc très vite habitué à la linéarité des établissements. Son refus d'un autre type d'habitat semble indiquer qu'il s'était rapidement dessiné un modèle assez précis de l'espace rural et du système agraire. Ce modèle prit graduellement sa forme définitive: le rang en arête de poisson tel qu'il existe encore présentement (Deffontaines, P.; Derruau, M.), un petit village n'étant le plus souvent qu'un renflement de population le long d'un rang, la paroisse.

Malgré les désavantages « objectifs » qu'on peut trouver à ce système, il semble bien que l'habitant y trouvait satisfaction. Il n'était en tout cas pas plus dépourvu que le paysan de Nouvelle-Angleterre, avec lequel il partageait d'ailleurs plusieurs traits économiques et culturels. Il est vrai que plusieurs censitaires vendaient leur roture, surtout au XVII<sup>e</sup> siècle (Harris, C. H., pp. 140-146), mais ceux qui restèrent éprouvaient pour leur région un profond attachement. À mesure que s'écoulaient les décennies, les liens matrimoniaux se multipliaient et soudaient des relations sociales fortes et nombreuses. L'entraide avec le « premier voisin » brisait un peu l'isolement et affermissait la solidarité du rang. La course des bois servait aussi d'exutoire psychologique pour les hommes en même temps que d'appoint éco-



nomique. L'idéalisation du statut maternel semble avoir joué un rôle correspondant pour la femme.

Il existait donc à la fin du régime français un modèle typiquement canadien de peuplement, de défrichement et de système agraire. Le territoire avait été «aménagé» par le peuple lui-même.

Pour bien des raisons qu'il ne convient pas d'analyser ici, la conquête anglaise, loin de porter atteinte à ce modèle, contribua à le consolider jusqu'à le rendre presque sacré aux yeux de l'élite cléricale et professionnelle. Cette consolidation trouva son achèvement définitif vers le milieu du XVIII<sup>e</sup> siècle. Les rébellions s'étaient terminées par d'amères défaites. Ceux qui avaient prédit, parfois dans de véritables visions messianiques (Ouellet, F., 1966, p. 143), le triomphe glorieux des Canadiens français voyaient au contraire grossir le flot des immigrants anglais dans les *Townships* et dans les villes: en 1851, 55% de la population montréalaise était de langue anglaise ainsi que 42% de la population de Québec. Depuis longtemps déjà, le commerce et l'industrie avaient échappé au contrôle des entrepreneurs français. Les seules voies de promotion sociale ouvertes aux Canadiens français étaient celles des professions libérales, qui déverrouillaient parfois quelques volets politiques, et des vocations sacerdotales. Seule la possession d'une bonne terre garantissait une certaine sécurité. Cela étant, la société canadienne-française ne put trouver sa propre signification que dans le tryptique langue, terre et foi. Ces trois biens, seule propriété véritable de cette société, devinrent les remparts sacrés contre l'envahissement anglo-saxon. C'est dans ce contexte que l'habitat rural et le système agraire canadiens-français furent érigés en un modèle immuable et supérieur. Plus on se sentait menacé, plus on se réfugiait dans cette forteresse rassurante de la paroisse rurale, que le clergé avait bien structurée, du rang, de la parenté, de la famille, de la petite entreprise locale, de la petite politique personnalisée, du patronage et de la pauvreté vertueuse. Ce modèle s'était à ce point imposé parmi les membres de l'élite qu'aucun autre mode d'établissement ne semblait pouvoir convenir à une population canadienne-française. Il avait en quelque sorte recouvert comme un épais brouillard la culture canadienne-française, empêchant ses élites, sauf de rares exceptions, d'imaginer un système différent. Voilà pourquoi les Canadiens français qui s'établirent en dehors de la vallée du Saint-Laurent, que ce

soit au Saguenay-Lac-Saint-Jean, en Ontario et même dans les provinces de l'Ouest, traînèrent avec eux ce même modèle agraire qu'ils appliquèrent partout où c'était possible.

Tel fut à peu près le sort de la société canadienne-française jusque vers la moitié du XX<sup>e</sup> siècle. Telle demeura aussi l'image de l'espace réservé aux Canadiens français. Encore en 1945, un auteur sérieux pouvait écrire ces lignes: «La grande ville est essentiellement un phénomène particulier de grand régime capitaliste d'inspiration étrangère; elle apparaît comme la tentative de monopoliser en quelque sorte, dans ses plus hautes manifestations, toute la vie d'une nation» (Arès, R.). L'idéal demeurerait encore la vie rurale: «Ah! si j'étais cultivateur! s'écrit Jean Rivard. L'on ne s'enrichit pas en appauvrissant les autres, comme le font quelques avocats, les médecins et les marchands. On tire ses richesses de la terre: c'est l'état qui semble le plus naturel à l'homme» (Gérin-Lajoie, A.). Voilà la principale aspiration, outre l'élan sacerdotal et missionnaire, que l'école visait à inculquer aux enfants, qu'ils soient de la campagne ou de la ville. L'espace québécois était en quelque sorte pollué, dénaturé, menacé par la ville.

Dans ce contexte culturel et idéologique, il est bien évident que presque toute la politique québécoise ne pouvait que favoriser la campagne. On encouragea le défrichement de nouvelles terres; on incita les exilés en terre américaine à revenir s'établir dans les campagnes québécoises; même aussi tard qu'en 1946, l'épiscopat du Québec publia une lettre collective pour favoriser la colonisation agricole. De 1941 à 1956, environ \$275,000,000 furent consacrés à la colonisation agricole, montant respectable pour une province pauvre en voie d'urbanisation et sans ministère de l'éducation (Brunet, M., pp. 145, 137 et 143). Qu'eût fait un aménagiste visionnaire ou futuriste dans ce contexte? Il lui eût certes fallu un pouvoir surhumain pour modifier cette conception de l'espace et de son utilisation.

En va-t-il différemment en 1970? Les modèles ont certes changé; mais, étant donné cet alourdissement culturel qui caractérisait la société québécoise, il serait étonnant que le vieux modèle ait muté en un modèle tout à fait nouveau. Sauf de très rares exceptions, les cultures humaines traînent longtemps derrière elles les valeurs du passé. Même les révolutions les plus radicales réussissent mal à les en déloger.

Force est de constater que le système du rang subsiste toujours, cela aux marches même de Montréal. Force est de constater aussi que le patronage constitue encore un des rouages essentiels de la société rurale. Bien plus, il semble que la notion de régions défavorisées ne s'applique qu'aux campagnes, la ville tenta-

culaire étant toujours considérée comme un mal inévitable. L'idée de décentralisation économique et culturelle, apparemment empruntée à la France, n'est sans doute pas étrangère à cette image de l'espace «normal» et de la «bonne société». La xénophobie canadienne-française, dont le régime scolaire a récemment révélé un aspect, n'est pas sans rappeler la forteresse culturelle érigée par le Canada français du XVIII<sup>e</sup> siècle. Enfin, la lenteur des réaménagements urbains reflète sans doute aussi la méfiance traditionnelle à l'égard de la ville. Bien plus, tout se passe comme si la culture canadienne-française résistait à l'élaboration d'un véritable modèle urbain au sein d'un contexte industriel. C'est que la ville, notamment Montréal, s'est développée presque à l'insu de l'élite traditionnelle du Canada français et presque malgré elle. Alors que le gouvernement, le patronage aidant, encourageait la colonisation agricole et connaissait assez bien ses ruraux, les citadins, ouvriers et fonctionnaires pour la plupart, étaient laissés à leur propre sort. Il en résulta des conséquences dont on mesure encore mal l'ampleur. La plus grave est peut-être la disparité sociale, culturelle et idéologique qui caractérise les communautés franco-québécoises. Il existe en fait deux Canada français: celui de la région métropolitaine qui groupera bientôt la majorité des Canadiens français, celui de la ville de Québec dont l'inspiration s'enracine encore dans la vieille tradition, mais qui dirige la destinée de l'ensemble des territoires. Voilà sans doute pourquoi presque toutes les recherches relatives au Canada français continuent encore de porter sur les régions rurales, alors que la culture de la population montréalaise demeure à peu près inconnue. On sait assez bien comment vivent un pêcheur de Gaspésie, un cultivateur de Saint-Justin, un bûcheron du Saguenay, mais on ignore à peu près tout des modes de vie, des sentiments et des aspirations d'un ouvrier de Montréal, d'un col blanc de la banlieue montréalaise, d'un professionnel d'Outremont.

Pourtant, l'urbanisme doit suivre son cours. De quels faits s'inspirera-t-il donc, puisque le fait urbain canadien-français n'a pas encore été révélé par des recherches scientifiques suffisantes? Il semble bien—et le Québec n'est pas l'unique cas en l'occurrence—que la plupart des plans d'aménagement et d'urbanisme des grands ensembles urbains doivent encore s'inscrire dans une sorte de modèle dépassé dont les racines plongent dans une perception stéréotypée de l'espace et de la société plutôt que dans une analyse poussée de la culture.



# 4

## Contrôle de l'environnement et urbanisation

L'interdépendance fondamentale qui existe entre l'aménagement du territoire et la conservation de l'environnement doit être respectée lors de la planification d'une région.

Si l'on considère que l'aménagement ne consiste pas simplement à combiner dans un ordre logique des bâtisses, zones vertes, routes, plages, cours d'eau, etc..., mais surtout de créer un cadre de vie agréable et épanoui pour l'homme, il n'est pas possible d'oublier les facteurs capables de souiller les plages, transformer les cours d'eau en égouts et rendre l'atmosphère irrespirable.

Notre environnement est en train de changer d'une manière perceptible à cause des activités d'une société hautement industrialisée.

L'accroissement rapide de la population, combiné avec un essor technologique sans pareil dans l'histoire de l'humanité, a créé des problèmes qui non seulement exigent des solutions compliquées, mais dans beaucoup de cas, n'ont pas été définis avec précision.

Notre planète est essentiellement un système fermé dont les limites d'autopurification sont nettement limitées. Il s'ensuit que l'homme ne consomme rien, il ne fait qu'utiliser les ressources de sa planète. Rien ne se perd et les déchets produits par les systèmes vivants, en général et en particulier ceux de l'homme, survivent d'une manière ou d'une autre. La nature maintient, avec une précision merveilleuse, un équilibre entre ce qui est utilisé et ce qui est produit. Ainsi la quantité d'oxygène consommée est très exactement compensée par l'oxygène produit. Dès que la population d'une espèce augmentait dangereusement, le manque de nourriture ou d'autres causes naturelles limitaient la prolifération de cette espèce jusqu'à ce que l'équilibre soit retrouvé. L'homme est le premier animal qui est arrivé à se soustraire jusqu'à un certain point, à des lois immuables. Cependant, en maîtrisant la nature et en essayant de conquérir la lune, il a créé une technologie qui est en train de déséquilibrer un statu quo millénaire. Ce faisant, il court peut-être à sa perte.

La tendance qui consiste à ignorer l'écologie se solde par des résultats surprenants. Ainsi, de très faibles concentrations d'insecticides dans les cours d'eau sont concentrées par des organismes primitifs comme le plancton. Ces derniers sont mangés par de tout petits poissons qui, à leur tour, servent de nourriture à des poissons de taille moyenne. Ces derniers servent à l'alimentation de certains oiseaux et du fait même la dose originale de poison qui constitue la plupart des pesticides, est concentrée des centaines et des milliers de fois. Le résultat final est que des espèces entières d'oiseaux accumulent dans leurs corps des quantités de poison et sont en train de disparaître.

La pollution des eaux par certains produits, qui en soi ne sont pas dangereux, conduit à un appauvrissement de la quantité d'oxygène en solution et se solde par une prolifération de plantes aquatiques comme certaines algues gluantes qui rendent les eaux impropres à d'autres formes de vie aquatique et ainsi inutilisables pour la plupart des usages habituels.

L'urbanisation et l'industrialisation rapides des dernières décennies ont multiplié les sources et par conséquent les problèmes de pollution. Il suffit de dire que les activités humaines au Canada produisent quotidiennement et rejettent dans l'air environ dix mille tonnes de bioxyde de soufre et le double de cette quantité en oxyde de carbone. La plupart des cours d'eau dans les zones habitées sont excessivement pollués. Des fleuves aussi éloignés que le Mackenzie sont très fortement pollués à proximité des centres miniers. L'océan lui-même est en train d'être pollué à un taux effarant.

S'il n'est pas encore possible de prévoir exactement les effets à long terme de cette pollution effrénée, il est cependant assez aisé de prévoir une fin apocalyptique de la vie sur cette planète si la pollution n'est pas enrayée d'une manière efficace. Il suffit de dire à ce propos que 70% de l'oxygène terrestre est produit par le phytoplancton des océans. Détruire le phytoplancton veut dire non seulement couper une chaîne écologique d'alimentation très importante mais aussi appauvrir les ressources d'oxygène dans l'air.

Si l'on ajoute au problème de la pollution de l'air et de la pollution de l'eau le fait que les déchets solides produits par une société technologique augmentent en nombre et en résistance à la destruction, on illustre d'une manière évidente l'énormité du problème auquel l'humanité aura à faire face à très brève échéance.

Le phénomène de l'urbanisation concentre et multiplie les problèmes de pollution. Il suffirait de remarquer que l'on estime qu'environ 90% des Canadiens vont vivre dans des zones urbanisées d'ici 50 ans. Les exigences de ces populations urbanisées vont être satisfaites par une industrialisation encore plus intense. Les problèmes de pollution engendrés par ces deux phénomènes doivent être compris par les urbanistes, de manière à prévoir les moyens de défense qui s'imposent.

On devra considérer dans le futur, une zone urbaine comme un système fermé avec ses besoins traditionnels: énergie, transport, habitation, industrie, institution, etc... mais réaménagée de manière à diminuer les effets



de la pollution. Ainsi la localisation de sources de production doit être décidée de manière à représenter le minimum de danger pour la santé et la propriété des citoyens. L'utilisation de moyens de contrôle de la pollution de l'air et de la pollution des eaux doit faire partie intégrante de toute étude économique. Les réseaux routiers, autant celui à circulation rapide que celui à circulation lente, doivent être tracés de manière à obtenir le minimum de production de polluants par les véhicules en même temps que le maximum de ventilation naturelle possible. L'importance de la localisation de ces réseaux peut être illustrée par le fait qu'un véhicule moteur en circulation rapide produit des quantités de polluants beaucoup plus faibles que le même véhicule en mouvement discontinu.

Les agglomérations urbaines ne possédant pas de surfaces vertes adéquates constituent des réservoirs de chaleur importants qui limitent la ventilation naturelle de l'atmosphère.

Finalement, l'industrie consommant aujourd'hui des quantités énormes d'eau pour satisfaire ses besoins va accélérer cette tendance dans les années à venir. Ceci impose non seulement une planification scientifique de la localisation des divers types d'industries mais aussi une étude approfondie de la politique d'administration en vue de la réutilisation massive des eaux.

Finalement, comme il n'est plus possible de considérer un problème de pollution détaché de son contexte, il est nécessaire d'adopter une politique globale qui va tenir compte non seulement de tous les aspects de la pollution mais aussi de la relation qui existe entre les activités humaines responsables de la pollution.

On peut prévoir que dans un avenir très rapproché des bilans très exacts seront établis pour tout ce qui entre dans une communauté urbaine et en sort, que ce soit à travers l'atmosphère, par les cours d'eau ou sur le sol. Ces bilans, programmés de manière à être rapidement traités par des ordinateurs, vont permettre de garder un certain équilibre dans l'environnement global des agglomérations urbaines.

En conclusion, on peut dire que si les dommages infligés à la nature sont déjà considérables, on n'a pas atteint une situation irréversible. La pollution des atmosphères urbaines, des grands cours d'eau, ainsi que la contamination avancée de certains lacs autrefois magnifiques, comme le lac Érié, auront sonné l'alarme en rappelant à l'homme satisfait, sûr de lui, que les lois presque immuables de la nature qui ont réglé la vie sur cette planète pendant des millions d'années sont encore valables et doivent être respectées, s'il veut survivre.

Malgré les efforts soutenus qui ont été faits en vue de faire du Québec méridional une contrée agricole, la forêt conserve ou reprend tous ses droits sauf sur une infime partie du territoire. Les Indiens qui vivaient presque en symbiose avec la nature ont vite appris à nos ancêtres les méthodes de vie appropriées à ce vaste pays. Les coureurs des bois et tous ceux qui vivaient de la forêt en ont respecté l'équilibre naturel. Ils ont appris à l'aimer. Une vie nouvelle était née. La liberté s'offrait; on pouvait la respirer à pleins poumons. Depuis le début, les grands espaces ont façonné le peuple québécois. Les vues mesquines cadrent difficilement dans cette immense et beau pays. Pays forestier par excellence il a bâti des forestiers dans l'âme. Le processus est toujours en marche.

La mentalité forestière n'exclut pas, bien au contraire, la vie de la cité. L'utilisation polyvalente des forêts du Québec n'est pas phénomène nouveau. Il se continue. Il se continue pour l'homme de la campagne. Il s'accélère pour le citoyen. De nos jours, la croissance contrôlée des villes doit accaparer la plus grande partie de nos efforts sans pour autant négliger la campagne, la forêt et les autres richesses naturelles. Celles-ci ne peuvent être aménagées en elles-mêmes mais bien en étroite liaison avec les exigences d'un urbanisme bien conçu dans le cadre d'un aménagement de synthèse du territoire appuyé sur des plans d'aménagement sectoriels et régionaux dans tous les domaines de l'activité humaine. Ce mode d'aménagement du territoire par harmonisation constante des divers secteurs devrait constituer la spirale historique du développement harmonieux du territoire et de la population qui l'habite.

L'urbanisme et l'architecture bénéficieront davantage des particularismes du pays si nous parvenons à humaniser la forêt selon notre propre civilisation issue de notre culture particulière et de celles des Amérindiens qui nous ont précédés et qui devraient maintenant nous accompagner. Nous pouvons même parler de la naissance d'un type d'homme nouveau en terre québécoise, en partie sous l'effet de cette merveilleuse et riche immensité ouverte sur le nord qu'a si bien chantée Monseigneur Félix-Antoine Savard dans un poème publié en novembre 1969 intitulé «Hymne à mon Pays» dont voici quelques extraits:



*«Je t'aime, ô mon Pays épaulé sur le Nord.  
Et de vous, je veux prendre conseil:  
puissante, inépuisable nature,  
plaines, fleuves et montagnes,  
riches solitudes inexploitées encore,  
terre des forêts, des minéraux et des blés,  
patrie des nids d'amour dans les roseaux de  
la toundra;  
Oui, de vous je prendrai conseil, pacifiques  
trésors de mon pays;  
Et j'écouterai l'appel de la très vaste et jeune  
et belle liberté.»*

Cet hymne serein s'élève à la façon d'un dieu au-dessus du sol québécois.

Les forêts du Québec, d'une superficie de quelque 350,000 milles carrés occupent plus de la moitié du territoire. Des forêts feuillues du sud jusqu'à la toundra semi-désertique du grand nord, en passant par le pré-nord et le moyen nord où l'on retrouve la forêt boréale et la taïga, le paysage québécois offre une diversité étonnante de végétation arborescente et arbustive. La flore herbacée est particulièrement riche de beauté dans les régions septentrionales où la nudité et l'éclat des montagnes offrent un saisissant mélange de couleurs à la naïve et trop rare contemplation des hommes, hormis les Esquimaux et quelques Blancs.

Dans cet immense espace d'environ 600,000 milles carrés nous récoltons annuellement quelque 10,000,000 de cordes de bois en produits de toutes sortes pour alimenter principalement les usines de pâtes et papiers, de sciage, de contreplaqués et de meubles. Dans une conférence que monsieur Louis-Jean Lussier prononçait à Québec en janvier 1970 lors de la 35<sup>e</sup> assemblée générale annuelle de l'Association forestière québécoise, il affirmait que nous pourrions «doubler la coupe annuelle, ce qui, en termes économiques, peut s'exprimer comme suit:

Avantages économiques découlant de la coupe additionnelle

- Nombre de grandes usines de pâtes et papiers: 18
- Nombre de grandes usines de sciage ou autres transformations du bois: 24
- Valeur de la production annuelle: \$1.0 milliard
- Nombre d'emplois directs et induits: 100,000
- Salaires directs et induits: \$500 millions
- Taxes et impôts: \$200 millions»

Une utilisation accrue de la forêt québécoise ne signifie pas nécessairement l'éparpillement des populations. En général, il suffirait de modifier ou d'élargir les villes actuelles pour recevoir la majeure partie de ce regain d'activités.

Nous sommes tous ensemble propriétaires de la forêt publique du Québec. Cette propriété indivise doit être aménagée et utilisée par tous en reconnaissant toutefois le fait qu'il faut absolument retourner à la forêt une partie des richesses qu'elle nous procure si nous voulons en obtenir de plus grands bienfaits. Ce réinvestissement s'applique tout autant dans le domaine industriel que dans le sain aménagement des eaux, de la faune aquatique et terrestre et dans l'utilisation croissante des possibilités récréatives qu'un territoire forestier bien aménagé peut fournir à la population. Avantages collectifs et responsabilités collectives vont de pair.

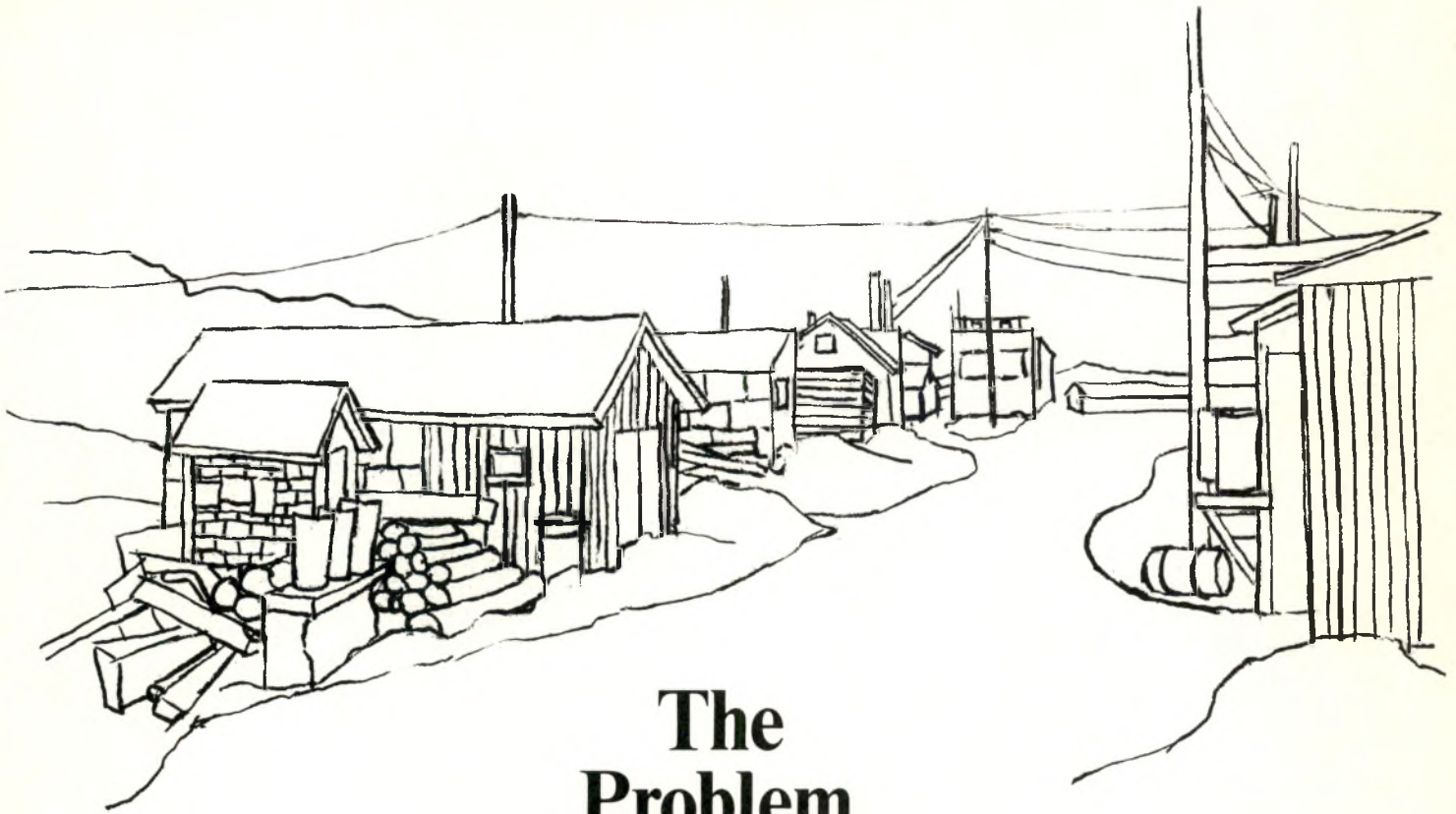
Une synthèse des aspirations et des besoins réels se fera convenablement à condition que les contacts entre l'administration publique et privée et les usagers de la forêt soient soutenus et continuellement en éveil. Le grand défi des années à venir dans le domaine forestier consistera à conduire d'une main sûre les transformations inévitables du milieu en vue de rehausser non seulement le standard de vie, mais également les aspirations spirituelles et morales de l'homme tout entier.

L'homme québécois n'a pas d'efforts insurmontables à faire pour que puisse s'épanouir une mentalité forestière adaptée à son pays tant dans les milieux urbains que ruraux. Les amateurs de grande nature, qu'ils soient pêcheurs, chasseurs, canotiers, villégiateurs ou autres forment au Québec un groupe fort imposant qui témoigne de cet amour des grands espaces et de la liberté qu'on y goûte.

La forêt du Québec continuera d'exercer une grande influence dans tous les domaines de notre vie sociale, économique et culturelle, au grand avantage de tous, pour peu que nous poursuivions inlassablement la conquête sans cesse renouvelée du pays qui continue à se prêter généreusement à nos volontés collectives.



The houses at Whitehorse are crowded together without any real order, thereby creating safety hazards.



# The Problem of Squatters in the Northland

by Richard G. Bucksar  
Illustrations by Margrit Stutz

As a result of the growth and expansion of squatting in the developing parts of the world, numerous social, economic, physical and political problems have arisen. The few available studies of squatting in rural Canada point to a serious deficiency of knowledge concerning squatters. The only available studies seem to indicate that the social, economic and psychological cost of squatting is very high: development programs have had to be postponed; bitter enmities have arisen between squatters and townsmen, and between squatters and government; municipal and provincial operating costs have risen owing to the pressures of these uncontrolled fringe settlements.

Early settlers to the Canadian frontier noted the growing problem of squatters on the land and attempted to place legal sanctions against them through government agencies. Noteworthy among early concerns was timber poaching, the danger to the resource base owing to the lack of fire control, and personal questions as to "rights" of ownership.

The lack of control over the squatters in many communities has made it necessary to pass laws and to place sanctions against them long after they have established a foothold in an area.

Northern communities experiencing rapid growth seem to be particularly vulnerable to the phenomenon of the squatter, although squatter communities are developing in other areas as well. The squatter, a common phenomenon in early mining communities and western lands, seems a displaced person in the twentieth century, with its dependency on community development and taxes.

The attitude of the townsman has always been important concerning sympathy towards squatters. Robin Hood by all rights was a squatter on Crown land and a poacher in the bargain. He, however, managed to be cast as a hero because "he stole from the rich and gave to the poor." Jesse James,



Louis Riel was probably the most famous squatter in Canadian history. In trying to be like Robin Hood, he managed to acquire the characteristics of a Jesse James, and in turn was cast as an anti-Christ by the government. A volatile personality, Riel had been educated by the church for nearly ten years, maintained an explosive degree of oratory and was a born leader of his people, the Metis.

The history of land tenure in the Red River area is rather complex, and for this reason it is easy to understand why the Metis would become alarmed to the point of revolution. The first settlers arrived at the Red River in 1812 under Miles Macdonell. The Earl of Selkirk selected the region for his enterprise, that of placing a settlement for evicted Scottish crofters in the interior. In addition to being philanthropic his intent was also twofold, "to place labour on the soil" useful to the Hudson's Bay Company, and to assist himself in withstanding the encroachment of his rivals, the North-West Company. He "contributed" half of the population of the locale, mainly settlers from Scotland. The remaining half included the descendants of employees of the company and voyageurs of the North-West Company, nearly all of them being either French or Metis.

With the arrival of these new settlers, it was imperative that some type of land survey be accomplished. The first system seems to have been patterned after the French seigniorial system. Trevor Lloyd describes the system as follows:

"We are told that each family was given a strip along the Red River below Fort Douglas. The strips were selected by lot. Each lot was 100 acres in extent and had four acres of river frontage.

"The strips stretched inland for two miles from the river bank and were at first ten chains wide. There was soon a great deal of variation in the width of the lots."

In the ensuing years, land titles were acquired in a leisurely manner and transferred in much the same way. Records were kept in a land book at Fort Douglas on the Red River, and those farming in the area often had no legal documents to show proof of ownership. Trevor Lloyd further illustrates that the case of all land owners was poor to say the least, but the Metis situation was pathetic. They possessed no evidence of legal ownership of the land and were generally considered as squatters by those around them.

The whole case of land tenure became increasingly important as the autonomous hold of the Hudson's Bay Company steadily decreased. As early as 1857, a large group of Metis petitioned a committee of Parliament in London as follows:

"When we contemplate the mighty tide of immigration which has flowed towards the north these six years past and has already filled the valley of the Mississippi with settlers and which will this year flow over the height of land and fill up the Red River Valley, there is a danger of us being carried away by that flood." (Trevor Lloyd, Ph.D. Thesis, pp. 276)

The message was virtually ignored. When the lands passed to Dominion control some ten years later, every effort was made by the government to populate the region as quickly as possible. Surveyors were sent into the area to set up a new and proper survey essentially based upon the American system, and they were promptly met and blocked by the squatter Metis, who were chiefly concerned with protecting their rights of ownership.

The rest is history. Manitoba and Saskatchewan were rapidly populated amidst and following armed rebellion, Riel was hanged, and a strained relationship existed between white and Metis for many years. These events occurred all because of a concern over the property rights of ownership on the part of what the government called the dictates of a relatively few "squatters." The rights and wrongs are the problem of history and perhaps a tiny mark on the conscience of those who rejected the Metis ownership and their "prior appropriation" of the land. The event should interest us, however, for it proves a case in point, that squatters may have legitimate rights in some instances! However, as Abrams points out:

"The old frontier areas of the more developed nations were once also the scenes of squatting, but in time titles were established, the land was often granted or sold to the squatters, and the law of force was supplanted by the force of law. Squatting, however, was rarely carried over into the cities of America or Europe, because law and property rights in cities were too firmly rooted. Members of the British privileged classes who had acquired in rural squatting until the time of the enclosures would not allow the same indulgences for urban property. The urban slum, not the squatter's shack, became the mark of urbanization in Europe and later America."

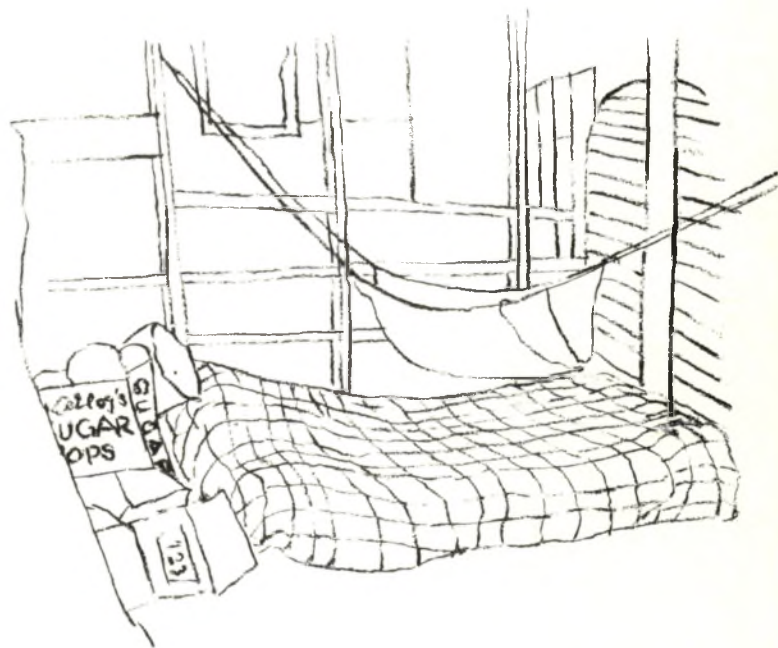
(Abrams: *Man's Struggle for Shelter in an Urbanizing World*)

another squatter, fought the railroad (the establishment) until he was "brought to justice," shot in the back by a friend and fellow squatter Bob Ford. Today, James is still revered in the eyes of his fellow native Missourians, but they sing the praises of Ford as "The dirty little coward that shot Mr. Howard."

The fact is generally assumed and accepted, that squatters represent unwanted segments of society but are useful to the economic structure of the same society that is rejecting them and are generally essential to the development of any frontier area. However, in their status as squatters, they create serious problems even in the frontier areas. Jim Lotz, in some unpublished material, sums up the major problems as:

- 1 The lack of control over the erection of structures on public or private lands in the provinces and the territories.
- 2 Their conflict with principles of community planning, such as hygiene, sanitation and various public and social services.
- 3 Lack of detailed information on squatters, their origin, numbers, location, attitudes towards relocation, and so on.
- 4 Insufficient knowledge on the techniques of handling squatters in a manner satisfactory to the individuals concerned and the public interest.

As the frontier has expanded in this century, many single-enterprise communities have been created. The frontier has become an attractive place to those seeking high-paying, temporary employment and in many cases is an open door to squatters and squatting.



This bed accommodates one adult and three children, plus one in the hammock.





Squatter house in Whitehorse. The debris in the yard does not offer a very pleasant view.

With such townsite development, squatters have become more easily identifiable than in the past. Either they are taxpayers, legitimate renters or they are squatters. If they are squatters, they have none of the "mythical rights" and should therefore carry their part of the tax burden, as stated in a 1968 editorial from the *Whitehorse Star*:

"The squatters who are going to have to move off White Pass property in order to make way for the construction of a long-planned road have absolutely no kick coming. They have been using the property that wasn't theirs for years, at no cost to themselves.

"There is actually no legal standing for the theoretical 'squatter's rights' as the average citizen would find out quickly if he tried to build a house on Crown or Territorial property. Why, then, should people who squat on White Pass property be exempt from the law? It smacks of the cowbird trick... dumping its eggs in another bird's nest. Guess who grows up big and strong while the owner is ousted?"

Lack of controls over the squatters in northern communities make it necessary to place sanctions against them long after they have become firmly entrenched in the community. Many came to the community in search of high wages only to be literally forced into a squatter confine or, to paraphrase Abrams, into an unorganized slum. Although, there may be an "economic elite" in some communities like Whitehorse as noted by Lotz, he also points out in "Northern Settlements and the Squatter Problem" that there is little social mobility from the squatter townsite to that of the permanent resident.

"The squatter population, then, represents a group of people trying to establish themselves or simply to live from season to season in a high-cost, economically marginal region. The squatter areas are like a net that catches all who come into the Whitehorse area with little or no money and few skills. Some stay in the net because they have invested money in their houses, while others stay because the squatter areas are refuges where they can live with less interference and less supervision than in the townsite."

In addition to problems of community development, regional development plans are also delayed by indigent and migratory squatters who claim prior appropriation of the land or "squatter's rights." Although there is no basis in fact for these mythical rights, news media will often grab at a human interest story and rouse public sympathy for the squatters, thereby resulting in costly delays for the agencies and the planners involved. A recent example of this type of delay was cited in the *Financial Post* of January 25, 1969.

*"Indians sit tight, block plan"*

"Five hundred Indians and Metis, who refuse to move from the prosperous community they have built at South Indian Lake, are blocking Manitoba Hydro's \$29 million project to boost the power potential of the Nelson River.

"The South Indian Lake group is one of the most resourceful and self-sustaining native communities in the province. It has its own frontier division school, a Hudson's Bay Company store and two churches. Homes are well kept...

"The community's economic base is fishing and trapping. The settlement, which is not a designated Indian reserve was started fifty years ago when a group of Indians from Nelson House decided to resettle..."

The squatters have cast a shadow upon the Canadian frontier. Their habit of building without proper planning has inevitably led to undeveloped slum areas at best. Truly these areas can be called "Frankensteins" of the frontier.

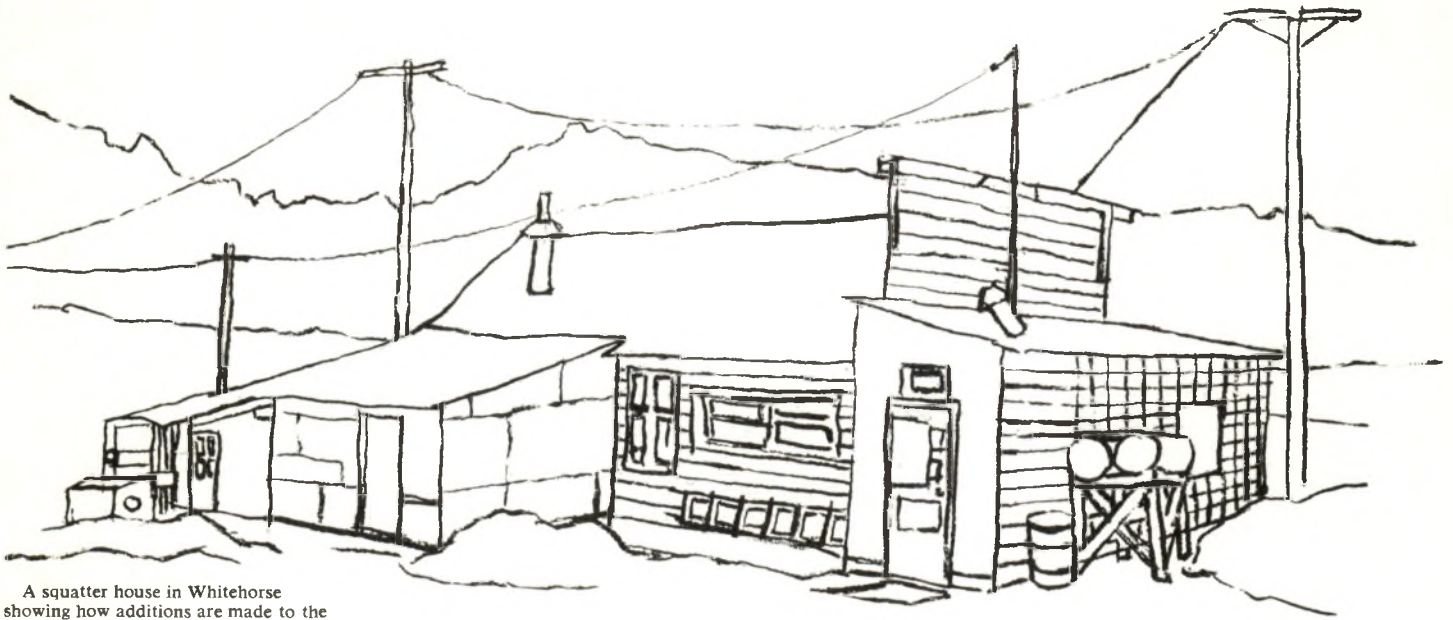
The natural insecurity felt because of a lack of land tenure has cast many of the squatters into the doles of the welfare. Although they generally maintain a physical mobility that is not native to the landowner, a "do what I please-ism," they generally lack the funds necessary to move back into the mainstream of society. In their weakness then, comes their real strength. They are forced to cast their lot with others in the same predicament. The gathering of these forces produces strength by sheer numbers as in the case cited at South Indian Lake. Many communities can record an excess of fifty per cent of the total population as being squatters on the land.

Existence on the frontier is economically and socially very difficult. This predicates the existence and the continuance of squatting on the Canadian frontier. As Lotz says:



Crowded conditions like these at Moosonee create severe fire hazards. Note the supply of firewood stacked in the yard with tent alongside.





A squatter house in Whitehorse showing how additions are made to the original dwelling.

"There is no doubt the squatter areas are aesthetically unpleasant and there is no doubt they do not carry their share of municipal responsibility, but the most serious aspect of the Whitehorse squatter situation is the existence of a number of problem and multi-problem families. Cruelty to children, illegitimacy, heavy drinking, disease, indigence, common-law relationship, temporary liaisons, petty crime, gambling and bootlegging were all noted among the squatters. A social worker estimated that 80 per cent of the welfare cases in Whitehorse were among the squatters, because the squatter areas do provide a place of refuge for the aged, the unemployed, the unemployable, the rejected, the chronically ill, Indians of white or Indian status and others who cannot, for one reason or another, fit into the pattern of society established in the city."

Solutions to the problems as described by Lotz are very difficult and are generally ignored as squatter problems per se and cast instead as problems of social welfare. Whatever the case may be, solutions are not easy to come by. As a broad generalization we might consider one of the following:

- 1 We can totally outlaw squatting throughout Canada.
- 2 We can accept squatting as a necessary stage of the development of the frontier.
- 3 We can initiate legislation to curtail present squatting and to prevent future squatting. This is often referred to as the "bulldozing" method. You are allowed to squat, however, as soon as you move out, the bulldozer moves in.
- 4 Allow squatting to run its course and assume that time will "heal all problems." This means that we turn our back on the problem.

As population pressures from the south move northward, we can assume that the question of land tenure will become increasingly important as the land is settled, and thereby limit if not curtail squatter development. When this happens, perhaps the squatter will pass into history as did Robin Hood, Jesse James and Louis Riel.

*By definition, a squatter is:*

A settler having no right or title to the land occupied by him, or a person renting a dwelling from a person known by him not to have legal title to the land on which the dwelling stands.

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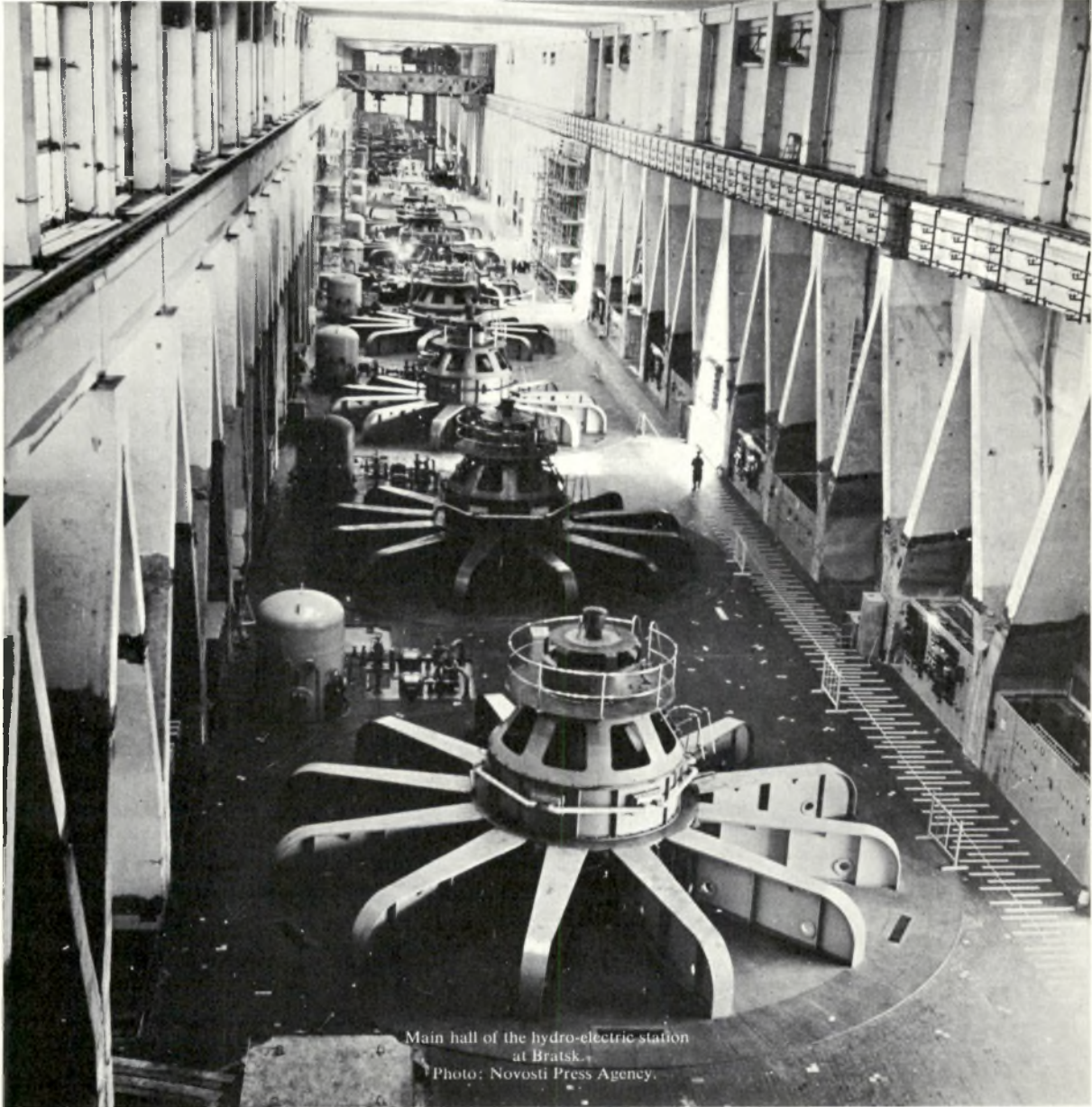
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# Siberia-



Main hall of the hydro-electric station  
at Bratsk.  
Photo: Novosti Press Agency.

## Treasure Chest for Russia

by Roger H. Charlier



It all started one morning in Moscow; getting up at 5:00 a.m. to catch a plane leaving at 10:45 a.m. The need to start so early was a mystery, but at six we sleepily delivered our luggage to the porter and half an hour later assembled in the lobby of the Hotel Ukraine (the largest in the Soviet Union) anticipating breakfast, only to find that the dining room would not open until an hour later. At 7:30 a.m. we were allowed half an hour to swallow our meal, and at 8:00 a.m. we boarded buses which took us through the heavy morning traffic to one of Moscow's five airports.

The place was jammed. Six cafeterias and a restaurant were going all out. Hundreds of people were practising the daily sport of waiting; lining up for every conceivable purpose—for taxis, buses, food, drinks and even for space on one of the cots provided, free of charge, for those who wish to catch forty winks. Our wait lasted 28 hours, spent in the Intourist departure lounge. Eventually we were on our way.

Generally speaking the trip was uneventful and although we did not see the Urals we did enjoy an extensive view of the lakes and endless rolling plains of western Siberia.

The terminal at Onisk airport, our refuelling stop, was only two wooden shacks, but planes dotted the field and take-offs and arrivals succeeded one another relentlessly. Safety regulations and boarding procedures would have driven a Western airport manager to distraction—passengers crossed runways at random while planes whizzed by; pilots wandered off into neighbouring meadows, and service crews happily smoked while refuelling the planes.

Irkutsk, which we reached at three in the morning, is about 3,250 miles from Moscow, and a thriving city of over 350,000 inhabitants. There are still many wooden houses, often with missing window panes boarded up with planks or pieces of cardboard. It has pot-holed streets and uneven sidewalks. But there are many tall, modern apartment buildings, streamlined office structures and stores, green parks with smiling benches, wide well cared for avenues, shining streetcars, and comfortable buses. We visited churches, movie houses, shops, inner court-yards and parks and were undeniably impressed by the Russians' success in taming the wilderness.

Despite the discomfort we experienced in getting there our journey from this point on proved to be a rewarding experience.

Siberia is a land of mountain ridges, untamed rivers, numerous lakes and the boundless taiga, a boreal forest which is slowly but surely being subdued by man. Of these natural attributes we found Lake Baikal to be the most impressive with the taiga running a close second.

The enormous size and depth of Lake Baikal is hard to describe. With the ever-changing colour of its amazingly clean and transparent waters teeming with edible fish and the fairy-tale beauty of its shorelines, abounding in fur bearing animals, it makes an unforgettable impression on anyone who has seen it, even if only once. With a length of 398 miles and a width of nearly 50 miles at its widest point, Lake Baikal covers 12,160 square miles, an area equal to that of Belgium or Holland. No other fresh water lake in the world can equal its

depth—494 feet—and its basin could contain all the water of the Baltic Sea or that from all five of the North American Great Lakes. Lake Baikal contains about one sixth of the world's fresh water reserves—some 5,700 cubic miles.

The annual outflow from Lake Baikal is about 15 cubic miles per year but the water level varies by about only three feet per year. This feature permits uniform operation of a whole cascade of hydroelectric power stations on the Angara River which, all totalled, have a potential of more than 13 million kilowatts. This chain of stations has been a major factor in the rapid urbanization and industrialization of the area by the Russians although colonies were established there as early as 1643.

The taiga, the second most impressive natural feature of Siberia, is often described as an area sparsely covered with stunted trees. In fact, however, it shows a considerable variety. The true taiga is primarily a forest of coniferous trees similar to those found in northern Canada just south of the tundra. Where the evergreens have been removed a secondary forest of birch and poplar has taken over. The most characteristic tree is the larch which, unlike the pine, will grow again after being cut off. Dwarf trees are to be found on the cool mountain tops giving way to the giant Siberian cedars at the lower levels.

The great economic importance of the taiga cannot be overlooked. Of the 4½ billion square kilometers of forest still existent in the world, 1½ billion are in the taiga. Like its North American counterpart it is rich in minerals of all types: mica, marble, graphite and many other varieties. This wealth has also had a great influence on the development of the area.

But, the advance of civilization is taking its toll. Valuable lake water is presently threatened by pollution from two recently completed pulp mills, although steps are being taken to correct this situation. The strong objections to the noise and stench raised by irate Siberians prompted Moscow to send an investigating committee and to temporarily halt production.

The primary problem facing the Soviet Government in developing this vast area is shortage of manpower. Siberia covers over five million square miles; an area larger than Europe. Its population is a mere 7½ million or less than two inhabitants per square mile. And, coupled with the fact that this part of Siberia was, until quite recently, considered as particularly bad for heart diseases owing to a lack of iodine and fluorine, and the age-old image of Siberia as only fit for use as a massive penal colony, has hindered immigration. But these views are being rapidly changed. The soil has been found to be rich in these essential chemicals and the myth of "slave labour only" has been dispelled. The pace of immigration has accelerated to the point where the population has increased by 50% over the last 20 years versus only 15% for the whole of the USSR.

The new settlers come principally from the western parts of Siberia and show a decided preference for the newly developed urban centers. As a result the rural population of Siberia generally is on the decrease but, on the other hand, Siberia now boasts 150 sizeable cities. The overwhelming



majority of the settlers are Russian. Other races are scattered among them to varying degrees and locations but they remain a minority. In the main the bulk of the population is employed in the mines, factories and power installations. In and around Irkutsk however, the farming community is on the rise, probably due to the greater demand for farm produce and the granting of permission to cultivate, on a private enterprise basis, products which may be sold in the cities for a profit.

To further facilitate exploitation of the vast mineral wealth and hydro-electric potential of the country the Government has plans involving the construction of a series of large industrial centres. Of these, two are already in existence in eastern Siberia, one at Bratsk on the Angara River and the other at Krasnoyarsk on the Yenisei. Coal alone would justify this industrial development—it is 4½ times cheaper to produce here than in the Don Basin—but the economists are also thinking in terms of extracting molybdenum, tungsten, gold, mica, tin, nickel, copper and diamonds. Location of the centres is contemplated in areas of low population density where construction poses no problem. Siberia furnishes its own wood and cement; it is self sufficient in grain and dairy industries are being developed. There is no shortage of food or building materials.

To compliment these industrial projects scientific research centres are also being established, the most noteworthy of which is located about ten miles from Novosibirsk. Here, at the staggering cost of some one third of a billion rubles, a branch of the Academy of Sciences of the Soviet Union has been located.

The idea of a location away from Moscow was expressed by a mathematician, Mikhail Lavrentiev. The site is within easy communication range from the Soviet capital in a magnificent forest. Lavrentiev had sentimental reasons for a return here. In a sunny valley stands the hut where he lived ten years ago but it is now flanked by Tyrolian-type villas.

The newly completed power dam created an artificial lake 15 kilometers wide and 190 kilometers long; wild life is protected. On the other side of this lake a modern city has grown, in some respects an extended suburb of Novosibirsk. It has been described as a town of “modern glass-and-fluid form architecture” with wide wooded spaces separating buildings. Here are a “handsome department store, a ten-storey hotel and a nearly completed palatial scientists’ club.” While Novosibirsk, a “restricted city” where General de Gaulle was hosted two years ago, is overlaid by black factory smoke, the forest town enjoys clear air and dazzling white winter snow.

Younger men were attracted to Academic Township (in Russian: Akademgorodok) by good pay, good housing, abundant laboratory space and the unique opportunity to join the scientific elite.

Nevertheless there are still many shortcomings: the quality of construction is poor by American standards, the department store’s floor and shelf space are virtually bare and the pampering of the scientists community contrasts sharply with the dull, drab, dismal housing blocks sheltering the average Soviet citizen. Yet, scientific production of the nineteen institutes has been amazing, ranging from oil discoveries to thermal power utilization.

Our flight from Irkutsk to Bratsk brought more surprises, the most unexpected being the virtual absence of Asiatics and Mongolians. These ethnic groups seemed to be completely missing from the population despite the fact that they were in evidence in Irkutsk. The Bratsk area has been wholly taken over by the Russians making it similar in many respects to any western American city.

Flying over the man-made Bratsk “sea” we were amazed to see, in the middle of the taiga, five or six settlements in areas where the forest had only recently been cleared. They were made up of neatly arranged geometrical patterns of homes, apartment buildings, and factories. The wooden isbahs and unimproved roads were rare and there were plenty of comfortable wooden or, more often, brick-and-concrete single dwellings and multiple-family units bordering incredibly wide four-lane asphalt thoroughfares.

There were still a large proportion of outhouses adorning the gardens of older homes. But then, 10 years ago I lived only about 30 miles from New York in a community where these were standard facilities for 90% of the homes.

We landed at a makeshift airport where bustling crowds were taking flights for numerous spots still further north. We were taken by bus to the Meteorological Institute of Bratsk which, like many other buildings, displayed on its walls signs proclaiming the peaceful objectives of Soviet foreign policy. As a matter of fact we saw and read more political slogans outside Moscow than in the capital, and, when I asked our guide whether people still read them I received the reply, “No more than you pay attention to publicity panels.”

For any visitor to the area the items of major interest are the hydro-electric development which has resulted in the creation of an artificial lake; the variety of mines and factories, and the way man has tamed the taiga, all of which required vast quantities of man-power. To improve the supply of this scarce commodity the Soviet Government has established excellent air and train services between this region and the less “forlorn” parts of the USSR. They have also made use of an old capitalistic trick, salary incentive. The Government grants a 40% salary premium for settlers in and around Baikal and a 70% premium for those who agree to go to Bratsk.

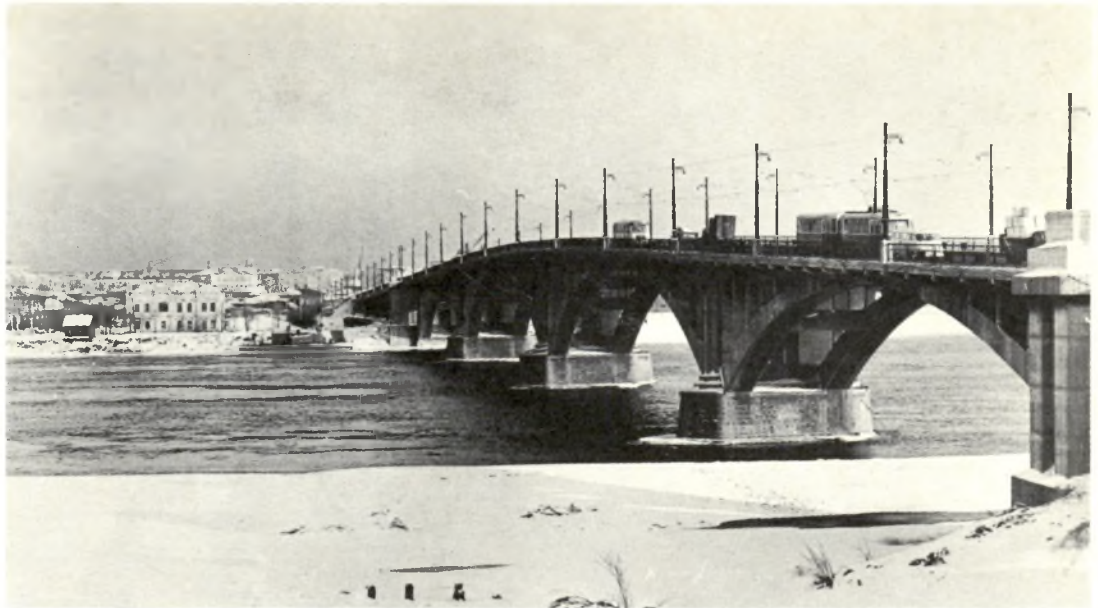
Today it is difficult to imagine that where the towns and industry are now, bears and many other species of animal roamed the taiga in 1954.

The abundance of insects used to be such that, not long ago, their swarm during the short sub-arctic summer would make it impossible to see either treetops or sky. Gnats, which made up the greater proportion depend upon fast-flowing oxygen-rich water to provide a breeding environment. By cutting off the cascades which dotted the course of the Angara for some two miles near Bratsk these natural breeding grounds were destroyed, and together with chemical treatment of deeper waters, life has been made more tolerable.

This, together with the carefully planned network of road and rail communications which form an integral part of the “industrial complex of Siberia” plan, has resulted in the rapid development of various industries throughout the area. Air-ready bus and train services carry people to their jobs, mostly



Bridge over the Angara River.  
Photo: Novosti Press Agency.



in factories. Under banners proclaiming "Peace, Work, Spring" we were shown a lumber mill employing some 10,000 persons. Other factories produce cord, rayon, and cellulose. I once visited similar plants in Cañada and was impressed. Here amidst the taiga I was even more impressed.

About ten miles away mining operations were under way. Cement factories were in full production. Highways linked the various communities—unimaginatively called Bratsk I, Bratsk II and so through Bratsk VII—and the airport. From the air it looked as if an improved road exists between Irkutsk and Bratsk.

Within the communities themselves Government shops seemed well stocked but the prices would stagger an American housewife. Sixty cents (US) for a lemon as against 35¢ in Moscow; \$15 for a woman's slip. Our guide's reply when asked about this is worth consideration however:

"True, consumer goods are costlier than in the United States. But medical and hospital care is free, rents average \$12 a month and the maximum income tax, which is soon to be abolished, is 13%. Rent has to be paid every month, taxes every year, and these are much higher in your country. How many slips, how many shoes, how many lemons do you need in a year?"

Then with a broad sweep of the arm and to further emphasize her point she embraced the tall L-shaped apartment buildings with their garden courtyards and children's playgrounds, and marched us off to the bus to visit the first building of Bratsk, a church built 300 years ago by a monk who founded the now-drowned original settlement. He called the community City of Brotherhood. Obviously, he had paved the way for today's comrade-state. Yet, just as in Moscow, Omsk, Irkutsk, there is the "wrong side of the tracks" in Bratsk. Here dilapidated wooden structures, the back and front yards cluttered with junk and filth, the outhouse half tipped over and clustered in between spur tracks, remind us that slums are not unknown even here.

The giant Bratsk hydro-power station has been constructed on the middle reaches of the Angara River. In 1964 it produced 12.6 billion kilowatt-hours and the total capacity of its

turbines is 4½ million kilowatts, versus only 3000 cubic meters per second at the Volga-Gorki Station. It incorporates all the time-tested features of the Gorki and Volgograd (Stalingrad) stations. The artificial lake created by the dam drowned the old settlement of Bratsk entirely.

The Bratsk station alone produces more electricity than all the celebrated Volga reservoirs together. Its artificial sea has a capacity of 170 cubic kilometers, a surface of 5500 square kilometers, a maximum depth of 160 meters (nearly 500 feet) or about one tenth of the deepest spot on Lake Baikal. Lake conditions were favorable for fish life; the influence upon climate of its area is already noticeable in that a temperature change of as much as 10 degrees centigrade is on record.

At completed capacity the combined plants of Irkutsk, Bratsk, Krasnoyarsk (on the Ienisei River) and Ust-Ilin (200 miles north of Bratsk) will generate 100 billion kilowatts. By comparison all the plants of France furnished, in 1963, only 88 billion kilowatts; and Grand Coule in the US 2 million kilowatts.

These plants will service western and central Siberia, providing the cheapest power in the world at a cost of 1/100 kopeck per kilowatt-hour. This does not however, take amortization into consideration. The amount spent for 1 ruble of gross value was 2%. Already, over 19% of electric power in the USSR comes from hydro-electrical plants.

A decade and a half ago this vast region north of the Trans Siberian railway was virtually uninhabited. Human activity was confined to slave labour in the salt mines and gold fields north of Irkutsk and along the Lena River and to the few isolated fishermen and trappers who worked the streams and forests. Today, the Soviets have successfully shifted populations and industry into an area which at one time was nothing but a desolate deep-freeze.



# BOOKS

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## **Land, People and Policy:**

By Gordon Edwards, Chandler-Davis Publishing Company, West Trenton, New Jersey, 1969, pp. 159, \$5.00; paper \$3.00.

Reaching out from under the haze of the U.S. "urban crisis" Professor Gordon Edwards has come up with some forthright ideas for a national urban land policy.

He deplores the lack of foresight, the needless complexity and frustrating delays which characterize land assembly operations in the path of urbanization. He blames this mainly on cumbersome and inadequate government policies and planning in urban matters, although he also takes issue with the speculative "hold-out" features of private land ownership. He singles out land assembly practices as the obstacle most likely to hobble urban development and redevelopment programmes. To further emphasize the message, he traces the dismal consequences of unrestrained "dull, dreary, and uneconomic" projects extending with inexorable monotony to the year 2000—and he may be correct!

This is scarcely a new concern, but it bears urgent repeating. In both the USA and Canada, a variety of devices from zoning to rent subsidization are used to placate municipal planning woes. Instead, tough region-wide decisions would resolve these jurisdictional conflicts and enable effective laws to be made.

Edwards scolds his fellow planners in the design professions for traditions which he claims exhibit "only the vaguest concern with public policy on environmental controls." He tilts at bureaucracy and the cult of "agency interests." Big business appears as the gallant knight in shining armour. In taking this latter view, Edwards gives much credence to the new interest shown by industrialist-developers such as Kaiser,

General Electric, Alcan, Gulf Oil, in the promotion and management of large-scale housing development projects.

The author also analyses several large-scale, land-acquisition programmes that have resulted in new towns and satellite communities in Western Europe. He notes that Swedish new towns follow a satellite or extended town pattern, being usually dependent on a central city. In this respect, the new towns of Reston and Columbia in the USA resemble more the Swedish type than the British type of self-contained new town development. The conclusion he advances is that in the USA, new towns would have a "tremendous potential," provided measures for the assemblage of large-scale land parcels can be initiated. This latter proviso, of course, begs the real question of priorities, an area which Edwards fails to discuss. Yet it is the key issue, especially when one considers that the City of Stockholm planned for its future growth by initiating public land-acquisition over sixty years ago, thereby making possible the admirable communities of Vällingby and Farsta today.

Rather casually he expresses the view that although the Hellyer Task Force identified the land assembly problem, their recommendations fell short of resolving the issue. Edwards considers it unrealistic to assume that rapidly growing municipalities could, or would, take advantage of Federal direct loans for land assembly and servicing. Perhaps this is true, so far as it goes, nevertheless in Canada, Federal-Provincial land assembly procedures are quite well developed through Section 35A of the NHA and have resulted for example, in the Thistletown development in Toronto. The 1969 amendments to Section 35C of

the NHA provide additional incentives to land assembly for public and general housing purposes, though they drop well short of the land banking proposal advocated by the Task Force.

Perhaps the author's most interesting contribution is his proposal for the establishment of an independent National Land Commission with state-created Regional Land Development Authorities, to promote the orderly use of land. The proposed Commission would be responsible for coordinating government land acquisition and disposal procedures, and for the provision of funds to regional authorities for the purchase and resale of land to developers in accordance with comprehensive plans. This appears to be a logical structure and one deserving attention in discussing methods to arrest the hodge-podge of scattered land development. A major reservation regarding the proposal however, is that the effectiveness of the Commission might be weakened by its independent status. Policy pertaining solely to land could prove impossible to circumscribe, and there is also the view that such policy should not be insulated from the political dialogue relating to subsidy programmes including those of public housing, welfare and transportation. In this respect the concept of the Environmental Quality Council established recently by the US Congress is interesting.

Professor Edwards' book is a useful compendium on the subject of land assembly. The documentation is good and the text is freely spiced with snippets of interviews covering a broad slate of academicians and practitioners. Its drawback, perhaps, is its inclination to be rather superficial. Morris Trevithick



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10	Scottish New Towns by Ivor Davies	Not the least of our urban dilemmas is that of expansion without space and growth without base. New towns may provide a way out. They have been pretty successful in other parts of the	world. Ivor Davies describes some of the financial and political mechanisms behind the development of New Towns in Scotland, one of the most successful.
17	Housing Planning Hot and Cool by Louis Derno	The author's message, through this medium, is to present illustrations which compare housing and planning in <i>Hot</i> and <i>Cool</i> eras. If you	don't get the idea at once, at least let it try and turn you on.
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30	L'aménagement rural dans le contexte économique du Québec de demain par Jean-Jacques Jasmin	«Peut-on retourner en arrière, arrêter le rouleau compresseur de notre industrialisation?», se demande l'auteur. Il semble que non, mais la planification n'a pas dit son dernier mot.	
31	La santé publique à l'ère de l'aménagement par le docteur Julien Denhez	Essentielle au bien-être et à la prospérité de la nation, la santé publique devient à la fois philosophie et méthode de <i>prévention</i> . Dans ce	domaine aussi, l'heure de la planification a sonné.
33	Le cadre de vie à bâtir par Georges Robert	L'État doit jouer un rôle de première grandeur dans le défi lancé par les prochaines décennies et l'heure du choix est venue. De quelle ma-	nière ce défi sera-t-il relevé dans la perspective québécoise?
36	World Meeting of Architects by Andrew Hazeland	The International Union of Architects met in South America last year. Andrew Hazeland tells what it was like to be a participant in this	world community of Architects and of some of the items they discussed.
	Margrit Stutz	Outside Cover	Couverture extérieure
	John Flanders	Photo Inside Cover	Photographie de la couverture intérieure

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M. E. H. Q. Smith.









## Romantic Renovations in Montreal

by Stuart Wilson and Bruce Anderson

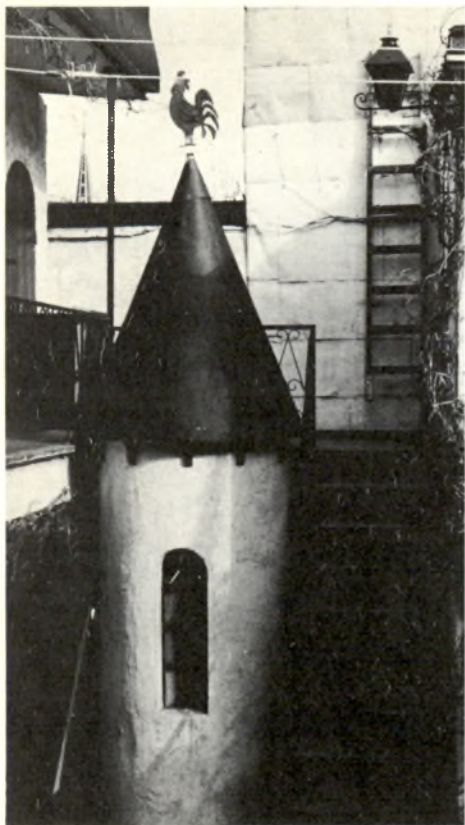


A phosphorescent glow spills on-  
to the sidewalk. Light comes  
from a small hexagonal iron  
lantern with blue glass. The  
lantern is suspended high up  
near a wooden ceiling beyond  
an arched way into a court-  
yard. Yellow light warms up  
inner space. The blue-black  
silhouette of a tall figure holds  
up a white gloved hand. A nude  
boy straddles a translucent  
water-basin.



LaFrance, Rue Plessis.  
Photos by Bruce Anderson

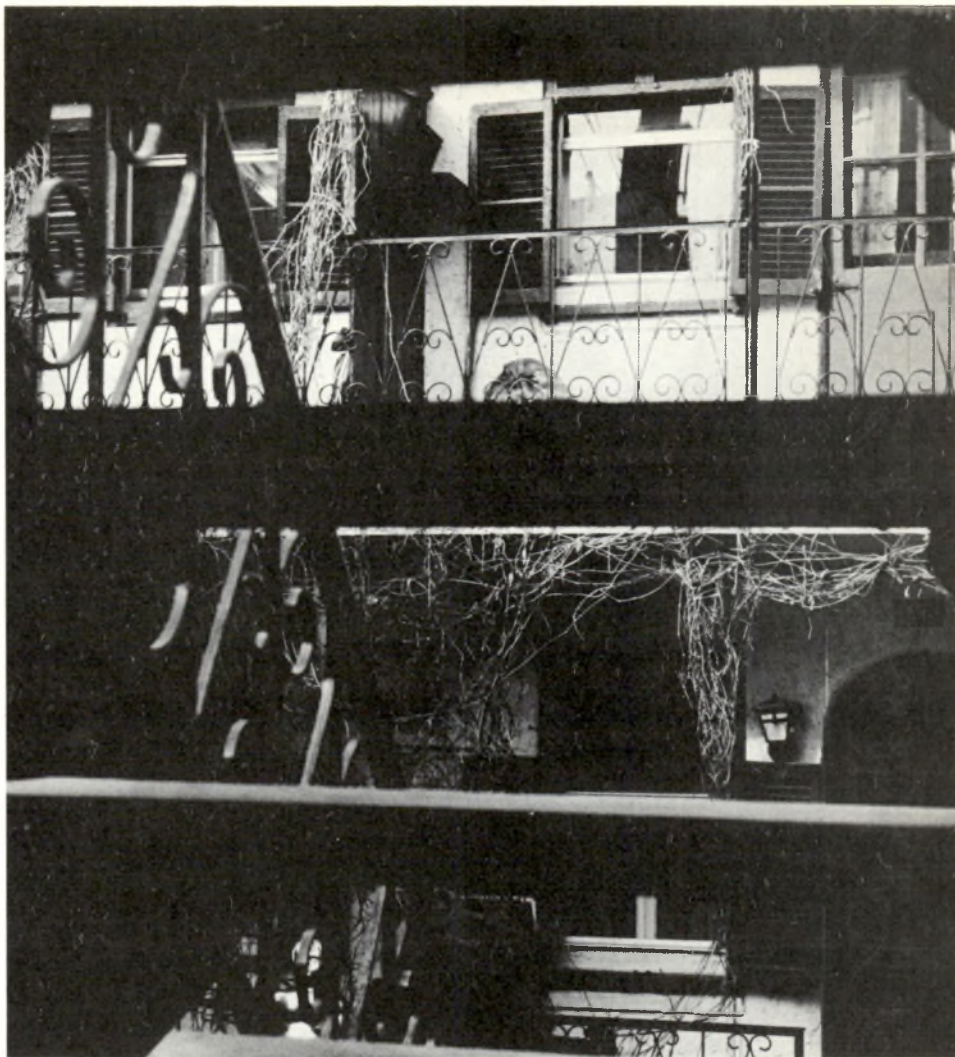




This extravagant vision was seen one evening in Le Faubourg, Montreal. Up the incline of Rue Plessis a short distance from Ste. Catherine East, the passerby is stimulated by a "surréal" creation. A closer look, in daylight, is prompted.

A white toyland façade stands out boldly from the weathered, red-brick fronts of adjacent houses. As though newly cut-out from the pages of "Tintin," an "auberge provençale" is crisply limned on the crusty background. White textured stucco covers the old brick walls. It is trimmed at the corners and has openings with blobby stone quoins painted battleship grey. Generous lumps of cement mortar have been bonded to the old brick wall. Silhouetted in sheet iron, Gothic black letters proclaim "France," the name of these spruced-up dwellings. In the centre of the house-front is a semi-circular archway. A flat-ceilinged, tunnel-like shaft leads from arch to rear court. The burnt umber woodwork of doors and windows make a balanced pattern on each side of the dark opening.

A mansard roof is protected by dark grey roll-roofing. Mica particles shine in the sun. The decorated dormers take on a new life. Flower-boxes, fixed to the sills of dormer windows glow with pink, white and red geraniums.



The tunnel is white and blue inside. Along the wall are French travel posters. Colour flickers from the courtyard. Climbing plants form a verdant backdrop for a gilded Pan-like figure. A red, white and blue tricolour decorates a square concrete water-tank. The sculptural theme is a travesty on a well-known Brussels' fountain.

Movement is arrested at the end of the asphalt-paved tunnel by a commanding figure. A gendarme gestures with Old World authority. The life-sized concrete dummy is stiff and motionless. Only for a moment does he block the passage. Flower pots, pointed grey, edges decorated with tricolour bands, adorn the space and surround the fountain.

At the rear of the paved court is a two-storey brick building fronted with continuous narrow wooden balconies. Gold letters on black cards once identi-

fied the dwelling-place of each "locataire"—Montcalm, Wolfe, Papineau and Frontenac—the names of prominent makers of Canada, as well as names of Montreal streets. Brick wall and balcony woodwork are painted burnt umber. Plants grow over railings and up posts. A stair climbs in a corner set-back.

On the south side of the court a small, raised, concrete platform, outside a kitchen door and underneath an overhanging balcony, supports a well scrubbed heavily ornate Victorian wooden table, escorted by four bent-wire ice-cream parlour chairs of yesterday. Through the window can be seen the polished wood veneer and white enamel finish of a well-equipped modern kitchen.

The walls of the front or street-house and its extensions, enclosing the court, are painted white. Soffits of balcony roofs and balcony are painted brown. Flower-pots are fixed to balcony railings.

Behind a balcony stair is a small two-storey, white, metal covered shed. Over a doorway is a florid hand painted sign,









"La Boutique." Inside, hanging on the walls or standing on the floor are relics, hoarded, repaired and burnished. These Victoriana and other objects of later date, with strangely swelling forms, await a collector. On the tunnel walls a printed and framed notice invites the public to bring old and unwanted furniture.

The transformation of the residential courtyard is recent. In 1959, the present owners bought the house then in a dilapidated condition. Since then, with the help of other residents, they have renovated these quarters.

The houses, grouped around a courtyard, are divided into eight apartments. The residents are young married couples, with the exception of one older couple who are the parents of one of the house-holders. Exteriors and interiors are neat and clean, as well as being bright and colourful. The basement of the principal residence has been adapted and converted into a children's playroom.

Residents are friendly with one another. Security enhances amity. Confidence is strengthened in having quarters which are not liable to be torn down at short notice, and which have been improved by a proud owner. The wife of the proprietor of "France" owns a set of photographs taken before, during and after the renovation. Newspaper clippings, which report the restoration are available.

Private attempts to improve the home usually provide immediate and tangible benefits to energetic individuals. However, available talents may work within straitened circumstances. Home-made renovations often surprise by their directness. Strange relationships are engendered by unexpected encounters between a work and its surroundings. The shock is provoking. Behind the quaint and cute lies a hard-headed practicality. Spontaneous efforts at self-improvement should not be compared with projects carried out by professionals. Accomplishments differ and they must be savoured in themselves. The amateur craftsman or artisan may not be as skilled as the trained designer working with a team of expert tradesmen; but he may be using his imagination in a vivid manner. Appreciation requires sympathy before judgment.

At the opposite or western portion of Montreal in St. Henri ward, parish of St. Zotique, below Rue Notre Dame, can be seen another and different example of a home made renewal project.

Down an asphalt-paved alley beside a newly prinked-up house are three men playing quoits on a summer afternoon.

The house, a tiny, low, mansard-roofed cottage with single, new, large brick chimney popping through the roof, stands free like a village house with a lane at each side. It has been renovated from top to bottom. The new, asphalt-shingled roof in salmon, tuscan and maroon, tops a maroon gable above newly painted white clapboards while below, ornamenting the street façade, runs a high decorative dado of split sandstone in blended colour. Fixed to this wall is a new ornamental iron balcony with a pale salmon, corrugated, plastic roof. A varnished oak door, centrally placed, is surrounded by a grey architrave and the wooden balcony floor is also grey to match the grey painted concrete of the foundation. The two windows of the ground floor, looking on to the balcony on each side of the door, are trimmed with small token-like decorative shutters in dark maroon with white and coloured decorations of gera-

niums in pots. The metal hinges are shaped like pine-trees, lying on their side.

One of the players emerges from the alley and walks across to where I am perched. He looks over my shoulder, and says, "Stop sketching and come into the back. I have something to show you."

Beyond the end of a shack-roofed, kitchen wing is a small yard. At the back of the lot facing the yard is a sign painting shop. A white bird-house sits on the roof. In front of the continuous red windows of the shop is a small garden from which grow young spruce. A white trellis fence encloses a small green lawn. Through an arched pergola are three comfortable wives of the sportsmen, seated at ease on dinky aluminum garden chairs around a small white table. Behind is a flower-bed, while beyond the flowers a view stretches over an immense mountain lake. The foliage on the necks and points of land projecting into the misty waters is beginning to take on an autumnal glow. The lake stretches to infinity. Moored beyond the flower-bed is a flat-bottomed Verchères row boat. The invitation is obvious. Untie the boat and take off into the highlights and reflections of a watery Eden.

This extensive scene is painted on metal sheets, measuring overall, twelve by twenty-five feet, protected from rain drops by a small, projecting, shingled roof.

Monsieur Joannette explains, "This work is not beautiful,—just a commercial effort." Previously he had worked for fifteen years in church decoration. Now he did more commercial work, such as signs and the interiors of night-clubs or taverns. Many years before, Monsieur Joannette had worked under the wing of Ozias Leduc, the revered Ste. Hyacinthe artist.

Turning to the house and studio he explained that the house must be one hundred and ten years old, at least. He said the shop had originally been a blacksmith's forge, then a transport depot for wagons and horses, later it served as a co-operative dairy. When the site was purchased everything was run down and dilapidated. Since then he had worked hard and restored and renovated the property to its present condition.



Small and drab places can be improved by the application of paint and wit. They can be rendered more habitable and more prepossessing by planting and repair. Examples of renewal and beautification of old run-down private properties are few and the small efforts pass unnoticed. Superior taste overlooks them. These are improvements which are too close to the narrow margin between survival and destitution to attract attention.

More successful efforts deserve study and encouragement. They form part of a trend towards self-help and personal expression. Isolated examples are easily noticeable in all popular neighbourhoods. Brightness and gaiety stand out against shabby backgrounds.

Designers and developers have a tendency to view a project as an opportunity to establish a complete and formally correct environment. Unplanned variations are disliked.

However, conditions change and adjustments are inevitable. Inflationary trends add incremental value to old artifacts, including out-dated buildings. Today the same object would cost more to make. Often it would be difficult, if not impossible, to find anyone who would know how to make the same object or anything resembling it and certainly not at the available price.

Old and new neighbourhoods should be regarded as open-ended arrangements which give scope for adjustment and improvement. The process of obsolescence and decay could be slowed by periodic renovation and embellishment. Housing in unchangeable and fixed forms will not remain convenient for indefinite periods of time. Nor will the pre-established forms and conveniences suit all comers.



Joannette House, St. Zotique.  
Photo by Bruce Anderson







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# Scottish New Towns

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by Ivor Davies    The first of two articles on  
new town development in Scotland.

**Current concern with Canada's expanding metropolitan areas, with regional disparities in economic growth and with the development of hitherto undeveloped and underdeveloped areas may be focussed upon the new town as a mechanism whereby an alternative location for urban growth is established, a sound and planned urban environment is created and industrial growth encouraged.**

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The concept of the new town is not new to Canadian thinking. But in practice, new towns have frequently been associated with single economic enterprises and their fortunes have fluctuated in close sympathy with the oscillations of restricted economic bases.

New town development of various types has occurred in Sweden, Denmark, Finland and the U.S.A. But widest and most intensive application of the new town concept, has taken place in Britain. So far the twenty-seven new towns designated contain around 1.2 million people and provide some of the best urban environments in Britain, with the added promise of continued growth in population and employment.

### Coalescence of the Concept

The geographer P. J. Smith has succinctly summarized the three spheres of concern which coalesced in the concept of the new town as a solution to many of central Scotland's problems in the second half of the forties.

Extensive war damage to the fabric of the Clydeside conurbation provided the opportunity there for rebuilding a better urban environment. The need for redevelopment at substantially lower urban densities, however, created a demand for housing which could not easily be accommodated within the conurbation and necessitated a measure of population deconcentration and redistribution.

Continued growth in those industries which had hitherto provided the mainstays of the Scottish economy was forecast, but changes in the locational patterns were thought necessary. Increased coal production, for example, was anticipated yet the traditional mining towns and villages were deemed physically unattractive, deficient in both community spirit and essential services and of an economically unstable base. The new town initially was seen partly as a means of achieving redistribution of the older industrial activities and in time became conceived of as a catalyst in the process of reorienting the basis and direction of the Scottish economy.

### The Political Mechanisms

Following the provisions of the New Towns Act (Scotland) 1946, the Secretary of State for Scotland designated sites for two new towns, East Kilbride and Glenrothes (Figure 1), and appointed development corporations. Two additional sites were later designated, Cumberland and Livingston in 1956 and 1962 respectively.

Although the basic purposes differed, with East Kilbride intended as a reception area for Glasgow's overspill population and Glenrothes as a settlement unit associated with ex-

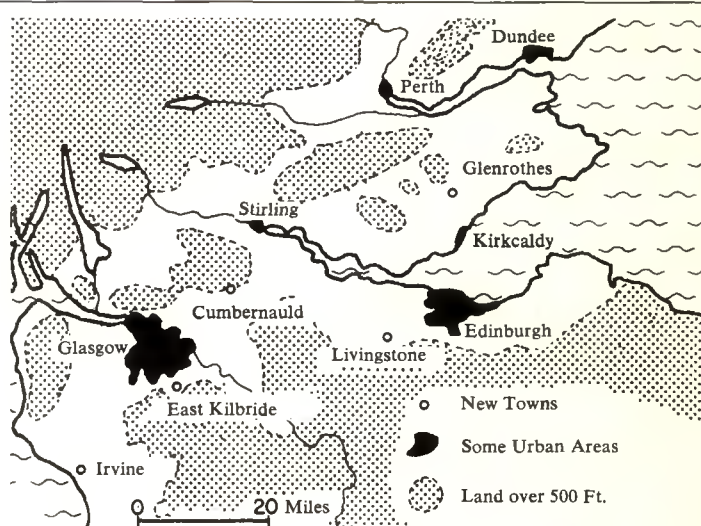


Figure 1  
Central Scotland: Location of New Towns.

panding coal mining activity, there was the common goal that excellent urban environments be created.

Sound planning and orderly development were needed to ensure such environments and were assured by the nature of the powers vested in the development corporations and by the terms of reference given to them. The corporations were then—and still are—charged with the preparation and implementation of master plans covering every aspect of spatial and temporal development in the designated areas. As land is built up it becomes the property of the corporations, which remain responsible for the structural maintenance and physical appearance of almost all buildings. (One exception, for example, is churches.)

### The Financial Mechanisms

The development corporations function very like private companies, except that they operate for the common good of the towns and their inhabitants, and not for financial profit. Initial and continuing construction capital is obtained from central government in the form of long-term loans, repayable with interest. Loans are repaid from the rents charged tenants of corporation-built houses and from the rents on corporation-constructed industrial and commercial premises. Revenue from taxes levied on property does not contribute to this loan repayment, but is directed towards the provision of services such as drainage and sewage purification, sanitation, street cleaning and refuse collection. Once an elected town council comes into existence, this body is charged with providing local authority services financed by taxes on structures.



Table 1  
Scottish New Towns—Summary Statistics\*

	East Kilbride	Glenrothes	Cumbernauld	Livingston
Year of Designation	1947	1948	1956	1962
Existing Population	2,400	1,000	3,500	2,000
Initial Target Population (Year)	45,000 (1965)	30,000 (N.A.) <sup>1</sup>	50,000 (1980)	70,000 (1985)
Revised Targets (Year)	70,000 (1971)	55,000 (N.A.)	70,000 (N.A.)	100,000 (2,000)
	82,000 (1976)	70,000		
Population 1968	58,880	25,959	25,700	6,220

\* Source: Data supplied by the respective development corporations.

<sup>1</sup> Not available.

Table 2  
Glenrothes: Cumulative Employment in New Manufacturing Industries 1959-68

Type of Employment	Cumulative No. of Workers									
	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Food, Drink and Tobacco	25	23	28	30	31	30	33	33	38	36
Mechanical Engineering	70	113	172	336	390	636	775	1014	1128	1043
Electrical Engineering	70	246	371	441	521	704	1249	2344	2361	2520
Metal Goods and Jewellery					73	102	132	131	205	219
Clothing						53	88	75	125	170
Textiles								116	145	172
Paper									35	40
Timber, Furniture and Bedding										11
Other	40	55	66	72	—	121	137	240	265	308



Both of these early new towns were designated with modest target populations (Table 1). The maintenance of an orderly pace of development and fulfillment of original goals is demonstrated in Figure 2, where East Kilbride's 1965 population was 45,000 (c.f. Table 1).

### Population and Employment Growth

The rate of population growth in Glenrothes (Figure 2) did not keep pace with East Kilbride during the 1953-63 period. This is attributed to the depression of the former's fortunes as actual demands for coal fell increasingly short of earlier estimates. The closing of the Rothes coal mine (at Thornton) in 1961 led the central government to issue the development corporation with instructions to curtail its activities and to abandon the master plan approved for the new town. The fact and nature of the continued growth of Glenrothes' population indicates that curtailment and abandonment did not occur. The increase in the rate of growth (Figure 2) and upward revisions of the target population (Table 1) reflect stabilization and diversification of the town's economic base (Table 2), a process making its economic structure more consonant with those of the other new towns.

It is worth examining this process in more detail. Initial employment opportunities for newcomers to Glenrothes were limited to coal mining, principally at Thornton, and to paper-making in two nearby mills. Some residents found employment in surrounding towns, mainly in Kirkcaldy some thirty-five minutes away by bus to the south. Over the nine-year period covered by Table 3, total employment in new manufacturing industries has increased from under 200 to 3,000. The bulk of this increase has been sustained by the growth of mechanical and electrical engineering, but since 1963 a widening range of secondary industry has been added.

Cumbernauld and Livingston reveal little variations in their gross growth patterns, but exhibit relatively uniform rates of population increase since designation. Cumbernauld was primarily intended to aid East Kilbride in the Glasgow overspill program and it is planned that eighty per cent of its target population will be derived from Glasgow.

Livingston, on the other hand, was designated with much wider objectives. The provision of an additional settlement to accommodate population dispersal from Glasgow constituted one purpose, but the choice of location is indicative of other aims.

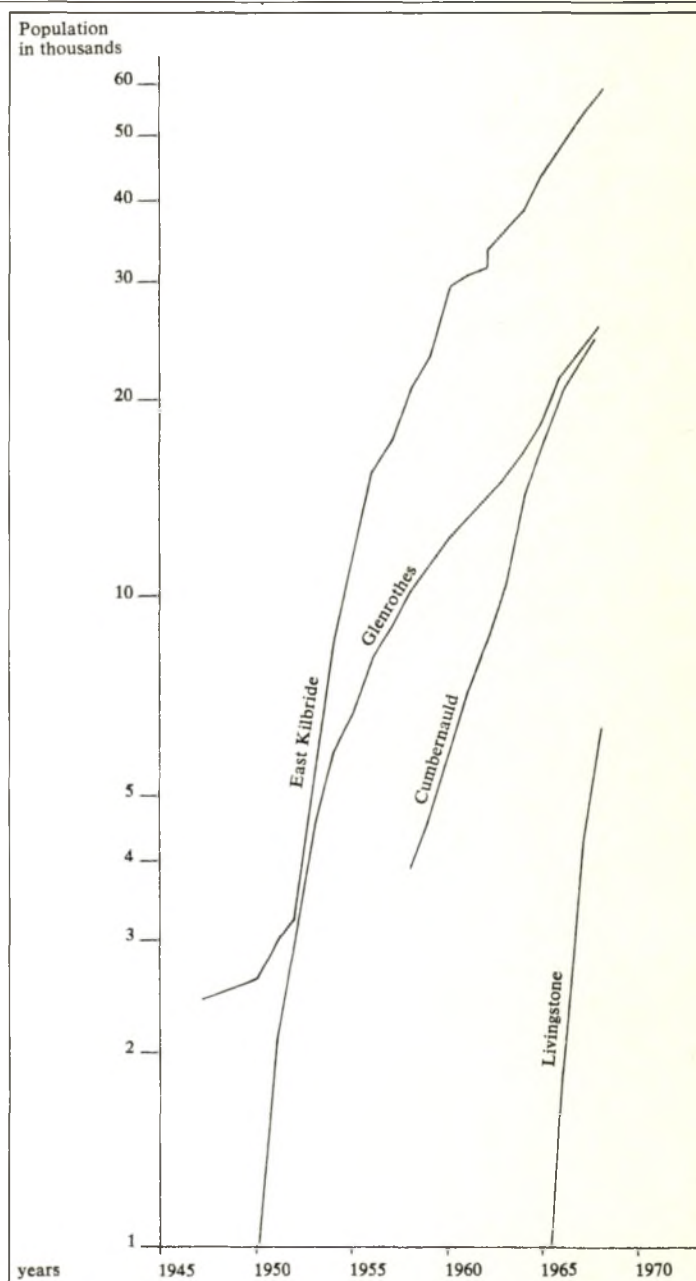


Figure 2  
Scottish New Towns: Rates of Population Increase.



**Table 3**  
Cumbernauld: Dwelling Rent Examples 1969-70\*

No. of Rooms	No. of Persons	Gross Income (\$)	1,081.60	1,892.80	2,704.00	3,515.20
1	1	62.40		111.80	166.40	239.20
2	2	62.40		114.40	182.00	262.60
3	3	62.40		119.60	195.00	283.40
4	4	62.40		132.60	213.20	304.20
5	5	62.40		140.40	234.00	330.20
6	6	62.40		140.40	247.00	348.40
7	7	62.40		143.00	254.80	361.40
8	8	62.40		150.80	265.20	379.60

\* Source: Cumbernauld Development Corporation, Schedule of House Rents, Standard 1 Housing.

### The Economic Circumstances

The area surrounding the site, in West Lothian county, was depressed economically and, visually, was a wasteland. As basic industries declined and as incomes and employment levels fell, service provision, always difficult in an area with an amorphous pattern of mining settlements, declined. Livingston, linked with the surrounding area by improved communications, can provide more sophisticated social and commercial services, a focus for increased employment opportunities, and can contribute to the restructuring of the settlement fabric. At a wider scale Livingston occupies a pivotal position in the industrial belt of central Scotland and may provide a central growth point between Edinburgh and Glasgow.

The Glenrothes performance, relative to those of the other new towns, contains important planning guidelines which may be studied with profit in any consideration of the role of new towns in the development of Canada.

The over-dependence upon a single primary industry rendered the town too susceptible to economic fluctuations in that industry. In addition, Glenrothes' location, beyond easy commuting distance to large employment centres, militated against permanent residency and acceptance of alternative employment opportunities. Many had to leave. In similar circumstance the other three new towns, however, would have been much more able to sustain and maintain their populations because of their greater proximity to Glasgow and Edinburgh.

### Reasons for Success

The success of the new towns in achieving their rates of population increase and in maintaining relatively regular rates may be traced to two basic facts: their ability to attract industrial enterprises and the ability of the development corporations to provide annual increments of housing units. Improved services and attractive physical urban environments are bonuses, as far as the bulk of the incoming population is concerned.

Three factors have contributed to the success of the new towns in attracting industry. Indeed some industrial enterprises have deliberately sought out the new towns as locations for new or expanding activity. Labour force and efficient physical environment are important considerations, but of prime importance is the complex of concessions industry obtains.

Manufacturing industries locating in the new towns qualify for central government and development corporation financial assistance, principally in the form of building grants, loans, and training subsidies. The Board of Trade may also make grants to manufacturing industry for expenditure on new plant and machinery. The normal rate of building grant is twenty-five per cent which can be increased to as much as thirty-five per cent in some cases. Investment grants of forty-five per cent may be made on plant and machinery for new establishments and for the expansion of existing production facilities.

The development corporations assist industrial growth in two main ways: by building factories to specific design requirements, and by building highly flexible advance factories. Under the first practice a specialised factory may be rented



from the development corporation by the firm, or it may be purchased outright. Under the latter practice the factories are designed to meet the requirements of a large range of industries and are usually rented from the development corporation.

The attraction of facilities is further enhanced by the readily available pool of labour. No industry is faced with labour shortages caused by housing shortages. Moreover, much of the labour supply is skilled and industrial relations in the new towns set standards envied in older industrial areas.

Lastly, the new towns provide ample space for efficient operation of initial industrial establishments while later expansion can be easily accommodated. Effective inter-establishment contact may be maintained and ready access to through lines of communication improves the speed and reliability of raw material supply and product distribution.

In this explanation of the success of the new towns in maintaining even rates of population increase, the role of industrial development is complemented by the fact of housing provision and by features of the provision.

### **Complementary Success Factors**

Most new town inhabitants move there to escape substandard and overcrowded conditions. Not only can they obtain a dwelling, but a variety of dwelling-sizes are provided and a close correlation between family-size and dwelling-size can be achieved. This general housing proposition is enhanced by the operation of graduated rent schemes, whereby tenants of the development corporation with incomes below a certain figure (this figure is defined as standard income) may apply for lower rents, these lower rents being graduated with income. There is considerable similarity among the standard incomes and gradations established by the various development corporations, to the point that the data for Cumbernauld in Table 3 may be regarded as representative of the other three schemes in operation.

#### **1 Rents versus Income**

Rents for standard housing are graduated for each \$135.20 (£52) of annual income between the lowest and highest annual income figures shown in Table 3. In the higher income brackets they vary according to the size of dwelling and number of occupants. Only a limited number of income brackets and within-bracket variations are displayed here. For those in the lowest income bracket (\$1081.60 p.a.), the existence of a larger family accompanied by a need for a larger dwelling can be satisfied with no rent rise. In the middle and high income

brackets there is variation within each income band, with a trend for the greatest rent increases to occur in the centre of the dwelling-occupant scale.

On the other hand, those tenants with an annual income in excess of \$3,515.20 (standard income) pay the standard rents listed in the last column, regardless of how high incomes are, unless, on the other hand, they take advantage of the more salubrious dwellings provided at higher rentals. In Cumbernauld, two further types of housing are available at the standard rents plus \$26.00 per annum or plus \$52.00 per annum. Lock-ups\* may be rented for \$62.40 per annum.

#### **2 Income Definition**

As rent varies with the very fine differences in yearly income of \$135.20, the definition of income is comprehensive and applications to qualify for inclusion in the graduated rent scheme are closely scrutinized. For the purposes of the scheme, income is considered to be the total gross earnings of the principal earner, together with any subsidiary income such as dividends, interest, and profits from any business.

Households with secondary earners (working wives, children over twenty years of age and boarders) are charged an additional yearly rent of \$31.20 for each secondary income in excess of \$208.00 per annum. In the other direction, for each child dependent upon the principal earner and subject to certain qualifications, annual income for rent calculation purposes is reduced by \$67.60 per annum.

#### **3 Rents Set for Years**

The attractiveness of the new towns as housing propositions is increased by the practice of setting rent levels for a number of years at a time. For example, in 1967 East Kilbride tenants were informed of their rent levels for each year until 1972. It is worthy of note that for the period 1969-72 no rent increases in five categories of dwelling were scheduled for those with a reckonable income of \$2,433.60 or less.

#### **Taxes**

Although rents are graduated in terms of income, local taxes, fixed by and payable to the appropriate local government authority, vary with the size and quality of the unit. Moreover the local tax rate and rateable value may vary from year to year. Rent and taxes paid by Glenrothes' tenants in three income bands and the standard income band have been calculated, combined, and expressed as a percentage of total income committed to housing costs. (Table 4)



**Table 4**  
**Glenrothes: Tenants' Housing Costs 1969-70\***

	Adjusted Annual Income (\$)											
	1081.60			1892.80			2704.00			3244.80		
Number of Apartments	Rent	Taxes	% I	Rent	Taxes	% I	Rent	Taxes	% I	Rent	Taxes	% I
1	62.40	57.20	11.05	124.80	57.20	9.61	116.40	57.20	8.26	197.60	57.20	7.85
2	62.40	65.00	11.77	124.80	65.00	10.02	192.40	65.00	9.51	221.00	65.00	8.81
3	62.40	91.00	14.18	124.80	91.00	11.40	213.20	91.00	11.25	247.10	91.00	10.41
4	62.40	117.00	16.58	140.40	117.00	13.59	228.80	117.00	12.78	265.20	117.00	11.77
5	62.40	130.00	17.78	140.40	130.00	14.28	249.60	130.00	14.03	288.60	130.00	12.90

\* Source: Glenrothes Development Corporation, The New Rent Scheme.

The effect of higher taxes associated with larger dwelling size is most apparent in the lowest income band, where the rent level is constant. More detailed examination of the table reveals that tax levels rise at a faster rate within income bands than do rent levels. This means that those affected most are families for whom the new towns provide better and alternative accommodation: those tenants from old industrial areas who were characterized by large families and low incomes. It is all the more imperative then, that for these groups spending a relatively higher percentage of income on housing, work-place and living-place be in close juxtaposition to reduce travel costs.

### Percentage of Home Ownership

Not all residents of the new towns are tenants of the development corporations, but the level of home-ownership is low. In Glenrothes, for example, 235 dwellings out of a total housing stock (1968) of 7,939, or two per cent, were in private ownership. Financial and social reasons are at the root of the current drives to raise the level of home ownership. As it rises, so the development corporations' housing deficits will be reduced and, it is thought, will increase the proportion of residents with a greater degree of commitment to the new towns and their futures.

Generally speaking, almost any corporation-built dwelling can be bought. The development corporations are, however, more interested in selling either detached and semi-detached units of high structural quality and occupying high amenity sites, or "executive" apartments in high-rise blocks rather than low-rental units. Prices of corporation dwellings

constructed primarily for sale range, in Glenrothes, from \$11,000.00 to \$21,000.00. In addition, in all new towns, some sites have been developed which contain dwellings built by private building firms.

### Contribution to Economy

Generous housing policies and practices have been crucial to the new towns' successful development. Provision of ample housing supply fulfilled the original objective of rehousing persons initially occupying substandard dwellings in nearby "old towns." It also acted as a magnet for new industries. The objective of industrial development in new towns to employ resident population was widened to provide a focus of employment in the environs of the new towns and the scale of this development has substantially contributed to a trend of restructuring and reorientation of the whole Scottish economy.

\* Garages.



## **Housing, Planning, Hot and Cool**

by Louis Dernoï

My object, in these illustrations, is to present in the proper "de-literate" McLuhanistic spirit, a contrast between housing and city planning in the Hot and Cool eras of history.

As a guide, I am including some examples of the terms "Hot" and "Cool".

<b>Hot</b>	<b>Cool</b>
Bureaucratic Societies	Tribal societies
Hellenic and Roman civilization	Greek and Etruscan civilizations
Renaissance, Baroque	The middle ages
Neo-classicism	L'Art nouveau
Rationalism, capitalism	To-day's electronic age
Nationalism	The global village
Individualism	Collectivism
Fragmentation	Integration
Withdrawal, privacy	Participation, involvement
Precision	Lack of definition
Sequence	Instantaneousness, simultaneousness
Independence	Interdependence
Linearity	Configuration, field approach
Centralisation	Decentralisation
Specialisation	Generalisation
Subjugation of nature	Blending with nature



# JOB

MANUAL WORK  
SPECIALIST  
ISOLATION

8 AM - 5 PM  
5 PM - 10 PM  
10 PM - 8 AM

WORK  
LEISURE  
REST



# ROLE

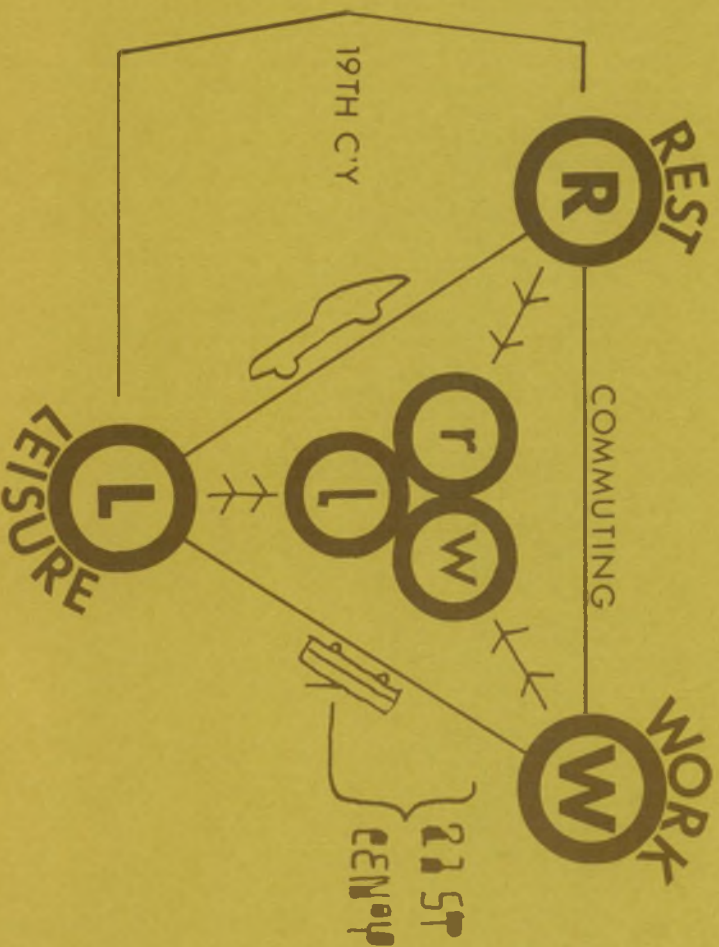
*automation*  
*generalist*  
*participation*

0001 - 2400 HRS.

"vivre pour vivre"

# FRAGMENTATION

MECHANICAL SOCIETY



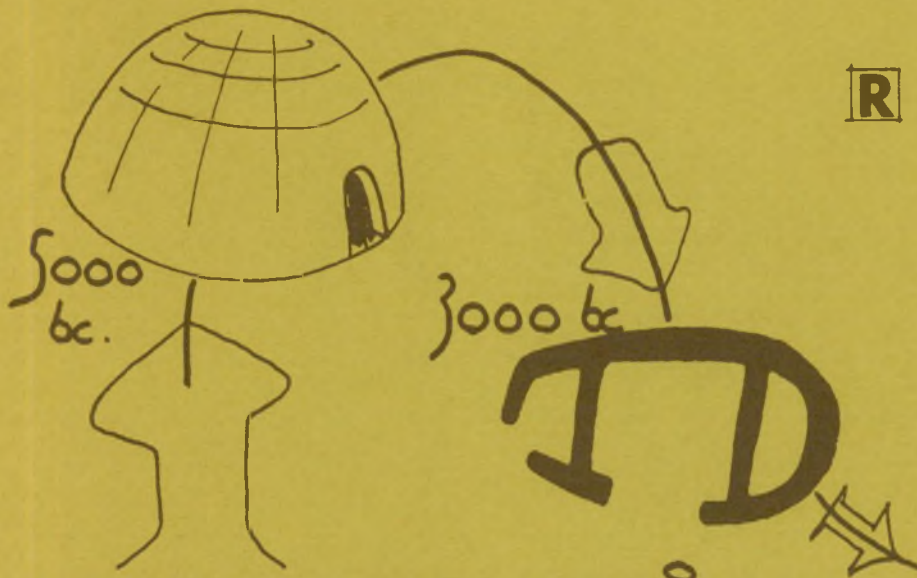
# INTEGRATION:

*Electronic*  
*society*

# REPETITIVE

ABCD - MINDED  
CIVILIZATIONS

**R I G I D I T Y**



ORAL • TACTILE  
• AUDITIVE MAN

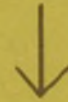
nature's curved lines



2000 AD.



THE BEGINNINGS OF  
LITERACY • 500 B.C.



PRINT TECHNOLOGY  
OF THE 20TH CENT'Y.

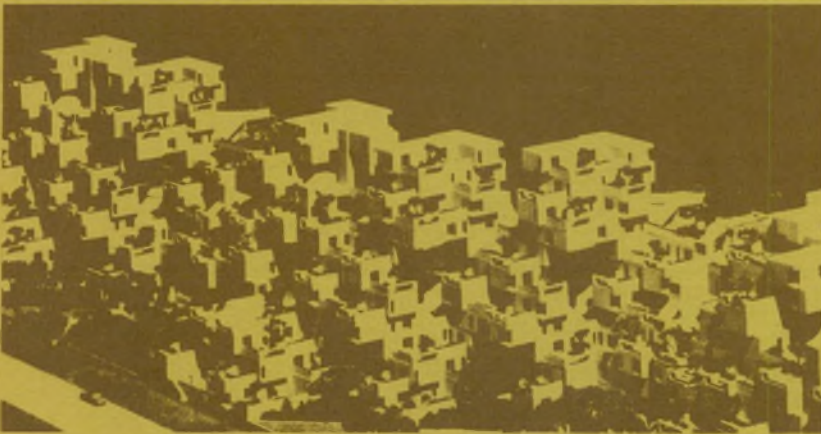




# TRIBE & VILLAGE



identical elements  
+  
variety of units



## ELECTRONIC ERA

## MECHANICAL SOCIETIES

MONOTONY & CONFORMITY



OR



UNDISCIPLINED  
LIBERTINISM





LINEARITY

NO STOPS

INDIVIDUALISM  
&  
ISOLATION



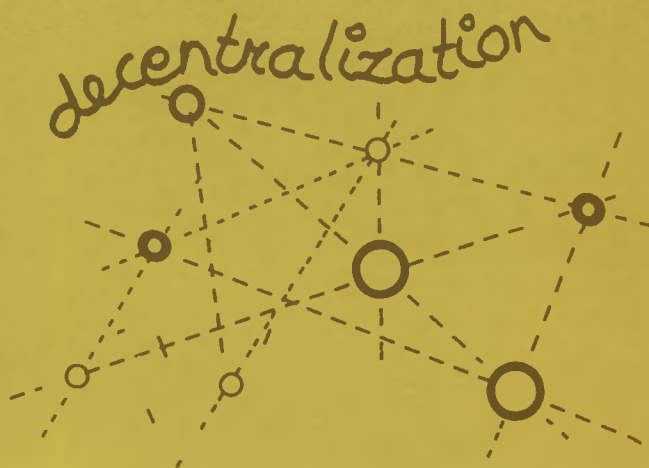
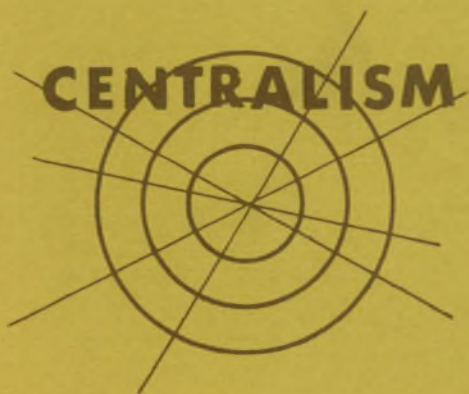
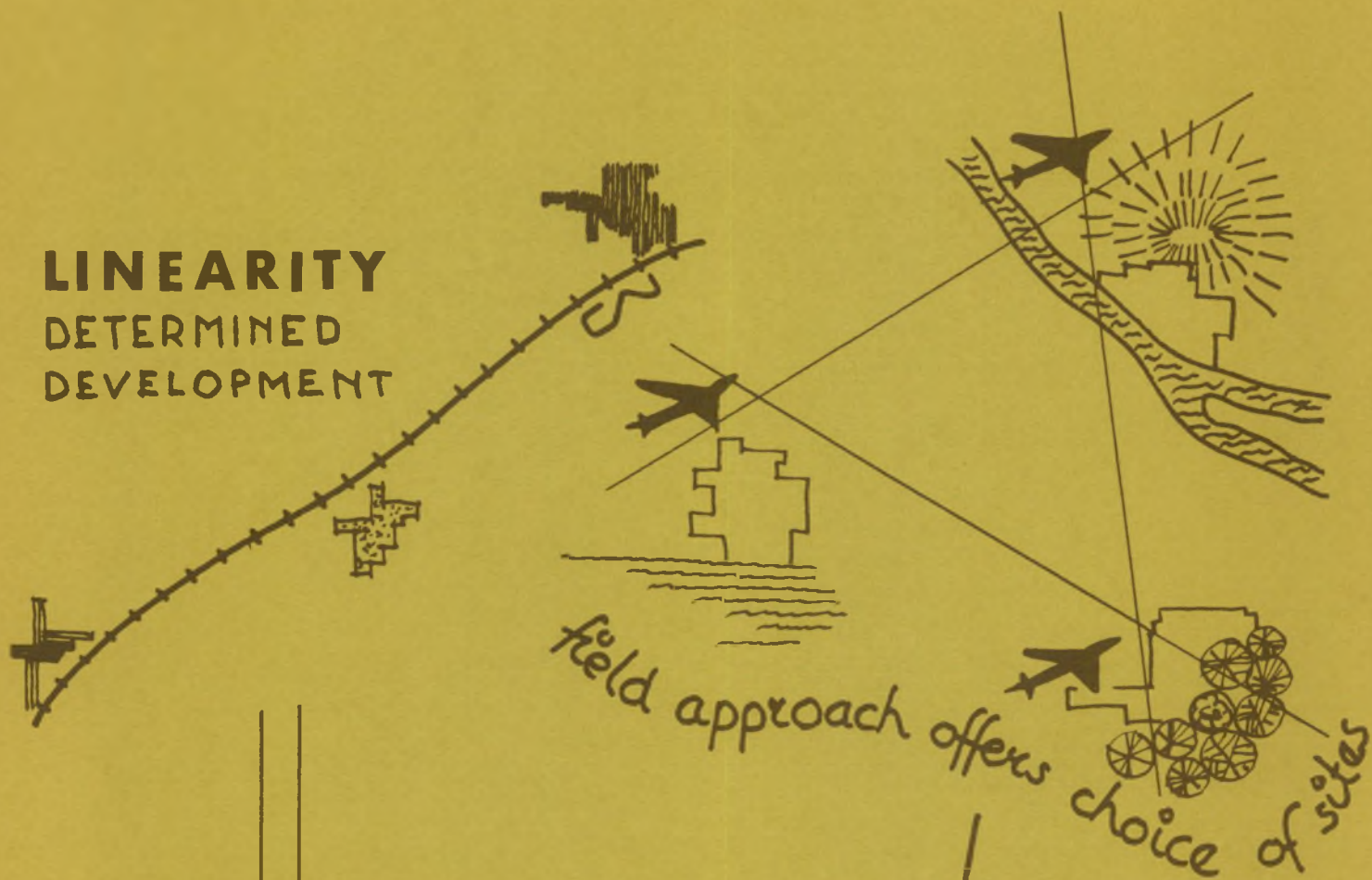
VS



*Field Approach*  
many focal points  
collectivism  
participation



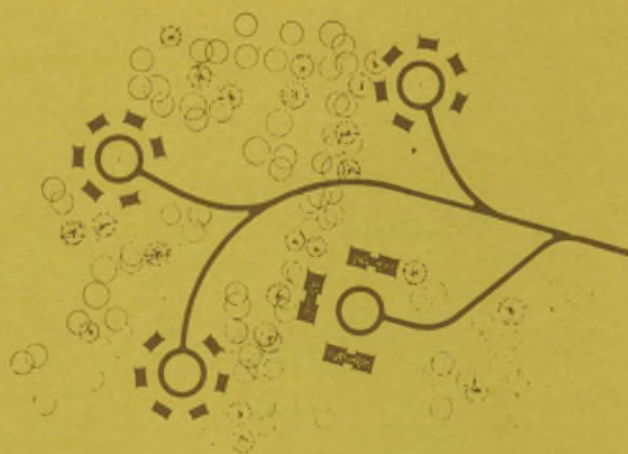
**LINEARITY**  
DETERMINED  
DEVELOPMENT



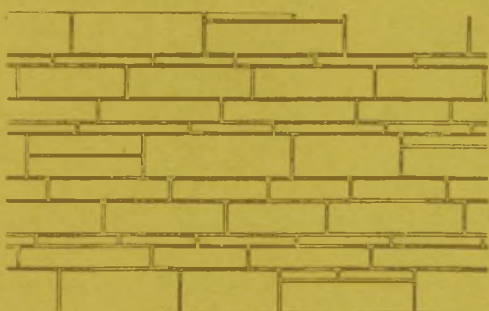
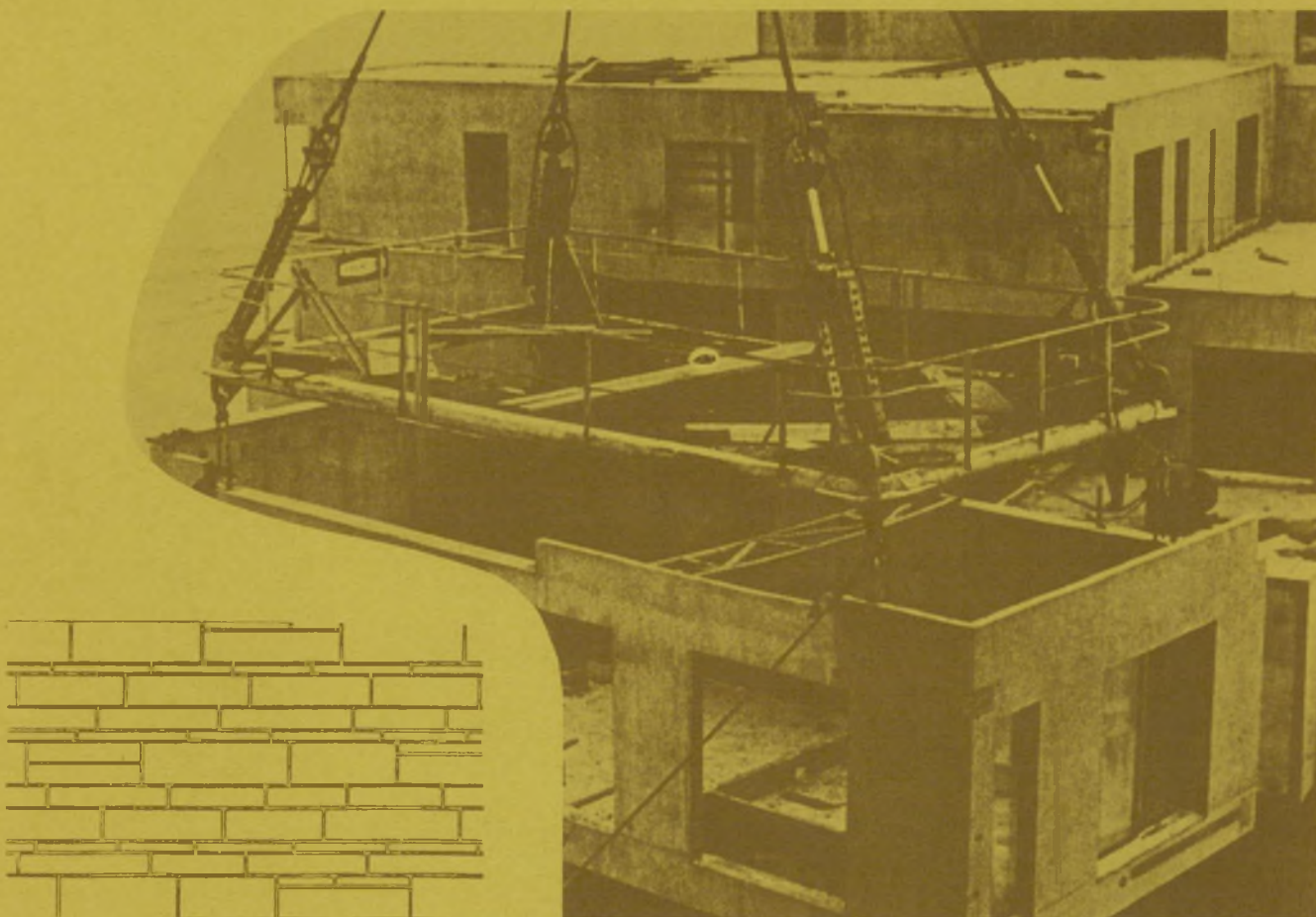




**STRONG PRECISION**  
IN PROPERTY LINES, ETC.



*lack of precision*  
*in limits of private & public*



**REPETITIVE  
FRAGMENTED**

**INTEGRATION  
SIMULTANEITY**





1  
2  
3  
4  
5

Région et habitat

L'évolution récente  
du problème des disparités  
régionales au Québec

Les bases culturelles  
de l'aménagement  
du territoire

Contrôle  
de l'environnement et  
urbanisation

Le québécois et la forêt

6  
7  
8  
9  
10

Centre-ville et banlieues  
métropolitaines: Perspectives  
d'une géographie volontaire  
du Grand Montréal

Architecture du paysage,  
étude du milieu  
et aménagement

Aménagement rural  
dans le contexte économique  
du Québec de demain

La santé publique  
à l'ère de l'aménagement

Le cadre de vie à bâtir

Habitat public dans le présent  
numéro la seconde partie d'une série  
d'articles consacrés aux problèmes  
d'aménagement du territoire  
québécois. La première partie de cette  
étude a été publiée dans la précédente  
parution et était également due  
à des collaborateurs directs du CEFAT.



Bien qu'il évoque encore pour beaucoup des faits de géographie rurale, le Québec est un pays en cours d'urbanisation généralisée. C'est là une réalité statistique et une expérience quotidienne. Or la caractéristique principale de cette croissance réside tout à la fois dans la concentration de la population dans la région de Montréal et dans la déconcentration de cette population à l'intérieur de la zone d'accueil, à la faveur d'un déferlement strictement horizontal du tapis de l'urbanisation, dont le caractère chaotique met en cause, de l'intérieur, l'équilibre économique et social de la cité-mère de la région, tout en inscrivant au sol un futur que l'on ne pourra plus effacer et que pourtant tous les analystes contestent déjà.

C'est d'ailleurs là un phénomène commun à la majorité des grandes villes américaines et qui a reçu le nom maintenant bien familier de «urban sprawl», étalement urbain discontinu, pendant négatif de la rénovation et de l'élévation verticale des centres-villes dont le caractère positif commence à être sensible à Montréal. Mais au centre comme à la périphérie, les défis à relever sont encore trop nombreux pour que soient brisés les processus cumulatifs spontanés qui détruisent l'image de la ville et pour que soient préservés et réinventés les cadres d'une urbanité significative, harmonieuse et progressive.

### **1. Le dossier de l'étalement urbain discontinu**

Les formes actuelles du déferlement urbain, en particulier le phénomène d'étalement en sautemouton, ont fait l'objet de toute une série d'études qui tour à tour ont dénoncé les problèmes liés à l'atomisation aux quatre coins de la frange urbaine d'éléments urbains non intégrés. Le caractère inachevé du paysage en témoigne: le fait urbain semble s'être dissocié de la ville pour se diluer dans un tissu rural dégénéré, un tissu «rurbain», en pleine déprise.

C'est bien là la conséquence du phénomène de «sprawl», récemment défini par le géographe Edward Higbee<sup>1</sup> comme un fractionnement prématuré de la masse urbaine à l'occasion de l'établissement fortuit et discontinu de multiples têtes de développement urbain, fractionnement détruisant le tissu à partir duquel un dessin urbain plus rationnel et plus beau aurait pu être taillé à une date ultérieure. C'est aussi la forme de développement la plus coûteuse, et pour les individus et pour la collectivité, d'autant plus que la libre compétition pour le sol provoque un emballement du processus de stérilisation du terrain rural, particulièrement sensible là où les meilleurs sites urbains coïncident justement avec les meilleurs sols agricoles, où entrent en compétition, directe et indirecte, une métropole en pleine expansion—dont on anticipe les retombées au delà de toutes les prévisions raisonnables—et la zone de production maximale<sup>2</sup>.

Les municipalités se sont donné tour à tour des plans directeurs d'urbanisme, théoriquement susceptibles d'assurer l'exploitation rationnelle de tous les terrains disponibles tout en réduisant au minimum les immobilisations de deniers publics qui croissent doublement en fonction de l'étalement des densités et de l'aug-

mentation des périmètres vacants, qu'égouts, aqueduc et chaussées asphaltées doivent contourner. Mais un plan directeur municipal reste un plan municipal. Outre qu'il n'a jamais pu juguler à lui seul la plus-value foncière en économie libérale, il ne répond pas aux objectifs du véritable aménagement du territoire qui réside dans la coordination des aménagements partiels (J. F. Gravier). C'est pourquoi on a beaucoup espéré du regroupement des municipalités et de la délégation des pouvoirs à une autorité couvrant l'ensemble de la région en cours d'urbanisation généralisée ou susceptible de l'être à plus ou moins long terme. Mais outre le fait que le processus ne soit que partiellement engagé, il ne saurait à lui seul régler les problèmes fondamentaux. On ne dira jamais assez, par exemple, que dans une communauté horizontale il est impossible de fournir un service de transport public à la fois bon marché et adéquat<sup>3</sup>. Or la promotion des transports en commun est une condition nécessaire non seulement pour la banlieue mais encore pour la promotion du centre-ville. Par ailleurs la plus-value liée aux activités spéculatives est toujours doublement onéreuse pour la collectivité qui l'a créée et qui doit un jour en assumer le coût. Elle est surtout le principal agent d'évolution, de différenciation et de hiérarchisation—voire d'aliénation—de l'espace urbain. La maîtrise de la croissance urbaine à la périphérie des villes et agglomérations nécessite la maîtrise du sol.

À défaut de pouvoir socialiser le terrain urbain et urbanisable, seule solution radicale, et devant la vanité des mesures de contrôle sporadiques, devant l'échec certain d'une politique d'avantages donnés aux exploitants agricoles, trois politiques, si elles étaient conduites simultanément et corrélativement, nous semblent pouvoir porter quelques fruits:

- a l'action sur l'offre par l'institution de mesures fiscales radicales contraignant les propriétaires de terrains inutilisés, conservés en vue d'en retirer un prix maximal, à les vendre parce qu'ils coûteront trop d'impôts,
- b le zonage immédiat (zones d'urbanisation prioritaire, différée, zone agricole, zone de récréation) à l'échelle la plus adéquate, c'est-à-dire à l'échelle de toute la zone en cours d'urbanisation généralisée. Le zonage devrait être assorti d'un droit de préemption et d'expropriation garantissant le contrôle des prix, et d'une politique de dévaluation progressive aboutissant à plus ou moins long terme à la disparition des plus-values. C'est la seule solution de rechange à la socialisation du sol,
- c la constitution par les municipalités ou mieux par un pouvoir régional,—ou encore par un organisme de «régie des terres»—de véritables réserves foncières pouvant assouplir le corset du zonage et stimuler la baisse des prix sur les terrains privés voisins.

Ces politiques concertées peuvent se concevoir à différentes échelles. Elles doivent toutes aboutir à la constitution de périmètres d'agglomération devenant des instruments d'organisation de l'espace, susceptibles de mettre la croissance économique au service de la promotion sociale. Car tel est en définitive l'objectif de l'aménagement du territoire.

Jusqu'à ces toutes dernières années on pouvait légitimement désespérer d'agir sur la demande. Or la création récente de nouveaux espaces urbains périphériques complexes et composites, de densité plus élevée, associant l'habitat en logements multiples à l'habitat unifamilial, autour d'un noyau communautaire non seulement fonctionnel mais culturel et sportif, obéissant à une esthétique paysagiste nouvelle, (telles les communautés d'appartements-jardins de l'Île des Sœurs et du Domaine des Hauts-Bois), permet d'imaginer une renaissance et une reconversion fondamentale de la vie urbaine à la périphérie des métropoles. La qualité esthétique semble répondre à un nouveau besoin. Le déséquilibre a-t-il finalement été facteur de prise de conscience, puis de croissance et de mutation positive? On peut l'espérer<sup>4</sup>.

## 2. L'évolution du centre et ses problèmes

Pour que vive la ville, il faut que dans le champ de forces dont elle est l'expression, les forces centripètes soient plus fortes que les forces centrifuges<sup>5</sup>. C'est là une nécessité première en tous cas pour qu'elle subsiste en tant que fait culturel et social. Or à cet égard le destin de la ville se joue dans son centre par lequel l'espace urbain se rassemble, duquel il tire toute sa signification.

Or jusqu'à ces toutes dernières années, du fait même de leur ancienneté, les centres-villes se sont très vite révélés inadaptés aux conditions nouvelles de la vie moderne, qu'il s'agisse des nécessités de la circulation, de la vie administrative, des affaires, de l'habitation. Cette inadaptation s'est traduite par trois séries de phénomènes négatifs: congestion fonctionnelle et surélévation de la rente du sol, paupérisation et détérioration des quartiers d'habitation, exode des habitants, des professions libérales en particulier, exode bientôt suivi par une fuite généralisée de tout ce qui faisait autrefois la valeur et la signification d'un centre de plus en plus sacrifié aux nécessités de la circulation et du stationnement<sup>6</sup>. Ce «lieu privilégié de la convergence, où la ville devait exercer et manifester sa puissance et d'où devait se dégager une image qui en exalterait le rayonnement» (Jean Labasse) se désavouait lui-même et s'engageait, comme dans la quasi-totalité des grandes villes américaines, dans un processus d'évolution régressive.

Fort heureusement l'action conjuguée de la volonté administrative et la sollicitation spéculative née de la rente foncière semblent avoir permis au centre de Montréal de se dégager progressivement d'un tel processus et il apparaît à certains comme un modèle d'une réussite en cours<sup>7</sup>. Évidemment la rénovation des zones grises ne fait que débiter. Cependant les éléments du problème sont aujourd'hui assez bien connus de la majorité des experts, et l'on peut espérer avec le Maire Drapeau que malgré ses aléas actuels, elle aboutira un jour ou l'autre. On peut et on doit pourtant élever le débat.

Pour que ce centre soit autre chose qu'un espace fonctionnel dont le seul prestige serait lié à la hauteur et à l'élégance des édifices qui en émergent, il convient d'abord d'éviter de confondre la valeur du centre avec sa fonctionnalité. Dans cette métropole qui grandit indéfiniment, qui s'émiette et qui perd ses structures matérielles et formelles, le centre et lui seul peut et doit donner sa signification à la ville. Un ensemble parfaitement fonctionnel et efficace peut faire un centre d'affaires mais pas ce centre acculturant et structurant d'ordre qualitatif, dépositaire de valeurs pouvant susciter une fréquentation non fonctionnelle, «plus essentielle que la fréquentation fonctionnelle». L'appel du centre est en effet fondé non seulement sur ce qu'il offre mais sur ce qu'il représente. L'image de la ville, comme l'a montré Kevin Lynch<sup>8</sup> est en effet beaucoup plus liée à un équilibre affectif qu'à des techniques triomphantes. Et cet équilibre affectif ne prend corps que dans le centre, dont la synthèse des qualités doit s'inscrire dans un paysage lisible, structuré et significatif, qui fera de la ville plus qu'une machine, plus qu'une société, mais aussi un objet d'art.

Abandonné à son évolution spontanée, le centre tend à dégénérer par excès de spécialisation, par désertion nocturne, par parasitisme. Les désordres variés qui s'y manifestent encore appellent une action planificatrice à deux niveaux: celui de son affinage, celui de sa gratuité. «Affiner» le centre, selon Jean Labasse qui a créé le mot par référence à l'affinage des métaux, c'est tout à la fois augmenter sa teneur potentielle et le libérer de ses impuretés, c'est-à-dire, à partir d'une claire vision de la nature profonde des vrais objectifs de la centralité, remettre au centre les éléments qui y ont le mieux leur place et en faire sortir tout ce qui peut être ailleurs. Insérer la gratuité dans l'espace central c'est préserver, dégager, créer, rendre d'accès facile, des espaces verts, des monuments, des couleurs, des installations communautaires, mais c'est surtout et au delà, permettre et donner accès au beau, au spirituel, au coude à coude, à la joie, à la récréation, à la discussion, au dialogue. On peut, justement, se demander si l'on ne devrait pas juger une civilisation à la mesure suivant laquelle elle aura été capable d'insérer la gratuité dans son horizon de vie.

De tels objectifs ne peuvent être le fruit de la fantaisie et du libre jeu des valeurs foncières. On ne les atteindra qu'au terme des efforts d'aménageurs pouvant s'appuyer sur une législation adéquate dont l'élément de base devrait être la municipalisation du terrain urbain, pouvant s'appuyer aussi sur une information sans défaillance. On en est loin. Mais déjà, parmi les choix possibles dont dépendra l'épanouissement du centre, trois semblent prioritaires: la reconnaissance de la priorité absolue de la circulation piétonnière (et donc l'amélioration du transport en commun au plan des commodités comme au plan des coûts), la sélection des équipements centraux par une réglementation des permis de construire et une fiscalité différentielle, la réintégration enfin de la fonction résidentielle, animatrice et garante de la vie sociale du centre.

En définitive, et même en économie libérale, il faut parier pour la ville, voire même la très grande ville. La grande majorité des analystes stigmatisent le déferlement urbain et le gigantisme urbain. Pourtant, parallèlement aux maux qui ont été dénoncés, il ne faut pas oublier que les forces vives qui provoquent la «métropolisation» sont aussi celles qui sont à la

base d'une mutation progressive de civilisation, capable d'assurer au plus grand nombre non seulement les attraits de la vie rurale mais aussi les agréments de la grande ville qui seule peut offrir aux hommes le grand choix de services et de biens de consommation, de ressources récréatives, culturelles et finalement sociales, dont ils ont de plus en plus besoin, qu'ils réclament de plus en plus, et qu'exaltent au maximum les mass-media. Les planificateurs ont été pris de court par le dynamisme de ces forces d'expansion, économiques, démographiques et sociales, qui évidemment ne sont pas mauvaises en elles-mêmes. Ils ont surtout été désarmés, en particulier face au problème de la spéculation et de la coordination des aménagements partiels, ce qui ne veut pas dire qu'ils le seront toujours. De toutes façons, le réajustement des tendances et l'élimination des distorsions ne pouvaient se réaliser en une décennie. L'expansion de l'urbanisation n'est pas intrinsèquement indésirable. Cependant les problèmes urbains se posent par l'incapacité de l'homme à les résoudre à temps<sup>9</sup>. En dépit de ses maladies, la grande ville nous ouvre des horizons nouveaux. C'est une énormité que de croire que les villes sont le tombeau de la race: rien n'est plus faux, elles en sont le berceau. Plus grande est la cité, plus considérables sont les opportunités (H. Isnard). Le problème n'est pas de réduire la marche du phénomène urbain, mais d'abord de réduire les frictions qui en résultent, et ensuite de la sublimer grâce à une claire vision des objectifs à atteindre. Ceux-ci se situent évidemment bien au delà du quantitatif, dans le qualitatif, culturel, voire artistique, expression d'une civilisation. A ces deux niveaux, outre le génie, «ce sont bien les moyens légaux et politiques qui en plus des moyens financiers, manquent le plus couramment» (J. Gottmann).

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L'architecture du paysage telle qu'exercée en cette fin de 20<sup>e</sup> siècle dans la plupart des pays soucieux d'aménager leurs territoires, a pour objet de relever un des plus importants défis posés par notre époque: celui de maintenir, recréer ou créer un environnement de plein air répondant à ses problèmes et besoins.

Au delà de l'harmonie et de l'esthétique qui lui furent traditionnellement attribuées pour les espaces libres dans lesquels l'homme évolue, l'architecture du paysage s'emploie actuellement à redémontrer le rôle qu'elle n'a jamais cessé de jouer en défendant dans la planification territoriale, la recherche et le maintien d'un équilibre général entre les milieux naturels (écologiques) et les milieux artificiels (lieux d'intervention de l'homme).

La tâche est ardue et les difficultés rencontrées lors de son accomplissement sont multiples. Qu'il nous suffise d'évoquer ici pour mémoire les plus courants:

- Pollution de divers genres de la nature: visuelle, de l'eau, de l'air, du sol, par le bruit;
- Phénomène de l'industrialisation;
- Évolution technologique tendant à l'accélération;
- Accroissement rapide de la densité des populations urbaines.

Ces conditions nouvelles de vie provoquent des mutations artificielles constantes dans le milieu naturel, et ont le plus souvent pour résultat sa dégradation totale.

Les répercussions d'actes posés et répétés sans réflexion préalable, sont à cet égard lourdes de conséquences sur la vie humaine actuelle et future.

Celle-ci, aux dires de nombreux savants (écologistes, biologistes, médecins), est en péril et le plus grave réside dans notre incapacité, faute d'observations, d'analyses, de contrôle et d'études, à évaluer l'importance de ce péril et ses conséquences.

Enfin, notons parmi les difficultés rencontrées (et non les moindres), celles issues de l'incompréhension générale des gouvernements, des responsables de l'aménagement à tous les échelons et du grand public à l'égard de l'intervention de l'architecture paysagère en ce domaine. Dans tous les cas, on se heurte soit à l'ignorance en la matière, soit à des idées préconçues sur une discipline comprise dans un sens restrictif, soit au désintéressement ou à l'absence de sensibilisation, soit à une opposition (vis-à-vis d'une intervention) due à des causes très diverses (intérêts financiers ou politiques, notamment).

Cependant, l'époque dite post-industrielle qui se dessine, est celle d'une prise de conscience de la nécessité vitale pour les peuples de décider de leur avenir, de leurs conditions et milieux de vie, de l'évolution de leurs territoires.

La nécessité d'intervenir en la matière nous force donc à refaire le point et à examiner comment l'architecture paysagère à notre époque est appelée à intervenir sur le milieu de concert avec les autres disciplines de l'aménagement.

La conception de paysage en tant qu'art pur a disparu, balayée par les hatives improvisations de la période industrielle et par la suprématie totale de la rentabilité économique en matière d'aménagement. (Période durant laquelle on est bien loin des pensées qui animaient nos prédécesseurs, voulant que les hommes qui excellaient dans l'art des jardins devenaient les confidentes et les conseillers des politiciens et des philosophes ainsi que les amis des rois).

Actuellement, cette conception fait place à une orientation nouvelle: l'architecture du paysage au service de la collectivité s'attache à répondre à ses besoins et à traiter d'une grande partie de son cadre de vie: les espaces non bâtis.

Toute une hiérarchie est en cause et les aménagements à préconiser dépendent des grandes décisions prises aux niveaux de l'aménagement du territoire, de la région et des localités.

### I. Les grandes structures de paysage territorial et l'utilisation de ce paysage dans le cadre de l'aménagement

Les préconisations en aménagement du territoire, constituent une ossature, un squelette sur lequel viendront se greffer toutes les constituantes nécessaires à la vie et à la croissance des différentes régions le composant. Il s'agit là de données générales de choix établis en fonction d'objectifs à atteindre, d'orientations, de programmes de développement où il faut utiliser au maximum toutes les ressources en tenant compte du long comme du court terme et permettre à des vocations régionales de se réaliser en y dirigeant les secteurs de développement appropriés. Pour cela, on se base généralement sur des critères scientifiques et économiques tous quantifiables.

Mais il n'en demeure pas moins vrai que d'autres démarches doivent être entreprises pour la réalisation du milieu sain, équilibré et harmonieux plus haut mentionné.

En matière d'aménagement du territoire, il y a un certain nombre de données difficilement quantifiables d'une part et encore peu connues actuellement même si les résultats de recherches entreprises furent divulgués il y a déjà de nombreuses années: celles qui touchent au cadre de vie de l'homme et à ses répercussions sur son existence.

A quoi sert, par exemple, une croissance économique spectaculaire si l'homme doit la payer si cher que sa survie même en est menacée, posant des problèmes plus difficiles à résoudre que celui de la croissance économique (voir le cas du Japon). Suffit-il de vivre ou faut-il que le milieu soit favorable à l'épanouissement humain?

*Dans cette optique, l'architecture du paysage s'appuyant sur les études des écologistes, déterminera «où, pourquoi et comment» le milieu naturel pourra être utilisé par l'homme.*

L'expérience en Hollande à ce sujet depuis déjà de nombreuses années, montre comment le ministère de la Planification physique confie à ses architectes paysagistes le soin de déterminer quels sont les milieux naturels susceptibles de devenir les supports des diverses activités humaines et quels sont ceux que l'on doit préserver sous peine de compromettre l'équilibre du territoire disponible.

Les grandes structures du paysage: boisé, hydrographie, topographie, terres agricoles et terres incultes, doivent être étudiées en vue d'une utilisation soit en tant que réserves, soit pour servir de base à des activités très diverses.

Il est évident que pour une telle analyse précédant l'action, l'architecte paysagiste œuvre avec tous les professionnels s'occupant de l'étude ou de l'aménagement du milieu naturel: géographes, pédologues, topographes, biologistes, spécialistes en pollution, écologistes, urbanistes, forestiers, agronomes, etc...

Il s'agit là de l'équipe de base en matière de planification physique, qui doit travailler en étroite collaboration.

Ces analyses faites et la synthèse en résultant, permettent de déterminer quelles seront les grandes lignes d'aménagement et d'utilisation du territoire en matière de paysage:

1. Ex.: Localisation des espaces à préserver: protection, conservation, régénération:
  - soit par une utilisation ultérieure à d'autres fins;
  - soit par une utilisation à long terme de poumons verts (proximité des villes)
  - soit à des fins de mise en valeur des sites—sites classés;
  - soit pour constituer des réserves naturelles de faune et de flore en danger de disparition.
2. Ex.: Localisation préférentielle des zones à urbaniser en tenant compte de la répercussion de cet acte sur le milieu naturel:
  - soit dans le cas de l'extension des villes existantes;
  - soit dans l'implantation des villes nouvelles;
  - soit pour la restructuration des paysages passant d'une occupation de type agricole à une occupation de type urbain.
3. Ex.: Localisation préférentielle des grandes zones affectées au tourisme, établie en fonction des vocations particulières de certains territoires.
4. Ex.: Localisation des autoroutes et liaisons interrégionales en fonction de la préservation maximale des richesses naturelles: respect des boisements, des terres agricoles, mise en valeur des sites présentant un intérêt historique ou culturel.

## II. Le paysage régional et son utilisation dans le cadre de l'aménagement

S'accrochant sur l'ossature territoriale, des précisions quant à l'utilisation du milieu naturel seront apportées par l'étude des plans directeurs régionaux de paysage se superposant aux plans directeurs d'aménagement.

La nature des préconisations dépendant d'une étude approfondie du milieu naturel varie selon:

- La population en cause (nature, nombre, coutumes, genre de vie).
- Le type d'urbanisation (présence de villes à forte densité d'occupation ou étalement des structures urbanisées).
- La vocation dominante de la région en question, régions forestières, agricoles, industrielles, multifonctionnelles... Chacune d'entre elles réclamant des traitements différents des points de vue de la préservation, mise en valeur, conception des loisirs et tourisme.

## III. Le paysage local et son utilisation dans le cadre de l'aménagement

Le problème de l'insertion du milieu naturel dans le paysage urbain est une des conditions d'équilibre de notre milieu de vie qui demeure la plus délicate à observer\* et c'est pourtant dans ce milieu que demeure la majorité de la population humaine.

Aussi, on s'attachera dans les villes à prévoir des possibilités de circuler à pied, de se reposer, de pratiquer jeux et sports en plein air et de conserver un contact avec la nature.

Du parc d'unité de voisinage à celui de quartier ou de centre-ville en passant par les différentes formes de circulation des piétons: cheminements, placettes, places publiques, l'architecture paysagère cherche à instaurer une trame verte destinée à devenir l'élément compensateur d'un milieu artificiel. Pour cela, l'architecte paysagiste tiendra compte:

### 1 du relief:

exemple: Dolbeau et Jonquière, où certains espaces verts sont conservés à l'état sauvage, parce que non utilisables (accessibilité);

### 2 de la géologie:

certaines lieux rocheux se prêtent mal à des plantations diversifiées, ou à des utilisations récréatives ou sportives variées;

### 3 de l'ordre de grandeur des populations:

exemple: les villes de Murdochville, Dolbeau, Trois-Rivières, Québec ou Montréal n'ont pas les mêmes exigences au point de vue diversité des équipements requis (donc des superficies nécessaires).

### 4 de la densité de population:

deux villes de 30,000 habitants par exemple peuvent avoir des besoins en espaces verts très différents. Le système des espaces verts sera fonction de la densité de population beaucoup plus que la superficie du territoire urbain. Les plus vastes et les plus nombreux doivent correspondre aux quartiers les plus peuplés et non les plus luxueux. «Joffet»

### 5 des conditions d'existence de la population:

*Conditions climatiques:* concept des parcs à repenser en vue d'une utilisation permanente ainsi que celui de la circulation des piétons.  
*Conditions de situation:* ville isolée en campagne: villes de Gaspésie, du Lac St-Jean ou villes faisant partie d'un contexte urbain: Québec, Trois-Rivières, Montréal. Dans les premières, moins besoin de grands parcs boisés, la nature est présente jusqu'aux portes de la cité, par contre, on insistera sur les équipements éducationnels, récréatifs et sportifs; dans le second cas, au contraire, il faudra faire entrer la végétation dans la ville.

### Conditions du milieu à l'intérieur de la ville:

exemple: grands espaces plantés à proximité des industries. Les zones tampons de verdure jouent un rôle régulateur.

### 6 l'état de la ville:

parties existantes, parties à créer, ou villes nouvelles. Pour les villes existantes, il faudra assainir, aérer, compléter au mieux des possibilités: opérations faisant partie de la rénovation urbaine. Pour les parties à créer, il faudra en prévoir le raccordement à celles qui existent déjà. Dans le dernier cas, rêve des jeunes urbanistes, architectes et architectes paysagistes, tout reste à créer.

Pour conclure ce tour d'horizon sur l'architecture du paysage, l'étude du milieu et l'aménagement, nous dirons combien nous sommes conscients de l'impossibilité d'obtenir des résultats (et encore moins d'atteindre les buts fixés) tant qu'une prise de conscience ne sera effectuée et qu'une volonté d'action concertée ne sera ressentie par les divers responsables de l'environnement: spécialistes divers, politiciens.

La compréhension du paysage en vue d'une utilisation équilibrée réclame un intérêt, des connaissances, de la clairvoyance, de la sensibilité et exige que des précautions soient prises. Or il s'agit là bien trop souvent de valeurs qui, dans les mentalités issues de notre civilisation, sont déconsidérées.

Aussi, rappelons de concert avec d'autres spécialistes de l'aménagement du milieu naturel, l'impérieuse nécessité de ne pas continuer à laisser cette mentalité prévaloir, suivant laquelle seules les politiques de développement partielles et à court terme sont «possibles».

Avec cette optique d'économie mal comprise, nous risquons en effet d'annihiler les bienfaits que nous sommes en droit d'attendre des progrès des sciences et de la technologie.

Face à cette situation, nous proposons comme base de réflexions et support d'intervention, l'exposé d'une loi fondamentale en matière d'utilisation du milieu naturel. Elle est présentée très clairement par François Bourlière médecin et président de l'union internationale pour la conservation de la nature et de ses ressources\*:

«L'homme ne peut se passer de la nature et vivre en dehors de ses lois. Est-il besoin de rappeler que notre survie dépend toujours au siècle de l'atome, comme à ceux de la pierre taillée, d'aliments produits par le règne végétal et le règne animal.»

«Nos contemporains ont trop souvent tendance à oublier que l'homme a certes des pouvoirs d'adaptation remarquables, mais que ceux-ci restent néanmoins limités. Nous pourrions toujours conquérir le cosmos, mais ceci ne nous empêchera pas de rester soumis aux lois de la biologie.»

\* Sans doute parce qu'il faudrait plutôt envisager dès le départ l'insertion de la trame urbaine dans le paysage naturel et non l'inverse; or la situation en ce domaine de la plupart des villes actuelles nous amène à poser le problème à l'envers.

\* Préface par F. Bourlière du livre *L'Écologie* de P. Farb, Collection Time-Life, édition 1969.



La campagne verdoyante, la ferme laitière et son beau troupeau, les bœufs de l'Île d'Orléans qui tirent leur charge, le petit village qui se groupe autour de l'église, l'artiste, le poète qui chante le réveil de la nature, les beautés de l'agriculture, etc..., etc..., etc...

L'exode rural, la désertion de nos campagnes, les villages fantômes du bas du fleuve et de l'Abitibi, peut-on retourner en arrière, arrêter le rouleau compresseur de notre industrialisation, de notre économie? Peut-on faire volte-face et augmenter la force ouvrière engagée en agriculture qui est maintenant réduite dans le Québec à quelque six pour cent? Quelle est l'influence de cette révolution sur l'aménagement du territoire, sur l'aménagement de nos campagnes et de nos petits villages?

Soyons réalistes et considérons l'agriculture non plus comme un mode de vie mais bien comme une industrie au même titre que celles des pâtes à papier, du meuble ou de la chaussure.

Même si l'agriculteur demeure dans bien des cas un artisan, il se spécialise de plus en plus et subit les pressions d'une industrie internationale dont il est une partie intégrante. Cette industrie, qui est certainement la plus importante économiquement, de toutes les industries, est celle des vivres.

L'agriculture est le centre de production de la matière première utilisée par l'industrie des vivres, elle est dépendante des fluctuations de prix aussi bien dans ces intrants que dans ses extrants. Les intrants à l'agriculture se composent des fournitures et services illustrés ici par les besoins de l'agriculture en machines, en carburants, en pesticides, en semences, en engrais, en finances, en matériaux de construction, en électricité, en services professionnels aussi bien d'avocats, de comptables que de vétérinaires ou d'agronomes. Les extrants se composent du grand monde de la transformation et de la mise en marché des productions de la ferme et peuvent être illustrés par l'entreposage, la congélation, la mise en conserve, la vente, le transport, la publicité, etc...

L'ensemble de cette grande industrie qui a été récemment baptisée «agri-business» représente une force ouvrière considérable, un cinquième du budget familial et l'industrie la plus importante de notre pays.

Présentement, la position de l'agriculture canadienne ou plus spécifiquement québécoise sur le marché international des produits agricoles est pour le moins alarmante. Le lait et ses sous-produits, qui sont la partie la plus importante de nos productions agricoles, peuvent être vendus par les pays où le climat est plus clément à un prix inférieur à notre coût de production. Notre industrie laitière, fortement subventionnée par l'État, produit du beurre qui doit se vendre au niveau du manufacturier à \$0.65 la livre, alors que la Nouvelle-Zélande peut nous en vendre, livré à Montréal, à \$0.26 la livre. Nous voyons depuis quelque temps nos gouvernements réduire l'aide à la production agricole dans le but de donner une image plus réaliste de la compétition qui existe dans cette industrie. Ces politiques gouvernementales peuvent, d'ici quelques années, causer des remous profonds dans la structure de l'industrie

agricole et par le fait même, dans le développement du territoire rural ainsi que dans le mouvement des populations sur ce même territoire.

Les grandes révolutions que l'industrie agricole a subies telles que la mécanisation, les engrais chimiques, les moulées balancées, les pesticides, les transports et services, ont eu une importance énorme dans le pouvoir de production de l'unité agricole et ont amené une surproduction locale de certains produits de consommation à caractère non élastique. Il faut penser maintenant que la technologie chimique remplace nos nourritures conventionnelles par des nourritures fabriquées, qui sont beaucoup moins dispendieuses, pour ne pas dire beaucoup plus hygiéniques. Les «frankfurt» sans viande, les laits de fèves soja, les «bifteck» de farine de poisson, les viandes fabriquées par la digestion de levures agissant sur les paraffines contenues dans les huiles minérales sont tous des moyens de remplacer l'agriculture que nous connaissons aujourd'hui par une autre industrie qui servira à nourrir l'homme de demain. Ces changements auront une influence énorme sur l'apparence de la campagne de demain et sur la fonction du village rural.

Il faut mettre également dans la balance le fait que seulement deux pour cent des terres de la province de Québec ont une certaine vocation agricole, que notre expansion démographique est de l'ordre de deux pour cent par an et qu'une expansion industrielle peut occasionner dans les cinquante prochaines années, une augmentation de l'immigration au Québec.

Même si le climat de la province de Québec n'est pas inductif au développement de l'industrie agricole, ces conditions climatiques peuvent être changées par des grands travaux de génie. Le détournement des rivières qui coulent présentement dans la mer Arctique ou le détournement des «icebergs» qui descendent le long des côtes du Labrador et dans le golfe St-Laurent peut changer du tout au tout le climat du Québec.

Présentement, nous demeurons compétitifs dans plusieurs productions agricoles et, notre population augmentant, nous serons tenus d'augmenter certaines denrées agricoles qui peuvent être produites d'une façon compétitive sur le marché mondial. Nous aurons donc besoin un jour ou l'autre de toutes les terres qui ont cette vocation agricole et nous nous devons en tant qu'aménagistes, de préserver cette richesse naturelle même si elle semble présentement ne plus avoir la valeur ni l'importance qu'elles avaient il y a un siècle.

La chimie peut changer considérablement nos habitudes alimentaires mais nous devons reconnaître que la photosynthèse, qui permet de transformer l'énergie solaire en énergie digestible, n'a pas été remplacée jusqu'à ce jour et ne le sera pas économiquement, pour plusieurs années. Même si nous remplaçons une partie des protéines animales, dans notre régime, par des protéines en provenance des poissons et des huiles minérales, nous conserverons pour plusieurs années l'habitude de consommer des plantes. Notre campagne de demain sera peut-être dénudée d'animaux mais nous y verrons du soja, du maïs, des céréales, des fruits et des légumes.

L'aménagiste se doit de comprendre la situation présente de l'agribusiness et l'évolution graduelle de l'agriculture du Québec dans le but de préserver les bonnes terres qui sont situées sous les climats les plus propices à l'agriculture. Il se doit de concevoir le village comme un pôle d'attraction naturel pour les industries para-agricoles et permettre une certaine décen-

tralisation dans ce sens. Il faut cependant qu'il conserve une juste mesure et que, si le réservoir de main-d'œuvre rurale est encore important, il est souvent peu qualifié pour fonctionner à l'intérieur d'une agribusiness mécanisée et automatisée au maximum.

Il faut concevoir que si la campagne peut ne plus avoir la vocation agricole qu'on lui reconnaissait il y a un siècle, elle demeure un élément important dans le contexte de notre évolution en tant que peuple aussi bien qu'en tant que société vivant d'une activité économique intense. L'homme a besoin d'espace, il a besoin d'air, il a besoin de récréation, il a besoin de la nature, de plus, cette même campagne qui a une fonction tonifiante dans notre société a également une fonction économique, orientée différemment, mais qui est réelle. La campagne est productrice d'énergie digestible. Pour ce, nous avons besoin de cultivateurs et nous avons besoin autour d'eux, d'une industrie énorme avec un pouvoir économique et social qu'il faut orienter et canaliser au profit d'une planification intelligente du territoire.

L'aménagiste doit se sentir beaucoup plus libre de retourner à la forêt les terres dont la valeur agricole n'est pas assurée pour le moment, que de les laisser disparaître à tout jamais sous la pierre et le béton d'un développement industriel ou domiciliaire. Notre territoire ne doit pas emprunter pour son développement des figures géométriques mais bien les contours logiques des possibilités de développement biologique (en considérant ici la biologie-économique). Nous avons malheureusement commis bien des erreurs depuis le début du siècle par manque de planification et de compréhension dans les différents secteurs de l'aménagement. Nous nous devons de mettre en place le plus tôt possible un office du plan qui aura entre autres, au niveau provincial, un droit de veto sur tout projet qui pourrait détruire à jamais nos richesses en terres agricoles.

Nous avons laissé la spéculation enlever à l'agriculture une grande quantité de bonnes terres qui se trouvaient dans le périmètre de nos grandes villes. Un pourcentage élevé de ces terres sont aujourd'hui abandonnées et présentent un aspect lamentable pour le touriste ou même le résident qui circule régulièrement à travers ces déserts couverts de mauvaises herbes et d'arbustes rabougris.

Il faut donc établir un plan, il faut établir des zones, il faut établir des règlements, il faut établir des normes et des législations. L'ensemble de cette planification doit tenir compte des besoins de l'agriculture aussi bien que des besoins des autres industries, des populations, des richesses présentes, des leviers à actionner, du développement économique et des besoins sociaux. Ce plan ne doit pas être fait pour aujourd'hui mais bien pour demain en sachant fort bien que demain, il sera modifié en raison des besoins d'après-demain (qui nécessairement ne seront qu'estimés, au moment des modifications dans le plan). Lorsque nous voyons chacun des gouvernements, chacun des ministères, chacune des industries, chacun des particuliers, appliquer à sa guise des modifications dans le territoire et cela indépendamment les uns des autres, nous voyons grandir une tour de Babel qui devra nécessairement se terminer par la destruction de cette civilisation même.

**La santé publique à l'ère de l'aménagement**  
par le docteur Julien Denhez

### Introduction:

Le présent article ne prétend pas couvrir l'immense sujet qu'est la «santé publique». Il ne se veut qu'un aperçu de ce secteur essentiel au bien-être et à la prospérité de la nation. Il se résumera donc en une courte synthèse des problèmes actuels rencontrés dans le secteur de la santé en montrant comment il est aujourd'hui possible de cerner et définir ces problèmes; l'état de coordination (ou de non-coordination) des ressources de la santé fera l'objet des considérations suivantes; le système d'organisation actuel des services de la santé sera ensuite analysé et ses faiblesses seront mises en évidence afin d'en déduire certaines formules de solutions.

### Définitions:

Avant d'entrer dans le vif du sujet, un mot seulement sur la signification que devrait prendre l'expression «Santé publique» en cette fin du 20<sup>e</sup> siècle: une certaine confusion s'est peu à peu établie dans les définitions relatives à la santé et à la maladie de sorte qu'il est maintenant nécessaire de définir quelques concepts essentiels en relation avec cette expression.

La santé d'une communauté humaine repose essentiellement sur un effort collectif des membres de la communauté, de ses «leaders» et des responsables de la santé. C'est cet «effort collectif» qui décrit le mieux ce qu'est la Santé publique prise comme «système d'administration publique» visant à créer, à conserver et à promouvoir l'état de santé de chacun des membres qui composent la collectivité. La «Santé publique» sera donc l'ensemble des mesures prises par la société pour atteindre à cet état de santé.

On comprendra bien que cet «effort collectif» devra se baser sur les sciences de l'assainissement du milieu physique; cet assainissement doit s'inspirer en entier d'une philosophie de prévention et rejoindre les préoccupations des écologistes. En plus, et c'est sa deuxième composante, la Santé publique utilisera les données des sciences médicales modernes et verra à appliquer à la collectivité les mesures scientifiques de la médecine préventive. Enfin, face à la reconnaissance universelle des droits de l'homme à la santé, elle s'efforcera de rendre accessibles à toute la population, les progrès technologiques de la médecine clinique moderne: c'est la composante sociale du système. Ce système vise donc à assurer un milieu physique qui soit sain et non pas l'occasion de maladie, à augmenter la résistance des individus à la maladie, puis, advenant échec (car il y aura toujours échec à la prévention), à garantir aux individus touchés un rapide retour à la santé ou une réadaptation fonctionnelle. Étant partie du système politique, il requiert l'apport de la législation et l'utilisation des méthodes de motivation populaire, de la simple éducation de masse à l'animation sociale.

### Problèmes de la santé:

Certes, il y a à notre époque comme à toutes les autres époques, un grand nombre de problèmes purement biologiques en santé. Mais l'importance relative de ces problèmes a cédé le pas à des conditions pathologiques d'origine sociale qui, à cause du bouleversement de la



pyramide des âges et particulièrement du vieillissement de la population, ont pris une ampleur qui va sans cesse croissant.

La démographie nous apprend que le groupe de personnes à charge augmente constamment, comparativement aux groupes de productivité. Les vies sauvées à la naissance permettent l'apparition d'un nombre de plus en plus grand d'enfants handicapés physiquement ou psychologiquement. D'autre part, les gens de plus de 65 ans sont de plus en plus nombreux et par définition, sont beaucoup plus sujets aux maladies chroniques. L'un et l'autre de ces phénomènes obligent à penser en termes de continuité dans les soins et en termes de recherches pour découvrir de meilleures méthodes de prévention. Or, ceci coûte extrêmement cher et ce fardeau financier retombe sur les épaules de la société, car l'individu ne peut seul faire face à un tel ordre de problèmes.

L'épidémiologie, c'est-à-dire la science qui recherche et décrit les facteurs en relation avec l'apparition de la maladie dans la société, essaie de mieux définir ces facteurs dits « sociaux » mais en même temps, elle met en évidence et de façon alarmante, un ensemble de conditions extrêmement menaçantes provenant du milieu physique urbanisé où vit une majorité sans cesse croissante de citoyens. Elle déduit de ses études qu'un grand nombre de maladies prennent naissance dans le milieu physique transformé par les activités de l'homme industrialisé. Les « man-made diseases » existent, il n'y a aucun doute, quoique les chercheurs cliniciens et fondamentalistes ne soient pas encore parvenus à en établir les relations de cause à effet et à en trouver les traitements spécifiques. La pollution de l'air, de l'eau, l'encombrement des villes, le bruit, l'aménagement irrationnel des lieux de vie, que ce soit la région, la ville ou même l'habitation, le rythme de la vie en général et urbaine en particulier, sont tous plus ou moins en relation avec certaines maladies respiratoires, certains cancers, nombre de troubles du métabolisme et surtout, nombre de maladies mentales.

Les outils utilisés par la Santé publique : l'épidémiologie, la démographie médicale, la sociologie médicale et l'économie de la santé, avec l'aide des sciences politiques, permettront de mieux définir les problèmes décrits, de mieux les analyser et de montrer la piste aux chercheurs cliniciens et fondamentalistes tout en permettant à l'administrateur public de faire démarrer des programmes pour mieux contrôler ces conditions nouvelles du milieu.

#### Ressources en santé:

La question que l'on doit se poser est celle-ci: peut-on continuer indéfiniment sur cette voie? Ne devrait-on pas diminuer relativement les coûts de la santé en y investissant de façon plus rationnelle?

Que fait-on avec les ressources en effectifs, en équipement et en programmes déjà entrepris? On décrit partout où l'on s'intéresse à la santé (ou à la maladie) une pénurie de personnel et de lits d'hôpitaux, mais il ne faut pas une étude exhaustive pour prouver que cette pénurie est des plus relative et est beaucoup plus liée à l'absence de coordination, à une mauvaise distribution géographique, à la compartimentalisation des soins et à une fragmentation inouïe des programmes en cours. Si l'on pense qu'on se sente obligé de crier à la pénurie de médecins avec un médecin par un peu plus de 800 habitants, c'est dire que l'administration actuelle de la santé se caractérise par une totale absence de système.

#### Organisation actuelle de la Santé:

Celle-ci est fragmentaire, morcelée, régie encore aujourd'hui par un système de compétition où l'on ne voit que très peu de complémentarité entre les ressources.

Les services de soins dits curatifs, sont centrés sur l'épisode aigu de maladie et cette philosophie a pénétré les services traditionnels de santé publique où, à part les immunisations de masse, on procède surtout à la suite de réception de plaintes et non pas selon une politique constructive de prévention des causes amenant ces plaintes. Tout le domaine de la salubrité fonctionne de cette façon; on n'agit, par exemple, auprès d'une usine polluant l'air de façon anormale qu'après que cette usine s'est installée et s'est mise à fonctionner!...

#### Formules de solution:

On ne voit qu'une solution aux problèmes de la santé publique. Devant la mal-utilisation des ressources et l'intensité sans cesse croissante des problèmes de la santé, il faut vraiment penser à une planification d'ensemble.

Comment planifier?... Selon sa tradition, le monde de la santé se croit encore seul responsable de sa planification et les efforts qui sont tentés dans ce domaine se font d'une façon purement sectorielle.

La question qui se pose est de savoir s'il est possible de planifier de façon sectorielle dans ce domaine si vaste, qui dépend de tant d'autres secteurs d'activités et qui peut en modifier tant d'autres? Il n'est pas possible d'isoler la santé de l'ensemble des objectifs d'aménagement; elle doit prendre rang parmi les priorités déterminées tant pour la région que pour la ville.

L'alternative est certes une planification globale: l'intégration du développement social et économique s'impose d'une façon absolue dans un processus de développement harmonisé. Monsieur Georges Célestin l'a nettement démontré lors de sa conférence d'octobre 1969 à Montréal, en donnant de nombreux exemples d'échecs de planifications trop sectorielles et insuffisamment intégrées.

La santé comme l'éducation, le loisir, le commerce, l'industrie... est une des composantes du développement social. Il n'est pas possible de garder dans son isolement traditionnel ce secteur primordial pour qui, aussi, vient de sonner l'heure de la mise en ordre, de l'organisation et de la coordination rationnelle, c'est-à-dire, l'heure de la planification.

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Les travaux de l'équipe s'inscrivent dans le cadre des recherches du Comité International Permanent pour l'Aménagement Régional (Liège). Durant trois années consécutives, elle s'est attachée à :

- faire le point sur la situation qui prévaut au Québec;
- déterminer les conditions nécessaires requises pour l'engagement d'une authentique politique de développement et d'aménagement du territoire;
- analyser les expériences d'aménagement régional engagées au Québec et à juger de leur bien-fondé;
- analyser les structures administratives, inventorier les forces vives du secteur privé et les équipes pluridisciplinaires compétentes pouvant être engagées dans l'action à court et à moyen terme.

Elle a avant toute chose cherché à déterminer la philosophie de l'action et à cerner le cadre et les circonstances dans lesquels celle-ci devrait s'engager avec le maximum de chances de succès. A cet effet, elle a précisé :

- les définitions de la région (en vue de l'action);
- le contenu de la région;
- les dimensions de la région (géographiques et démographiques);
- la nature de l'autorité régionale (institutions); enfin
- le rôle de l'État et le cadre où il s'exerce.

### I. Définitions

1 «Est région au maximum, l'ensemble territorial qui, par l'extrême diversité de ses ressources naturelles et de ses activités peut satisfaire toute la gamme des besoins des populations qui l'occupent<sup>1</sup>.»

La notion de ressources naturelles n'apparaît plus comme un critère nécessaire et suffisant en égard à l'intensification des moyens de transport et au fait que la matière première (en poids et en coût) intervient de moins en moins dans le produit fini qui s'allège et devient de plus en plus complexe. La division du travail de plus en plus poussée et l'intervention d'avantages comparatifs font que la région tend à la fois à se spécialiser et à s'ouvrir de plus en plus largement au monde extérieur. Assez paradoxalement, les ressources naturelles prennent surtout de l'importance en ce qu'elles fondent des activités tertiaires; loisirs, sports, tourisme. Cependant, les ressources hydrauliques depuis que l'eau est devenue un bien rare (donc économique) revêtent, pour la région, une importance primordiale.

*Il apparaît donc que c'est la satisfaction de toute la gamme des besoins des populations qui occupent l'espace considéré qui soit la notion prioritaire à retenir.*

2 En prenant en considération cette notion de besoins, on débouche inévitablement sur cette autre qui lui est complémentaire, celle des échanges intra et inter-régionaux. «La région est un espace hétérogène gravitant autour d'un foyer de développement et dont les diverses parties complémentaires entretiennent avec le pôle et entre elles plus d'échanges qu'avec la région voisine<sup>2</sup>.»

Le caractère hétérogène tient à la juxtaposition de zones urbaines et de zone rurales, aux inégalités dans la densité des échanges, aux fonctions différentes des parties de l'aire qui, on le souligne, sont complémentaires. Il s'agit en outre d'une région polarisée et fonctionnelle dont le pôle est à la fois marché, source d'approvisionnement et centre de redistribution.

Enfin, de cette acception de la région découle la notion de contenu: tous les équipements requis pour répondre aux besoins de la population sans que celle-ci soit contrainte de s'adresser à un pôle extérieur de la même importance que celui de la région ou à la ville-capitale (métropole régionale).

### II. Contenu

1 *Le pôle* est nécessairement un complexe industriel caractérisé par :

- une puissance industrielle importante dont les productions dépassent largement les seuls besoins locaux voire régionaux;
- la présence d'une ou plusieurs industries de base (industrie qui se situe en amont des industries de transformation et de consommation);
- la diversité des industries transformatrices animées par des entreprises de taille nationale voire internationale.

La diversité industrielle du pôle se fonde sur l'interdépendance (directe ou indirecte) des secteurs d'activité. Le pôle est une zone d'attraction (main-d'œuvre et capitaux). Le pôle est en outre une communauté urbaine: c'est la métropole régionale ou d'équilibre. Il s'agit d'un ensemble plurimunicipal qui, par l'importance et la densité de sa population, se distingue nettement de son environnement. C'est un marché où s'échangent biens, services et informations. La structure de la population active est dominée par la proportion de travailleurs industriels et surtout de travailleurs des activités tertiaires.

L'organisation des moyens de transport et de communication est conçue en fonction de ce pôle. Celui-ci regroupe outre le commerce local et régional, les organes de décision décentralisés de l'administration, de l'organisation bancaire ainsi que les services sociaux, culturels et spirituels nécessaires à la région.

Cette notion de pôle va à l'encontre des thèses de décentralisation totale.

2 *Le réseau urbain ou l'armature urbaine* qui s'articule autour du pôle (métropole) et qui regroupe un ensemble de villes de tailles et de fonctions différentes, tailles et fonctions étant en corrélation et établissant une hiérarchie.

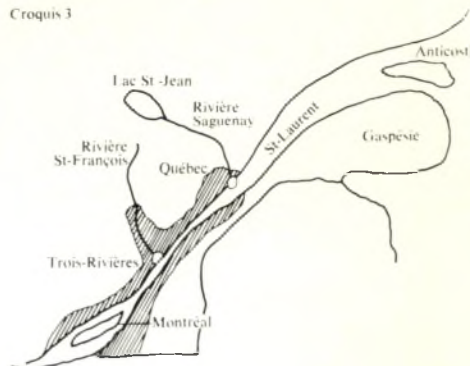
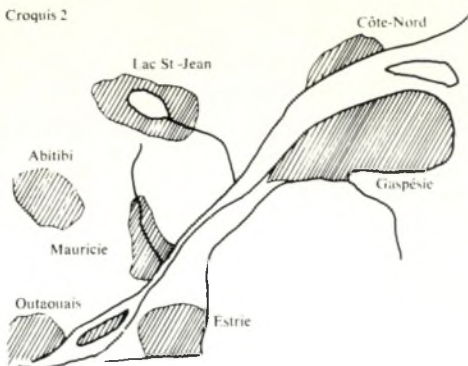
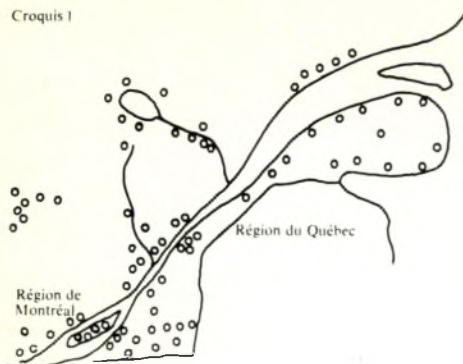
Les centres urbains relaient la métropole régionale pour certaines fonctions. Ils entretiennent avec cette dernière plus de relations qu'avec toute autre métropole. Chaque centre a une aire d'influence qui lui est propre et dont les dimensions varient selon la taille et les fonctions du centre.

3 *L'aire régionale* et son réseau urbain se répartissent en sous-ensembles hiérarchisés.

4 *Ce contenu quantitatif* conditionne l'intensité des échanges et des relations de même que le degré de satisfaction des besoins des hommes, il conduit à déterminer :

- a les équipements que chaque centre-urbain doit contenir en rapport avec ses besoins et ceux de l'aire qu'il commande;





b la répartition des hommes sur le sol de manière à ce qu'ils trouvent au moindre coût et à égalité d'accessibilité les équipements requis pour répondre à leurs besoins;

c le lieu d'implantation des emplois secondaires et tertiaires (nouveaux ou relocalisés);

d la nature des activités à développer de manière à susciter et entretenir la croissance régionale;

e l'articulation des réseaux de transport.

*Si aucune norme ne peut être définie pour ces opérations, elles doivent se concevoir en fonction d'une éthique fondée sur les principes d'égalité (ou du moins d'égalisation des chances) et de libération des hommes des contraintes de l'inorganisation et du milieu.*

### III. Dimensions

1 La population doit être assez importante et éduquée pour représenter un réservoir de main-d'œuvre qualifiée requis par la dimension et la diversité des activités économiques.

2 La notion de rentabilité domine le problème des équipements, le secteur public comme le secteur privé doivent la prendre en considération.

Aussi, à côté des goûts, des désirs et des besoins des populations, le volume de la demande solvable,—plus que le revenu per capita—entre-t-il en ligne de compte. Il est fonction du volume de population. Aussi, pour réunir les équipements indispensables, la région doit-elle compter un volume minimal de population. Celui-ci doit être compatible avec la demande minimale normalement requise pour la rentabilité des services les plus rares (par ex.: université, enseignement technique supérieur, sièges bancaires, foire—exposition nationale ou internationale, laboratoires de recherches, festivals, etc...).

3 Unité d'aménagement et de développement, la région revêtira ainsi des dimensions démographiques et économiques telles qu'elles puissent être retenues pour l'élaboration d'un plan à long terme, ce qui suppose une superficie et une autonomie de problèmes.

4 Les dimensions spatiales seront de l'ordre inverse à la densité démographique. Elles seront suffisantes pour organiser une répartition harmonieuse des populations ainsi que pour accueillir les équipements requérant le plus d'espace (parcs, forêts, zones de délaissement, ressources aquifères, espaces libres, etc...).

### IV. L'autorité régionale (les institutions)

L'adoption d'une politique régionale de développement suppose dans la plupart des cas une adaptation des institutions en fonction des buts poursuivis et inévitablement la création d'un gouvernement régional. Le plan régional est la chose de la région et l'autorité centrale ne doit fixer que les objectifs généraux de développement socio-économique du pays et le rôle que la région joue dans le concert national. Conception, élaboration et réalisation du plan, désignation de la politique à appliquer et prélèvement au budget des indispensables moyens pour la mener à bien doivent relever de la population régionale impliquée par ce développement et cet aménagement.

Nous voyons donc apparaître une autre donnée, la première étant un gouvernement régional issu du peuple, la seconde étant la levée d'un impôt régional nécessaire à affirmer l'indépendance de l'autorité régionale démocratiquement élue vis-à-vis du pouvoir central.

Plus grand est le rôle assumé par la région dans les diverses étapes de sa planification, plus effective aussi sera l'adhésion aux objectifs assignés et aux mesures proposées, puisqu'ils émanent directement des vœux formulés par les populations en cause. Donc concertation permanente engageant la population dans l'action régionale.

Au stade de l'élaboration, on doit voir apparaître des organismes privés, qui, s'ils ne sont pas investis de l'autorité suffisante pour assurer la mise en œuvre, présentent, dans l'élaboration, l'avantage d'une complète indépendance à l'égard de contingences politiques momentanées. Ces dernières sont forcément mouvantes et le détachement des experts du secteur privé assure une meilleure crédibilité des perspectives à long terme que l'on sait n'être point «conditionnées».

Les domaines de juridiction fédérale et provinciale devront être précisés le plus tôt possible afin que s'instaure une véritable coopération au niveau des gouvernements supérieurs. Le respect de l'indépendance municipale doit être consacré. La naissance de structures régionales est un des phénomènes nouveaux qui étonne par sa vigueur; le Québec ne saurait échapper à la règle, toutes les structures régionales qui n'ont pas obtenu l'approbation démocratiquement exprimée des populations, sont vouées à être remises en question à plus ou moins brève échéance et basculent quand l'action engagée ne débouche pas sur des «réusites» opérationnelles et que la remise en question par la population est inévitable et souvent violemment contestataire<sup>3</sup>.

Nous rappellerons que les considérations émises par le Conseil Économique de l'Ontario rejoignent nos vues en matière de réforme gouvernementale en tout ce qui touche à la création des régions:

1 L'idée d'un gouvernement régional doit aller jusqu'à reconsidérer la réforme totale du système gouvernemental de la province. Ceci requiert l'examen de l'organisation et des activités aussi bien des services provinciaux que du système municipal. Le but de cette réforme devrait être de former un gouvernement acceptable par les électeurs et pouvant être contrôlé au moyen de procédés démocratiques.

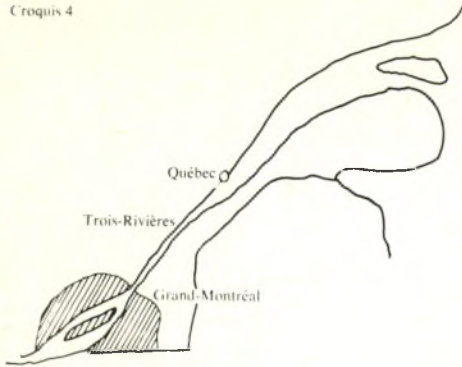
2 Pour déterminer ce qui revient au gouvernement régional en fonctions et revenus, soit des municipalités existantes ou des gouvernements provincial et fédéral, le procédé devrait, dans la mesure du possible, être le suivant: l' élu doit pouvoir assumer des responsabilités à un poste particulier d'un échelon déterminé au gouvernement; il doit être apte à saisir le coût réel de chaque service et aussi de diriger les profits directs ou indirects qui découlent du service qu'il dirige. Une telle évaluation des services publics est un préalable nécessaire à la détermination des priorités de la dépense publique.

3 Avant d'introduire un gouvernement régional dans une région, des études doivent être faites afin d'informer l' élu sur les taux actuels des services publics. Ces études doivent également montrer l'économie qui pourrait être réalisée en réservant au gouvernement régional certaines fonctions particulières; elles devraient de plus fournir des chiffres sur les coûts additionnels que pourrait amener l'expansion inévitable de certains services insuffisamment développés.

4 Tout doit être fait pour assurer au gouvernement régional une taxe de base suffisante afin que ce dernier puisse garantir un minimum de services permanents et lui assure une indépendance vis-à-vis des positions supérieures et cela, indépendamment des subventions qui lui reviennent ou qui sont susceptibles de lui être accordées. La province doit cependant conserver un revenu suffisant, lui permettant d'assurer ses propres opérations et d'équilibrer par des transferts les budgets des gouvernements régionaux.

5 Il sera nécessaire d'envisager un système de classification des responsabilités sur une même échelle pour les gouvernements provincial et régionaux et les autorités municipales, ce qui serait une formule de réforme des structures gouvernementales.

Le rôle de l'État, essentiel, que personne ne lui dispute mais qu'il va devoir assumer pleinement, est celui du choix des grands objectifs de développement.



Les disparités régionales et provinciales sont le problème majeur auquel le Canada et le Québec vont devoir s'atteler et les gouvernants devront le plus tôt possible faire les choix politiques sans lesquels l'Aménagement du Territoire n'est qu'un mythe, un mirage.

Pour le Québec, ce choix peut se traduire en quatre croquis, il en est d'autres possibles bien sûr mais tous vont orienter nécessairement et ce de façon radicale, l'Aménagement du Territoire du Québec et ils ressortent avant tout et uniquement d'une prise de position politique. L'heure du choix est venue.

Nous voyons nettement à la lumière des données de ce cadre de vie à bâtir ce qu'est une région, ce qu'elle doit contenir, ses dimensions, qui doit prendre en mains ses destinées, quel rôle de coordination doit avoir l'État.

Nous savons maintenant que le Québec est une de ces régions d'aménagement et que l'aménagement du Québec est lié à des décisions politiques attendues par la grande majorité de la population qui croit en la marche vers le progrès de son territoire.

1 Comité pour l'aménagement et l'Expansion Economique de la Région lyonnaise, p. 46.

2 J. R. Boudeville: Economie régionale, espaces opérationnels. Cahier de L'I.S.E.A.—Série L no 3, juin 1958.

3 Il n'est pas d'exemple d'application de politique régionale réussie qui ne soit réalisée en plein accord et avec la participation étroite de la population de la région.

#### Croquis 1

...«il faudra choisir entre l'aspersion des investissements à l'échelle d'un territoire immense, sous-peuplé, sous-développé, faiblement équipé...»

#### Croquis 2

...«ou accourir au secours de régions problèmes dont on ne peut se désintéresser mais dont on n'est pas assuré pour autant que les investissements qui y seront faits seront bénéfiques au Québec où même régénéreront les régions...»

#### Croquis 3

...«il y aura le choix d'un grand axe privilégié où sont fixés les groupements humains les plus denses, doté des équipements les plus importants, le long des grands moyens de communication, ouvert sur le monde...»

#### Croquis 4

...«ou bien permettre à la région montréalaise de «forcer», d'où engorgement du réseau circulatoire, perte considérable due au temps improductif, pléthorique métropole étouffant...»



A World  
Meeting of  
**Architects**

by Andrew Hazeland









Palace of the Arches,  
Brasilia.  
Architect: Oscar Niemeyer.



The flight on Aerolineas Argentinas from New York to Buenos Aires took thirteen hours. Wearing a large blue official tag of identification I arrived in some trepidation, wondering who would meet me. The tag worked, for I was greeted by three beautiful, multi-lingual girls wearing specially designed pajama suits.

The girls swept me through customs and immigration, organized my bags and took me off to lunch at a nearby fashionable estancia-type restaurant. A 'cook out' was in progress and a tonnage of meat was being grilled over open fires. I indulged in a slow lunch.

Eventually I was off on a two hour flight to the south west, to Bariloche, over the great flat fields of the pampas—very much like our Prairies, not quite as orderly and not quite as many sloughs. We then flew over some foothills and could see our destination, San Carlos de Bariloche, situated on the great lake of Nahuel Huapi which runs some 70 miles to the north west into Chile. We landed at the eastern end of the lake. Although early spring, it was snowing. We were 41° south and apart from the rest of South America, the only other large land areas further south were Tasmania and the South Island of New Zealand.

The Llao-Llao Hotel at Bariloche was a large, clumsy edifice, beautifully situated on the lake and in lovely country, surrounded by the foothills and the snow-topped mountains of the Andes. Bariloche is the luxury skiing, fishing and holiday spot of the Argentine. Not as dramatic as our Rockies, but in many ways more beautiful with the most wonderfully clear skies and a marvellous quality of light. As the sessions started we were all very conscious of the clear, sunny, spring days outside.

Before the official sessions of the General Assembly started, Jim Langford, who is A.D.M. Public Works and I were invited to an informal meeting of the Central and South American countries. Through whispered translation of Spanish and

Portuguese we got the message: the I.U.A. had been too central to Europe. This mood was reflected in the subsequent elections.

There were 114 delegates at the General Assembly at Llao-Llao. Canada, based on the number of Canadian architects was allowed five delegates and four attended—W. Leithead, President, R.A.I.C.; N. Arnott, Vice President, R.A.I.C.; J. Langford, A.D.M., Public Works and myself.

The first session was a report given in a beautifully simple and clear way by Sir Robert Matthews. By contrast, the next item was the new draft statutes and by-laws. Appallingly long and unnecessary flowery speeches followed and from this developed procedural wrangles and a refusal by the Chair to make any ruling. One thing was clear, there was a need to establish an acceptable debating procedure for I.U.A. Also, it seemed necessary that other administrative powers be given to the Executive. In spite of confusion, lack of control, and a session running from 9:30 a.m. to 8:30 p.m. the day saw the acceptance of new statutes and by-laws.

There was further drama at the elections. Pierre Vago, who had been the first and only secretary general was to run for the presidency. He was opposed by Ramon Corona Martin of Mexico—a former I.U.A. vice president and president of the Mexican Institute of Architects. The fear of continuing European domination gave the presidency to Corona Martin by the slim margin of two votes. It must have been a very hard blow to Pierre Vago who had devoted his post-war life to the Union. He took it very well, but one was conscious of emotion and this was reflected to a degree by the tributes given Vago and by a standing ovation.





A suggestion had been made to run the secretary general's office with a troika of representatives from France, Switzerland and Lebanon. At the last moment the Swiss and French delegates were withdrawn and an unknown was put forward by Switzerland. The result was that Henri Edde of Lebanon was elected by a substantial majority. Edde is well known in the I.U.A. He is also a former Chairman of the United Nations housing, building and planning committee. He spoke highly of CMHC's President, Herbert Hignett, and his supporter at the United Nations, Robert Adamson.

There was time for fun and time for serious talk, much of it with the most interesting people. And there were some splendid outings. One glorious day there was a trip to Cathedral mountain to watch the last of the spring skiing, and a ride to the top for the dramatic views and to observe two of my Canadian colleagues in borrowed boots and skis—one wearing a dark rain coat and the other his Carnaby suit! It's always good to be able to say, when international skiing is talked about, "But have you tried it at San Carlos de Bariloche. Where? Oh, it's in the Andes!" If I had any regrets it was that in three weeks time the fishing season opened, for the area has some of the finest trout and landlocked salmon fishing in the world. They told me, "We will get you a special scientific licence" but they didn't, and in some ways I was pleased they stuck to their regulations.

In spite of the boring procedural difficulties and the exhaustion caused by listening to the translation of many flowery speeches (the I.U.A. has four official languages—English, French, Russian and Spanish) much was achieved; new statutes and by-laws, a new president, a new secretary general and executive, a new direction for the I.U.A., the building of strong regional groups and the need to focus on the emerging nations. The latter were not represented at the meetings and a number are not members of the I.U.A.

We returned to Buenos Aires to attend the I.U.A. Congress. There was an opportunity to see the city on the Sunday before the opening sessions. Buenos Aires has a population of some seven and a half million, about one-third of the total population of the Argentine. It is European in character with some large squares and avenues, but the narrow street grid layout is dominant. Traffic moves along on one-way streets with lots of hooting, shouting and at maximum speed. It never seems to stop, day or night, at least it didn't do so outside my hotel window. The city has some fine classical buildings and it was enjoyable being at the Teatro Colon, a copy of the Paris Opera House, and also seeing such new buildings as the Bank of London, a most interesting hung-reinforced concrete building.



The sessions of the Congress got off to a bad start. The Teatro San Martin was not large enough to hold the estimated three thousand delegates, in addition to many invited architectural students. The latter were in a state of protest (they had been battling police the previous week and had just elected, I was told, Fidel Castro as their Honorary President).

The students saw the Congress as an opportunity of expressing their views to an international audience. They immediately created trouble at the opening session by crowding around the rostrum and grabbing the microphone. The disruption was a most unfortunate beginning. It seemed to intimidate those who were in charge of the Congress and had spent such a long time planning it. Efforts were made to change the agenda, but after some confusion the meetings proceeded as they had been planned. However, at all times, one was conscious of the overwhelming number of people.

The theme of the Congress was Social Housing. Various projects had been submitted by countries and selected for presentation by a jury. But, because of a crowded program, there was no opportunity to have any discussions after the presentation. Listening to the translations was tiring—the voices of the authors always booming through the translations.

A number of excellent projects were put forward although most were not low-cost ones. Of the fifteen selected, I recall in particular an interesting attempt at low-cost housing in a new town built in Mauretania to house iron-mine workers—in 1957 sand and wind was all that existed—in 1963 it was a small city for 5,000 inhabitants. Other projects that come to mind were an Argentine experiment in Corrientes by Esequiel Pert, terraced housing near Vienna by Gunther Warwick, a public housing project by Balmaceda and Vazquez in Santiago, Chile, a project in Germany and one in Switzerland, a huge rebuilding project in Tashkent by the U.S.S.R. and an urban renewal by S.O.M. in Oregon. The lack of discussion was disappointing and this was a real failure, together with the unwieldy number of people within the space provided.

Concurrently with these presentations, there were four groups concerning themselves with various subjects relating to housing concerns. These were seminars fairly well attended, but the panel discussing them moved along rather slowly, generally because of the translation difficulties. Also, the Congress had an exhibition of housing in the same building as the meetings were being held. It was badly hung and appallingly lit, but there was a good program of films each night.

In spite of these disappointments, there was a real sense of belonging to a world community of architects. Also there was much pleasure in participating with our generous and warm hearted Argentine hosts in a series of very pleasant social events.

There was a day spent at an estancia where we were entertained in splendid style, fed from a huge barbecue, listened to Argentine singers, gazed at dances and watched "the duck game." The latter is played on a polo field with four players on horses. They use a ball about the size of a soccer ball but with four handles on it. The players grab this from each other, lean down and scoop it off the ground and generally work it down the field by passes and so on with the final object of throwing it through a goal, a circular net of about five feet in diameter.

I left Buenos Aires before the end of the sessions, as these tended towards closing social events, and visited, on my way back, Sao Paulo, Brasilia and Rio de Janeiro.

I had the good fortune of travelling through Sao Paulo with an Australian architect, and we spent one day there looking at buildings and being amazed by the huge crowds on the streets, the size of the city with its skyscrapers, many of which showed the influence of Niemeyer, also the solid traffic made up almost exclusively of Volkswagens, since there is a Volkswagen factory in Brazil.

I saw Brasilia under the worst circumstances; a drizzling rain, a grey day and on Sunday. This meant that the huge distances between buildings were exaggerated by the lack of traffic and people. In spite of this, I could not help but be impressed by the scale and size of this effort to build a capital in the forests of Brazil. Again, there were some wonderful buildings done by Niemeyer and even the superblocks in the residential area had been worked out carefully, special care being taken with the circulation of people and traffic, the provision of commercial and playground areas. One would have to live in Brasilia to appreciate its qualities. For a one-day visit I could not help but be impressed by the grandeur of its concept and the beautiful qualities of many of the public buildings.

My last few days in South America were spent in Rio de Janeiro. The beauty and drama of this city is well known and I won't comment about it. Two things did impress me: one was that despite the great contrast between the rich and the poor, it was possible to see a person living in a favela on a hillside close to apartment houses that were obviously occupied by millionaires, enjoying with his wealthy neighbour the lovely sand, beach and waters of Copacabana. The second, was the similarity between some of the old colonial domestic architecture in Rio and the old domestic architecture that I saw in Macao many years ago.

Two new directions came out of the I.U.A. meeting. Greater concentration on regional affairs and assistance to emerging nations. In thinking about these, it seems as if there is an opportunity for the architectural profession in Canada to work through the Canadian International Development Agency and the new International Development Research Centre of Canada, towards a program oriented to the Latin American countries and of interest and value to the larger community of nations.

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# Canadian Cities their Health, Malaise and Promise

by Daniel Cappon

**Two problems confronting us to-day are cities and universities. Both will be the subject of articles by the author. This is the first.**

## **Introduction**

Seventy percent of Canadians are urban dwellers; eighty percent will be before the century is over. All live on 1% of the land. With modern technological means, it does not take more than 7% of the working force to deliver the agricultural and fisheries products of a country like ours. Thus many can and do spend the non-working season in a nearby city. We are, therefore, an urban society. What then, are the characteristics of a city providing an adequate environment for such a society?

## Characteristics of a City

*Size* is a vital feature. A million or more make a metropolis—

Canada has two of them with one, Toronto, contributing more to the Federal coffers than 7 of the provinces (outside Ontario & Quebec) put together; specifically \$2.25 billions per year, or 40% of Ontario's tax revenues.

A city of 400,000 to half a million is large enough to demand, for instance, a 21st century completely up-dated rapid transit system, such as "personalized transit" and "dial-a-bus" and automated services. Canada has a few cities of that size, or coming up to it, like Vancouver and Winnipeg.

A city of 100,000 rarely, if ever, becomes a ghost town. It becomes established in history. Half of our provincial capitals are in this category; the twin cities of Ottawa and Hull, Kitchener and Waterloo, the Lakehead cities and of course Hamilton, London, Victoria, Calgary, Sudbury are surpassing this point of no return. In antiquity, a city like Athens could be great with only 100,000 people.

The rest of our cities, with the exception of such areas as that from Hamilton down the Niagara Peninsula, and therefore the majority are small cities, are still buried deep in the Canadian rural bosom. In effect nearly a quarter of our population lives in our two metropoli.

*Density* is another important characteristic. Successful cities like Florence and Bath and perhaps London have a reasonably high density, especially at the core. Perhaps an ideal mean is 25,000 persons per sq. mile. The two extremes 500 - 1000 people per sq. mile (Canberra) and 100,000 (Tokyo and New York), are deadly, in opposite ways. With density goes architectural and human variety; opulence—economically and culturally, also spontaneity of exchange and excitement in encounter. Satellite cities, even new cities, suburbia, and often specially fabricated capitals like Canberra and Ottawa, Brazilia, are usually dull, low density dormitories. Below a density of about 3,000 people per sq. mile cities become a poor compromise between town and country and give way to the alienating and poisoning motor car. They suffer from perceptual monotony and a social conformity which includes neurotic hang-ups. Los Angeles is the best example of low density massive scale disaster.

We have only two cities, perhaps three, with a sufficient mix of densities. We need more. London, for instance, badly needs to build itself tightly about a center or two, and hug it so as to avoid the deadly sprawl, before it reaches a quarter of a million.

*Form* is essential to a city. It must have a memorable skyline; furnish a cohesive picture; give a total impression; provide foci for orientation and stimulate an esthetic reaction. Once seen, Athen's Acropolis is unforgettable; so is Rio's Sugar Loaf mountain and the Hong Kong bay. A

river, a falls, a lake, a mountain, help. Calgary, Vancouver, Victoria, Montreal, even Fredericton and Ottawa certainly Quebec City have an advantage in this respect. Toronto will continue to have a tough time until the lake is laid bare and incorporated in the mental picture of Torontonians. But Moose Jaw, Edmonton, London, North Bay, St. Catherines, you name them—are badly in need of definition. The fact is that with few exceptions, to paraphrase Spiro Agnew's oratory, 'if you've seen one Canadian medium-sized city (the majority) you've seen them all' Architects and town planners are trying to implement better designs, but they've got to try harder and, what's more to the point, they've got to be backed up by the people's civic pride and their desire for an effective form of government.

*Tradition* is something one cannot buy. It comes with time and historical events. Together with form, tradition tends to give a city its character. This is what makes London and Paris and Rome great. This is what makes its inhabitants special; Londonners, Parisians, New Yorkers, rudeness, arrogance and all. Not only does Canada lack tradition, because of her youth, but it has rejected—except in Quebec recently—most of the traditions that could have been imported. Consequently, there's very little tradition in the cities of Canada that is not provided by a parking spot from which to watch the railway cars go by, or provided by The T. Eaton Co. The exception is Quebec City, a city giving the semblance of having a soul, albeit a recently much burdened one.

Tradition, of course, can be built. Montreal had Expo '67. The city needs only to grow from there and with the staging of the 1976 Olympic Games, looks like doing so.

*Character* and tradition may be the most important qualities for the survival of the city, when paper and filing cabinets and offices become obsolete as a result of telemetry; because they form a learning environment. It may well be that the most likely future use at least of the core of cities is that they become a school territory.

*Heterogeneity.* One of the consequences of large size and high density in urban living is the increased likelihood of a rich mix of people. This is where the company town fails to stimulate the psyche and where the dormitory corridors of suburbia, given over to a classless society, show the city shut down at night. We do have two cosmopolitan areas, the two metropoli, perhaps three with Vancouver thrown in, whose ethnic groups thrive against a solid native background. Of the two, clearly Toronto has a much greater future, in the short run, while Montreal is busy frightening off both a varied fund of human resource and capital. It is perhaps an irony of fate that the inhibiting and discriminating WASPS should eventually



## Canadian Cities their Health, Malaise and Promise

provide a more solid and more tolerant social background to a mix of peoples, than the culture-loving Gallic stock.

*Circulation and Transportation.* The ideal compromise is one between downtown pedestrian spaces, or at least large malls for the confluence of people, and rapid transit, preferably a system radiating out to give easy access to the hinterland, to the great Canadian out-of-doors. It is perhaps at this point that I should assert that among our many good fortunes is the fact that we are young—McLuhan chooses to call it primitive—and that our cities are growing from a frontier type of ribbon form—off main streets or else in radiating star fashion.

One of the things that is killing American cities is their fatally concentric growth and segregation. Their urban divisions are:

- a an inner ring, where visitors come and go but where 40,000,000 militant poor live—half black, half white;
- b outer rings where the white rich middle classes live along socially stratified corridors and within quite tight ethnic and religious boundaries;
- c what I call the blue pasture land, where the WASP aristocracy dwells in splendid isolation, even from various vintages and factions of its own kind.

We must never allow expressways and traffic circulation to ring our cities and thus become traps for our citizens, but rather we must build bridges, physical and social, from the centre outward to the periphery, to all points of the compass and thus attempt to prevent rigid ghettousing.

Quite ridiculously, even our small towns are getting choked during the rush hours on the main streets. There is nothing here that the will of the people translated into effective forms of Government and proper economy, could not solve by means of the simplest methods of human and transportation engineering.

*Housing* is a paramount characteristic of a city. Its components are land usage, the dwelling or enclosures and the cost of money. Like all countries Canada is short of housing stock. It needs around half a million habitable houses. Like all countries, Canada has its share of sub-standard housing, perhaps 20% are in need of repair, renewal or the bulldozer. But unlike most countries in this predicament, Canada is among the three or four wealthiest in the world; it has the second largest land mass in the world; and it is one of the most sparsely populated countries with a total no larger than that of a large Balkan country. What is more, some of the best designers are Canadian and our technology is superb. Also, thanks to our neighbours to the South, we are relieved of a large burden of defence and generally spared from pulling our share in the world. Thus, there's no excuse. Yet, the most ridiculous situation we find ourselves in is that Toronto has by far the costliest land

price anywhere. Ten percent, say 15% is a reasonable land price out of the total cost of a private shelter. In Toronto it is 50% and this is totally unacceptable. Solutions are available, and they are urgently required. Helmyer had one and he resigned.

Even the cost of money could be remedied, to a large extent, if we redistributed the power in such a way that the public sector pulled together. After all, as Henry Ford said, money is only a transportation system, conveying goods from one person to another.

The housing crisis is not only soluble, but Canada ought to have the finest homes in the world. It possesses the materials, which are less expensive than elsewhere; and it has the know-how. And the Italians, that splendid body of men who build roads and cities, are with us. Unfortunately, so are American union methods.

Admittedly we have only patches of urban blight in Toronto or St. Johns; slightly bigger ones in Montreal, but they are absolutely intolerable; even if they occur in Kamloops and in the Shanties of the Northland.

*Industry, Manufacture and Commerce* of course support the cities. Ideally they are environmentally integrated in city life—not sprawled over large distances. Also, ideally, there should be a sufficiently broad portfolio of industries supporting a city, so that the collapse of one—like mining in Sydney or agriculture in Winnipeg or shipbuilding in Halifax or nickel in Sudbury—should not render the city a ghost-town. Yet, industry should be specialized enough and big enough (in the French Style) and sufficiently related to world markets so as to ensure prosperity. Certainly the origins of the city are intertwined with the extension of the market place. And this should be given lucid visibility as well as symbolical space and significance: like Covent Garden in London, or the insurance companies in Zurich or the Bourse in Paris or the docks in San Francisco, Copenhagen and Oslo, or the jewellery stores on the Copacabana in Rio or the bazaars of Bombay or the market in Mexico City. It is vastly important that the North American pastime called shopping be related to the cultural life of the market-place, to the live arts and the cinema. Aneamic attempts at this are detectable in Toronto, Montreal and Vancouver, but their flavour and taste is lacking. We need more, much more.

This brings me to one of the main bodies of this exposition. What are the sites, the places, that make a city what it is? What compensates man for becoming urban and relinquishing pastoral splendour and how much of that splendour can be restored to him? What are the foci of civic pride and the nerve centres of the city?

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## The Ingredients of City Sites

Here's a list in no particular order, ranking the sites that make a city.

- 1 *Cultural sites:* for the performing arts, like music; for the exhibiting arts—like museums; for sports—like hockey arenas, colourful spots like Yorkville in Toronto, or the R.C.M.P. H. Q. in Regina (that was). This includes street scenes like the Santa Claus parade or the Highland games at Cape Breton or the carnivals in Rio or New Orleans.
- 2 *Business and Commercial sites:* where the banks, the Trust companies, the large retail stores and the Stock Exchange reach for the sky. Where restaurants and boutiques reach into the earth. This is where opulence and the stomach, personal adornment and good conversation meet.
- 3 *Communication network:* where television, radio, newspapers, the film and book industry reign supreme.
- 4 *Government:* including political party headquarters, the hall of justice—precincts of police—where at times, and in places, as in Toronto, the City Hall lends a heart to the city, yet the throb comes from the skating rink (as in Rockefeller Centre) and from the children's voices.
- 5 *The Transportation network:* where planes, taxis, subway, bus and railway and cars should be truly co-ordinated. In Canada, for instance, the International Airport in Toronto is potentially the front door, at present held ajar in Montreal. It is where immigrants and business men come, where tourists fly in.
- 6 *Health Services:* these can become the focus of a city, as in the spas of Bath or Bohemia. More importantly they offer security to visitors and citizens. They are often a matter of pride—as was the case in Bologna, Italy or in Montpellier, France, or in Edinburgh, Scotland. This should have happened in Baltimore where Johns Hopkins has recently dominated the world of medicine, but it did not turn out to be a significant civic asset because this great medical institution failed to relate itself to the poor of the city. Pride in health services could be the case in Toronto, where the medical personnel if not the environment, is superb.
- 7 *Parks, Recreation and Conservation Areas:* these are a bid to restore "nature" to urban man, as in London and Paris, and also to link him with his past, as in Copenhagen and Stockholm; they also link him back with the rest of the animal and vegetable kingdoms, again, as in the Zoo of London or the botanical gardens of Rio. Parks, of course, can become social disaster areas, like New York's Central Park.
- 8 *Architectural Sculptural Monuments and Street furniture:* give form and beauty to a city. These, together with tradition and Michaelangelo made Rome. Certainly, the dirty Tiber does not add to Rome's glory.  
Street furniture when unobtrusive adds elegance and clarity to the city and where it is visible like lights it may add excitement as well as luminosity.
- 9 *Homes and Gardens:* this includes the dreaded high-rise, as much as the posh residential districts, like Hollywood's, to which the taxi-driver and touring bus hurries the visitor.  
The squares, the parks, the streets in the downtown core should be made for walking, the monuments for walking to and around. It is these and the homes and gardens which separate the viable European city from the North American asphalt jungle.
- 10 *Secular and Divine Institution:* certainly time was, and still is, when the monuments man erected to house his gods dominated the city and gave it form if not reason for being. This is so in Florence, Rome, Constantinople and old Dehli. Yet community centres and even private clubs can do something not dissimilar for a neighbourhood, or even for a city, for instance the Gymkhana clubs of Bombay, the pukka sahib's club of Imperial India.
- 11 *Industrial Parks and Manufacturing centres:* these can be tourist attractions. In Venice you go to see how glass is blown, in Scottish towns you see how the tweed is woven. Certainly the glowing slag at Copper Cliff at night could be dramatic if it weren't so noxiously earth-scorching. The Don Valley in Toronto has made itself into a remarkable dwelling and working mix; and Sheridan Park in the heart of the Toronto-Hamilton aggregate demonstrates that industrial research can be a show place.
- 12 *The Seats of Education:* these have threatened to wrest from church and government (the Town Hall) the place of honour in the centre of the city. But education has turned out to be somewhat of a can-can show, with periodic fashion vogues dictated more by taste than by science. Students have differing ideas as to what they want to do with these institutions. Nevertheless some of the most exciting examples of Canadian architecture are in Universities: Simon Fraser, Scarboro' and presently at York, Calgary and Halifax.



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Perhaps I should leave the sites that make a city to an even dozen. The purpose of this enumeration was two-fold; to point out some of the essential ingredients of a city and to suggest that their form and structural relationships, as well as their social and functional usages, can give a rich organic integrity.

If there were some of the line-drawings and shadings that sketch the city as it is or as it might be, what are some of the criteria, the indices on which one can measure or at least evaluate the essential purposes of a city? How might the health and success or the illness and failure of its dwellers be estimated? To this purpose the following list of possible indices was constructed.

## Indices of Malaise

### A Psychiatric, reflecting reaction to stress

- 1 Psychotic rate (annual hospitalization) perhaps the problem of downtown and inner city cores.
- 2 Need for psychiatric care, perhaps the problem of suburbia and high-rise.
- 3 Completed suicides; notoriously high in some university populations.
- 4 Rate of sexual deviance; which tends to concentrate in cities.
- 5 Rate of hard drug usage; which also concentrates in cities.
- 6 Alcoholism, omnipresent.
- 7 Rate of repeated self-caused accidents (proners), like one-car accidents—an indirect index of mental health.

### B Social I. Marital, reflecting broad trends in society

- 1 Rate of run away children, an index of unhappy homes.
- 2 Rate of run away adolescents, ditto.
- 3 Rate of child neglect.
- 4 Marital breakdowns.
- 5 Rate of common law relationships.
- 6 Rate of desertion or one parent households; a social concomitant of poverty.

### Social II. Criminological, all of which tend to concentrate in the city.

- 1 Homicide rate.
- 2 Juvenile arrests.
- 3 Adult arrests.
- 4 Rate of crimes of violence (apprehended or not).
- 5 Rate of attempted suicide.
- 6 Rate of arrested sexual deviates.
- 7 Rate of arrested drug users.

### Social III. Environmental, reflecting physical blight and social stress

- 1 Percentage of unfit housing units.
- 2 Crowding in terms of room occupants or persons per acre or square mile. The threshold of overcrowding being the number of persons exceeding the number of rooms occupied.

### C Health and Medical

- 1 Infant mortality, reflecting ignorance and neglect.
- 2 Infant morbidity, ditto.
- 3 Rate of nutritional deficiency—an index of poverty and ignorance.
- 4 Incidence of child lead poisoning; an index of child neglect.
- 5 Rate of venereal disease; an index of neglect.
- 6 Rate of tuberculosis; also an index of neglect and poverty.
- 7 Rate of poor child dental care.
- 8 Rate of illegitimate pregnancies—an expression of rebellion, or ignorance and neglect.

### D Economic

- 1 Rate of families at poverty lines.
- 2 Rate of families at subsistence level.
- 3 Male unemployment (annual) rate.
- 4 Unemployment of females as a percentage of the labour force available.

### E Educational

- 1 Drop-out rate of 16-18 year olds.
- 2 Percentage of men in population over 25 years with eight years or less of education.

Here, for what they are worth, are the Metro Toronto rates available in relation to an arbitrary threshold of malaise and then again compared with the Metro Baltimore figures: —→

In order to obtain these statistics (which are largely available to me from Baltimore and from which I constructed an arbitrary mean), and apart from consulting standard words like that of D.B.S. which is ten years out of date and not very useful since it is given in census tracts, I approached some ten types of ministries, agencies and friends. The greatest difficulty was that figures, where available, were not related to Metro or even to the city. People are not yet city oriented. In some instances, as is the case of lead poisoning in children or mental hospital admissions, this would necessitate a special research. Other times, as in most of the social problems and drugs and alcoholism rates, the facts are simply not available. By far the most useful figures came from the Metropolitan Police Force through the direct co-operation of Police Chief James Mackay. The doctors really tried to be helpful but did not quite have the answers because it would take a special research project. Agencies, like the Children's Aid lacked the courtesy even of acknowledging the enquiry. The Provincial Ministers who could, replied through their departments. This finding is in itself significant, perhaps of Canadian complacency.

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Index	Toronto rate	per population	Threshold	Baltimore
<b>A Psychiatric</b>				
1. Annual hospitalization	4	1,000	10:1,000	20:1,000
2. Need of psychiatric care	4 (receiving care)	100	1:5	Higher <sup>1</sup>
3. Suicide (completed)	10.9	100,000	10:100,000	Unknown
4. Sexual deviance	Unknown		10:100	Unknown <sup>2</sup>
5. Hard drug usage	Unknown		1:1,000	Some 25:1000 <sup>3</sup> inner city
6. Alcoholism	Unknown		5:100	much higher
7. Repeated self-injurious accidents (or one-car accidents)	Unknown		10:100 accidents	Unknown
<b>B I. Social</b>				
1. Runaway children	2	100 children	Unknown	Unknown
2. Runaway adolescents	2	100 adolescents		
3. Child neglect	Unknown		1:100 children	Unknown
4. Marital breakdown (divorce)	.6 (approx. estimate)	1000 population	10:100 marriages	Unknown
5. Common law relationship	Unknown		10:100 marriages	Unknown
6. Desertion or one parent households	Unknown			50:100 inner city
<b>II. Social Criminological</b>				
1. Homicide	1	100,000	10:100,000	Higher
2. Juvenile arrests	8	1,000 juveniles	10:1,000	27:1,000
3. Adult arrests	(total 60,000 or approx. 30)	1,000	40:1,000	56:1,000
4. Crimes of violence	2.6	1,000	5:1,000	Unknown
5. Attempted suicides	total 596 or approx. 30	100,000	Unknown	Unknown
6. Sexual deviate arrests	2.74	100 criminal code arrests	10:100	Unknown
7. Drug user arrests	0.475	100 criminal code arrests	Unknown	Unknown
<b>III. Social Environmental</b>				
1. Unfit housing units (in need of major repair)	2.1 (in 1961)	of 100 total occupied dwellings	5:100 housing units	10.3:100 <sup>4</sup>
2. Crowding	9.8 (in 1961)	of 100 total occupied dwellings	5:100 housing units	10.5:100
<b>C Health</b>				
1. Infant mortality	17.4	1,000 live births	20:100 live births	28:1,000 <sup>5</sup>
2. Infant morbidity	Unknown			Unknown
3. Nutritional deficiency	Unknown	negligible	0%	15:100 infants inner city
4. Lead poisoning	Unknown		0%	Unknown
5. Venereal disease	Unknown		0%	Unknown
6. Tuberculosis	Unknown	1,000 population	10	14
7. Poor dental care	Unknown		10:100	perhaps 25:100
8. Illegitimate pregnancies	Unknown	100 live birth	5	23:100

1 1:2 in Mid-Manhattan, N.Y.

2 The city has "The Block" a centre of world pornography.

3 Drug users steal some \$75-150 million dollars worth of goods each year.

4 Nearly 20% deteriorating and substandard.

5 Some 40% in 1,000 live births in inner city.



# Canadian Cities their Health, Malaise and Promise

Index	Toronto rate	per population	Threshold	Baltimore
<b>D Economic</b>				
1. Poverty line families	11:1 under \$2,000 annually	of 100 male earners per population	10:100	15.2:100 (less than \$3,000 annually)
2. Subsistence line families	very few		1:100	4.6:100 (less than \$1,000 p.a.)
3. Male unemployment (annual)	4	100	5:100	6.6:100*
4. Unemployment of females as a percentage of force available	Unknown		3:100	5:100
5. Welfare (persons under 21 on welfare)	0.3	100 persons	1:100	17.3:100
<b>E Educational</b>				
1. Drop-out of 16-18 year olds	Unknown		15:100	20:100
2. Percentage of male population over 25 yrs. old with 8 yrs. or less of education	Unknown		25:100	51:100

\* Over 20% are under-employed.

A city, a community in transition becoming healthier, would tend to *report* mental illness, crime and disease more often. Consequently in the phase of development between an inchoate vicinity and a community there will be a *rise* in these rates of malaise. Ultimately, of course, all these indices would fall and flatten out.

A sick vicinity shows indifference. The citizens do not help another when in distress. Hospitals, courts and other institutions reflect this basic indifference and the standard of service is low.

A sick city, robbed of its rural grape-vine like the telephone party-line information system, and not sufficiently interested in neighbours or in people even to gossip, suffers from a dramatic information gap. The residents of such a place don't know who the Prime Minister or the Mayor is; where the capital is; how large their city is; where to find medical, dental or financial help or how to shop. Still less do they know how to eat, sleep or play effectively. So much so, that about the only frontier post in this kind of no-man's land, is a day-care centre where at least the youngest members of the vicinity can sleep, rest and maybe learn.

What are some of the criteria of *successful* urban living interior? Clearly it is more than the absence of malaise.

- 1 Socially viable neighbourhoods with continuity, if not tradition: would have as many people as one can become acquainted with in a lifetime—probably 10,000—centered in conglomerates forming communities of some 10 such neighbourhoods aggregated in larger units up to a metro level (10 x 10 x 10,000). This may mean “ghettos,” for likes attract likes in neighbourhoods. While the neighbourhoods may tend to be homogenous the communities, of which they are a part, need not be so.

- 2 A double identity and an allegiance is desirable: one with the neighbourhood and a further one with the city, which is eventually extended through to province or State and to nationhood and beyond. This transcends the ghetto and extends the aggregate into large diversities of peoples united in a feeling bond.

- 3 Cultural enrichment is an essential of a successful city: this is achieved through active participation in the live arts, in exhibits, in sports, in club life, in political life and through the acquisition of civic, preferably regional, power in balance with central or federal power, where the citizen can express his preferences and his will.

- 4 High standards in educational and employment opportunities and their performance: this includes continuous experimentation and innovation both while learning and while at work.

It can be measured in terms of the number of significant social transactions counted by communications emitted and received between the people within a city.

- 5 Dignity and power: the citizen of a successful town must be recognized for what he is, with full rights. He must have dignity in the knowledge that he is master of a significant portion of his personal destiny and also master of a different and equally significant portion of his corporate destiny. This may or may not include land and home ownership.

- 6 Welfare: in a successful city welfare operates in a total system which comprises all the main meanings of the root word namely, well being, wealth and wholesome-ness. The purpose is to give each person an opportunity to develop his potential.

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7 Information and communication: the successful citizen knows what's going on—in his neighbourhood, in his city, in his county and in the world at large. And also he knows how best to relate to these various orders of human organization.

8 Beauty and character: a great city is not a monument like Brazilia, New Dehli or Hitler's Berlin; nor is it necessarily beautiful like Venice or Florence but it does present instant recognition like Athens and Rome, in skyline, and like Manhattan, both by day and by night.

A real city is alive, day and night. On these criteria most American cities are ghost towns at night and therefore not real cities.

By the same token a great city has a large leisure class, seeking and getting a vast range of pleasures.

9 In a well-planned city the element of danger is sought: it should be found. At all times some of the young citizens seek challenges often to limb and occasionally to life itself. This in order to discharge their surging energies, to sharpen their mental and physical alertness and to test the strength and quality of their courage, and sometimes, alas, as a show of mere bravery. This function the city should provide, as a good in itself. Failure to do this may divert young energies from a healthy to a sickly path so that the test of oneself becomes an attack upon others.

The means for providing outlets for these primarily male youthful pursuits may be on conventional lines—such as athletics, like especially constructed hills for skiing and for fast toboggan runs and even for rock climbing in the summer; arenas for contests such as boxing, judo, karate and fencing; pools for skin and deep-sea diving; hard steeple-chase courses for horse riding and so on. Imaginative, unconventional means must also be found to provide thrills and spills, for instance, in different kinds of racing in all sorts of different vehicles; or climbing high towers or parachute jumping and gliding. Clearly there is plenty of room here for innovation so that those who need these kinds of challenge most and can afford the means for discharging these energies least, that is the poor and the kinetically deprived, may find ample access to them as part of a project in recreation.

Given these criteria, the final question is this: what can the Canadian experiment in urban living achieve for this country, and for the world, in offering possible models of successful cities?

## The Canadian Experiment

Canada is the most comfortable country in the world to live in. To be a Canadian is to command respect everywhere. These advantages might be considered to be more the result of good fortune than of purposive achievement. Clearly we owe to ourselves and to our fellow earthlings to show what can be done when all the odds are in one's favour.

For instance, we have two city states: Toronto and Montreal. How can their environment be optimized? Clearly here is an opportunity to create two model, regional governments working in (constitutional or revised) relationship with the Federal Government and mediated by the provincial Government in order to implement ideal long and short term plans for the area. To this purpose one might assemble say 100 square miles of land-banks in each region, serviced locally through Federal loans. But, in order to assess the optional method for bringing down land prices one would allow private developers to buy and sell the land in Toronto (for it is time Toronto had some little advantage of its much favoured sister) while requiring government to do a good job of all three functions (assembly, servicing and selling land) in the Montreal region. This type of controlled experiment would prove which method is better. The basic principle worked in Saskatoon. At the same time both towns should build up a high density core and sub-centres so as to prevent a mere peripheral sprawl.

Similarly, the various methods for eliminating urban blight might be carried out on macro-environmental scales—with charettes and advocacy planning, open-ended systems and adequate feedbacks and favouring renewal in one area (like Halifax) but using imposed planning, closed ended system, and favouring the bulldozer in another area (like Winnipeg).

Cultural links built environmentally across various barriers, without bilingualism might be experimentally contrasted with honest bilingual attempts and the results should be judged on common criteria. Ghettoing and integration might also be compared for optional results in terms of the involvement of the various social units.

The challenge of the north might be accepted nationally rather than provincially. That particular piece of real estate could well turn out to be one of Canada's most precious possessions. And the limits of man creating his own total environment could be tested there. Should the city ultimately fall, as Ghandi wished and Mumford and McLuhan predicted, should there be a return to the land in a leisured society of tomorrow, urban Canada should be a ready forerunner. Already Canadians, with their prefab cottages by a lake and now the in-farm buying craze are engaged in a serious process of ruralization. A partial abandonment of the city, at least its suburbia, may be around the corner. This



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may be tried first in Canada, where the more opulent might manage their business affairs from a distance.

In order to make a valiant attempt however, the Canadian experiment must be underwritten by the whole nation, not by fragmenting, separating factions. At the very best a divided Canada means only one surviving independent sovereign state—Ontario—then at the very best we would have to follow a model no larger or better than Sweden.

Also in order to succeed, Canadians would have to muster maximal moral strength. This means the end of smugness, hypocrisy and fence-sitting and the acceptance of an international role in keeping with the capacity of this nation. And this in turn means minimal reliance on the United States. It means that we have to own ourselves, in terms of land and industry, even if we cannot achieve as much fiscal independence as the Scandinavians have. It means research to ensure independent technological and scientific competence—which is wealth in itself. It means not ignoring outer space. And it means responsible trade offs: if we are to rely on the U.S.A. for defence, we must at least pull our weight technologically in underdeveloped countries and thus bring many of them under the socio-political influence of Canada (e.g. O.A.S.).

Above all it means cleaning out our own house and thus showing the Americans to a point (the difference being that we do not have their racial problem) how best to treat the problem of poverty.

It certainly means ceasing all aspects of pollution before Lake Erie is irrevocably lost; that is within five years. It probably also means that we must have the guts to face squarely the moral and the practical issue of whether we are going to share our land with the overpopulated and underprivileged countries and if so, when, with whom and how. Specifically, how are we going to face the Chinese pressure for exodus out of Hong Kong, once we have recognized Red China (seventeen years later, than when it might have been politically innovative).

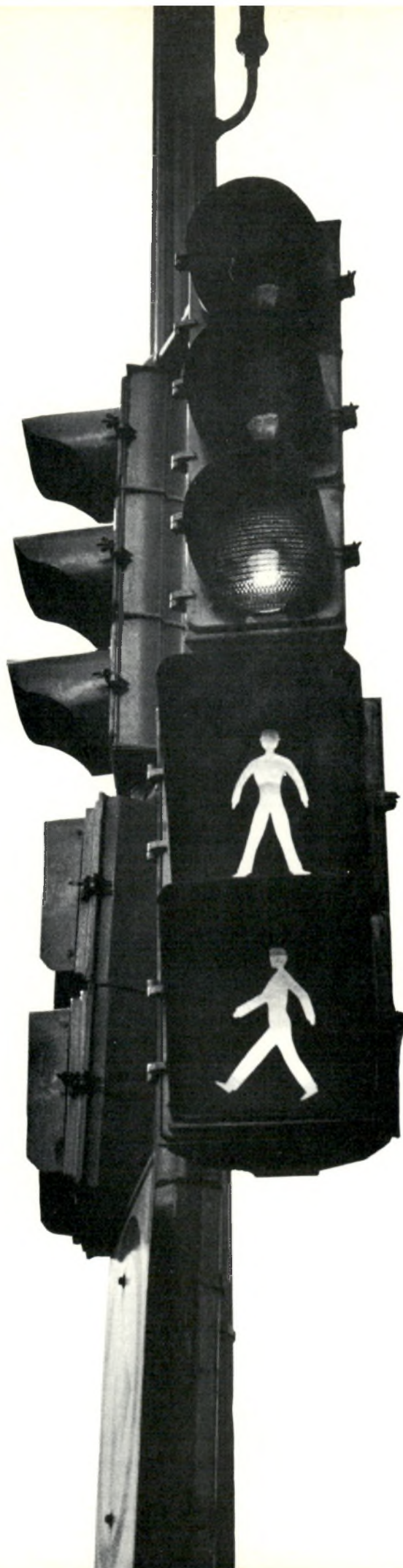
I suspect, too, that if we followed the ways of other nations, in the paths of dissent if not violence, sheering off into smaller and smaller factions and mismanaged by a world of increasingly emasculated males, we would not succeed.

We would stand a better chance if we showed courage and imagination on a grand, socially re-designed scale whereby, for instance, we might transform the traditionally man-to-man and woman-to-woman stance (in a literally homosexual) society into a truly heterosexual society, in which both sexes moved freely, though differently; and in which both sexes were rewarded equally for their joint competence in decision-making and in performance throughout the realm of socio-political activity.

Surely we cannot do all these things all at once. Neither can we succeed by doing them one at a time, in an order of priority, for priorities of this sort are for the birds... of linearity and we live in a mosaic, in a system of patterns. Rather we must work on a system, on an ecological, an holistic approach. As Canadians are probably the most future-orientated and internationally-minded people on earth, we have in this respect once again an enormous advantage.

Therefore with our power throttle wide open, we might do *some* of these things all at once; and do more with a vast vista sweeping before our eyes, operating in broad general patterns, yet consolidating details as we experiment along, until the job is done. And if we did all this and some; and if we addressed ourselves energetically to urban living, then the twenty-first century at least might well belong to Canada.

This article is based, in part, on an address given to the Unitarian Fellowship of London.



## Réseaux piétonniers

par Mme Gisèle Thiry

**Analyse et observation expérimentale des réseaux piétonniers dans un environnement résidentiel en zone urbaine.**

### **Abstract:**

The aim of this study is to identify, develop and describe some of the principles that regulate the planning of pedestrian networks, and to demonstrate a method for the analysis of these networks, so as to provide a means of optimizing their design. This study was limited to pedestrian circulation in an urban, residential context.

Initial observations of both historic examples and several current proposals lead to the identification of these basic, interacting characteristics of pedestrian networks: structure, utilization and growth. These were used to set out the working hypothesis of this study.

Through "structure", a topology of pedestrian networks was established and the notions of hierarchy developed.

Through "utilization" it was found that community facilities located in a pedestrian network are distributed according to regular empirical models that are explained from a theoretical point of view. Furthermore, we outline and describe the patterns of pedestrian movements.

Through "growth" the rate and basis of growth were analysed.

These methods of analysis were subsequently applied to nine pedestrian networks. Six of these (Eltendorf, Cordes, Berne, Biskupin, Boras, Monpazier) were drawn from documentary sources, and three (San Francisco, Savannah, Montreal) were studied on site.

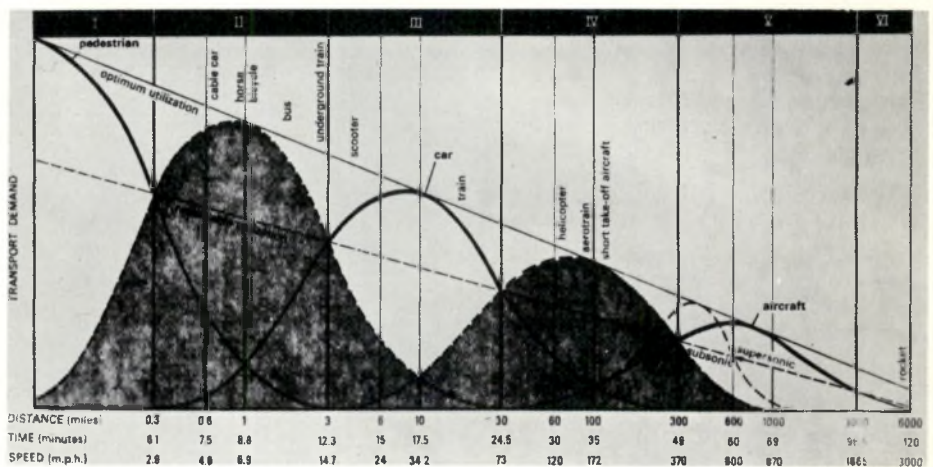


Même à une époque où les moyens de locomotion se sont fortement développés, le déplacement piétonnier a gardé son importance. Gabriel Bouladon (The Transport Gaps, Science Journal, April 1967) met en relation la distance avec le nombre de passagers utilisant chaque type de moyen de transport. Selon cette étude, il apparaît que plus la distance est faible, plus on a intérêt à se déplacer à pied. Ce résultat aurait pu être prévu de manière intuitive, car plus courte est la distance, moins rentable est le temps perdu à prendre possession du moyen de transport.

Le diagramme de G. Bouladon montre que pour une distance de l'ordre de 0.3 mille (environ 6 minutes à pied) ou moins, il n'y a pas de moyen de locomotion concurrentiellement efficace le déplacement piétonnier. (Fig. 1)

Fig. 1  
Graphique comparant le nombre de passages en fonction de la vitesse.

Ce graphique est obtenu en portant sur l'axe vertical le nombre de passagers, et, sur l'axe horizontal la distance de déplacement. La distance de déplacement est divisée en six domaines dont I-VI sont clairement définis comme ceux du déplacement piétonnier, automobile et aérien. Les courbes grises en II et IV montrent une déficience des moyens de transport appropriés à ces distances. D'une manière générale, les voyages courts sont plus fréquents que les longs.



Le but de cette étude est de décrire le principe ordonnateur des réseaux piétonniers, de valider une méthode d'analyse et aussi d'aider à optimiser la planification de ces réseaux. Cette étude est limitée aux réseaux piétonniers dans un environnement résidentiel en zone urbaine. Nous constatons l'interaction de trois caractéristiques fondamentales: structure, utilisation et croissance.

La structure du réseau piétonnier cherche à identifier la disposition des différents éléments (parties du cheminement piétonnier).

Les caractéristiques des éléments sont le type, la dimension, la formation et le principe ordonnateur hiérarchique. Le type du réseau piétonnier exprime l'essence de l'ensemble des éléments constituant celui-ci. Les éléments de la structure du réseau piétonnier peuvent être indépendants ou faire partie d'un groupe d'éléments appelé sous-système ou encore constituer en eux-mêmes un sous-système. La formation et la dimension des éléments permettent entre autres de reconnaître l'ordre hiérarchique dans la structure du réseau piétonnier.

L'utilisation du réseau piétonnier cherche à identifier les activités des éléments, c'est-à-dire les générateurs, comme habitations et institutions collectives, et les différentes parties du cheminement piétonnier qui font partie du système.

Les générateurs sont des éléments qui fournissent ou absorbent le trafic piétonnier, et, par là, décident de l'activité sur ce réseau piétonnier et par conséquent de son utilisation. Il faut différencier entre les générateurs collectifs-publics et individuels-privés. Les générateurs collectifs-publics sont, en général, des lieux centraux qui sont susceptibles d'être fréquentés par un grand nombre de gens.

De ce fait, les critères centralité, accessibilité et efficacité sont élaborés au cours de l'étude originale.

Dans la grande diversité des activités dans un réseau piétonnier, on cherche à identifier les patterns de mouvement.

L'utilisation différente des éléments du réseau piétonnier fait apparaître un ordre hiérarchique qui peut être indépendant de la hiérarchie donnée par la structure du réseau.

La croissance cherche à identifier si un agrandissement du réseau piétonnier peut se produire, à quelles conditions, selon quels principes d'organisation et de quelle importance.

Sous les aspects structure et utilisation, des critères sont identifiés qui permettent de reconnaître le principe d'organisation sans tenir compte du facteur temps. L'aspect croissance met en relation le temps avec le changement de structure et l'utilisation d'un réseau piétonnier.

Pour cette raison les caractéristiques flexibilité et variabilité sont élaborés au cours de l'étude originale.

Les caractéristiques fondamentales trouvées sont développées en détail par la suite. Elles servent de base pour les analyses des exemples de réseaux piétonniers choisis et elles sont examinées pour confirmer leur validité (Fig. 2).

Cette méthode d'analyse est appliquée à six réseaux piétonniers (connus par la bibliographie) Eltendorf, Cordes, Berne, Biskupin, Boras, Monpazier (Fig. 3), et à trois observés expérimentalement sur place.

- San Francisco, Sunset Park Side District, California.
- Savannah, Old Savannah District, Georgia.
- Montréal, Saint-Denis, Québec.

Fig. 2

Le tableau donne les propriétés des réseaux piétonniers étudiés.

- réponse positive—la caractéristique est observée.
- réponse partielle—la caractéristique est observée mais sans certitude.
- sans réponse—la caractéristique n'a pas pu être observée.


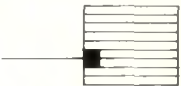



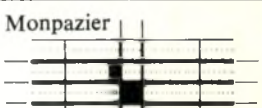
Les critères qui apparaissent sur ce tableau comme (linéaire simple, linéaire composé, etc.) sont élaborés en détail dans l'étude originale.

Note: hier.—hiérarchie  
change.—changement

Eltendorf	Cordes	Berne	Biskupin	Boras	Monpazier	San Francisco	Savannah	Montréal	
●									linéaire simple
	●	●							linéaire composé
									non-linéaire simple
			●	●	●	●	●	●	non-linéaire composé
		●						○	Tri-dimensionnel
●	●	●		●	●	●	●	●	relier
●	●	●	●	●	●	●	●	●	définir
●	○	●	●	●	●	●	●	●	répéter
	○	○	○	●	○	●	●	●	mettre en séquence
○	●	●	●	●					sélectionner
●	●	●	●	●	●	●	●	●	dimension-éléments
●	●	●	●	●	●	●	●	●	hiér. direction
		●		●					hiér. densité
●	●	●	●	●	●	●	●	●	hiér. formation
	○	●			●		●	○	hiér. superposition
●		●				●	●	●	centralité linéaire
	●	●		○	●	●	●	●	centralité surface
●	●	●	●	●	●	●	●	●	accessibilité
●	●	●	●	●	●	●	●	●	efficacité
		○				●	●	●	patterns-mouvement
●	●	●	●	●	●	●		●	hiér. utilisation
		●			●	●		●	chang. intérieurs
●		●				●		●	micro-croissance
●	●	●					●		macro-croissance
	○			○					croiss. mono-nucléaire
									croiss. multi-nucléaire
●	○	●			○				croiss. lunaire



Fig. 3  
Tableau synoptique des types de réseaux  
piétonniers étudiés.

L'ordre de complexité	Réseaux linéaires	Réseaux non linéaires
Peu différencié	Eltendorf 	Biskupin 
Différencié	Cordes 	Boras 
Très différencié	Berne 	Monpazier 

L'observation expérimentale a porté seulement sur des réseaux non linéaires car ils sont aujourd'hui les plus courants. Parmi les exemples étudiés expérimentalement, nous choisissons de présenter ici l'analyse du quartier Saint-Denis à Montréal.

#### Montréal, Quartier St-Denis

##### Description:

Le quartier Saint-Denis compte parmi les plus anciens quartiers de l'île de Montréal. Depuis longtemps, la rue Saint-Denis était une liaison de circulation nord-sud très importante, et aujourd'hui encore les comptages de circulation confirment cette importance. La zone observée est située dans la partie centrale de la ville. Elle est à l'est de la rue Saint-Laurent qui partage la ville de Montréal en deux parties, occidentale et orientale. La rue Saint-Laurent est, dans la partie considérée, une des rues nord-sud les plus commerçantes de Montréal.

Dans la zone observée se trouve depuis 3 ans environ une station de métro qui est considérée dans cette analyse comme le générateur collectif-public le plus important.

##### Limites du domaine d'observation:

Le domaine observé est bordé au nord par l'avenue Mont-Royal qui est dans la région considérée comme une liaison est-ouest très importante et très commerciale.

La limite orientale est constituée par la limite de la rue Saint-Hubert, qui est une liaison sud-nord importante. Cependant, cette rue bifurque après l'avenue Mont-Royal et devient une rue à sens unique. Elle est plus importante dans la direction sud et constitue aux heures de pointe une barrière pour le piéton.

La limite méridionale est la rue Roy qui est la dernière rue droite continue; au sud de cette rue le réseau perd sa régularité. A l'ouest nous avons choisi comme limite la rue de l'Hôtel-de-Ville. Le choix aurait pu aussi bien se porter sur n'importe quelle rue entre Hôtel-de-Ville et Saint-Laurent. Il n'en aurait pas résulté de discontinuité dans le domaine d'observation.

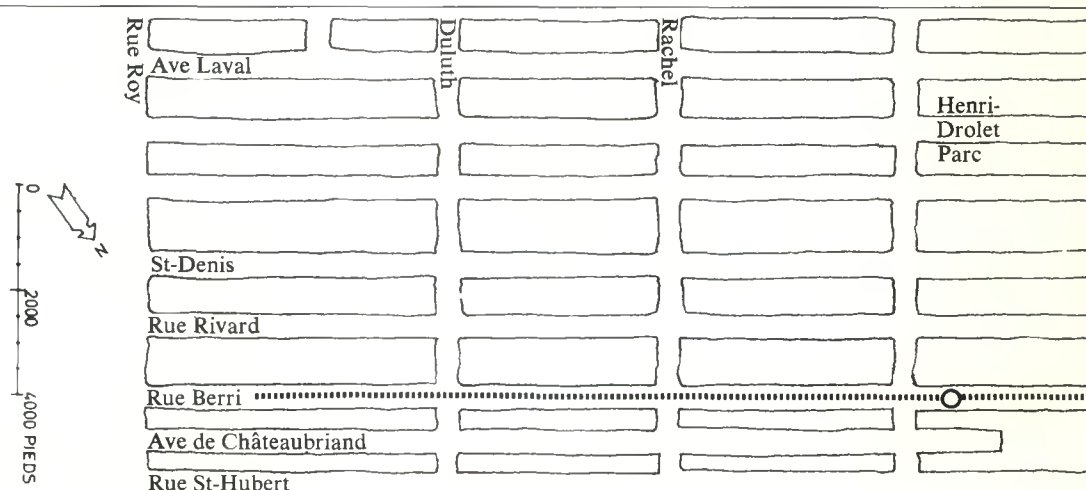
##### Domaine d'observation:

La densité de population est homogène sur tout le domaine. Les maisons sont toutes à deux ou trois étages. Au départ, il y avait surtout des maisons bifamiliales (duplex); par la suite, sont apparues des maisons d'appartements dites multifamiliales, mais dont la hauteur reste la même.

Malgré l'uniformité de hauteur et de conception finalement ces maisons se différencient les unes des autres par des détails variables, comme, par exemple, les balcons, les entrées, les escaliers différents, etc. (Fig. 10)

On peut considérer la population de cette région comme homogène et ayant un revenu relativement bas.

Fig. 4  
Plan du domaine observé, 1966.



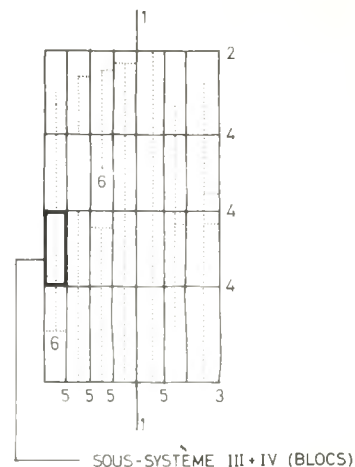
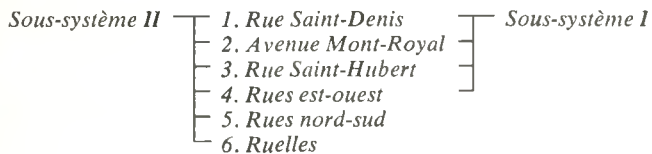
## Structure

Fig. 5

### Système

#### Type de réseau

Le système du réseau piétonnier est composé des sous-systèmes I, II, III et IV :



### Sous-système I

Fig. 6

Le sous-système I est un collecteur, dont l'élément principal est la rue Saint-Denis (1), (fig. 7). Il reçoit de la circulation de la rue Mont-Royal (2) et des autres liaisons est-ouest (4) qui sont semblables entre elles.

Aux heures de pointe, la rue Saint-Denis (1) divise ce domaine en deux parties.

La ségrégation des circulations piétonnières et automobiles se fait simplement par l'existence des trottoirs de largeur variable. Les trottoirs les plus larges et plus fréquentés sont ceux de la rue Saint-Denis. La largeur en est variable et parfois des boutiques en retrait créent des échancrures. Ces endroits ont partiellement le caractère de place (fig. 7).

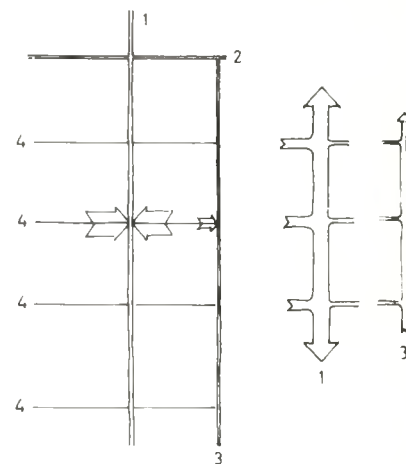
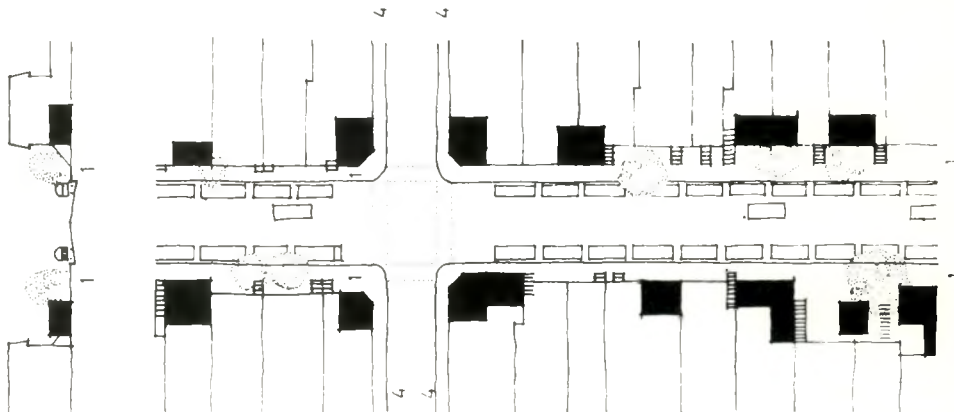


Fig. 7

Diagramme montrant une partie typique de la rue Saint-Denis—la largeur des trottoirs est variable.



### Sous-système II

Fig. 8

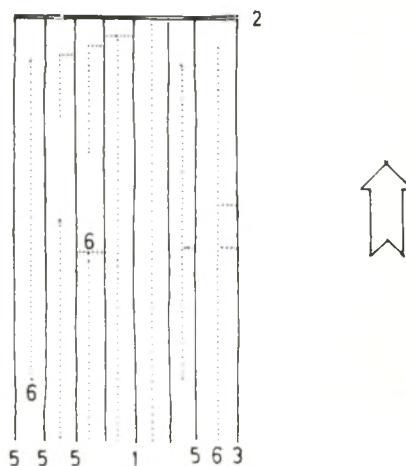
Le sous-système II est le distributeur qui assure l'accès aux habitations. Il est composé des rues nord-sud (5), y compris la rue Saint-Denis (1) et la rue Saint-Hubert (3). Entre ces diverses rues et à l'arrière des maisons il y a des ruelles (6) dans lesquelles il n'y a pas de séparation entre la circulation piétonnière et automobile (l'avenue Châteaubriand est une exception). La circulation vers le nord (rue Mont-Royal) est plus forte que dans la direction opposée. L'ordre hiérarchique serait: 1, 2, 3, 4, 5, 6.

#### Hiérarchie par direction:

La direction nord-sud est privilégiée par une plus grande densité du réseau.

#### Hiérarchie par formation:

Les éléments 1 et 3 par leur formation plus larges.





Le système est formé par la répétition des blocs (sous-système III). Ces blocs montrent une grande diversité. Les blocs sont composés de maisons alignées de 2 et 3 étages.

On accède aux maisons depuis la rue nord-sud (5) rarement depuis la rue est-ouest. La largeur des trottoirs est très variable: parfois le trottoir est très étroit, parfois il est séparé de la maison par un jardinet.

*Groupe de sous-systèmes III*

*Fig. 9*

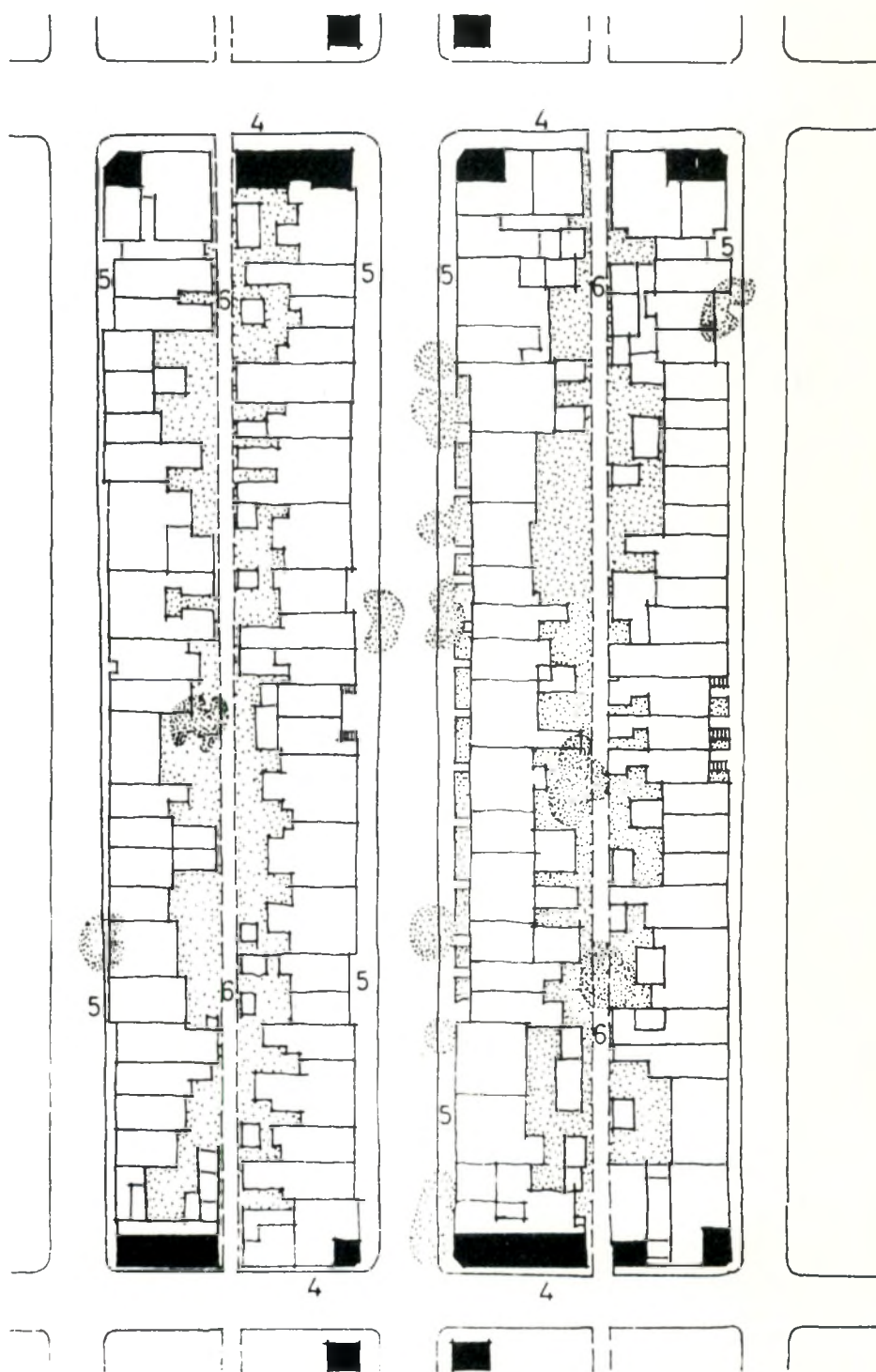


Fig. 10a

P stationnement

G garage

B balcon

7 accès individuel

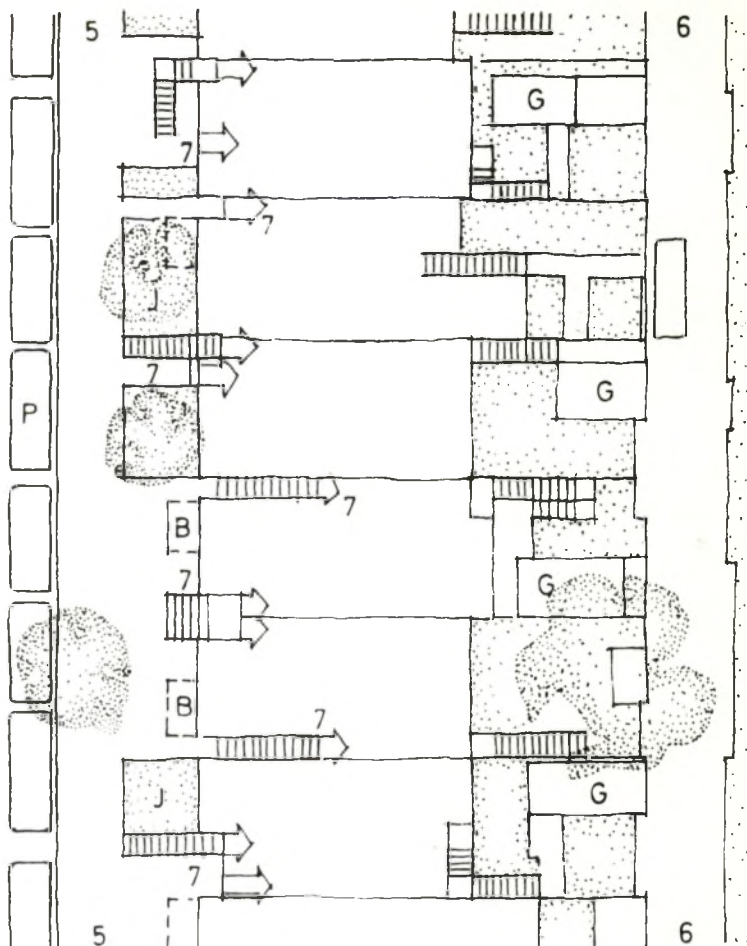
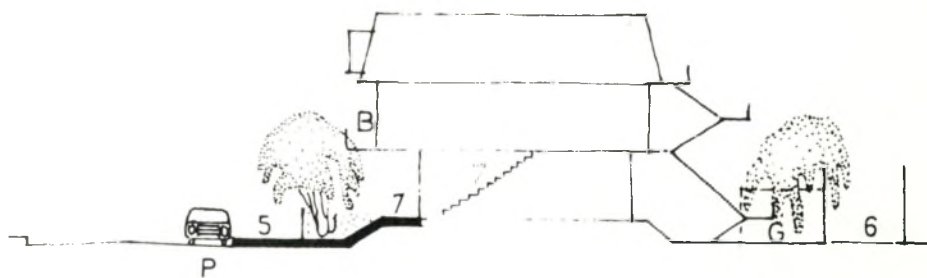


Fig. 10b

Coupe



#### Sous-système IV

Le bloc (sous-système III) est composé des sous-systèmes IV qui sont des maisons situées l'une en face de l'autre. Les éléments du sous-système IV présentent une grande diversité. L'accès aux maisons peut se présenter de manière variable:

- entrée au niveau de la rue,
- entrée par quelques marches vers le haut ou vers le bas,
- entrée par une galerie de style colonial,
- accès par un escalier extérieur.

Il peut y avoir des jardinets dont certains sont fermés par une grille. La diversité est renforcée par les nombreuses couleurs utilisées.



Fig. 11a  
Station Mont-Royal

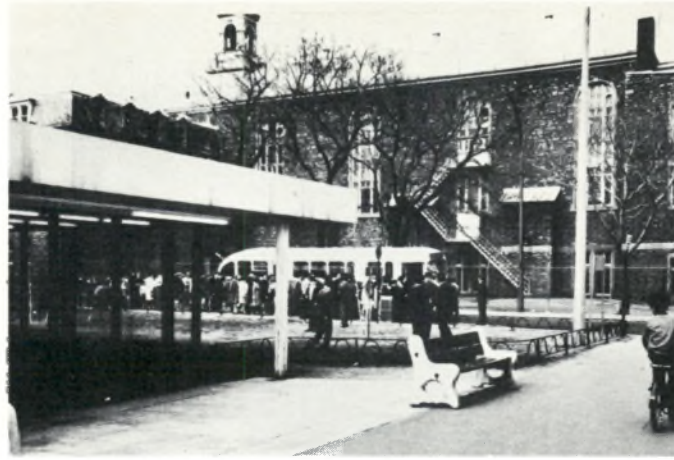


Fig. 11b  
Le point de transition entre le métro et  
l'autobus.



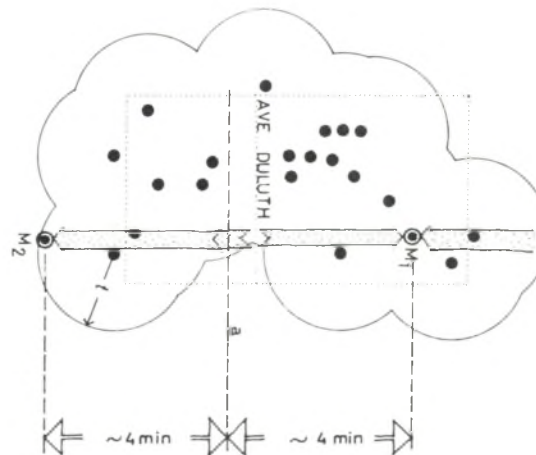
## Utilisation

### Centralité par surface

Fig. 12  
M1 Mont-Royal  
M2 Sherbrooke  
 $t = 2$  minutes

Dans le domaine observé il y a un certain nombre de générateurs collectifs-publics non commerciaux tels que églises, écoles, bibliothèques, terrains de jeux. La station de métro (Mont-Royal) est considérée comme un générateur collectif-public d'une grande importance et ceci surtout aux heures de pointe.

Elle est un point de transition entre le métro, l'autobus et le piéton et l'inverse (fig. 11).



La prochaine station de métro (Sherbrooke), en direction du centre-ville se trouve à l'extérieur du domaine d'observation, cependant elle influence cette zone: si on divise en deux la distance entre les deux stations, la ligne (a) de séparation se trouve au sud de la rue Duluth. En 4 minutes on peut atteindre une des deux stations. Nous avons observé que le domaine desservi par la station de métro Sherbrooke s'étend jusqu'à la rue Duluth. La station Mont-Royal dessert surtout le domaine au nord de l'avenue Mont-Royal.

Du fait que la zone observée est habitée par une population dont le revenu moyen est relativement bas, l'importance du métro, c'est-à-dire des transports publics, est très grande. Le critère de centralité par surface s'applique ici.

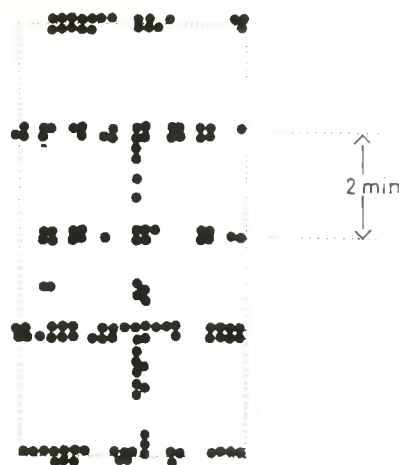
## Centralité linéaire

Fig. 13

### Diagramme de centralité linéaire

Les commerces se répartissent le long des liaisons est-ouest et de la rue Saint-Denis nord-sud. Les magasins sur les rues est-ouest pourvoient aux besoins journaliers tels que épicerie, cordonnerie ou nettoyage. Les magasins de la rue Mont-Royal et surtout de la rue Saint-Denis distribuent des biens plus différenciés tels que vêtements, restaurants, cinémas.

Le critère de centralité linéaire s'applique ici.



### Accessibilité:

Depuis tous les endroits du réseau piétonnier on peut accéder rapidement à tous les types de générateurs collectifs-publics existants dans ce réseau. Si on pose un cercle de  $T=2$  minutes autour de chaque générateur collectif-public non commercial, on couvre presque tout le domaine d'observation.

### Efficacité:

Dans le domaine observé, les commerces s'accumulent le long des côtés courts des mailles, presque chaque intersection compte un commerce aux quatre coins (fig. 9, 13); de plus, de manière assez sporadique, nous voyons apparaître quelques magasins au milieu des longs côtés.

La distance entre les générateurs collectifs-publics commerciaux est de deux minutes.

### Patterns de mouvement de passage:

Le pattern de passage est observable surtout dans les rues est-ouest, ainsi que dans la rue Saint-Denis et Saint-Hubert. Ce pattern de mouvement coïncide avec les activités des rues commerciales, telles regarder les vitrines, faire les courses, etc. Il est plus fréquent au coin des rues car les piétons discutent entre eux, ce qui est favorisé par les magasins situés aux quatre coins.

### Limites à un territoire:

Les patterns de passage limités à un territoire et les patterns d'aller-retour sont à observer dans les rues nord-sud de caractère résidentiel. Dans ces rues, il y a une grande diversité d'activités. Des éléments comme les escaliers, les jardinets, les bouches d'incendie, les voitures garées attirent les activités sur le cheminement piétonnier.

Ce sont surtout les enfants qui utilisent cet équipement pour leurs jeux. Les escaliers sont le lieu de rencontre, de bavardage entre voisins; en plus de leur fonction de lier des étages, ils peuvent servir de banc pour s'asseoir, de table à manger, etc. Les piétons utilisent la totalité de l'espace «rue». On peut observer des discussions d'un côté à l'autre de la rue, ainsi que des jeux de balle s'effectuant d'une fenêtre à l'autre.

Ces activités sont possibles et sans danger parce qu'il n'y a guère de circulation automobile de passage. Les voitures garées servent autant aux jeux que comme lieu de discussion. Les voitures stationnées forment une barrière mobile et de ce fait limitent le terrain de jeux (trottoir).

Les ruelles (éléments 6) à l'arrière des maisons ont une fonction de service (garages, voirie, téléphone, etc.); de plus elles sont des terrains de jeux linéaires qui servent seulement à certaines activités comme dessiner sur les parois de bois, faire du vélo et du patin à roulettes, ou encore en général tous les jeux qui nécessitent plus de place et de sécurité.

Dans ces ruelles il n'y a pas de circulation piétonnière de passage, ce qui peut être découragé par les murs qui forment un enclos défavorable. Derrière ces murs, il y a des cours pour des activités privées.

L'avenue de Châteaubriand a le caractère des éléments 6 et aussi celui des éléments 5 parce qu'elle montre une séparation entre le trottoir et la chaussée; cependant, on observe que les enfants jouent sur la chaussée et que les voitures sont stationnées sur le trottoir.



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## Croissance

### Croissance

### Changement intérieur

### Micro-croissance

La croissance se limite au changement intérieur et à la micro-croissance. Elle est à observer dans les ruelles où des boutiques sont ajoutées à l'arrière des maisons et le long des rues commerciales (éléments 4). Par le changement des commerces la croissance est négative en ce sens que plusieurs magasins disparaissent ou restent vides pendant longtemps.

Sans que le réseau soit modifié, des nouvelles maisons multifamiliales se construisent sur le terrain de plusieurs maisons unifamiliales démolies. Ceci montre une certaine flexibilité.

On peut observer une liaison à un niveau supérieur dans deux cas, mais elle relie seulement des maisons privées (fig. 14).

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Fig. 14

Photographie montrant la liaison à un niveau supérieur.



# HOLLYWOOD'S

Influence on  
Your Home Furnishings  
by Eric Minton

Motion pictures have  
been with us for  
more than fifty years.  
We take this for granted,  
forgetting that  
not only has the industry  
documented, and dictated,  
the mores of our times,  
it has influenced the  
style of our homes and  
furnishings as well.





- 1 The celebrated white-sets of the mid-nineteen thirties as seen in "The Merry Widow" with Jeanette Macdonald. The sets for this production won an Academy Award for designer Cedric Gibbons in 1934.
- 2 "Our Dancing Daughters" with Joan Crawford is one of the great films of the nineteen-twenties. The sets, by Cedric Gibbons, introduced concepts in home furnishings and design that are still with us to this day.
- 3 The high collared uniforms, marcelled hair styles, laced shoes and personal maids heightened the concept of nudity and the bath in "Male and Female" by Cecil B. De Mille with Gloria Swanson and Thomas Meighan. The idea was extremely daring for a motion picture in 1919 but De Mille handled it with impeccable refinement.
- 4 New modes of social behavior in public were accelerated in 1921 when Rudolph Valentino introduced the 'Tango' in the celebrated "Four Horsemen of the Apocalypse". The attention to detail in the sets for this film lead to a new realism in ensuing films.

all photographs  
Courtesy  
George Eastman House  
Rochester, New York



The influence of film both politically and socially was felt for the first time during World War I and in the years immediately following. The British Government recognized the genius of that pioneer movie-maker, D. W. Griffith, and commissioned him to make a propaganda film for the war effort in 1917.

At the same time President Wilson, seeing *The Birth of A Nation* said, prophetically, "it's like writing history with lightening." The power of the cinema to move men's minds was obvious even at that time.

It also proved to be a source for social change that no one could foresee. In the early days of cinema, human qualities were depicted in tones of either black or white for melodramatic effect. But one man, Cecil B. De Mille, showed human nature as it really is, with all its inherent strengths and weaknesses. The result, beginning in 1916, was a series of films in which the 'stars' of the screen were demoted to a human level with all the foibles of humanity. For the first time the screen took a look at ordinary everyday life.

To ensure box office success De Mille used a room that was, for screen purposes, sacrosanct—the bathroom. "In his films bathing became an art, disrobing a necessity, but done with such taste and against a background of such luxury that even the most censorious could not complain." De Mille and his bathtubs became a joke. But the public were impressed. And that functional room took on a new look in which marble, tile and chromium were all used by the film maker with great effect. By 1930 plumbing corporations, hitherto limited to trade papers, were taking full-page advertisements in national magazines, as they do to this day, to display bathrooms obviously modelled on the De Mille originals.

The high standards set by the studio's art departments gave Hollywood films an unmistakable polish, as well as patina of opulence that was quickly copied on a mass scale by the general public.

The art director is a coordinator of many crafts in the broad field of architecture and engineering. In 1928 at Metro-Goldwyn-Mayer studios, art director Cedric Gibbons threw out existing concepts of interior decoration in the home, with a series of amazing sets designed for the film *Our Dancing Daughters*, with Joan Crawford. The sets were a revelation to architects, decorators, and housewives, and the effects of that film may be seen even today. Venetian blinds, indirect lighting, leatherette furnishings, chromium trim, terraza flooring were all introduced at once. It is one of the films in which the sets take the audience's attention away from the story. As a result, a whole new range of service industries sprang up in the field of home furnishings to take care of the heavy demand for change.

Gibbons adopted in his films the philosophy of the uncluttered. He slashed away at every excess and at such established conventions in decor as patterned wall paper and flowered draperies. His ability to achieve functional simplicity can be seen in his influential use of white in contemporary settings. The sets for *Dinner At Eight* (1934), with the platinum blond, Jean Harlow, started a whole new trend in interior decorating that lasted a full decade, and is now being revived again. The bedroom setting in the film used eleven shades of white, a concept that was visually so striking that it was seen again much later in Marilyn Monroe's *Something's Got To Give*. In 1934, Gibbons won the Academy Award for his interior design work on *The Merry Widow*, in which white was the predominant tone.

The liberating influence of spacious open sets, characteristic of the nineteen-thirties, may also be seen in the timeless Astaire and Rogers dance vehicles made at the time for R.K.O. Pictures. Astaire insisted on natural back-

grounds, preferably those that offered an opportunity for the dance sequences that flowed inventively from the plot construction. Geometric patterns filmed as pure cinema were set aside. Astaire and Rogers danced their way through living rooms and bedrooms designed for them by Van Nest Polglase. The country-club set for *Carefree* (1938), with its finished stone-facing and French windows, received nationwide publicity. The use of stone in this way, in recreation rooms, is still popular.

To control expenditure after 1939, innovative set design was, of necessity, limited. And the immediate post-war years with the introduction of television brought new and unforeseen problems to the film industry.

As the age of assembly line film production ends, the importance and influence of set design diminishes, but only in the quantitative sense. The quality of the sets for *The King And I* (1956), and *My Fair Lady* (1964), did much to enhance these lavish productions, and to ensure their success.

Film productions in 1970 emphasize rapidly changing values and standards. The medium as a social mirror reflects trends that have been evolving over the past decades. And such is the power of film on television and in the theatre that its influence can certainly be expected to continue. The human equation will continue to be depicted, though the results will be predictably astonishing.

And the background for the comedy and the drama will remain of equal importance, rising from time to time as in the past to introduce new designs for living—designs that will be reflected in houses and apartments from one end of North America to the other.





De Mille also recognized the importance of fashion and he saw to it that his heroines were dressed in the latest styles. Gloria Swanson's beauty moved him from the fashionable to the extreme. The sophisticated laughed, but Miss Swanson's films attracted more women to movie theatres than ever before. And it is safe to say that in the years from 1919 to 1921, De Mille, and Miss Swanson were the supreme arbiters of fashion. The best designers in the business moved to California. They are still there and their work in films is still an influence in that specially changing world.

Film, in reworking the fabric of society, also radically altered social behaviour outside the home. In 1921, Rudolph Valentino danced the tango with Alice Terry in *The Four Horsemen of the Apocalypse*. Suddenly cabarets, and dancing in public became acceptable. This great film was also notable for its set decoration and for the careful attention to detail given by director Rex Ingram. Admission was \$1.50, an outrageous charge at that time, but this film, more than any other, established cinema as an art form worthy of serious consideration, particularly the contribution made by the film's art director.





# Scottish New Towns

## Environments of Segregation

by Ivor Davies

**Segregation in the positive sense, that is, between urban and rural, between residential and industrial, between pedestrian and vehicle.**

**The second of a two-part series.**

Photographs courtesy:

East Kilbride Development Corporation  
Glenrothes Development Corporation  
Bryan and Shear Ltd., Glasgow for the oblique aerial  
of Cumbernauld

1 This view, in a Glenrothes' neighbourhood, captures the spirit of the garden city movement: children safely at play, before their homes, in an almost rural setting.

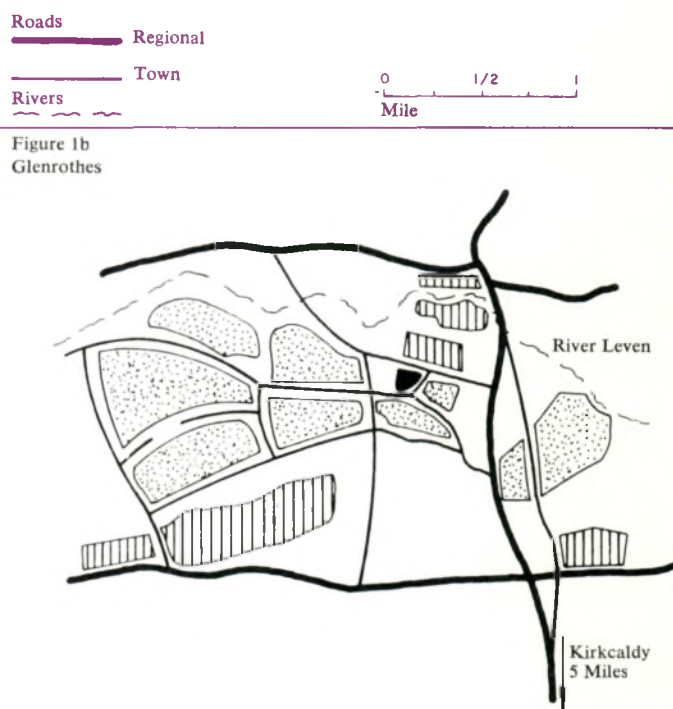
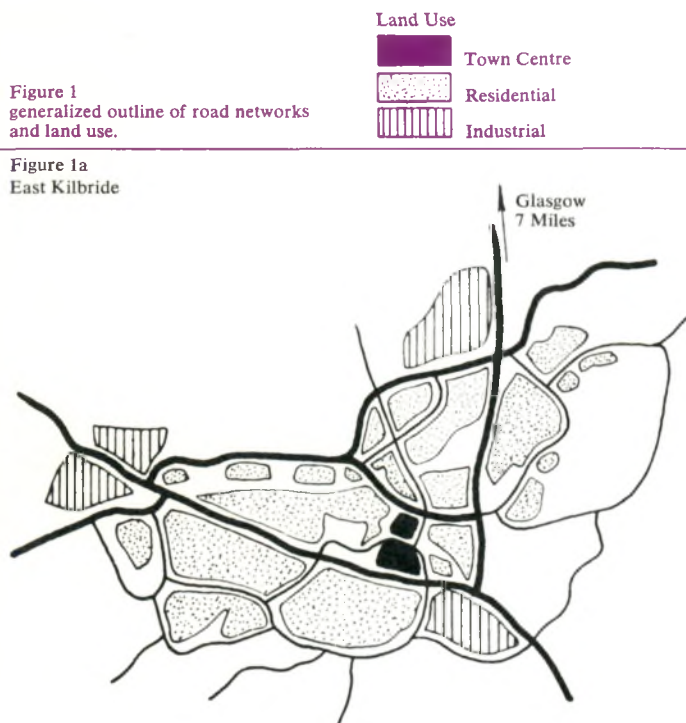


The objectives underlying the creation and development of new towns in Scotland varied from the provision of reception areas for population dispersed from the Clydeside conurbation to the stimulation of the economic growth of regions.

Each new town, however, presented the opportunity to create a totally planned environment which could avoid the recognised malaises of existing urban areas.

Of paramount importance was the provision of decent housing. But there was concern, too, about making service, recreational and employment facilities readily available and accessible. Decent housing meant, in part, an acceptable level of visual and auditory privacy: the immigrants were largely derived from urban environments where they literally lived on top of one another. Safety for child and adult alike constituted a functional goal within the wider desire to provide the physical structures in which the new town inhabitants could enjoy life.

Fulfillment of these goals has largely been achieved by adherence to the principle of segregation in laying out the new towns' fabric. At a broad scale there is a clear distinction between urban and rural land: the edges of the built-up areas are sharply defined and there is no intention of allowing rural-urban fringes to develop. Vital to this is the control over adjacent rural areas afforded the development corporations by the fact that the designated areas are more extensive than the space required to accommodate their target populations. At East Kilbride, for example, only half of the 10,250 acres designated will be utilized for building purposes: the balance will insulate the new town from possible encroachment by adjacent expanding urban areas and an accessible rural environment will be preserved for the new town population.



## Segregation

At a smaller scale internal segregation is most apparent in the arrangement of land-uses whereby residential developments, secondary industry and tertiary facilities are channelled into specific and separate areas. Cumbernauld excepted, the new towns' road networks define the various zones.

The theme of segregation is maintained by the circulatory patterns created. There is a basic separation of pedestrian and vehicular traffic, while in the latter, through-traffic is separated from town-traffic; different venues are provided for service vehicles and those transporting people; traffic generated in the consumption of goods and services converges at a central point while most of that generated by the journey to work diverges to peripheral locations.

Ideas on the implementation of these principles have varied, with the result that basic differences exist in the forms and functioning of the four new towns. East Kilbride and Glenrothes, designated within one year of one another, are sufficiently similar to allow simultaneous consideration. Cumbernauld and Livingston differ from these two and from each other to the extent of meriting separate treatment.

East Kilbride and Glenrothes closely embody in their layouts the principles of the garden-city movement, exhibiting residential neighbourhoods grouped around a centrally placed town centre and secondary industrial establishments concentrated in peripherally disposed estates (Figure 1a-b). The neighbourhood constitutes the basis of town form: as a physical unit it contains enough residences to provide a popula-

tion threshold for an elementary school, a nursery school and for different levels of retail provision. Safety is the keynote: vehicular traffic is discouraged from unnecessary intra-neighbourhood movement by narrow roads, sharp curves, loops and cul-de-sacs and encouraged to increase the ratio of its use of the neighbourhood bounding roads by the latter's width, coupled with straight or gently-curving alignments (Figure 2a).

The size and shape of the neighbourhoods and the internal patterns of facility-location are designed to obviate the necessity of extra-neighbourhood journeys in the satisfaction of daily needs and the necessity of crossing main roads. There is also the aim of reducing the use of the car for trips generated and terminating within the neighbourhood unit.

## A Hierarchy of Retail Outlets

Within each neighbourhood there is, generally, a hierarchy of retail outlets with two grades: members of the lower grade outlets—providing food, meat, confectionery and newspapers—are carefully distributed throughout the residential development and while at a focal point these outlets are repeated, additional goods and services, such as lunch bars, taverns and branch libraries, are also found. This neighbourhood centre constitutes the second and higher grade of service provision.



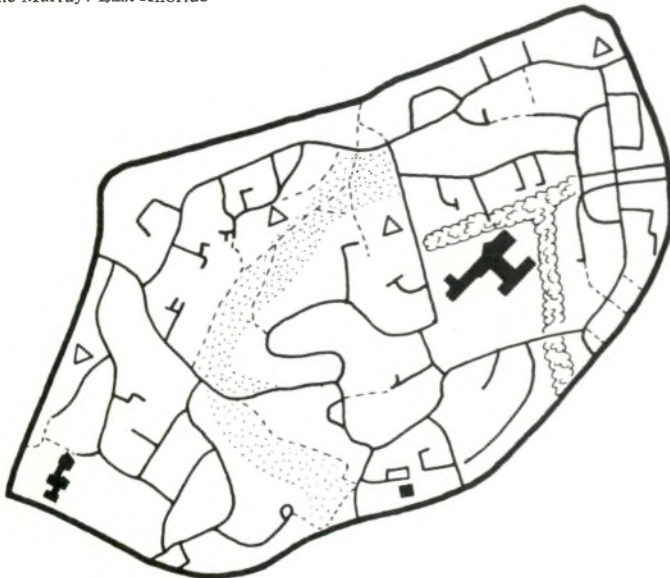
Figure 2  
Circulatory systems and facilities; in part of the Murray Neighbourhood Unit, East Kilbride; and in the Seafar area of Cumbernauld.

— Main Road  
— Local Road  
- - - Footpath

■ School  
■ Retail Outlet(s)  
△ Church

☁ Wooded Area  
☁ Open Space  
0 1/4 Mile

Figure 2a  
The Murray: East Kilbride



More sophisticated consumer items and services are provided at the Town Centres. This structure of good and service provision has been criticised on the grounds that merchants located in the lowest grade have no immediate competition and can exploit a largely captive clientèle; but one of the desirable effects of this scale of localized provision is that the more direct and more rapid access to the outlets via footpaths, compared with the more circuitous route for motor vehicles, induces the inhabitants to walk rather than drive. Thus the safety-factor for children is increased.

### Neighbourliness Induced

There is another effect. Pedestrian journeys to schools, shops and playing-fields all provide opportunities for neighbours to meet each other: there are no strangers here, passing and exchanging empty stares through car windows. This is important too because most of the neighbourhoods' inhabitants have left social and physical environments, into which their roots ran deeply and to which they were strongly attached, for ones in which they feel strange and oddly ill at ease.

2



### Visual Stimulation

The new towns' residential developments are young and often brash; there is little sense of history or tradition exuded by the buildings, most of which are of equal age; and, initially, house design was repetitive. Temporal variety is an impossible attainment but latterly, variations in house size and design and in house-grouping are making the neighbourhoods visually more interesting and exciting.

At Glenrothes within-neighbourhood variation is now complemented by between-neighbourhood variation, whereby more character is brought to the total appearance of each residential area (Photos 2-3). This feature may contribute to the adjustment of newcomers in that they might more readily identify with a small and well-defined neighbourhood unit than with the whole fabric of the new town: a sense of belonging may be more rapidly developed. However, a recent study of The Murray (East Kilbride) revealed that most residents did not identify with it; but with very much smaller areas within it and focused on their homes.

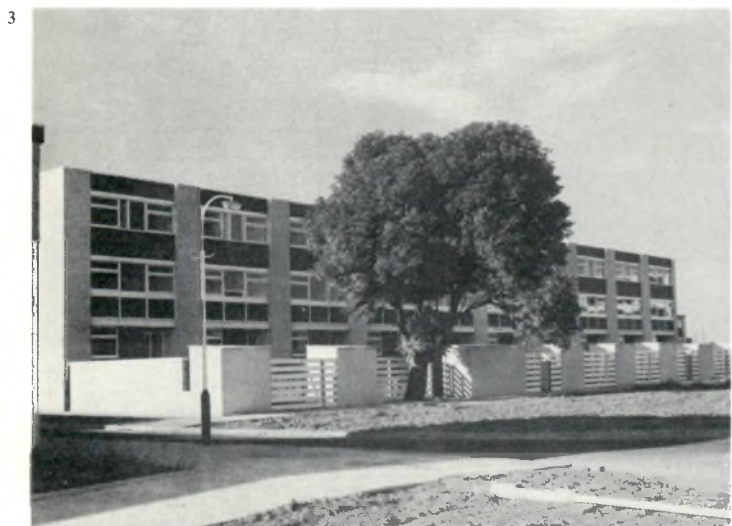
The theme of segregation is maintained in the layouts of the town centres and the functional patterns which have developed. Customers either disembark from public transport vehicles or park their cars at the periphery of the central area and proceed on foot to a concentration of retail outlets, commercial and administrative offices, and cultural and recreational buildings. At East Kilbride a wide pedestrian mall (Photo 4) opens into an attractive square (Photo 5), while at Glenrothes paths, ramps and steps converge upon a glass-canopied and elevated structure. At both there is ample space and opportunity to circulate freely or linger, stop, watch, rest and talk.

2 A Glenrothes' neighbourhood: dwellings are in short rows. Some, well spaced, front a road. House design is varied, vehicle and pedestrian separation good.

3 An interesting dwelling-grouping in Glenrothes. Ground floor: entrance hall, garage and study. First floor: main living area. Second floor: bedrooms. This is barely finished, but an old tree remains.

4 The main pedestrian mall at East Kilbride Town Centre, looking towards the main square. Pedestrian circulation occurs on either side of banks of open-air benches interspersed with artificial ponds and clumps of shrubs. Covered walkways provide protection for the pedestrian in inclement weather.

5 The main shopping square at East Kilbride. Restricted to pedestrian traffic, this open space is carefully arranged: movement round the perimeter, under canopies, is not restricted by those sitting. The benches are sited forward of the retail outlets and are oriented towards the centre of the square where open-air displays and exhibitions take place.



Two measures may be employed to evaluate the attractive power of the town centres: the degree to which they have captured the patronage of the towns' populations and the extent of tributary area development. A 1964 survey\* indicated minimal patronization of Glasgow and other large service-centres by East Kilbride residents, while a 1965 survey of weekend shoppers in East Kilbride revealed that twenty per cent had travelled in from nearby industrial towns of the same standing in terms of service provision. While Glenrothes is successful in attracting customers from an aureole of small towns and villages, its own population makes frequent use of Kirkcaldy's service facilities.

### Secondary Industry

Segregation of secondary industry has been achieved by locating manufacturing establishments in industrial estates, often at some remove from residential developments and visually screened from them by shelter belts or by topographic undulations. The exact positioning of the estates on trunk roads or on main town-approach roads reduces the amount of traffic, generated by such industries, entering town and contributing to congestion there.

### Population Targets and Housing

At the functional and planning levels both of these early new towns are facing problems linked with the upwards revisions of their target populations. Such revisions stemmed, in part, from changing concepts of the new towns' roles; but their roots lay in the very success of the new towns. Success, in these instances, bred problems: of housing, of employing and of serving.

The problem of housing a greater number of people was most easily solved, simply by adding to the number of neighbourhood units. Notably neither neighbourhood areas nor population densities were appreciably increased (Table 1). This may demonstrate continuing attachment to the principle that acceptable standards of privacy and natural lighting be achieved through the maintenance of certain distances between dwellings and dwelling groups.

Neighbourhood addition provided the solution at Glenrothes but, due to difficulties of building upon undermined land to the north and south, the built-up area is elongating in an east-west direction. The chief planning officer holds that this shape is providing the basis of a socio-economic segregation which is assuming a spatial dimension with "inevitably... the older houses with cheaper rents at the east end of the town and the newer houses with dearer rents at the west".<sup>1</sup> Such segregation

\* In which the writer participated.

1 Comment by Glenrothes D.C chief architect and planning officer, contained in material supplied to the writer by the development corporation.



6 Four-room dwellings and three-room apartments, in East Kilbride, viewed from the rear. Each house is provided with a garage and the pend, away from traffic flow, serves the apartments. Garages can be erected on the hard standing.

7 Aerial oblique of Cumbernauld looking along the main ridge to the Town Centre. Residential areas occupy the slopes of the ridge and are well supplied by footpaths and garages. The open area for town centre expansion is clearly visible.

Table 1  
Neighbourhood Development: East Kilbride

Neighbourhood	Population	Gross Acres	Gross Population Density	Net-Density
Calderwood	17,839	295.5	60.4	85.1
Mains	12,893	209.7	61.5	85.0
Murray	12,034	207.8	57.9	81.1
Westwood	14,583	231.2	53.1	90.3
St. Leonards*	5,150	87.6	59.4	81.5
Totals	62,499	1,030.9	60.6	85.1

is certainly not one of the goals of the new town and, elsewhere, a development corporation publicity release contains a view of a housing complex annotated to reveal members of different socio-economic groups residing in adjacent dwellings; and social integration is one of the implicit aims in new town development.

### The Need for Car Space

The solution to the problem of providing more employment opportunities has been similar: additional industrial estates have been zoned, both to meet the demand for increased numbers of jobs and to accommodate the increasing space demands of industry resulting from, primarily, the need for more parking space.

A more difficult problem has been posed by the need to provide increased service functions and establishments within areas originally calculated for much lower populations. At Glenrothes this means a multi-storey service complex. More people means more vehicular traffic on road systems already starting to wilt under the pressure of rising car-ownership. Early planning was based on the assumption of a ten per cent ratio of households with cars; however, a 1968 car-ownership sample survey of three Glenrothes' neighbourhoods revealed ratios ranging from 47 per cent, through 60% to 66%; and

the planners are allowing for 100 per cent car ownership in current housing developments (Photo 6). Car ownership does not necessarily mean daily-use of the vehicles by all, but use must increase as the towns increase in areal extent: as home, work-place and town-centre spatially diverge.

### The Four Towns—A Summary

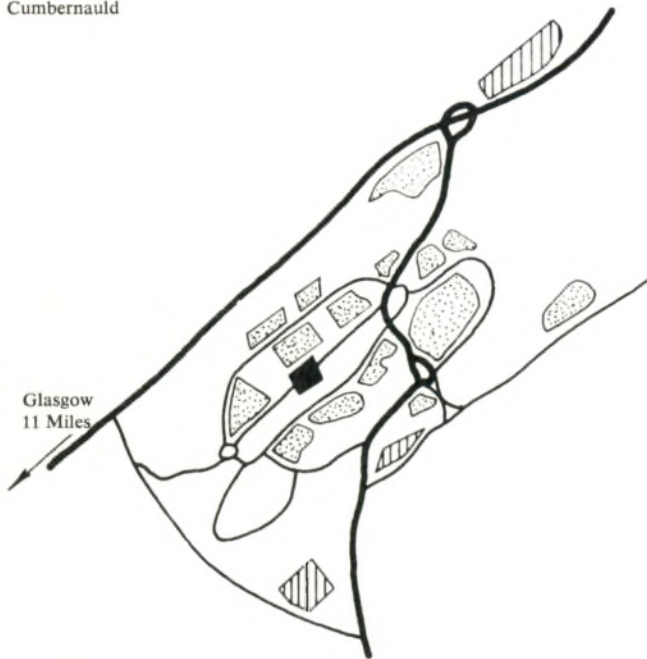
Cumbernauld and Livingston differ radically in concept and design, both from East Kilbride and Glenrothes and from each other, although both espouse the same principles of segregation of land uses and circulatory patterns.

Visually and functionally Cumbernauld is dominated by the first phase of a town centre which is one-fifth complete (Photo 7/Figure 1-c). Visual dominance is achieved by the continuous mass of the structure, a multi-deck building with roads and car parks located beneath shops and offices to which they are connected by elevators and escalators; the commercial facilities themselves are located at various levels and are interconnected by malls, steps and ramps.



\* This neighbourhood is incomplete and still under development.  
Source: Data supplied by East Kilbride Development Corporation.

Figure 1c  
Cumbernauld

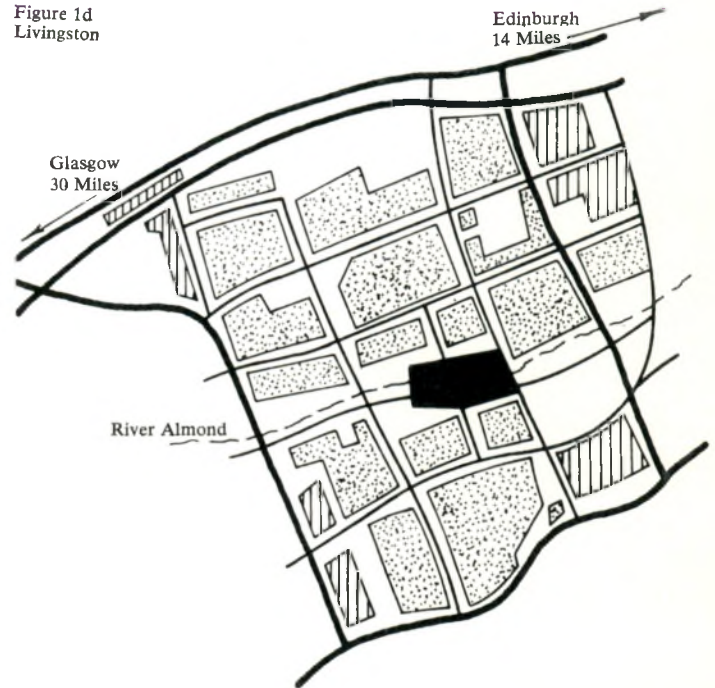


The town centre's towering appearance is enhanced by its site astride a ridge running along the top of the principal hill in the area. Functional pre-eminence is attained by the concentration of most of the new town's social, economic and cultural activities at the town centre: there are no neighbourhood shopping centres (except at Abronhill, a satellite residential development) but general stores are distributed throughout the residential area. The bulk of this occupies the flanks of the hill: eventually 50,000 will be housed here and an additional 20,000 will be located in residential developments surrounding the hill but largely separated from the main mass of the town by playing fields and public open space.

It is calculated that this spatial arrangement will allow three-quarters of the population to be located within one third of a mile of the town centre: within walking distance. Pedestrian ways saturate the residential area (Figure 2-b): few parallel main roads and those approaching the latter pass under or over. Convenience facilities, such as general stores, elementary schools and churches, are associated with the pedestrian ways, most of which traverse or terminate in the town centre. The dearth of roads, neighbourhood centres and playing fields within the actual residential areas allows areal concentration of dwellings.

Overly high net residential densities do not result: at Cumbernauld the mean is 85 persons per acre (cf. East Kilbride's

Figure 1d  
Livingston



85.1 persons per acre, Table 1). Privacy does not suffer: intelligent and attractive use of fencing and walls protects the gardens, and the dwelling windows which open into them, from the gazes of passers-by.

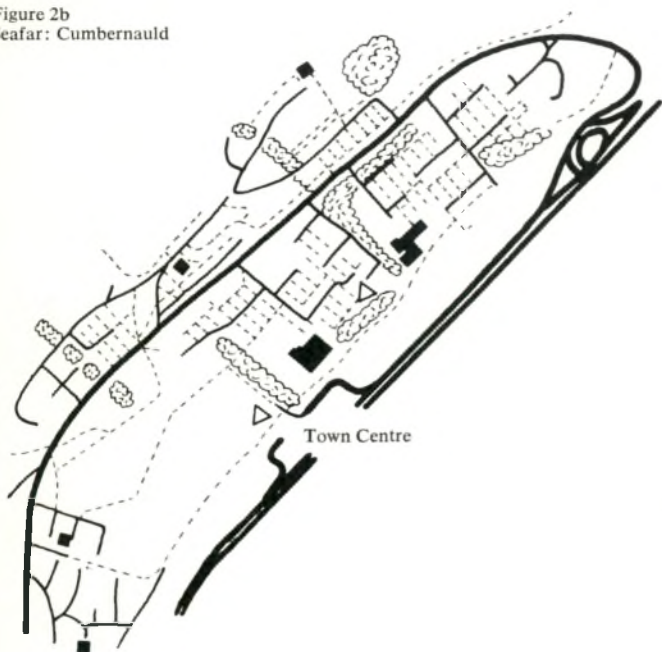
Livingston, designated in 1962 and with a 1968 population of only 6,200, is not sufficiently advanced to provide a meaningful example of new town development; and recourse must be made to the master plan.

Bounded to the north by limited access regional roads and with its western and eastern peripheries demarcated by two town-region connecting roads, the overall shape is sharp and approximates a square (Figure 1d). Within this square a grid of major town roads will diffuse internal vehicular traffic throughout an urban area almost bisected by a river (the River Almond). This river will provide an axis for a belt of parkland running through the centre of the town, but the belt itself will be interrupted by a complex of central area establishments straddling the river itself.

Extending upslope from the river will be a number of environmental areas each of differing population density: despite internal population density variation there will be a general density-decline, with 70 persons per acre characterizing residential areas close to the town centre and falling to 15 persons per acre at the margins. Overall symmetry is achieved by the disposition of the industrial areas to the four corners of the planned built-up area.



Figure 2b  
Seafar: Cumbernauld



Of the four new towns Cumbernauld has proceeded farthest in the application of the principle of segregation, with a very marked emphasis on pedestrian traffic. It has already suffered an increase in its target population which has necessitated the original plan to be modified in favour of satellite residential development. Any further target population revisions could place considerable strain on the pattern of pedestrian circulation. Livingston apart, the new towns exhibit the common feature of a central area enclosed by residential developments and main roads; thus expansion of such areas beyond original projections raises problems. Livingston's central area, on the other hand, could expand laterally, at the expense of open space.

These new towns have an enviable record of success: they have housed at higher standards, they have moved from the notion of self-containment to the idea of providing service and employment opportunities for wider areas and the first is interwoven with the second.

No uncritical application in the Canadian setting of these new town ideas is advocated here. Rather it is suggested that they do provide a useful model, worthy of examination, to be modified and adapted for different circumstances. Scottish new towns represent bold decisions of the past coupled with imaginative steps for the future. Canada has recently witnessed one bold idea for the development of a major part of its area,<sup>1</sup> and revolutionary ideas in the forms and functions of new settlements could complement this.

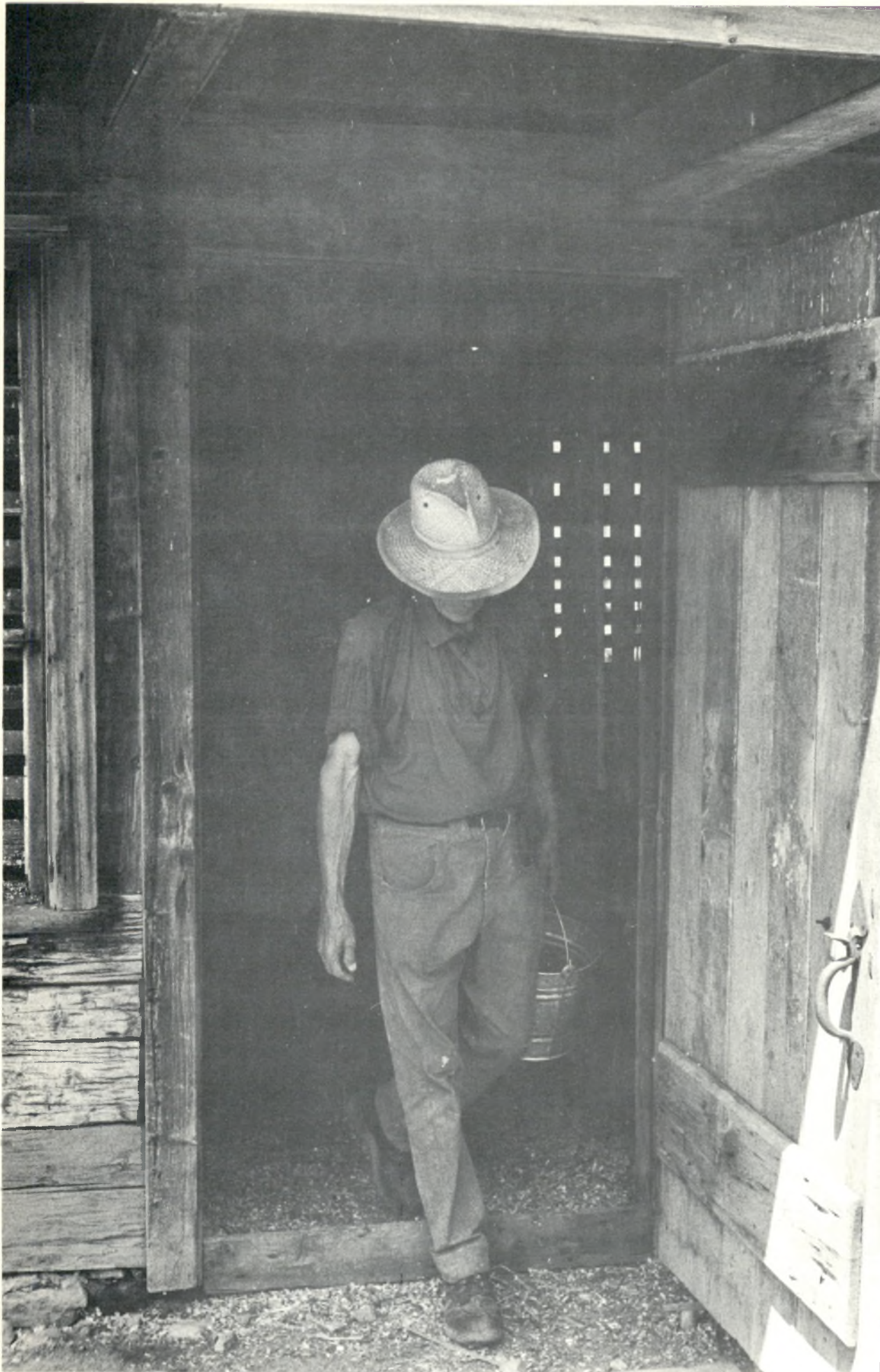
Field work for this paper was partially supported by a grant from Lakehead University's Chancellor's Fund. The writer thanks the respective new town development corporations for material included within this paper; and S. Spivak, Lakehead University, for cartography.

The author is especially grateful to the following organizations for generously providing him with some of the information used in these two articles:  
East Kilbride Development Corporation  
Glenrothes Development Corporation  
Cumbernauld Development Corporation  
Livingston Development Corporation

#### Erratum:

First article fig. 2. Due to an error in the original chart, the line shown for Livingston starts incorrectly. It should begin at 2000 in 1962—not as shown.

<sup>1</sup> Acres Research and Planning Limited, *Mid-Canada Development Corridor... a concept*, (Fourth Edition, 1969).



*Today, the urbanization of Canada is almost complete, with seven out of ten people living in our cities.*

*A hundred years ago, with a population of three and a half million, eight out of ten lived on farms.*

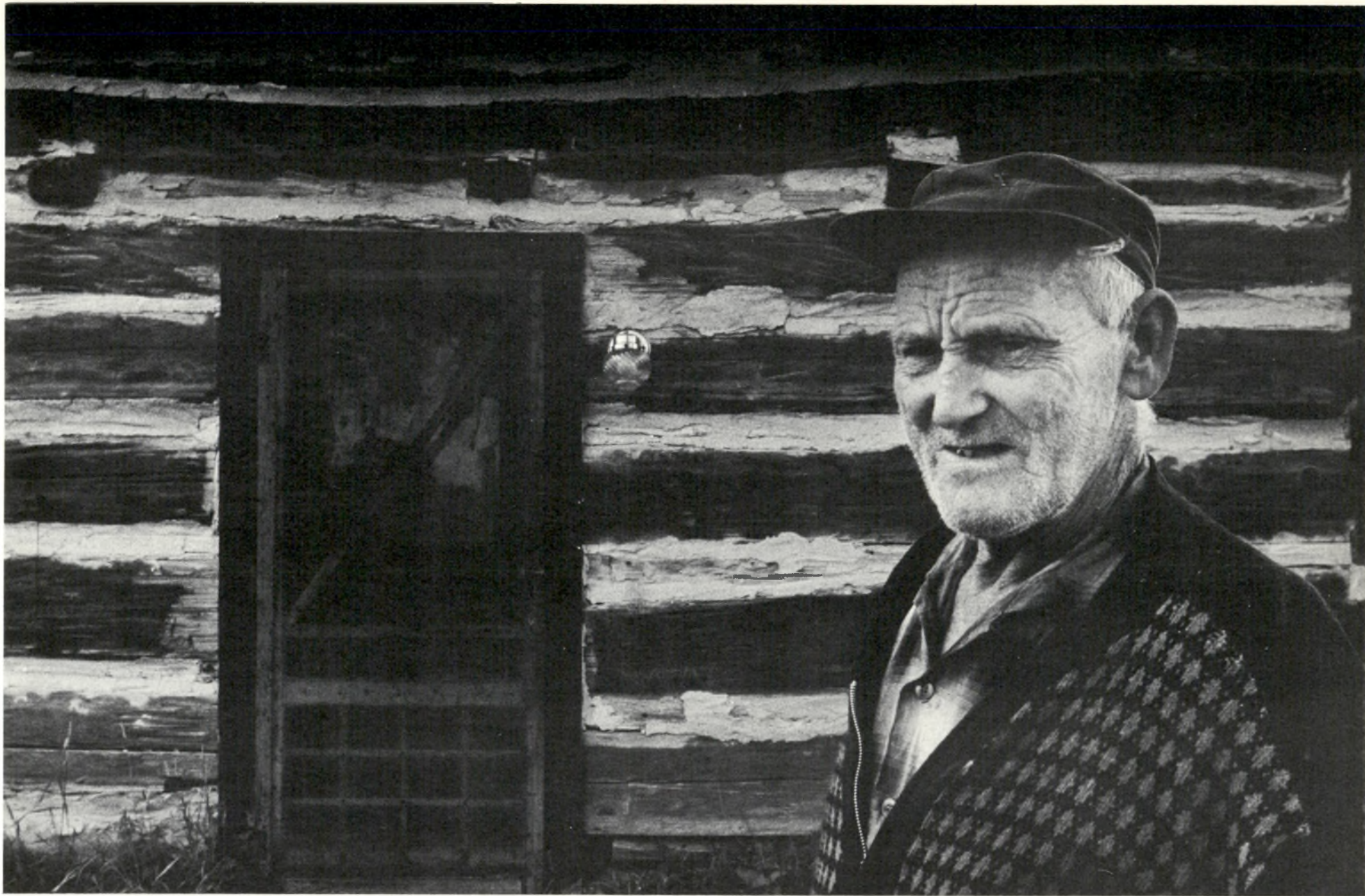




*Much of the Canadian quality comes from  
this rural heritage.*

*But how much of that special kind of  
resourcefulness and self-reliance has been lost  
in the rapid migration to the city?*





*Industrialization and urban problems have made us overlook the rural dilemma—economic decline and urban growth. A whole way of life is rapidly disappearing and with it an important part of our heritage. There is no way that this can be stopped, even if stopping it were possible.*

*But we must look and learn before it disappears completely.*





*The anonymous carpenters of rural Ontario left a countryside rich in a vernacular architecture of simplicity and honesty that does them credit.*

*It is seen in the simple shelter of the one-room log houses, reminiscent of the Georgian style of Europe, but ingeniously adapting the cedar and spruce logs that were almost too plentiful to the farmer clearing his land. And, as inadequate as these buildings were, many will be used for years to come.*

*It is seen, also, in the weathered, silver-grey spruce of the barns generously proportioned and admirably adapted to the climate, with hay storage lofts providing insulation to the stables below. Often built with the help of the neighbours at barn raising bees, these structures today are falling into disrepair because the farms no longer support their owners' way of life.*





*This architecture, like all successful vernaculars, was able to adapt to the needs of a growing and optimistic economy at the turn of the century. Sawmills and brick yards added more materials to the vocabulary. It was also able to adopt as its own the endless wall signs of the travelling salesman.*





*These people with their self-reliance, their resourcefulness and their architecture came to terms with the harsh realities of the climate and the wilderness.*

*They brought us through to an era when all the communications innovations of our time were put into everyday use.*





*But if change has relieved the isolated nature of the rural areas, it has also contributed to its downfall.*

*Before the automobile, it took two days to travel the seventy-five miles of dirt roads between Ottawa and Alexandria in a horse and buggy.*

*Today it takes seventy-five minutes on the hard-topped highway. Country people now must not only adjust to the economic pressures of the decline of farming, but they must also cope with the creeping, self-strangulation of our cities.*





*Our heritage is an asset that must be preserved  
and an accessible countryside is part of that.  
But little is being done to preserve these resources.*

*The important historical houses are being  
recorded, and in some cases preserved,  
but conservation of the humble architecture  
that I have recorded has been left to the dedi-  
cation of a few concerned individuals.*

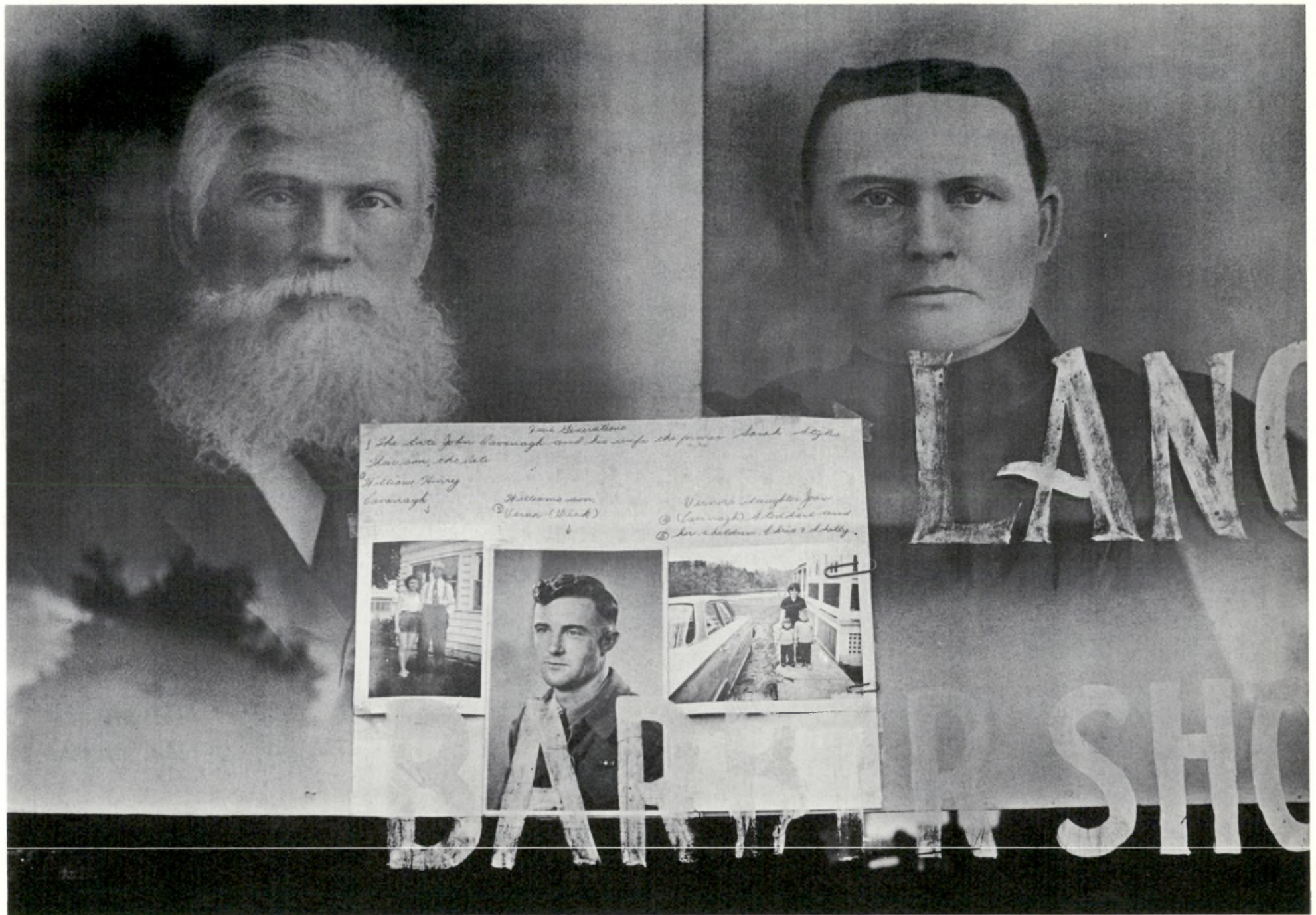




*If architecture is an art, it is nothing if it is not an art of the people. The architecture of rural Ontario is for the people. In this lies the clue to the failure of our cities. They have become personal moneytrees for the exploiters and their entourage.*

*Cities should be for the people. Recognise this or it may soon be too late.*





Perhaps, now, the most meaningful asset  
 that we can conserve from country people is  
 their resourcefulness. And this means we must look again at this  
 simple and honest Ontario Vernacular.



# L'environnement d'une cellule d'habitation

par Pierre Teasdale

## Abstract

The first objective of the study was to demonstrate that it is possible to observe, qualify and record the reactions between people and the physical environment of their housing unit, and the second, to demonstrate by analysing the results of these findings that it is possible to define criteria that can be subsequently used in the planning and design of these housing units.

In terms of methodology, the study was conducted amongst a control-group of 40 families living in identical units located in an urban renewal project. Three different techniques, verbal to non-verbal, were developed and applied simultaneously during one lengthy meeting with each of the families: a questionnaire-interview, a graphic interview and a recording of visual observations. An analysis was made of the results of each method; these analyses were compared, and categories of data were also analysed across the three methods.

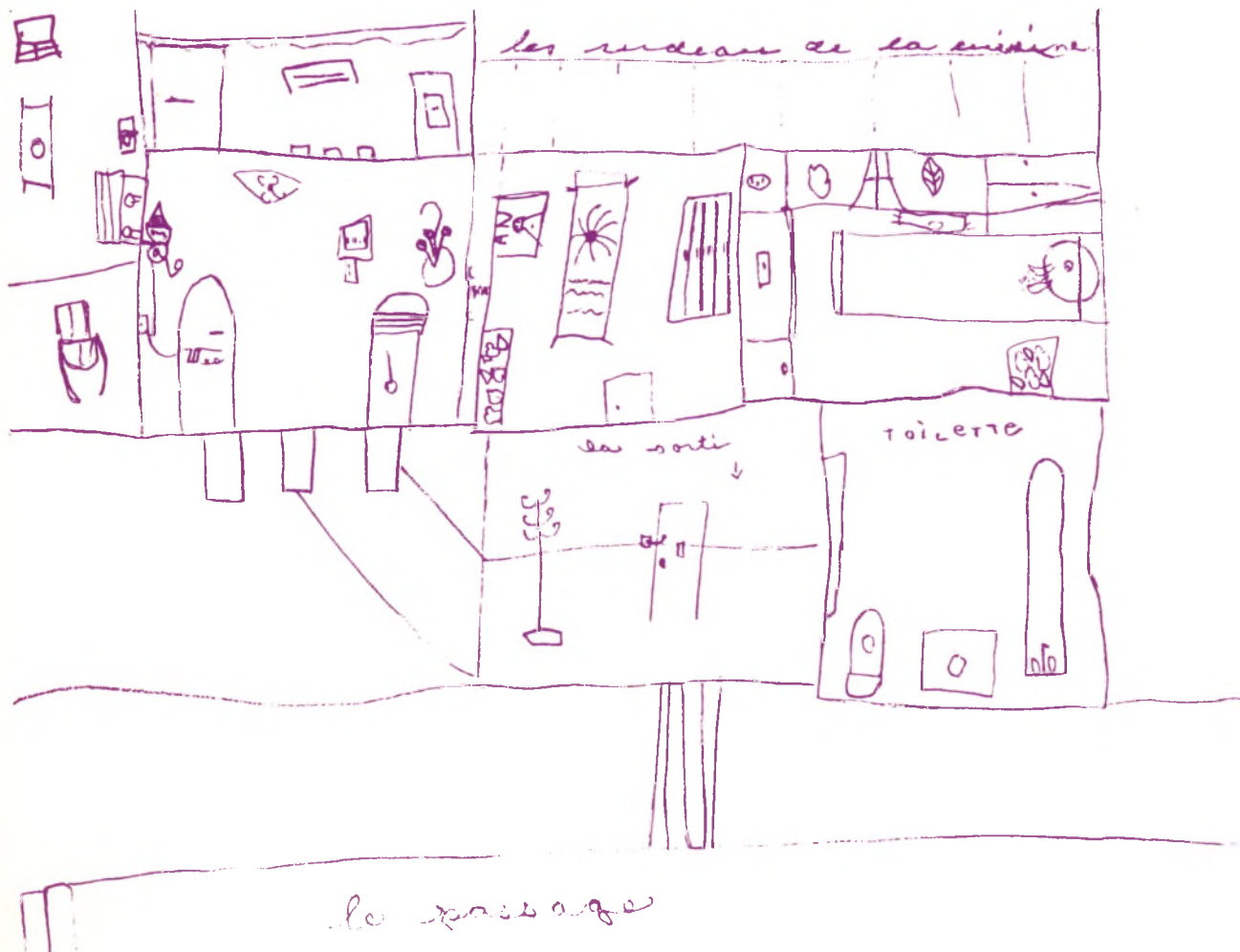
The study shows the value of the development of these techniques in the pursuit of the objectives. The potential of each method is evaluated in terms of further application. The analysis of the data indicates the importance of the cultural aspects of the design problem. It also shows that the problem of making qualified predictions on the life styles of the future inhabitants infers the consideration of various levels of flexibility within the dwelling. The study also points out the inadequacy of the graphic methods used to conceive the dwelling. The environmental issues are inferred at the level of the decision making process that determines the physical environment. The study finally shows that more research is both necessary and possible on the above.

*Condensé d'une étude expérimentale sur l'environnement physique d'une cellule d'habitation type planifiée dans un contexte de rénovation urbaine, les Habitations Jeanne-Mance à Montréal. Cette étude a été présentée par Jean Louis Robillard et Pierre Teasdale à la Faculté de l'Aménagement de l'Université de Montréal comme complément aux conditions d'obtention de la maîtrise en architecture, en avril 1968.*

Les développements techniques réalisés depuis quelques années dans les divers systèmes de construction permettent aujourd'hui de mesurer avec précision le rendement des matériaux utilisés dans la construction.

Il existe cependant très peu de données précises sur la question des relations entre l'homme et son environnement construit. Pour arriver à une évaluation complète du rendement d'un bâtiment, il faudrait, en plus de posséder cette gamme de données physiques, acquérir une connaissance objective sur les réactions des gens provoquées par l'environnement.

La relation directe qui existait à l'époque entre «un» client faisant part de ses besoins à «un» architecte n'existe à peu près plus, du moins en ce qui concerne les bâtiments pour les grands nombres. Il en résulte que l'occupant ultime de ces édifices participe rarement au processus de décision conduisant à la production finale de son environnement. Cet occupant demeure généralement anonyme et l'architecte, ne possédant pas de données sur lui, se voit très souvent forcé, en compagnie d'autres spécialistes, de prendre des décisions arbitraires à son sujet.





## Techniques d'observation

Trois techniques sont utilisées au cours d'une enquête menée auprès de quarante familles habitant la cellule type: celle de l'interview, celle du dessin et celle du relevé; l'enquête est suivie d'une analyse séparée et corrélatrice des données recueillies au moyen de chacune de ces techniques.

## Objectifs de l'étude

Obtenir de façon empirique certaines données sur les réactions des individus au sujet de leur environnement et analyser ces données afin de préciser certains critères de l'environnement dont on devrait tenir compte dans le processus de planification de l'habitation.

## Méthodologie générale

Observer au moyen de diverses techniques le fonctionnement d'un échantillon type de l'environnement existant: une cellule d'habitation contenant une diversité de familles.

## Échantillon type

La cellule d'habitation choisie se situe dans les Habitations Jeanne-Mance (Fig. 1). Ces habitations, le premier complexe d'habitation publique à Montréal, contiennent environ 800 logements répartis à travers trois différents types de bâtiments. Un de ces trois types de bâtiment, celui en hauteur (Fig. 2), permet de grouper 240 logements de quatre pièces et demie dont les seules variables sont l'étage et l'orientation (Fig. 3).

Cette cellule conçue et planifiée par des architectes à partir des données minimales d'espace (Fig. 4) imposées par la Société centrale d'hypothèques et de logement et en collaboration avec des architectes de la même société, offrait la possibilité de vérifier l'effet de ces standards sur les familles en cause.



Figure 1. Ensemble des Habitations Jeanne-Mance.

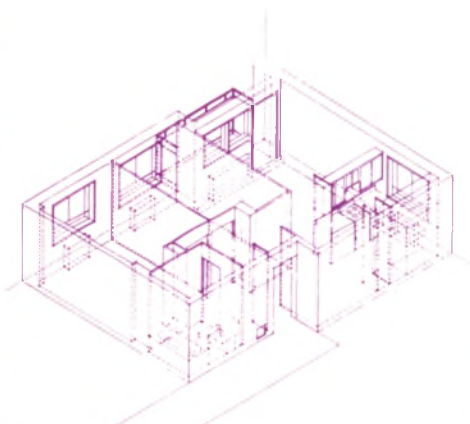


Figure 3. Cellule type étudiée.

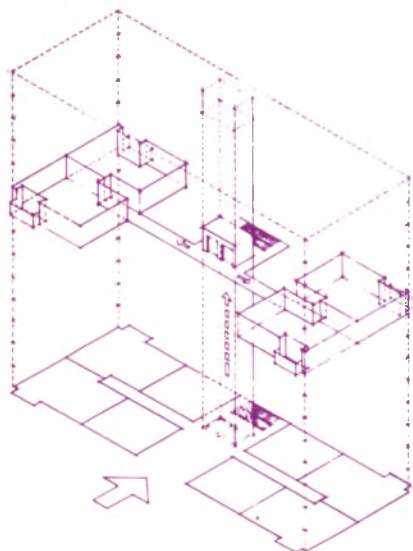


Figure 2. Tour d'habitation type illustrant l'emplacement de la cellule étudiée.

## Le dessin

Cette technique projective s'inspire de certains tests appliqués en psychologie clinique et en ethnopsychologie; elle consiste à demander aux personnes interviewées de faire un dessin de leur appartement. Il ne s'agit évidemment pas ici de déceler des traits de personnalité ou de culture, mais plutôt de développer un moyen d'enquête permettant de minimiser la paraphrase complexe de l'interview en même temps que de recueillir de l'information complémentaire sur les réactions des individus au sujet de leur logis.

En examinant les dessins et la séquence (Fig. 5) selon laquelle ils ont été exécutés, on peut repérer, comme dans les réponses à l'interview un certain nombre de constantes dans les distorsions graphiques (Fig. 6) et dans la manière de dessiner ou de ne pas dessiner certains éléments de la cellule (Fig. 7). Ces observations corroborent très souvent les données recueillies au cours de l'interview; par exemple, la distorsion plus ou moins grande d'un espace est en général reliée à la fréquence d'u-

tilisation de cet espace: on tend à donner plus d'importance en surface et à dessiner avec plus de précision du point de vue proportion les espaces que l'on utilise plus souvent; par contre, on omet carrément de dessiner ou on dessine avec beaucoup moins de précision les espaces que l'on utilise avec une moins grande fréquence.

## Le relevé

Le geste de l'occupant aménageant le mobilier de son appartement constitue une réaction bien spécifique à l'environnement; il s'agit donc ici d'enregistrer graphiquement sur un plan à l'échelle, l'emplacement des meubles et autres objets se trouvant à l'intérieur de chaque cellule. Cette technique, comme les deux précédentes, permet d'identifier certains patterns: si on examine, par exemple, la disposition du téléviseur et du divan à travers les 40 relevés du salon, on remarque que le divan est le plus souvent situé près du mur latéral le plus distant de l'entrée de la pièce et cette position est nettement reliée à celle du téléviseur qui est presque toujours placé le long de la fenêtre du salon (Fig. 8); autre exemple, dans les chambres la disposition du lit est répartie de la même façon, le lit est le plus souvent le long du mur latéral non adjacent à l'entrée de la pièce (Fig. 9).

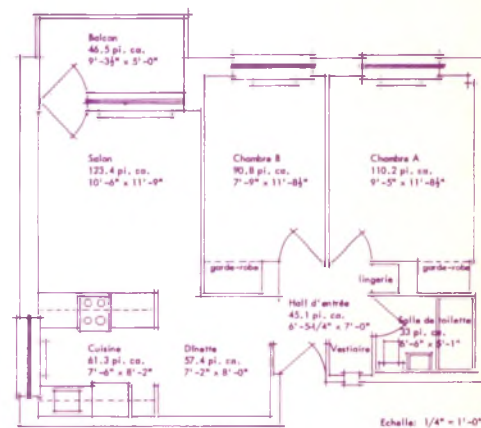


Figure 4. Plan de la cellule type.

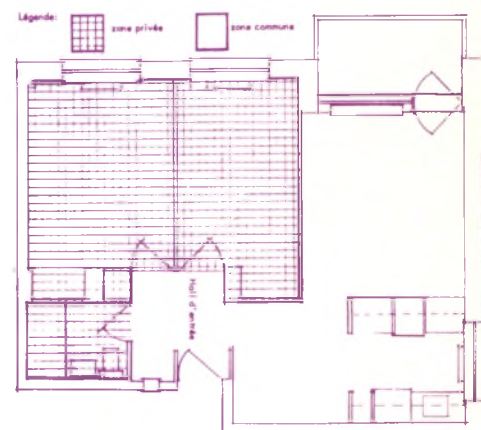


Figure 5. «Séquences»—Les pièces qui apparaissent le plus souvent sur les dessins en début de séquence sont la salle de toilette et les deux chambres; celles qui apparaissent en fin de séquence sont le salon, la cuisine et la dînette. En établissant la distinction «début» et «fin de séquence» on perçoit l'importance de deux zones existantes dans le logement: la zone commune et la zone privée.

### Corrélation des données

Les trois techniques décrites ci-haut s'entrecoupent et leur application simultanée a l'avantage particulier de permettre, au moyen de corrélations, la précision et la vérification des hypothèses.

Un certain nombre de données recueillies reflètent, par exemple, l'aliénation et l'isolement des personnes interviewées; mentionnons entre autres:

- l'isolement physique: 82.5 pour cent des familles habitent entre le 5<sup>e</sup> et le 12<sup>e</sup> étage;
- l'aliénation sociale et économique: «on ne sort pas beaucoup... on ne reçoit pas beaucoup à la maison... on a peu d'amis dans le quartier»;
- l'absence d'identification entre les individus et l'environnement extérieur immédiat: la majorité des dessins représentent la cellule par un rectangle (Fig. 10) et la relient très rarement à la trame extérieure, c'est-à-dire soit à la rue (Fig. 11) ou tout simplement au corridor qui y mène (Fig. 12).

Soulignons la très grande importance de la radio et de la télévision dans les activités des personnes en cause. Ces activités sont celles qui ont la plus grande importance tout au long de la journée et il semble que ce soit à travers la «fenêtre» du téléviseur que se fassent la majorité des contacts entre ces personnes et le monde extérieur.

D'autres séries de données recueillies au moyen des trois techniques indiquent par exemple une utilisation intense et multiple de l'espace dînette et une non-utilisation presque totale du balcon.



Figure 6. «Exemple de distorsion graphique».—Dessin type illustrant l'exagération de la superficie de la zone «A» par rapport à celle de la zone «B».

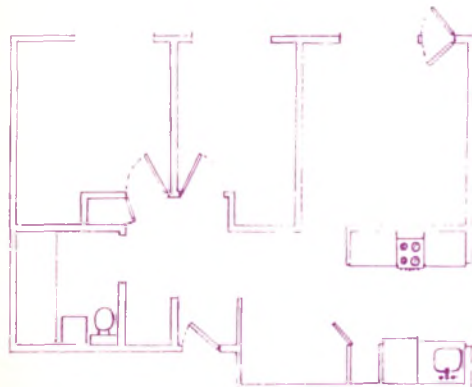


Figure 7. «Omission d'un élément de la cellule».—Le balcon n'apparaît que sur 28.3% des dessins recueillis.

### Critères sur l'environnement

A partir des données recueillies au cours de cette enquête et des observations faites sur la cellule, on découvre des relations négatives et positives entre les occupants et leur milieu physique. Notons que les conflits sont plus faciles à déceler que les relations positives car certains critères n'ont pas été considérés ou ont été écartés au cours de la planification de ces habitations.

Un certain nombre de critères sur l'environnement, soulevés par ces relations ont été rassemblés en catégories types et sont discutés dans les paragraphes suivants:

#### Intimité et communicabilité

Dans la cellule étudiée, le hall d'entrée sert à la fois de zone publique et de zone tampon entre les espaces communs et privés. Cette distinction des espaces d'entrée et des espaces tampons que l'on retrouve dans les maisons d'avant 1945 n'existe pas ici. L'adjacence du hall d'entrée aux espaces privés (Fig. 13) soulève l'absence de hiérarchie dans l'organisation des pièces du logement. La position de la salle de toilette est dictée beaucoup plus par les impératifs de la technologie de la construction du bâtiment en hauteur que par sa relation aux autres pièces (ce chambardement des hiérarchies se manifeste dans plusieurs autres domaines de notre société.)

L'ouverture qui existe entre la cuisine et le salon, au niveau du comptoir de service, ne permet pas de communication visuelle avec le salon. Elle ne sert pas non plus de passe-plats puisque la dînette n'est pas située de ce côté. Dans plusieurs logements, cette ouverture a été fermée parce que les occupants sont friands de friture et que les graisses de cuissons se dispersaient dans le salon. Or, selon les dires d'un des architectes du projet, il était présumé

que le type de cuisine des habitants serait une cuisine en casserole. La cuisine doit être repensée complètement en rapport avec le contexte culturel et social des occupants, ce qui implique aussi sa relation avec les autres pièces: ses dimensions, sa situation, son intégration ou sa complète séparation.

#### Flexibilité

Le problème de flexibilité d'une cellule d'habitation se répartit sur trois niveaux. La cellule, comme unité, peut s'accroître ou décroître; les espaces à l'intérieur de la cellule peuvent être transformés ou offrir un choix d'utilisation; la disposition du mobilier dans chaque espace peut varier.

La cellule étudiée ne peut répondre aux deux premiers critères de flexibilité mentionnés. Elle ne répond pas non plus au dernier critère sans engendrer des conflits de toutes sortes: par exemple dans les chambres, les lits ne peuvent occuper qu'une seule position raisonnable (Fig. 9).

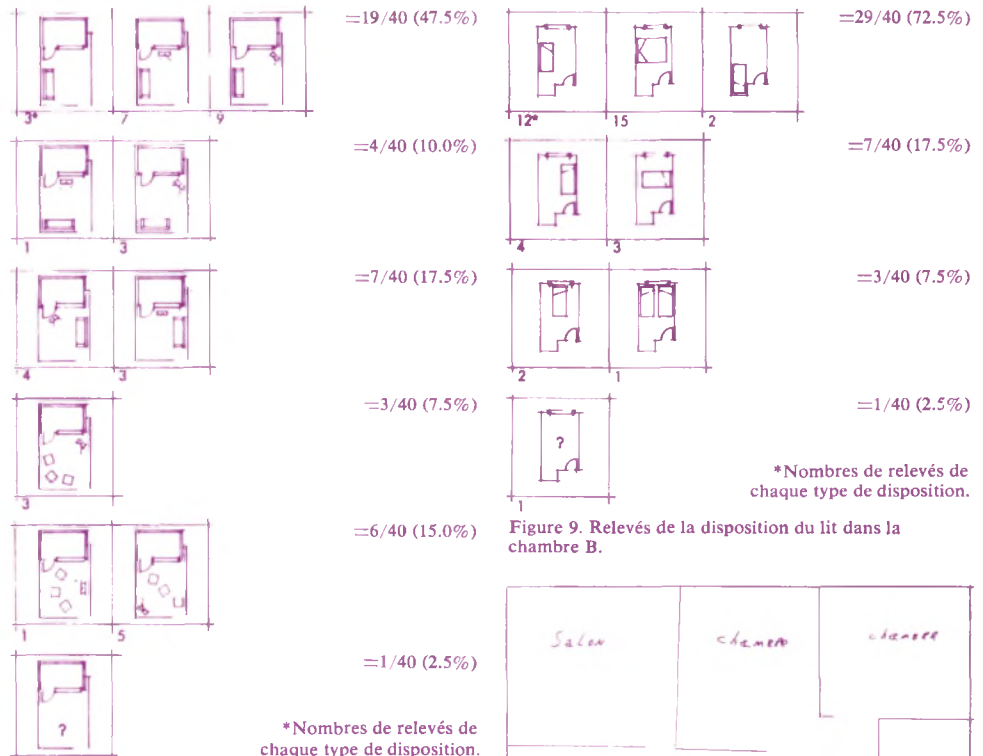


Figure 8. Relevés de la disposition du divan et du téléviseur dans le salon.

Figure 9. Relevés de la disposition du lit dans la chambre B.



Figure 10. «La majorité des personnes représentent la cellule par un rectangle».



### Le contexte culturel

Les conséquences d'ordre culturel ajoutent de la complexité aux problèmes du planificateur quand il doit les considérer de concert avec les critères mentionnés. Il est évident, lorsqu'on retrouve des logements quasi semblables à travers le monde, que cet aspect est rarement considéré. Cette perspective d'études environnementales trans-culturelles dépasse les limites de cette étude particulière mais suggère un autre champ de recherche.

### Conclusions

L'importance d'une étude comme celle-ci ne se situe pas seulement au niveau des données particulières qu'elle apporte sur les relations homme-environnement. Mais aussi elle est valorisée quand ses résultats peuvent avoir une influence sur le processus de décision dont cette cellule est le résultat.

Les problèmes soulevés par les différents points de vue des groupes responsables dans le domaine de l'habitation créent un déséquilibre au niveau des décisions. C'est ainsi que les planificateurs sont parfois forcés de prendre des décisions plus directement orientées sur le point de vue politique et financier des administrateurs, que sur celui des habitants futurs, les véritables clients. Aussi, l'anonymat de ce client pousse le planificateur à prendre des décisions arbitraires fondées sur des normes établies, sur des exemples déjà conçus et souvent étrangers au contexte dans lequel ce dernier évolue.

Le déséquilibre qui existe présentement au niveau des décisions, et qui réapparaît au niveau des solutions, peut être attribué en grande partie à la faiblesse de la position du planificateur qui ne possède pas vraiment de données objectives et scientifiques auxquels il doit répondre.

C'est ainsi que cette étude veut contribuer au développement et à l'accroissement d'un matériel scientifique qui renforcera la position du planificateur. En considérant les moyens très limités mis à la disposition de cette étude, il est rassurant de constater l'intérêt qu'elle suscite chez les différents groupes mis en cause. Avec leur concours, il sera possible de poursuivre le perfectionnement des techniques de recherche, car les études futures devront être approfondies sur le plan méthodologique et en faire la preuve.

Ces recherches sur l'environnement ne se limiteront pas seulement au domaine de l'habitation mais pourront s'étendre à tout le domaine bâti ou contrôlé par l'homme.

Le degré de flexibilité est relié au degré d'identification des individus à leur environnement. Or, dans le logement, une planification qui offrirait une multiplicité d'utilisations des espaces et une variété d'aménagements de chacun de ces espaces, répondrait mieux à ce besoin d'identification.

### La cellule et son plan

Il est intéressant de constater que la répartition des surfaces attribuées à chacune de ces pièces compose un «plan» bien équilibré (Fig. 4). Mais l'impression de ces espaces, lorsqu'on y pénètre, est totalement différente et donne du plan une image trompeuse qui est due à la disproportion de la dimension verticale. Ce qui indique que l'unité d'habitation est souvent conçue en deux dimensions et que la troisième n'y est incorporée qu'au moment où les unités types sont empilées pour devenir un bâtiment.

Elle illustre bien la méthode de travail des planificateurs, comme aussi celle de la bureaucratie administrative qui accorde souvent les autorisations nécessaires après l'examen unique du plan. Un des dessins recueillis durant cette enquête, qui représente chaque pièce en coupe et en plan simultanément, illustre intensément la disproportion qui existe entre l'horizontalité et la verticalité des espaces (Fig. 14).

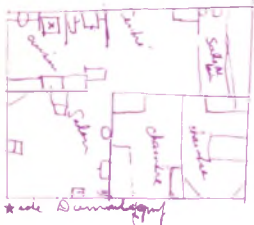


Figure 11. Exemple d'un des rares dessins reliant la cellule à un élément («rue Demontigny») de l'environnement extérieur.



Figure 12. Corridor type.



Figure 13. Entrée de la cellule.



Figure 14. Dessin reflétant la disproportion entre les dimensions horizontales et verticales de la cellule.

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Minister Responsible for Housing

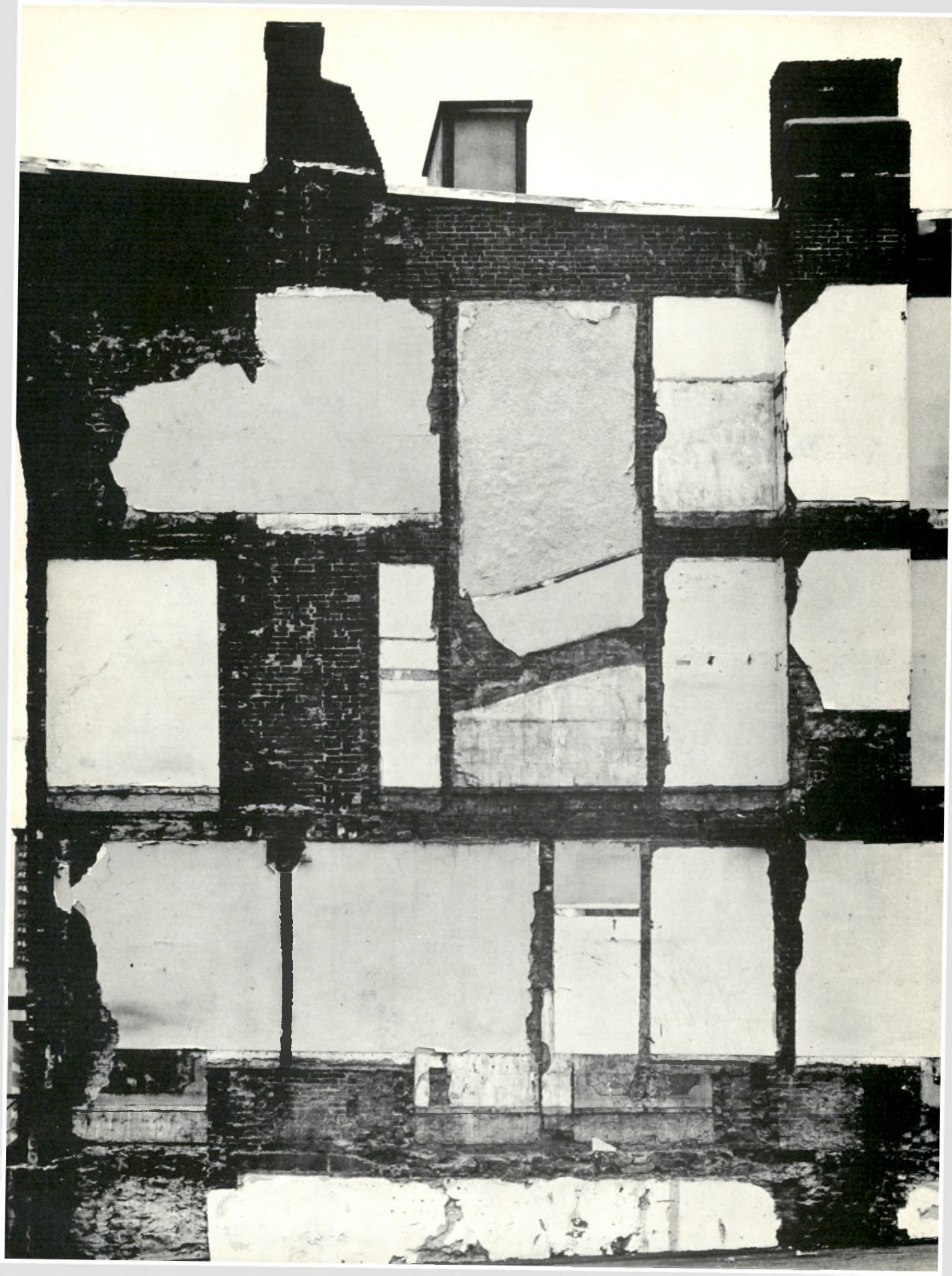
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Ron Solomon	Photograph inside cover	Photographie de la couverture intérieure

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# The University as an Intellectual Community and a Catalyst for Change

by Daniel Cappon

The second of two articles discussing important national problems. The first, on cities, appeared in the previous issue.

First photo: Robert Lundgren. Remainder: CMHC  
by Bill Cadzow, Ron Landry.



## Introduction: A Critical Statement

Education, as a massive western enterprise and despite its crippling cost and near universality, has left its early promise largely unfulfilled. The quantum of hatred and intolerance has not been reduced in the human heart, nor even in behaviour; still less has it facilitated the development of love. If truth and wisdom had been the search, they have not yet been revealed.

If health were a correlate of education, its mental component has not been raised nearly enough to a standard from which man may cope with the tidal waves of his environment. The result is perplexity. Man, not yet overwhelmed is swaying between the strain of change, the stress of problems and the danger of destruction.

How much of this failure, the failure of yet another western dream, can be apportioned to the University and how much to the infra-structures of education is impossible to assess. In spite of their physical and organizational relative separateness, all levels of education are part of a system.

One of the great failures of education as a whole has been its appalling lack of measurement or even a lack of validated assessment criteria. Yet one may say, arbitrarily, that the University is the senior service, the crown jewel in a somewhat artificial head gear adornment. It has power, money and glory. It enjoys that ultimate luxury: academic freedom. Thus the University should bear the major responsibility.

Interestingly, the educational system has not only largely failed to civilize, cultivate, sharpen man's mind and to socialize his behaviour to the level of adequacy demanded by the challenge of the times (in other words it failed to educate), but it has also not quite fulfilled the functions which it is accused of pursuing when it allegedly perverted its basic aim, namely training. So a University product is neither an adequate thinker and creative discoverer, nor even a fit tool for technocracy. He needs some four years more on the job training, in industry and in the field, before he can become a useful organization-cum-computer-organism, or, shall we say, an adequate professional.

As to the pursuit of truth and knowledge, this has been largely technological in this century consequently the bulk of advances have been industrial.

Hence there has been a lack of fulfilment in all sectors of education. In the teaching-learning "know what" area, many, if not most, have learnt too often *despite* the system and *outside* it. There has been lack of fulfilment in the service area in that both private and public sectors of employment are beginning to favour non-university recruits, the great unwashed. They hire them wherever they can, because of their dedication and enthusiasm. And there has been lack of fulfilment in research or at least in the "know how" area, carried out more successfully as an integral part of "purposeful work", outside the educational system.

Probably the most promising result of education has been the ability to criticize, to dissent, to be dissatisfied and to a small extent to utilize to some minor benefits the restlessness and constructive activism generated. But this has deteriorated from dissent to disease and from constructive improvement to alienation and anarchy. Much of this illness stems from other sectors of society, but some of it is due to the myopic desire for drastic instrumental or governmental change without adequate revision of goals, without the process of self-renewal, without the contextual considerations of the systems involved and without projection into alternate futures. In other words, the approach to violent dissent has been largely paved by uneducated emotions motivated by frustration, if not by despair and activated by impulse.

For instance, changing a University government before re-defining the purposes and aims of the institution and without re-examining its strengths and failures, is putting the cart before the horse. Already the benefits of education are being challenged on social and even on economic grounds. Thus the question of enclosing a university in solid physical and institutional structures has already been raised on the grounds of modern technology (especially that of audio-visual communication) and on the grounds of the necessity for continuous, cradle to grave training, if not education, in response to three or four changes of careers in a lifetime. Finally, it is being

questioned on the possible grounds of building total learning environments into urban and even rural living.

And, the building of Universities—supposedly a community of scholars—into perhaps the decentralized cul-de-sacs college system and the centralized and streamlined multiversity might have some virtue if no other than that they each seem to be the end points of a long evolutionary path.

Finally, one does not choose this occasion as an issue for the reform of government. If there were some virtue to leadership, if a President had a vital function, however ultimately modified in the light of the kind of university that is desirable, one should not make the appointment of a new President, a battleground between, say, the Senate and Board of Governors.

To illustrate one kind of rational and constructive approach to this particular problem, of the appointment of a President to fill one of the epidemic vacancies, one would first decide whether the University should become an openly political body. It is already a covertly political body. Should the University become frankly political, this would mean that the political involvement of faculty, administration and students would not be an extracurricular private affair, often necessitating the resignation or leave of absence by one of the active members. On the contrary, direct political involvement would itself become a curricular activity. It would also mean, *inter alia*, that an active politician could very well qualify for a teaching appointment (and here the inequities and dangers of this change would have to be carefully weighed). Under such redefined circumstances a new President should be *elect-ed* in a proper political way, openly and following formal campaigning and on so-called democratic lines. The new President would, therefore, be more likely to be a red-blooded political animal than a non-political thin blooded academic.

It is reasonable that the ends should determine the means and that the means determine the end product—in this case the type of leader and the kind of government he will lead.

On the other hand, if the nature of a university should remain at least openly apolitical, an academic fortress protected

from popularity, and other dangerous elements, then the President should be appointed in secret, as is traditional. Probably the appointment should be made solely by a Board of Governors, as has been the practice.

Now, if subtle modifications were sought in the nature of academia, in its governmental structure, President and subsequent type of leadership, this could all be achieved by changes within the membership and structure of the Board of Governors. These changes should be consistent with the desired direction of modification—more business, academic, professional or more student-need oriented—or more visionary.

The one thing *not* to do, the one thing asking for disaster is to make an imprudent and uneasy compromise between the frankly political, democratic mode of elections and the traditional authoritarian mode of appointment. The result of such a compromise would be tension to breaking point. Quite apart from what this does to the search for a President and to the fate of his appointment there is a tendency for this process to set back *both* the legitimately confronted forces, the democratic revolutionary force and conservative authoritarian one. They both tend to collapse in guilt and confusion without resolving rationally their differences. The resolution should occur on the broad organic or systematic grounds of defining the purpose of the University; designing the institution accordingly and then implementing, sorting out and feeding back effects, desirable or otherwise, so as to modify an ever-evolving, adaptive structure.

To return to the main axis of my discourse, if education in general and the university in particular have largely failed to fulfil their earlier promise of centrality in society, in that they have proved to be relatively incapable of adequate response to change, in what way can they be expected to fulfil a role as agents of change—or catalysts—as initiators, facilitators if not actually designers of change? Moreover, how can they be expected to go further, that is project alternative possible changes, adjusting rates or phasings of change as they go along and putting measurable or at least objectively judgeable values on such changes in terms of "progress" or in terms of betterment?



## Analysis of Failure

If change were desirable, or inevitable, then its control or at least choosing between possible changes would indeed become desirable. It is, then, only reasonable to look to the organizations of society, its institutions, for a controlling or at least for a major catalytic agent. Emotional bias and quick judgments on a relative failure of other institutions such as the church, government, industry or business, soon make one discard these and turn back to something like a University, with a kind of last hope. Hope maintains life no less surely than does oxygen, moreover, there is something residually appealing in the University, at least to a man whose life was and is still dedicated in large part to it. In any case, in order to verify (or shall we say) to assess the relative failure of the University and also in order to correct faults, if this were possible, it is mandatory to dissect the anatomy of this moribund or sick body.

Why has the university failed to *respond* adequately, that is quickly enough, qualitatively appropriately enough and quantitatively in sufficient amount to experiential changes spearheaded by technology? As in all man-made or natural problems of insufficient response, the answers to such a question comprise a complexity of over-layered and inter-locked sets of reasons.

Among them, in no particular order of magnitude or priority are:

- 1 The traditional sequestration of the university from society and the preservation of its apparent political purity, so that it may protect its community of scholars for the higher purposes of mankind. In any case it is unlikely that they could compete and survive in the market place.
- 2 The enclosure of this sequestrum in the organization of an institution, with the paradoxical consequence, now apparent in all institutions, namely that what is most desirable to preserve (truth, knowledge, goodness, beauty, freedom and so on) becomes most readily extinguished by the oppressive rigidity of structure. To put it differently, if growing points of culture were flourishing at some time in the Academia or the Universitas (which may have been the case but, as I shall show, is now and forever most unlike-



ly to occur) and if because of their necessary tenderness it were desirable to protect and enclose these growing points, then the only means hitherto devised by society has been the hot-house of institution. And the moment this occurs with any security, the points cease to grow and a steady state is reached. The paradox comes from the necessity to protect something that is tender and growing and the fact that the means of doing so tends to kill the very thing protected.

- 3 There have arisen a series of conflicts within this educational institution whose rapidity, magnitude and intensity have been such that instead of resulting in enhanced adaptation, they stalled its development.

Among them (again in no particular order) are:

- a The conflict of scale. This is related to the population explosion, the mass society and consequent economic problems of having to relate size to cost. The apparently inevitable (probably by default of innovativeness) consequence of this conflict has been the death of the university as a liberal college and the illusion that it can survive as a discrete college entity within a multiversity setting.
- b The conflict of ideology. This is related to the confused definitions of what a university is, what it should be at least in terms of its teaching, research and service functions relative to society, if not also in terms of its contemporary socio-political relevance e.g. Maoist, New Left, Liberal, Conservative, etc.
- c The conflict of power. Here, too, there are overlapping and many layered aspects; those of promised active power, the University as a leader of society; those of the power structure inside it, the new power of its transients, the students; the old power of its lodgers, the students; and the real power of its codgers, the administration. These shifts of power reflect similar shifts and confusion in the outside society and also provide an unhappy model of the power vacuum sickness of the community at large.

On a psychological level much of this difficulty, as well as the unresolved conflict of style, is caused by the fact that in the protracted adolescence of



students and staff there persists the image of the family structure with its typical power struggle; the oedipal complex, paternalism and all. This family dynamic is extended to, and through the university and tends to persist for longer than ever into 'the real' working life of the chronologically mature student-become-professional.

d The conflict of substance. Here, on a macroscale, is the question of whether universities, as opposed to other higher level educational institutions like community colleges, should not become places for graduate studies. On the same large canvas there is the struggle between the professionalism (technology) which the popular schools (of Architecture, Medicine, Business Administration, etc.) stand versus academia represented by the non-professionals of the Arts and Sciences. Again, on the same scale, there is the conflict between producing a thinking, unemployed generalist as against producing a robot, highly paid specialist.

On multiple micro-scale levels there are questions of the relevance and efficacy of curricular content. This includes the perpetuation of linearity in visual thinking and in syllogistic logic as against innovations of patterns in configurations and systems of visual thinking and symbolic logic.

It includes the problem of slicing knowledge vertically along conventional disciplinary lines as against slicing it horizontally into inter-disciplinary confluences. It also includes the conflict between an emotionally reassuring setting of factual authority as against the unsettling format of exploration.

Finally, it includes the paradox of the grading or marking system with its traditional reliance on false accuracy based on variable and subjective standards, variable and erratic methods of assessment or judgements and variable judges, all this against the clear possibility of non-traditional grading.

By the latter I do not mean to suggest the partial abandonment of grading camouflaged by the pass-fail grade, but taking into an accurate accounting system the entire range of student-teacher enterprise. Such a system of grading is perfectly achievable. The consequence of having failed to

produce an adequate grading system has been that educational methods and content have changed like can-can shows as a result of fashions imposed by impresarios, rather than as a result of reasoned judgement.

e The conflict of finance. This is partly a factor of scale. It also is partly a factor of competing expenditures of relatively forever restricting venue and it is partly political expediency in an attempt to control such factors as student unrest and violence. Thus, what is bought either in terms of basic space units or in terms of pound of brains is not what is best, but what is feasible.

All these conflicts and more are reflected in the conflicts of environmental design. These range from the decision to enclose classes and lecture halls and encamp a university in the first place (fixing it rigidly in space) and designating it for the transients (students) (that is fixing it rigidly in time); actually the design is as in most institutions like hospitals fashioned for the inmates (professors or doctors) rather than for the transients or "other users" for whom it is designated. Even more importantly this range of design conflict ends in the physical environment reflecting some of the vast conflicts of high-rise and suburbia displayed in the outside community.

Integration (of design) is left in the eye of the architect instead of the corporate mind of all those concerned in this particular environment.





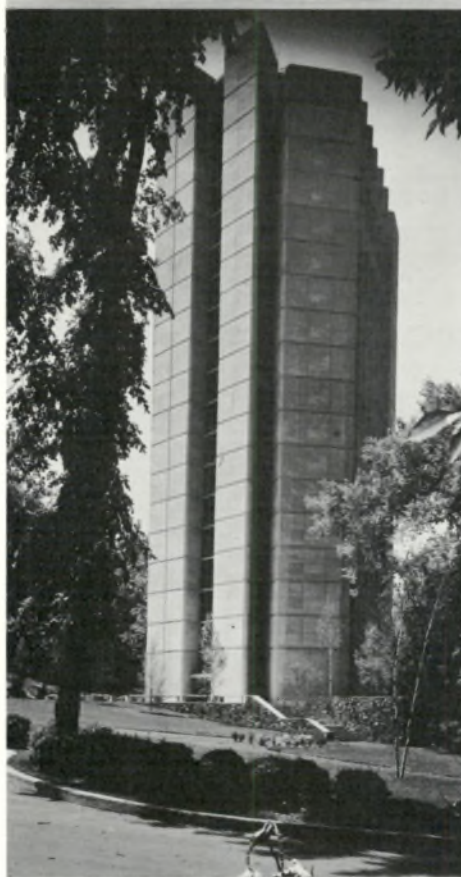
### Hope for Remedy

Clearly if there were no other institutions likely to become an effective agent of change, that is predicting, evaluating and controlling it, and helping society implement continuously adaptive options, then one must look back in hope to the University. This means trying to put right what is wrong and foster what is promising. The latter is easier.

My diagnosis of what is promising, my divination of the growing points of culture would put the most fertile territory in no-man's land, at the interface or confluence between various institutions, probably between *all* major institutions, such as the educational governmental, business, industrial and religious grouping. This means that one is prepared for the core of institutions to suffer from accelerated decay and hopeful self-renewal, while one looks to the periphery for creativity and innovation. This means the encouragement of inter-disciplinary areas like Environmental Studies and Transportation centres and like Human Biology and Human Engineering and like the Arts, Sciences and Humanities of Communication and of Development to carry the hope of co-operative progress, certainly in the intellectual realm, but also in terms of social behavioural models and the growth of value systems.

This would imply that illusory academic freedom, at worst a rationalization of relative irresponsibility in society, would give way to academic involvement in the matrix of social life. I am not suggesting that intellectuals or academics do not have the leisure or inclination or indeed the power to influence change since they do knit mythologies, but I am suggesting that the mythophilia of the academic is relatively irresponsible because he does not look beyond to consequences and feed-back. Not only do these kinds of interdisciplinary and inter-institutional enterprises cross fertilize and rejuvenate ancient disciplines and give them new purpose through work in the 'real world', but they also call for funding and support by joint public and private sectors served by cooperative research and education.

Very likely the consequence of this kind of movement would be a fairly clear-cut division of labour where instrumental and pragmatic, hardware-type of



research and work would be largely extramural and adaptive, while flexible, system, social and software research work would be done largely intramurally.

This kind of direction also suggests that a non-ceiling proportion of a professor's salary and even a student's stipend may be legitimately earned in the open market. This would render the scholar more merchant than mercenary. In turn it would ease both the burden of the educational budget on the state and of penury in the scholar. This arrangement might also mean the active political involvement of University personnel in pressing the implementation of research, of theoretical teaching, planning and design. The hope would become that the University will lead all major institutions toward an intellectual and emotionally integrated decision-making process, subjugated to cost-effectiveness and cost benefit analysis once there is a re-evaluation of the social good and the individual good. That is, once there are perimeters for the market exchange of these goods.

This kind of change would call, in turn, for a phased restructuring of the government and the power and the money distribution between university and society and within the university. Then, and only then, would such restructuring become a rational process or at least more than a sullen rebellion.

One of the redistributions of responsibilities and powers which intrigues me and which offers great hope for a future society is the rearrangement of the essentially male structure of public affairs into a truly heterosexual community. At least let the University set this particular innovation.

It may also be that the University, indeed all schools would recognize with a degree of appropriate humility that they are *not* the only, indeed they may not remain even, the *major* agents of education, anymore than the family might remain the major influence in the upbringing or rearing of children beyond 9 or 10. It may well be that the burden of continuous education will be transferred to multi-communication media systems, carried out in the main by highly skilled

advertising or entertainment industries, aided and abetted by the electronic computer and by publishing businesses but catalysed hopefully by educationists.

In the same vein it may well be either that the University and all schools will become merely nodal points in a learning environment, where the world's poetry might be written on the walls of the city and the world's music might flush into our minds when lavatory chains are pulled and the world's mathematics and languages might percolate when man lies in a bath or on a bed slumbering. It may be that the University and Schools will diffuse in the environment electronically, as it were, and thus disappear into environmental space and lose a fixed location.

Clearly such trends, let alone such well defined courses or directions would obviate much that will then be perceived as the crudities of history. Gone would be such things as the chiefs of departments or faculties, even the good ones being sucked in by the tyranny of bureaucratic bumph and eventually seduced (via memoranda) into the cloak and dagger and fine, Italian hand politics, that are characteristic of institutions not openly political and therefore which are not sufficiently merciful. The gradual deterioration of the good chief who resents his administrative work (to which in any case, he is ill-suited), into the clinical phases of aching, ennui, then numbness and then vanishing into the nether world of bureaucratic shadows, will become a pathetic memory.

Questions of tenure and of penury; of sabbaticals and of elections versus appointments; of seniority and of retirement and of cults like that of youth (even the worship of those who have always been old) and the cult of gaps that mark the generations (the beat, the rock and roll, the grass, the crass) all these will be resolved in the natural evolution of purposive change.

And, hopefully, the research, teaching and service functions of the University would integrate not only within itself but within the entire educational system (however extended) and find new directions in such matters as joining the advances of technology to the newly fashioned social awareness for the individual advancement of man.



# Projets d'aménagement de la Place d'Youville et de la Place Royale

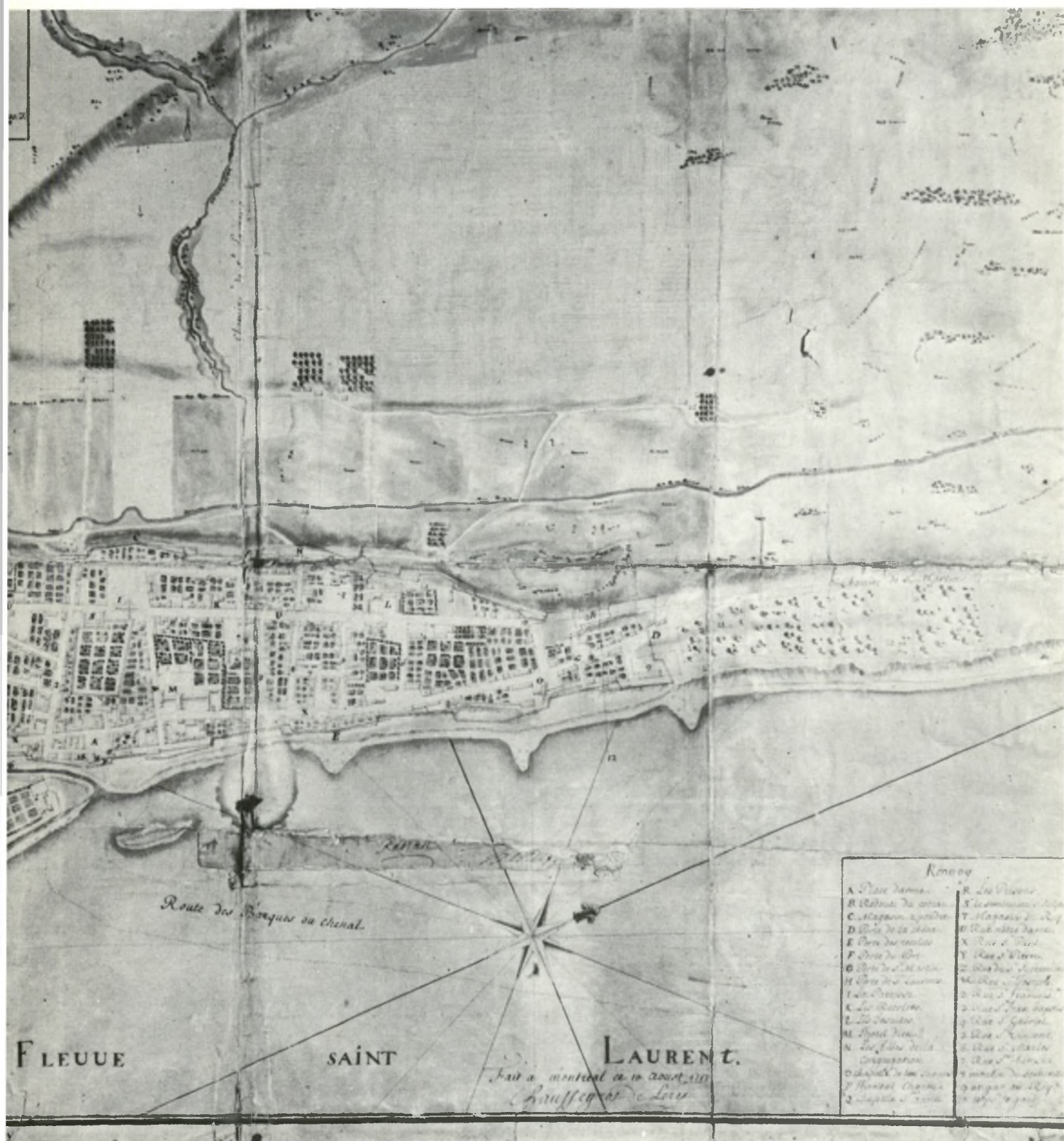
Texte et photos fournis par la Division de l'aménagement urbain du Service d'urbanisme de la ville de Montréal, par les bons soins de MM. Jean-Guy Théoret, architecte et de M. André Mitchell, photographe.



## 1 Introduction

Les projets d'aménagement de la Place d'Youville et de la Place Royale s'inscrivent dans le cadre du plan directeur du Vieux Montréal.



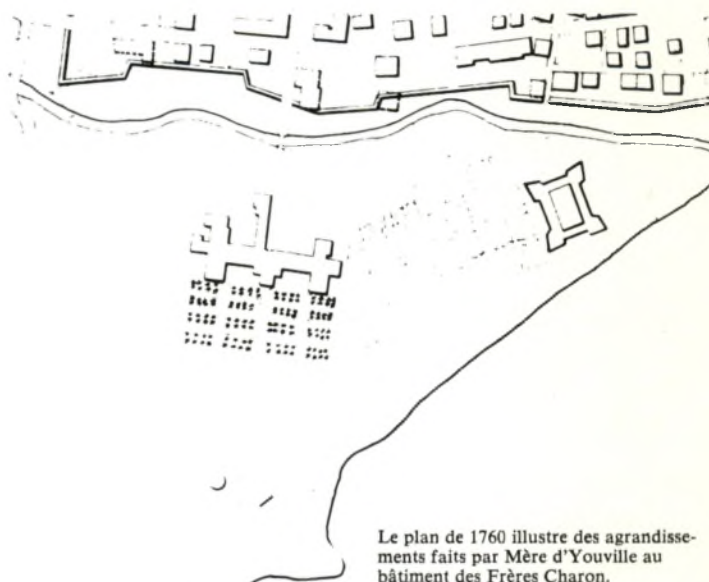


C'est afin de maintenir un équilibre dans le développement général du secteur historique que la municipalité a décidé de faire porter sur la partie «ouest» du Vieux Montréal un effort d'investissement comparable à celui déjà consenti dans la partie «est».\*

La division de l'Aménagement urbain du Service de l'Urbanisme fut chargée de la préparation du projet de réaménagement de la Pointe-à-Callières.

\* Place Jacques-Cartier, Place Vauquelin, rues St-Paul et Bonsecours, restauration de l'édifice du Marché Bonsecours.





#### a Importance historique des lieux

C'est ici, sur cette presqu'île formée par la Petite Rivière et le fleuve, que se déroulèrent les événements les plus marquants de la vie de Montréal.

En 1642, Maisonneuve y débarqua et y fit construire un fort.

En 1694, ce fut la construction de l'Hôpital des Frères de la Charité dirigé par François Charon de la Barre.

En 1701, Monsieur de Callières, alors gouverneur de Montréal, y signa la «Grande Paix» avec les «sauvages». Par ce traité, Ville-Marie put s'étendre avec plus de sécurité.

De 1717 à 1744, l'ingénieur Chaussegros de Léry fut chargé d'ériger les fortifications de Montréal. Ces murs longeaient le versant nord de l'actuelle Place d'Youville.

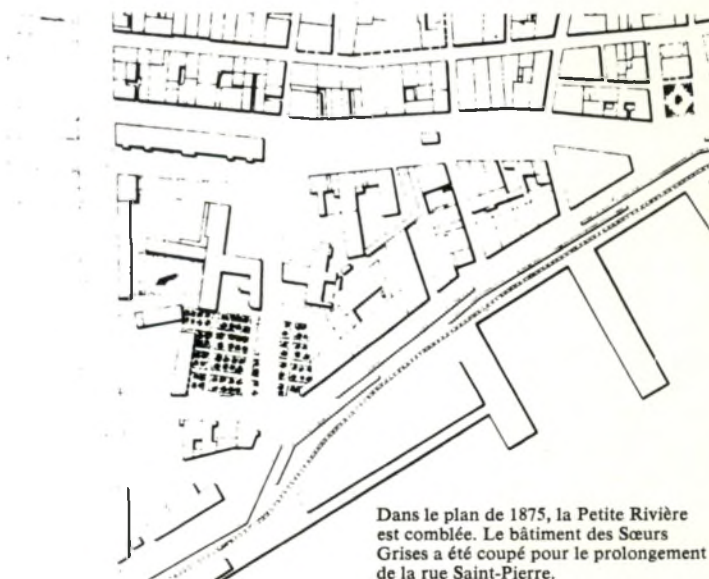
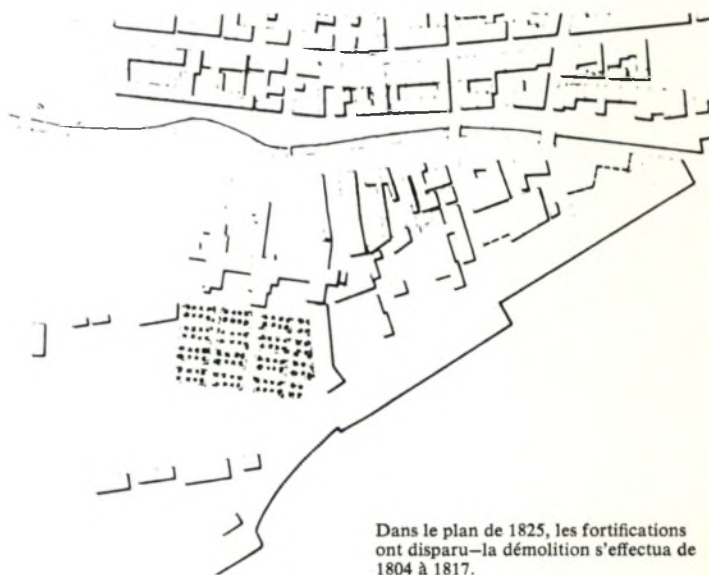
En 1747, Dame Marguerite d'Youville prit la succession des Frères Charon pour y établir la communauté des Sœurs de la Charité, dite des Sœurs Grises.

De 1804 à 1817, les commissaires furent chargés de la démolition des fortifications et s'acquittèrent—c'est regrettable—admirablement bien de leur tâche.

En 1830, sur une partie remblayée de la Petite Rivière, on construisit le Marché Sainte-Anne qui abrita plus tard le Parlement du Haut et du Bas Canada.

En 1849, le gouvernement La Fontaine/Baldwin votait d'importantes réformes. Ces dernières n'eurent pas l'heur de plaire aux marchands et banquiers qui se voyaient ainsi privés de certains privilèges.

En outre, ils étaient indignés par la loi accordant des indemnités aux victimes comme aux rebelles de la révolution de 1837. Ce mécontentement général dégénéra en une émeute au cours de laquelle l'édifice du Parlement fut incendié le 25 avril 1849.



### *b La transformation du secteur*

Avec l'expansion rapide de la ville et le développement intense du commerce portuaire, les bâtiments de ce secteur ancien se transformèrent progressivement. L'habitation y disparut graduellement pour s'implanter dans de nouveaux quartiers situés plus au nord, tandis que les fonctions directement liées à l'activité portuaire (l'entrepôt, le commerce de gros) s'établirent dans les bâtiments anciens. Les structures vieillirent, les bâtiments furent laissés à l'abandon ou démolis pour faire place, de date toute récente, à de hideux terrains de stationnement.

La Place d'Youville elle-même fut transformée en aire de stationnement.

## **2 L'aménagement proposé**

### **La Place d'Youville**

#### *Les thèmes*

L'aménagement proposé s'inspire de l'histoire et des conditions anciennes de la topographie de Montréal pour évoquer un climat et une ambiance respectueux de notre passé. Il ne s'agit pas de recréer une situation ancienne qui serait chaotique, voire en contradiction avec nos besoins modernes, mais plutôt de suggérer une présence, un rappel du passé.

- L'ancienne «Petite Rivière» recouverte à la fin du siècle dernier est prétexte à l'aménagement d'un canal.
- L'existence du Parlement du Canada en 1841 est prétexte à l'aménagement d'une place dont le tracé et les matériaux seront un rappel de son architecture.
- L'Hôpital Général des Frères Charon et de Mère d'Youville, seul élément vraiment historique, est remis dans son état original (XVIII<sup>e</sup> siècle).

#### *L'occupation des bâtiments*

Il est essentiel que l'entrepôt avec son camionnage actuel soit supprimé. Une aussi forte concentration de ce type d'occupation a lourdement contribué, par le passé, à détériorer le caractère de l'ensemble, et perpétuer cette occupation entraverait toute opération de mise en valeur du secteur.

Progressivement, au rythme du remplacement et de la rénovation des bâtiments, les occupations incompatibles avec le caractère de la Place seront remplacées par celles prévues au «plan directeur du Vieux Montréal»: habitations, ateliers, bureaux, boutiques, commerces dans lesquels moins de 50 p. cent de la superficie totale de plancher est affectée à l'entrepôt, etc.

Les bâtiments au nord de la Place d'Youville bénéficient d'une double exposition ayant front sur la rue Saint-Paul et sur la Place d'Youville. Leur état de conservation, la hauteur des étages, l'entre-axe des structures, la superficie des surfaces vitrées en font des bâtiments très valables. Par l'adjonction d'équipements modernes (ascenseurs, climatisa-

tion), ces bâtiments offriraient des espaces de bonne qualité pour l'aménagement de bureaux. Les rez-de-chaussée, plus hauts encore que les étages courants, pourraient loger des ateliers, des boutiques, des salles de montre, des commerces assurant une animation continue au pied des immeubles.

Au sud de la Place, les bâtiments sont de facture plus ancienne. Moins hauts, plus étroits, souvent groupés autour de cours intérieures, ces bâtiments qui bénéficient d'un meilleur ensoleillement pourraient être affectés à l'habitation.

Dans cette partie sud de la Place, la propriété des Sœurs Grises occupe une place privilégiée, et par l'étendue de la propriété et par la valeur historique des bâtiments qui s'y trouvent. Le projet de restauration de leur propriété s'appuie sur l'hypothèse du retour des Sœurs Grises au lieu de leur fondation, à l'endroit même où vécut et mourut Mère Marguerite d'Youville. Avec la démolition des bâtiments ouvrant sur les rues Normant et Saint-Pierre, et la fermeture de la rue Saint-Pierre, au sud de la Place d'Youville, il devient possible de rétablir le bâtiment dans ses dimensions originales par l'adjonction d'une aile et la reconstruction de la chapelle.

Le bâtiment se situant au centre du lot, le terrain vacant à l'avant et à l'arrière serait aménagé en jardins et entouré d'un mur de pierre pour conserver à l'ensemble un caractère de calme et d'isolement.

Ainsi, on assurerait de façon définitive la sauvegarde des restes d'un des plus vieux bâtiments de Montréal, en plus d'introduire dans le Vieux Montréal une activité discrète mais permanente.

#### *La circulation*

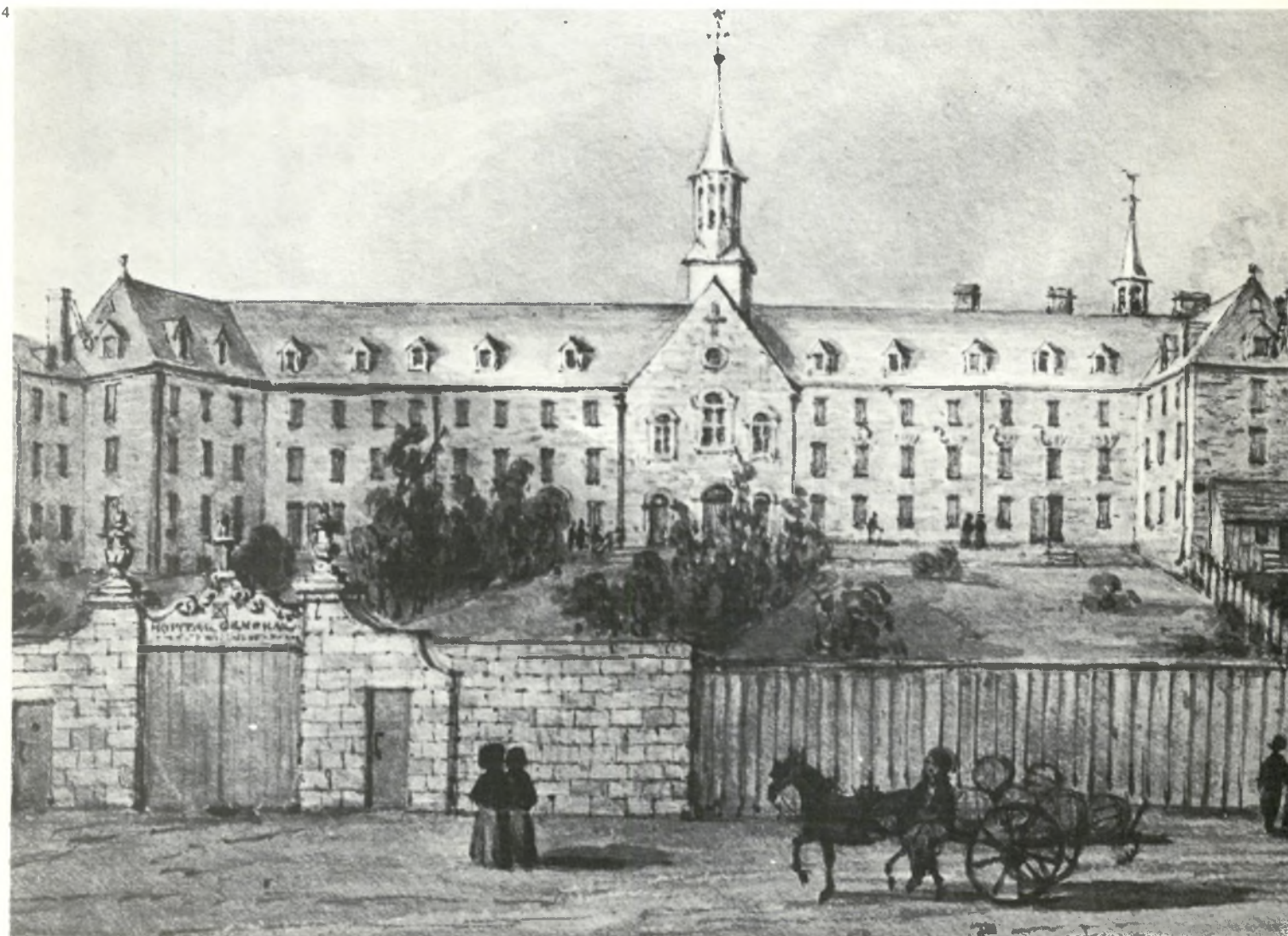
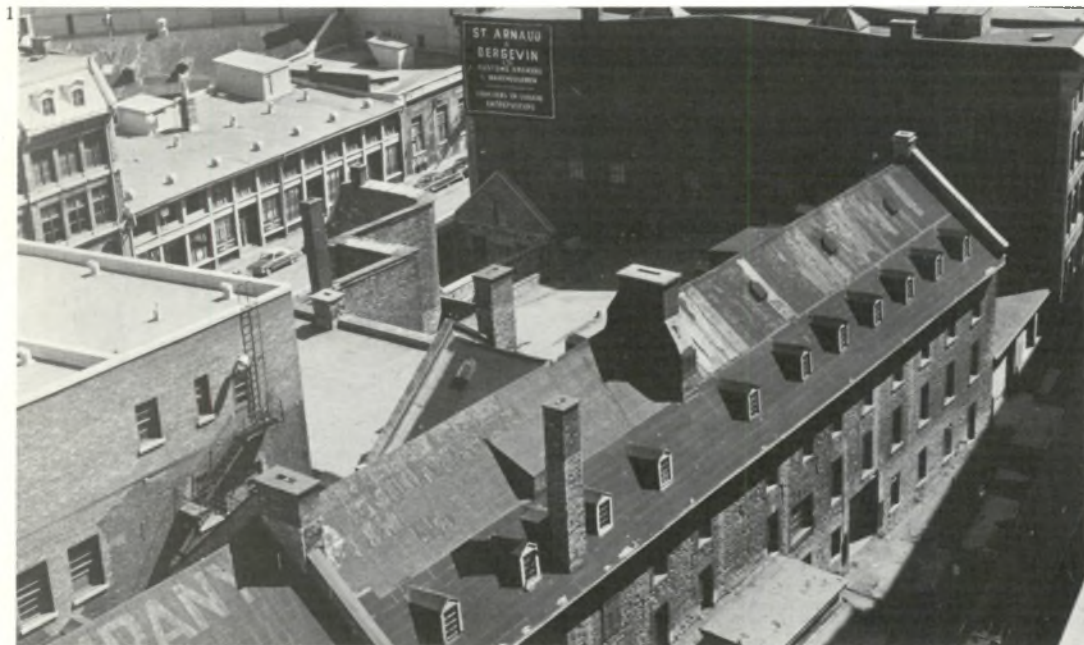
L'élimination du camionnage lourd sera la conséquence de la disparition de l'entrepôt comme occupation principale des bâtiments sur la Place d'Youville.

Aussi faudra-t-il, par l'aménagement approprié des carrefours, éviter que la Place ne serve de raccourci entre la rue des Commissaires et la rue McGill. Cette circulation, qui n'a pas la Place comme point de destination, sera reportée à la périphérie du secteur.

L'aménagement fera disparaître les 200 unités de stationnement qui occupent actuellement tout le centre de la Place. Ces unités seront regroupées dans un garage à plusieurs paliers situé entre la Place d'Youville et la Place Royale.

Le volume de la circulation engendrée par la desserte des bâtiments pourra être reporté sur des chaussées de 22 pieds (normes du Vieux Montréal). L'excédent de l'emprise sera versé à la circulation piétonnière. Les trottoirs le long des bâtiments seront suffisamment larges pour permettre la plantation d'arbres, la pose des lampadaires et du mobilier urbain.









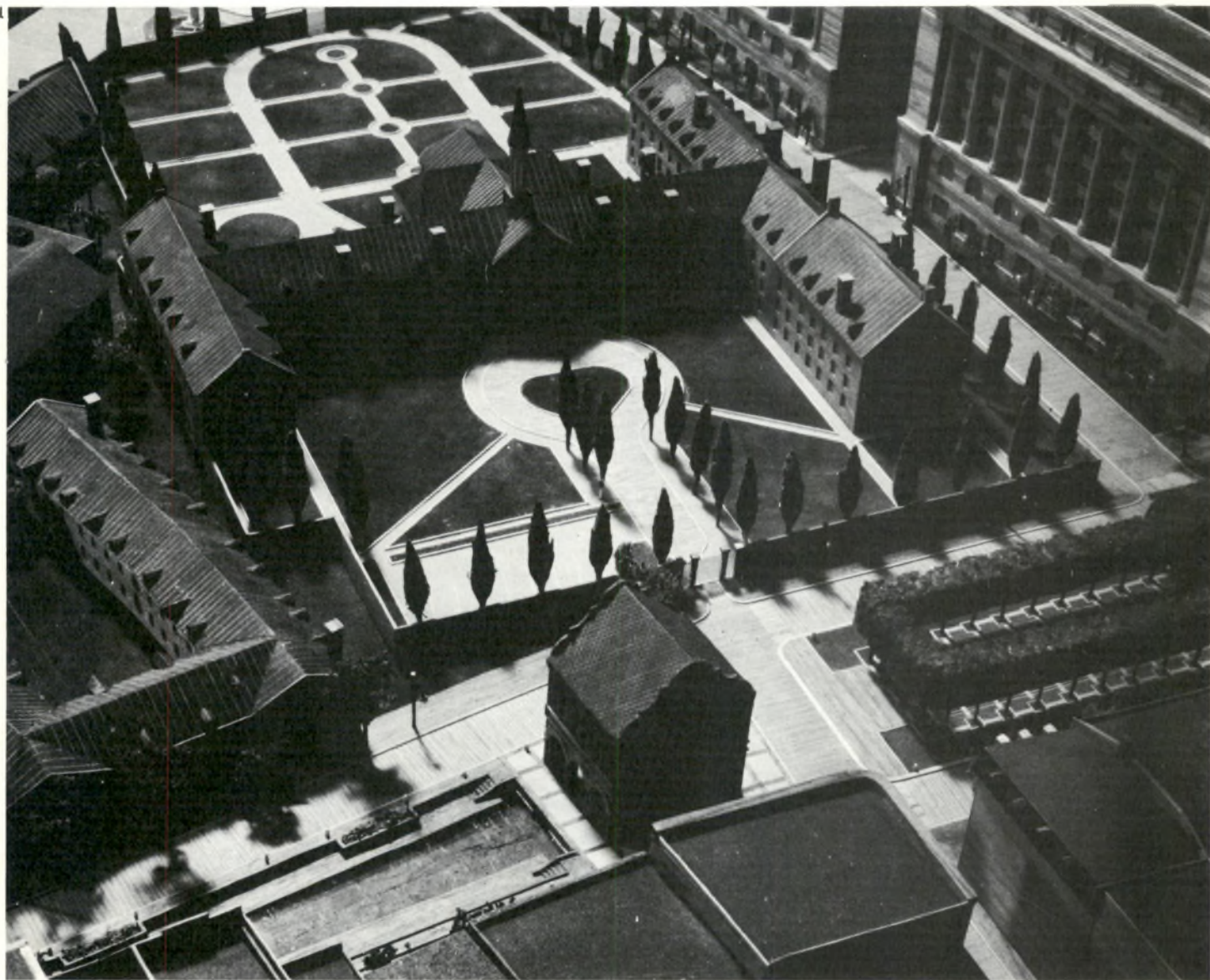
1,3 Vue plongeante du bâtiment des Sœurs Grises, dans son état actuel, prise du haut de l'immeuble actuel des douanes. Au centre, une partie du mur de la chapelle.

2 En regardant vers le nord, le bâtiment des Sœurs Grises, dans l'axe de la rue Normant.

4 L'hôpital général de Montréal en 1844. Reproduction d'une aquarelle en couleur de J. Duncan—Publication autorisée par l'Office du Film de la province de Québec.

5 Vue aérienne de la Place d'Youville, faisant voir, à gauche, la caserne des pompiers.





Tout le centre de la Place est réservé aux piétons: promenade à deux niveaux différents le long du canal, flânerie, repos à l'ombre des arbres sur la place de l'ancien Parlement.

Au sud de la Place d'Youville, la disposition des bâtiments autour des cours intérieures rend possible l'établissement d'un réseau public de cheminements piétonniers. Ce réseau, partant de la Place ou de la rue du Port, longe les vieux murs, passe devant les grilles qui délimitent les cours intérieures des bâtiments, pour déboucher par une porte cochère sur la rue de la Commune. Des cheminements semblables sont établis au sud de la rue d'Youville et à l'est de la rue du Port.





3



1 Maquette à l'échelle du réaménagement projeté mettant en évidence la relation entre les espaces publics et privés.

2 Détail de la maquette: au premier plan, le pont Saint-Nicolas qui enjambe le canal aménagé pour rappeler l'ancienne Petite Rivière. Au second plan, la caserne des pompiers restaurée.

3 «La Douane de Montréal, vue du Port.» Aquarelle de Jacques Viger. Reproduction autorisée par l'Office du Film de la province de Québec.

4 Place Royale, l'ancien bâtiment des douanes dans son état actuel.

## La Place Royale

### Analyse de l'état actuel

En ce moment, la Place Royale offre un aspect très inégal. Aux valeurs positives que sont les justes dimensions de l'espace formé par la Place et les proportions adéquates de l'édifice qui l'occupe en son centre, s'opposent la qualité inférieure des traitements de surface et la médiocre apparence de certaines des façades qui l'entourent.

L'aménagement proposé s'attachera à mieux marquer au sol l'emprise de la Place par un traitement plus adéquat des surfaces du petit parc au sud de la Place ainsi que des chaussées et trottoirs.

Également, il faudra implanter, lorsque cela s'avérera possible, des écrans là où un meilleur encadrement vertical est désirable.

La présence d'un monumental obélisque fiché en plein centre du petit carré de verdure au sud de la Place cause un problème particulier. Ce haut monument est davantage à la mesure de l'hommage des donateurs qu'à celle des dimensions modestes de cette portion de la Place et qu'aux proportions délicates de l'édifice qui l'occupe en son centre. L'implantation de ce monument est à reconsidérer.

### L'aménagement

Le revêtement des chaussées sera de granit rouge tandis que les trottoirs seront revêtus de dalles de grès.

Au centre de la portion sud de la Place Royale, un petit square de type urbain conservera l'esprit de l'aménagement actuel. Le traitement du sol sera un rappel du drapeau de l'amirauté en usage dans la marine française au moment où cette place reçut son appellation de «Place Royale». L'obélisque, placé au sud de la Place, s'appuiera sur un élément végétal constitué d'arbres taillés.

4



L'allongement de la partie centrale de la Place, au nord comme au sud, permet d'aménager deux petits carrés gazonnés de part et d'autre des escaliers d'entrée. Du côté de la rue Saint-Paul, deux peupliers de chaque côté de l'entrée principale accentueront l'ordonnance du bâtiment central. Une grille délimitera les espaces gazonnés, marquant ainsi la présence d'un édifice privé au milieu d'une place publique. Les rues de part et d'autre du bâtiment central sont établies à sens unique, assurant la communication entre les rues Saint-Paul et de la Commune. A la belle saison, des bacs amovibles garnis de plantes et d'arbustes ainsi que des bancs fermeront à la circulation automobile la partie sud de la Place. La desserte des bâtiments se fera alors par la rue de la Capitale.



The American experience in urban renewal at home and in economic development abroad had convinced many decision makers that the era of arbitrary decisions made by outside experts, without discussion at the local level, was at an end. People had to be involved in decisions that affected them.

**Citizen Participation** by Jim Lotz

## The Beginnings—The American Experience

Early in 1960, the United States government discovered poverty, and decided to do something about it. In 1964, the Economic Opportunity Act was passed and Section 201 of this Act defined a community action programme as “a programme... which is developed, conducted and administered with the maximum feasible participation of residents of the areas and members of the groups served.”

In 1966, Congress passed the Demonstration Cities Act. This was aimed at renewing the physical and social fabric of American cities. The Act required “widespread citizen participation” in community development. In the same year, the Foreign Assistance Act included a provision, known as Title IX, that called upon the Agency for International Development to place emphasis on “assuring maximum participation in the task of economic development on the part of the people of the developing countries, through the encouragement of democratic and local government institutions.”

The American experience in urban renewal at home and in economic development abroad had convinced many decision makers that the era of arbitrary decisions made by outside experts, without discussion at the local level, was at an end. People had to be involved in decisions that affected them.

The 1964 attempt to legislate for participation in domestic anti-poverty programmes, however, seems to have foundered as people tried to realize the ideal of “maximum feasible participation,” with specific groups in specific

programmes and projects. Daniel Moynihan, now a Special Assistant to President Nixon, but formerly deeply involved in the War on Poverty, wrote a book on his experiences called *Maximum Feasible Misunderstanding*. But what, after all, constitutes maximum feasible participation? A nation that put a man on the moon had a great deal of difficulty in determining the feasibility of the simple concept of citizen participation. Goodwill and enthusiasm were not lacking but in typical, dynamic American fashion, too much was attempted in too short a time. And people long engaged in stimulating and aiding citizen participation—like Saul Alinsky of Industrial Areas Foundation in Chicago—were not involved or consulted.

With lots of federal largesse, a whole host of experts set out from Washington to make sure that the poor got their fair share of benefits in the War on Poverty. The Office of Economic Opportunity was established to initiate and co-ordinate programmes aimed at removing poverty, once and for all, from American life. And participation was to be one of the keys to success.

# participation

In conditions of uncertainty, people will communicate their fears to others, and a sense of unity begins to grow in the face of what are seen to be common threats to existence.

## The Canadian Experience

When Canada itself “discovered” poverty in 1964-1965, there was not the same rush to solve the problem—once and for all—that characterized the American attack on poverty. Health, education and welfare—and other human-focused aspects of government—were provincial responsibilities, the Federal Government could not take the initiative in these areas. A Special Planning Secretariat was set up in the Privy Council Office, and this co-ordinated government action in the anti-poverty fields. The Company of Young Canadians was formed and, as the Parliamentary Committee that studied it in 1969 found, spent a lot of time trying to lead the poor and the disadvantaged people towards a better life. In 1969, a Special Senate Committee on Poverty was formed, and this began to look at poverty in Canada under the chairmanship of Senator David Croll.

The public, through the media, were bombarded with a steady stream of messages in a period of rapid social and economic change. The poor realized that they lacked money and power. More and more events seemed to be out of control, more and more it began to look like a runaway world. In conditions of uncertainty, people will communicate their fears to others, and a sense of unity begins to grow in the face of what are seen to be common threats to existence. Action—any action—is liable to be seen as preferable to just waiting for something to happen. Not only the poor, but other citizens began to feel helpless in a period of rapid change, and in the grip of forces beyond their understanding and control.



### A Case Study—Ottawa's Lower Town

In 1966, I directed an interdisciplinary urban research project in Ottawa's Lower Town. This was an area slated for urban renewal. Looking at the literature, it turned out that we knew less about the social, economic, political and cultural dynamics of Canada's capital than we did about those of such countries as Zambia and Somalia.

Our research focused on mutual aid, the life of the women of the area, its social history, the role that radio forum could play in urban renewal, and the role of the university in the community. It turned out that the area had a strong tradition of self-help, that there were communication mechanisms within the area that worked very effectively, that the women tended to be isolated even from the mainstream of urban Ottawa life, and that no attempts had been made to use radio or TV to explain urban renewal to the citizens of the area.

The City of Ottawa had already carried out the usual survey, knocking on doors and gathering data on the area and the people, to help them in the urban renewal. They were collecting data for very specific purposes; we were merely curious.

### Variations and Realities

There has been a tendency to see cities either as de-personalized, de-humanized, alienating environments, or to portray certain parts of cities as close-knit, wholesome, folksy, friendly places. Both views oversimplify reality. A city, in fact, offers the choice of a wide variety of life-styles. If you want to be alienated, you can very well be so in the city. If you want to be friendly, you can also be so.

Lower Town turned out to be very much of an urban village, a self-contained enclave within the city. The woman interacted with each other as neighbours but some would not even go uptown because they felt ill at ease there. They could feel friendly towards some people and alienated towards others, depending on what they were doing. Lower Town was the territory, or turf of a largely working class, Catholic, French-speaking group of people who had been helping themselves, through various agencies, for a number of years.

### The Origin of the Plan

No attempt seems to have been made by the City of Ottawa to contact the grassroots leadership in the area, and to inform and involve them in the urban renewal plan. As usual, the urban renewal scheme began with a decision to do something about the road network. In planning for a new road, the planners found it necessary to contemplate raising a road that cut through Lower Town. In lifting up the road, as it were, they discovered Basse-Ville or Lower Town. The area had been noted in an urban renewal study of Ottawa as one that needed new housing and reconstruction. The city planners seem to have decided to kill two birds with one stone—raising the road and renewing the area at the same time.

The residents of Lower Town had already experienced the results of planning around roads instead of around people. When the MacDonald-Cartier Bridge was built, several hundred people in Lower Town were moved from the approaches to the bridge on the Ottawa side of the Ottawa River. Whatever the rationale for this action, it appeared to the citizens of Ottawa as an arbitrary one, in which people were displaced with little concern for their welfare or their future.

### Citizens' Committee

In Lower Town, before the renewal began, a Citizens' Committee was formed. This was based on a consensus model. "Reliable people" were appointed to the Committee, and they were considered to be representative of the citizens of Lower Town. The experience of the United States shows that it is impossible to legislate for participation, that co-opting people on to committees creates more problems than it solves.

### The Consensus Model Committee

The consensus model works on the belief that people are rational, that they will not fight and argue with each other and with government officials, and that they will take advice and guidance from those who are considered to be experts in certain fields. There is also the happy belief that conflicts of interests and views can be smoothed out or smothered before they begin to threaten planned action.

### The Conflict Model Committee

The conflict model, upon which Saul Alinsky bases his approach to social change, focuses on fighting the system, the establishment or city hall, and opposing everything they do, to get concessions. It is characteristic of the ambivalence about social change in Canada that while the planners in Lower Town were endeavouring to quiet the fears of the residents there by working with an appointed Citizens' Committee, the National Film Board was making films of Alinsky expounding his belief that the poor lacked power, and should do everything they could to wrest it from those who had it.

Action polarizes people and forces them to choose sides. The consensus model and the conflict approach represent the two ends of the spectrum of participation.

### Citizen Opposition to the Plan

In Lower Town, the approach of the City of Ottawa resulted in local citizens organizing to oppose urban renewal. At the same time, because urban renewal forces people to make decisions about moving that they might otherwise have avoided, a number of the stabler and more affluent families in Lower Town moved out. Owing to citizen opposition, Central Mortgage and Housing Corporation withheld approval of the plan and, since they were providing most of the money for the renewal programme, this held up planned action by the city.

In 1969, the Ontario Municipal Board held hearings on the plan. These were conducted in English, and seemed to confirm the views of certain people in Lower Town that those who were ordering their lives really understood little about the reality of them. By the early spring of 1970, while a number of substandard houses had been pulled down, no new ones had been built. And the Director of Urban Renewal for Ottawa bewailed the fact that there

had been three citizens' committees in Lower Town, and that it was still proving difficult to get genuine citizen participation in the planning.

### The City's Efforts

The city people involved—planners, urban renewers, social workers—all showed themselves to be honest and conscientious people. The city set up an information centre in a parish hall, and the people there did all they could to ease the strains of change, and to reassure the people of the area about the intentions of the city. Unfortunately, they were still city employees, on the other side as it were, and therefore the information they gave was suspect, or incomplete because they had to hold some material confidential.

The city showed a great deal of nervousness about anyone from outside interfering with the smooth operations of the urban renewal scheme in its social and physical aspects. City employees, of course, like members of any government system, are supposed to be non-political. And there seemed to be little understanding in Lower Town East that local citizens wanted effective say—and not merely token representation—in discussions about their future.

In short, the people of Lower Town wanted to engage in political action to counter the apolitical approach to planning espoused by the city planners. And the approach of the social workers associated with the plan was to provide the help and advice the poor people needed in a traditional manner. The citizens of Lower Town countered this welfare approach by organizing themselves to solve their own problems—as they had done in the past. In May, 1970, a group opened a co-operative store.

### Theory versus Practice

Everyone involved in the Lower Town project learned a great deal. Theory is one thing, empirical experience another. And few people, other than academics, are willing to believe anything until it happens to them. The city authorities, for their part, have shown concern and an increasing degree of flexibility; they have begun to understand that conflicts of interests can be managed. And on the other hand, the citizens have begun to see that "the city" is not blind to their interests and is capable of being influenced.

### Demise of the Overall Plan

A great deal of time, trouble and stress could have been avoided if the City of Ottawa had matched its advanced level of planning technology with an equally sophisticated level of social technology. It is obvious from the literature on urban renewal and regional development that the days of the "overall plan" that set down, in exact detail, what was going to be done where, when and for whom, are over. Plans are not ultimate statements about the fate of an area; they indicate how a problem can be tackled and have to be constantly revised and reshaped as new factors become apparent.

...the poor are educated these days. They are not dumb, alienated, placid people who can be treated in a veterinary-hygienic manner by people who feel they know what is best for them.

### **Concordia Estates and Milton Park Citizens' Committee**

In Montreal, a group called Concordia Estates bought up about twenty five acres in the centre of the city. Again, their mechanical technology was superb and their idealism unbounded. But they neglected to plan with people, and locked the renewal programme into a critical path. The result was the formation of an aggressive citizen's group called the Milton Park Citizens' Committee which did everything it could to block the proposed "new town in-town." This concept of renewing certain older parts of cities sprang from the American disillusionment with traditional methods of urban renewal and with the establishment of completely new towns. One gets the uneasy feeling in Canada that we are being expected to live parts of the American dream that did not work out in the United States.

A survey by an American community development consultant, carried out in 1969-1970, identified over two hundred citizens' groups in Canada. Twenty-nine were identified in Vancouver, twenty-one in Winnipeg, thirty-nine in Toronto, fifteen in Ottawa and thirty-four in Montreal. Their names and aims vary. They want to have a say in the decision-making process; they want benefits that other groups get; they want to be involved when plans and programmes are to be implemented; they want a sense of social solidarity and common purpose in working with others towards mutually beneficial goals. They press for welfare rights and employment, block urban renewal schemes and superhighways, provide recreation, carry out research on the ownership of slum housing, provide community services, present briefs, and create awareness. The names of some groups are:

The Frog Hollow Committee in Vancouver, "No Other Way" in Calgary, "We Help Ourselves" in Edmonton, Burrows-Keewatin Tenants Association in Winnipeg, The Just Society in Toronto, Le Comité des Citoyens de Ste-Zotique in Montreal, the Black United Front in Halifax.

The Carota Report did not cover middle class groups and such phenomena as the Women's Liberation Movement, youth groups and groups protesting pollution and environmental insult. In Ottawa, for instance, the residents of the Glebe united against a proposal to run a highway through the area. In Sandy Hill, in the same city, residents concerned about the deterioration of the area and the impact of the expansion of the University of Ottawa on housing and services formed an action group. In Toronto, "Pollution Probe" is advised by a university professor and is attempting to "do something" about pollution. In the Yukon Territory, the Yukon Conservation Society was formed to protest the insult to the ecology brought about by mineral exploitation. The National Capital Youth Opportunities was organized by drop-outs in Ottawa and got jobs for youth in the summer of 1969.

### **The Disposition of Citizen's Groups**

A sense of insult and injury pervades most citizen's groups. They are liable to develop into a counterforce to government, and to see themselves as being against the establishment. The Just Society has attacked members of the welfare bureaucracy—in print. But how many of the citizen's groups are viable, how many exist other than on paper and how many will be in existence in two years time—it's impossible to tell.

And, as a woman from a low-income area in Ottawa noted, the poor are educated these days. They are not dumb, alienated, placid people who can be treated in a veterinary-hygienic manner by people who feel they know what is best for them. They have to be consulted and involved in decisions that affect them. They are groups that are enthusiastic, idealistic and isolated.

Most of the citizen's groups do not seem to see themselves as being "political" in the "party" sense. They will work with any party or person who can help them achieve their goals.

The Carota report was one of the first counts of the number of citizen's organizations in existence, and most know very little about what the others are doing. There is some intercommunication—a pamphlet issued by a Tenant's group in Kingston was picked up and reproduced by the Tenant's Union of Prince Edward Island. The Just Society manages to make the pages of the Toronto *Globe and Mail* by their actions. The Special Committee on Poverty of the Senate has given a number of low-income groups visibility and a chance to express their views.

It is easy to get sentimental about the poor, and to see citizen's groups among them as inherently noble and right. It is less easy to understand the operational conditions under which these groups operate. And it is almost impossible to get across to certain people that civil servants are conscientious, honest people trying to do their jobs, and not a bunch of wicked people intent upon making life miserable for everyone—and especially for the poor.

### **Participation to Stay**

The current wave of citizen participation is not a passing fancy. It is new phenomena in Canada that has to be dealt with by anyone concerned with social change. In Ottawa, some city aldermen have encouraged people in their wards to form citizen's committees, and they meet and talk with them regularly to find out what they see as problems. Other city politicians have tried to jump on the bandwagon, and to take over citizen's groups, claiming to speak for them.

Modernization, urbanization and rapid change always result in new mass movements as people feel threatened by forces beyond their control. There is a search for certainty, a hope for better times. The current interest in astrology and the occult is an example of this. Anthropologists have studied cargo cults in which traditional people await the arrival of a ship or a plane that will bring all the white man's goods—without the white man. Historians are familiar with the phenomena of millenar-

ianism, in which people come to believe that they will soon achieve perfection during a time when all human ills will disappear. And, of course, prophets arise, proclaiming their truths as the only ones.

In Canada, outside threats or external stimuli may serve to bind people together. Like the grain of sand in an oyster, the irritant may lead to a thing of beauty—or to a ghastly mess. In Toronto, the Spadina Expressway created a citizen backlash. In Prince Edward Island, a visit by the Senate Committee on Poverty stimulated a local leader into forming a tenant's union which became very well organized and strong in a matter of a few months.

### **Participation and Leadership**

Citizen participation brings up the question of leadership, and of a voice for the voiceless. Who speaks for the poor, the disadvantaged, the different? Or, for that matter, for the middle class?

The citizen's movement in Canada is less a movement specifically of the poor than of citizens. It does not appear to be a class movement, but more in the nature of a general ferment and a desire for participatory democracy. Politicians can promise this—only citizens can assure it.

As the political leadership attempts to change and adapt, it will have to deal more and more with leaders—real or self-appointed—of citizen's groups. Indeed, if the political system in Canada had been functioning properly (in the way that political scientists assume it does) there would be, in theory, no need for citizens to form special pressure groups to get what they want. Citizens groups can use the traditional political process, and involve the politicians. But they may prefer other tactics. Most of the citizen's groups do not seem to see themselves as being "political" in the "party" sense. They will work with any party or person who can help them achieve their goals.



Among the citizen groups that I have encountered, good and responsible leadership is emerging. The leaders tend to be somewhat blunt, and are sometimes labelled "trouble makers." But the art of politics includes dealing with people who may be trouble makers to some and enablers to others. But there are a number of problems connected with leadership emerging. Unless responsible and representative leaders are encouraged, and given a chance to perform and to train, then other leaders who will stress violent protest and the disruption of existing institutions may take over. This much is obvious from the U.S. experience. The poor are not apathetic and leaderless; this is largely a middle class myth. If the U.S. War on Poverty had paid more attention to identifying and encouraging indigenous leadership that was trusted and respected at the grass-roots level, much of the turmoil associated with this crusade would have been avoided. The central government in the U.S. showed a tendency to go full speed ahead, to create new structures, to ignore existing ones, to avoid conflict or the potential for conflict, and to encourage new leaders who thought as they did and hence could be "trusted." Little attention was paid to local leadership patterns, existing power structures, and value systems. Practice raced ahead of theory, and by the time theory was developed it had been outdated by practice.

In Canada we can use the U.S. as a Distant Early Warning Line, and learn much from their experiences. There is nothing so practical as a good theory and the American work has provided lots of theory that can be tested in Canada and, if it fits, adapted. In Canada, we have a chance to blend theory and practice in citizen participation, so that each enriches the other.

One gets the uneasy feeling in Canada that we are being expected to live parts of the American dream that did not work out in the United States.

#### **Training and Developing Leadership**

Alinsky, in his writings, stresses the development of competent leadership. In a low income area in Ottawa, a citizen's group was formed when rents were raised. Some houses were renovated, and a government grant secured from a Federal agency. Another agency of government rented a house to the group, which used one side as a meeting place and office and the other as a medical clinic. Early in 1970, the same government agency provided a house for emergency accommodation for people who were burnt out—a pressing need in many areas. Under the skilled and sympathetic direction of a parish priest, who acted as co-ordinator, the group functioned well. But no attempt was made to train local people for leadership roles. When the priest left, another priest tried to move into the position of co-ordinator, with the help of certain members of the citizen's committee. The result was as expected; the government refused to renew the grant to the group if the new co-ordinator took office, one set of citizens accused the Federal agency of trying to impose their ideas on them, the committee split and another citizen's group formed.

#### **Social Animation**

In New Brunswick, the Ford Foundation has initiated a Leadership Development Programme to train grass-roots leaders. These will be people who can operate, on equal terms, with local citizens and with government officials. These people will become enablers, communicators and co-ordinators, passing accurate information in a spirit of trust. The concept of leadership involved in this programme focuses on training people who can store and communicate knowledge and information about the limits of the possible at a given time, with a given group.

The technique used is that of social animation. Social animators keep asking people: "What is the problem? What can you do about it? What options are available to you?" This non-directive, dynamic approach to problem identification and solution keeps citizen's groups operating so that they channel and direct their abundant energies towards immediate and real problems, while keeping long term goals in view. It is a rational and scientific approach to change that puts the onus on people themselves to develop solutions to their problems. Action cancels all options so people have to be aware of the possible and probable results of their proposed actions. Through social animation, leaders have a chance to show what they can do—for themselves and the group. Otherwise citizen's groups may fall apart or be taken over by outsiders who will use them for their own purposes, often snatching failure from the jaws of success in typical radical fashion. Maoists and others have attempted to take over leadership in certain parts of Ottawa, only to be rebuffed by local leaders who described them as "nice, middle-class kids who never had to struggle for anything."

Academics must resist the temptation to be experts in the lives of other people. This approach has not worked with planners; there is no reason to believe that it will work with social scientists. Academics, in the main, are middle class. They always have their "outs"—they can walk away from a difficult situation. Low income people cannot.

Citizen participation in urban and rural areas in Canada cannot simply be dismissed by elected officials or government agents as a confounded nuisance. Nor can they be uncritically accepted as "a good thing." Their promise depends on their performance—in terms of the people in the groups themselves and in terms of the larger Canadian society. What may emerge in Canada is a genuine, democratic, ethical movement that helps people at every level to widen their horizons, determine opportunities and develop group and individual potential. Or the movement may become radicalized and resort to force and violence to make its point, or it may simply fizzle out or fade away.

To encourage the first outcome, the following points need attention:

Theory is one thing, empirical experience another.  
And few people, other than academics, are willing to believe anything until it happens to them.

Leadership training and development must be extended. On the basis of the experience with the Ford programme, it appears that local leaders require at least a year's training. This would involve reading, talking, moving around, visiting development projects, talking with government officials and learning the limits of the possible.

Universities should provide some sort of diploma course for leaders, especially for people without a university degree. There is an obvious role for small universities and community colleges to play in this matter. Leaders, by interaction with students and staff, would do much to offset the ivory tower aspects of these learning institutions and tell students about the real world. In exchange, the leaders could learn about the theory of action and social animation.

A wide variety of tactics and strategies are available either in the literature or in the minds of people who have been on the front line of citizen groups. What really works? What is ritual and what is reality in social action and community development? What is shadow and what is substance? Saul Alinsky, on his visits to Canada, has meticulously avoided telling people what they should do. In effect he says, "It's your problem." While we know relatively little about Canada's cities, we do know a great deal about modern society, social action, politics, and how people are likely to act under certain conditions. Universities, which, after all, are publicly funded bodies, can provide social science information that will help citizen groups to determine where the best pay-offs are. Academics must resist the temptation to be experts in the lives of other people. This approach has not worked with planners; there is no reason to believe that it will work with social scientists. Academics, in the main, are middle class. They always have their "outs"—they can walk away from a difficult situation. Low income people cannot.

Universities can invite representatives of citizen groups to talk to classes, and participate in seminars. In some cases, this is already being done. At the May meeting of the Northeastern Anthropological Society, at Carleton University, four people from low-income areas in Ottawa talked in an articulate manner about their problems and discussed how anthropologists could help. The lecturers and visitors should be paid for their time and their knowledge. And it is advisable to have them introduced by an academic who has their trust and can direct, guide and animate the discussion. Otherwise there is an understandable tendency for citizen leaders to use the classroom as a platform, and for some students to feel a compulsion to rush down and "help the poor."

As citizen's groups stretch themselves, they begin to understand that the government is not hostile to them.

If there is a need for social science and social practise among citizen's groups to enable them to determine where they are, and what they can do, there is also a need for some groups to point out the *ethical* consequences of certain actions. The churches are beginning to awaken to social responsibilities beyond the traditional ones, and a recent statement by the Canadian Catholic Conference noted that the Catholic Church would support citizen's groups. It was the churches in the United States that invited Saul Alinsky into certain areas, and clergymen in Canada have provided leadership, advice and encouragement for citizen groups. But again, there is a need for leadership training among the clergy so that they learn to understand the limits of the possible and do not take leadership roles that should belong to local people who have fewer options than most clergymen have.

One problem in being poor is that you have to live with the consequences of the actions of other people. There has been an increasing desire by academics and middle class professionals to be socially useful and "relevant." The advocate planners and the radical social workers see themselves as working *with* people, instead of *for* them, but their very professionalization may result in their rejection by lower income people. Middle class people can and have worked in their own neighbourhoods, simply as good citizens. And they can be experts on tap for other citizen's groups, coming in as and when requested. The social animation process helps people to determine what talents are available within a group or a community, and tells them where to get needed expertise.

The Department of National Health and Welfare, through the Welfare Grants Programme, has provided funds to a number of citizen's groups. This has helped local people to get started and get organized. Central Mortgage and Housing Corporation and the Citizenship Branch of the Secretary of State's Office have also helped citizen's groups become aware of their problems. In Ontario, the Minister responsible for Citizenship announced in the spring of 1970 that he had funds to help citizen's groups. In Prince Edward Island, about \$9 million is budgeted in the regional plan for citizen participation in development. So obviously there is an official commitment to citizen participation in planning in Canada, even though the topic is shrouded in obscurity at the present time. The government agencies need to develop criteria for the effectiveness of citizen's groups. Certain citizens' groups have shown that they can perform in terms that are satisfactory to both local people and the government. The Yarmouth South Renewal Association in Nova Scotia is working with the



Newstart programme there. Both sets of leaders—in the official programme and in the citizen's group—respect each other. These patterns of performance need to be studied, evaluated, assessed, and the results communicated to everyone involved in participation. In keeping with the scientific spirit that seeks to understand and not to condemn, projects do not have to be labelled as “successes” or “failures.” What needs to be understood is how effective they were in achieving their goals, and in whose terms.

The media have helped in spreading the word about citizen participation. There has been a tendency to play up the most dramatic aspects of citizen participation, and to allow certain people to use television as a soapbox or a sandbox. But members of citizen's groups are extraordinarily aware of the importance of the media—especially television and radio. Open line programmes have provided opportunities for citizens to air issues and have provided feedback to leaders. When Saul Alinsky was in Halifax in May, 1970, citizen leaders in Yarmouth paid close attention to what he said when he was interviewed on television.

### Citizen participation is neither a panacea for the human problems of the cities, nor for those of the nation.

Church groups have provided invaluable moral support and small grants of seed money to groups like the Tenant's Union of Prince Edward Island. Most citizen groups have very small budgets, and no professional staff. They don't want pious platitudes—they want money, support, and action. On the other hand, church groups surely are entitled to ask what the money will be used for, and can refuse to support those groups who seek to damage and destroy individuals and structures. They can work with people who seek meaningful change in an evolutionary manner, and who respect others. As citizen's groups stretch themselves, they begin to understand that the government is not hostile to them.

Managing conflict, not avoiding it, has been shown to be the most fruitful way of handling problems of change. And managing change in urban areas depends upon a realistic understanding of what is really going on in the minds of people and in the city streets and offices.

There is a need for television stations to build programmes around citizen's groups in a social animation context. The citizen's group should not only tell tales of woe, or shout about despair. With skilled producers and animator-interviewers, they could tell others what their problems have been and how they tackled them. As with so many other things in Canada, there have been promising beginnings in this sort of concept.

There is a need to write up the experience of citizen's groups and get this material into print as quickly as possible. The empirical and the theoretical implications of what has happened to date in Canada needs to be documented and disseminated. There is no reason why daily newspapers could not devote one page a week to what the citizen groups plan or are doing. The *Globe and Mail* runs a weekly column by James Lorimer, an economist, on the travails and triumphs of a citizen's group in Toronto.

Universities can lend status and neutrality to citizen's groups by acting as enabling mechanisms for bringing together both “sides” in a spirit of mutual harmony, and letting them interact. Arranging meetings at which both members of citizen's groups and government agencies can meet and talk openly and freely—without confrontation—helps to ease a lot of strains and pains.

Citizen's groups that are well organized and articulate are becoming less invisible. The Tenant's Union of Prince Edward Island, for instance, has closed down unsuitable, substandard accommodation in Charlottetown, and has drawn up plans for a low and middle income housing project. The TUPEI leader, Alex Burke, is a well-informed, dynamic and concerned leader.

When a citizen's group in Ottawa wanted to learn about urban renewal, the Canadian Council on Urban and Regional Research made them a small grant to travel to New Haven to study what had happened there. This sort of experience is invaluable for people who tend to believe only what they see and hear themselves. More exchanges between citizen's groups within Canada and with other countries would provide valuable support to the cross-fertilization of ideas and experience. In Britain, for example, Citizen's Advice Bureaux have provided sources of information for everyone with problems that they could not solve on their own. The free flow of information and knowledge does a lot to offset the fears of people who feel out of touch with events. Conferences that feature information exchanges rather than windy rhetoric are also valuable in letting people exchange ideas and experiences.

Citizen groups need support, without interference, from wherever they can get it to build up sound structures for handling the stresses and strains of social change. The citizen's groups can provide many opportunities for ordinary citizens to learn the theory and practice of politics and to understand how change can be handled in a dynamic and concerned manner. This movement—if it is neither smothered nor subverted—will provide opportunities for people, as groups, and as individuals, to play a more active role in determining their own destiny.

### Conclusion

Canada is moving into the future backwards. It can learn from many other nations about the liabilities and the benefits of citizen participation. Citizen participation is neither a panacea for the human problems of the cities, nor for those of the nation.

In the U.S., the myth of the melting pot was developed to offset the myth of rigid stratification in European societies. In Canada, a pluralistic life-style is emerging—one that allows people to participate, at the time and place of their own choosing, in enterprises and actions that concern and benefit them. In due course, leaders of citizen's groups may move into the larger fields of municipal, provincial and Federal politics. The citizen's groups can provide excellent training grounds for people who otherwise would not have the opportunity for social and economic mobility.

In an era of rapid change, the stability of any society depends on the degree to which it remains open so that people with talent and abilities get a chance to use them to achieve their own goals and those of the larger society. Modernization releases enormous energy as people's aspirations are raised. If possibilities for realizing these aspirations do not keep pace with achievements—or the hope of achievement—the social structure and the people in it are liable to undergo stress. Managing conflict, not avoiding it, has been shown to be the most fruitful way of handling problems of change. And managing change in urban areas depends upon a realistic understanding of what is really going on in the minds of people and in the city streets and offices.

Canada is in the fortunate position of being able to learn from the mistakes of other countries that have attempted to encourage or ignore citizen participation. By demonstrating new methods of citizen involvement, and avoiding the polarities of the consensus or the conflict approach, Canadians could feedback a great deal of theory and a lot of good empirical material to other nations that are undergoing the stresses and strains that mark Canadian history at this time.

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# Children and Space

The last in a  
series of four articles  
on planning and  
preparing environments  
in which children can develop.

by Polly Hill



## The Complete Environment

The world today is rightfully concerned about many of the worst of man's characteristics. Not only about those forces that perpetuate cruelty, discrimination and insensitivity but also those man sets in motion to destroy his environment. As a result, we organize, we make plans, but... it's what we actually do that counts and how we go about it.

Children, more than any other segment of society, are the losers if these plans never materialize.

## Understanding Others' Perceptions

Professor Kiyo Isumi has said, "The ever increasing problems which are occurring in our man-made environment indicates the complete inability on the part of both designers and others to realize the significance of other people's psychic perceptual problems and their effects on behaviour."<sup>1</sup>

This seems to me to be at the crux of what I have been trying to say in these past articles. We must understand what children perceive at their level of development. We must be aware that sterile, adult-structured environments create passive, static, bored or sometimes overtly rebellious behaviour.

Apparently when we pollute the air we breathe, and the water we drink we recognize what we're doing! Surely, if we look a little closer we'll see how our short-sighted, inappropriate planning creates "play pollution" that has drastic effects on the behaviour of our children, endangering their healthy potential.

*The International Playground Association in 1967 issued some important practical recommendations for action.*

1. *No new housing schemes should receive either Government or Municipal financial subsidies nor municipal planning consent unless adequate space has been reserved for play.*
2. *In addition to physical recreation, young people need opportunities for free, constructive play with raw, natural materials that they can use to suit their own desires.*
3. *There should be comprehensive training, full time and part time, for play leaders, and their work should be recognized as a profession.*
4. *Play space should be planned and completed wherever possible before the children occupy their new homes.*
5. *Each country should endeavour to establish a centre where expert information can be made available to all concerned with play, and where research can be undertaken.*
6. *With more and more leisure time becoming available, children should have the right to and opportunities for using their free time creatively.<sup>2</sup>*

These recommendations are extremely relevant to the Canadian scene and must be implemented if we're ever to stop making costly mistakes.

Even in a brand new town like Yellowknife, children are in danger of being squeezed into the bad lands (playgrounds placed, not where the children are, but where it's impossible to build anything else), or they are the losers, when vast sums of money are allotted to a huge community centre, whereas in that could climate small centres, a short walk from living quarters, are imperative in play planning.

## Good Design is Almost No Design

One of the causes of the play dilemma is that good landscape design for children's outdoor space is really no design, or almost no design at all (i.e. a true adventure playground).

Landscape architects should be content to recreate nature where it has been obliterated—for example, designing artificial streams, mounds, sand pits, planting of trees and shrubbery, or preserving nature where it still exists. The latter may involve fighting vested interests whose land use is motivated by economic gain rather than human needs. Again, a good example of this is in Yellowknife where a delightful lake frontage, a short stroll from the main street, is already cluttered by a windowless arena, a brand new R.C.M.P. building and a gas station. The tiny existing park has no room to expand!

Landscape architects, in most cases, want to leave their mark. The semi-adventure playground is promoted much more than its messier cousin the junk yard type and even in semi-adventure playground developments, the physical skills are catered to in a greater degree than the development of the social and creative skills.

Why are recreation and education authorities, who are the clients of architects and landscape architects, so reluctant to recognize the social and creative needs of children? Recommendations two and six, of I.P.A. are not just meaningless generalizations. Examples of implementation of these principles abound in the preceding articles, but still the paying clients, but not the consumer (i.e. the child), is content with expensive static design solutions.





### Diversity the Key—Indoors and Out

"The world around our early ancestors was mainly the world of nature, with its enormous and vibrant diversity of sights, sounds, smells and tastes to keep the senses alive and alert. In a later phase of the relationship between man and his perceptual environment our forebears embarked upon the building of towns and cities, gradually shutting out from their daily experience more and more of the visually rich non-human surroundings that used to be theirs, in fields and forests, on mountains and plains."<sup>3</sup>

Diversity is the key word in planning for the child. In outdoor space this means raw materials and as much nature as possible.

The semi-adventure playground, which also has value, leaves lots of room for the subtle hand of the designer—but it must stay subtle. These man-made children's play gardens, must not get cluttered up with adult-imposed tricycle traffic patterns or tricky single purpose climbing apparatus or "imaginative symbolic" structures, like wooden horses, that don't look like a horse but can be anything the child wants it to be. It is all, let's face it, just as static as a sewer pipe and a great deal more expensive.

Diversity for indoor space means simple, flexible room arrangements with the minimum of built-in facilities. It means the size and finish related to the age and activities of its customers. The two to five year olds, for example, need floors that are part washable, diversified with soft and warm sections. The 6 to 14's need rough indestructable surfaces, the harder the better.



### The Influence of Planning

An example of how the planned environment influences its "customers" was recently noted in a brand new playground: a fort, made of cinder blocks, was surrounded by what I assume were mounds—but they were only 2 feet high and six feet in diameter, so their play value was nil. All the rest of the equipment in this area was static, including pretend cannons. The game observed was to dig into the carefully shaped mounds to make mud balls, for a cheery battle between the English and the "Frenchies." Now, what kind of behaviour does that environment inspire?

### Play Space and Sociability

Space that creates sociability is not that difficult to produce. For example, streams instead of wading pools—or in addition to wading pools—promote intricate co-operative projects. Tree houses instead of forts may induce secret societies and exclusion tactics, but making it exclusively "yours" is the first step in sharing, and it's surprising how quickly joint projects evolve. Even making one's own fort turns out to concentrate more on providing all the amenities to one interior so that war is seldom declared.



### Conclusion: Mud Pies to Murals

I would like to close this series of articles with a final plea: it is for education to develop creativity and the real role that environment and planning space has in providing opportunities for creative work.

Mud pies do lead to murals, murals in a symbolic sense, not as an actual product. Our creative powers need exercise, even at the most tender age, and if given all the opportunity for expression either with mud, hammer and nails or paint brushes a higher, more refined form of creativity develops. For some children it may simply mean nurturing a creative personality, which hopefully will develop an open, aware and sensitive adult. Wouldn't it be great if the children we give these opportunities to now, grew up to be the designers or the "paying clients" of our children's children's space tomorrow? That alone would be a valid reason for my urgent demand for change.

Wake up, everyone, before we cripple the creative potential of the next generation.

<sup>1</sup> *Isumi Kiyo*

L.S.D. and Architectural Design.

<sup>2</sup> *International Playgrounds Association, Hon. Treasurer, Miss M. E. Oher, 12 Cherry Tree Drive, Sheffield S 119 AE, England.*

<sup>3</sup> *Parr, A. E.*

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Robert Roussil

speaks...

I have been working on this for many months now. The first one I made was in Toronto but the size became ridiculous for a sculpture, it was 40 feet high. I made one five years ago in Montreal. It was a steel structure and it took a lot of running around and going up and down. After that I got close to this type of project.

I think the sculpture itself gets involved and the sculptor does not exist anymore. I think it is part of the renewal of man to create new things—habitation. The first thing a man does when he starts to think of living is to talk and sculptors do the same thing.

## *Robert Roussil parle...*

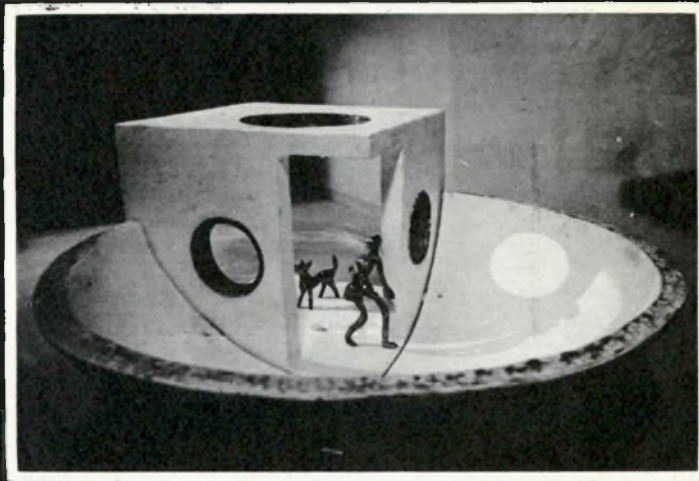
*Cela fait des mois que je travaille à ceci. Ma première sculpture de ce genre a été faite à Toronto, mais elle atteignait des proportions ridicules, quelque chose comme quarante pieds de hauteur. J'ai recommencé l'expérience à Montréal, il y a cinq ans: une structure d'acier qui a demandé beaucoup d'efforts, mais depuis lors, je me suis familiarisé avec ce genre à part.*

*Je pense qu'une fois achevée, la sculpture constitue un TOUT, vit sa propre vie et que le sculpteur n'existe plus, je veux dire en tant que créateur de l'œuvre en question. Je pense qu'il fait partie de la tendance incessante de l'homme de créer de nouvelles choses, des habitations, par exemple. La première chose que fait un homme quand il commence à penser à la vie, c'est d'en parler et le sculpteur fait comme les autres.*



I don't want furniture in the house. I have made furniture, but I created it more for outside use. As for the house itself, I want it to be a complete form like a sculpture. I don't want to have to worry about putting chairs or beds or cupboards or anything else in.

Everything exists within the house and it is all done together. I am not thinking of a house as it is made today. The owner of a house has to think of a complete solution to it—that is his problem.



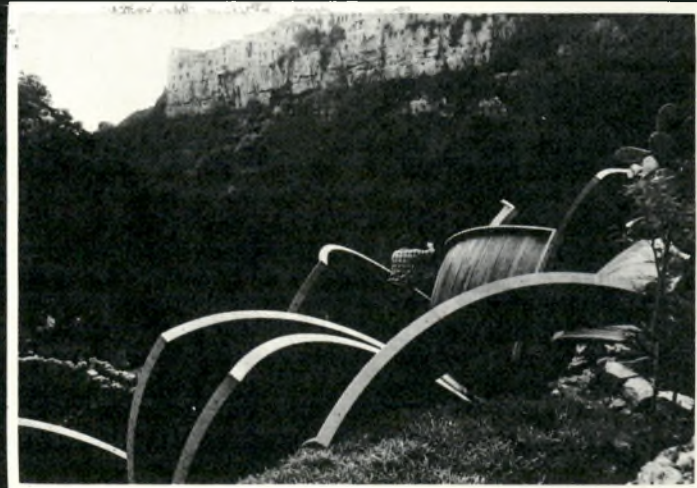
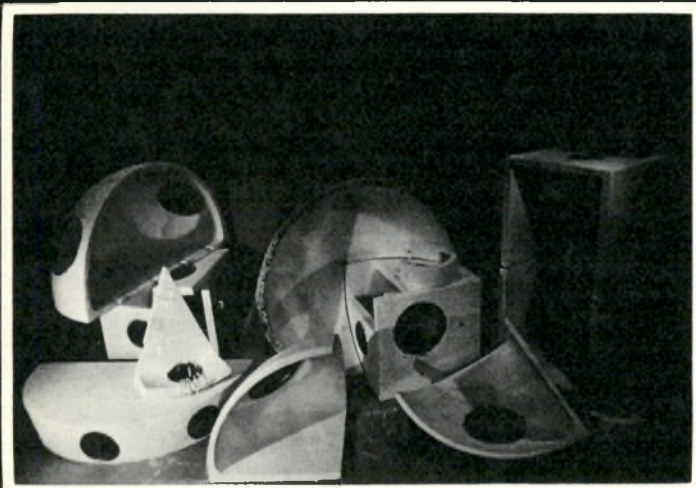
*Je ne veux pas de mobilier dans la maison. Quand il m'est arrivé de dessiner des meubles, ils étaient destinés à l'usage extérieur principalement. La maison? Je la vois conçue comme une sculpture, c'est-à-dire une forme complète, concrète et définitive. Et je ne veux pas avoir à m'inquiéter de la garnir de chaises, de lits, de buffets, que sais-je?...*

*Tout est préconçu à l'intérieur et l'ensemble a été exécuté comme un tout. Je ne pense pas à une habitation telle qu'on la construit aujourd'hui. Et le problème pour le propriétaire, c'est de trouver une solution globale, de repenser complètement l'idée même de son logis.*



I am trying to make a house more personal and more human, especially more human. Housing has become a very inhuman business and I think freedom of form can help. The sculptor is not a technician, necessarily, but he can suggest something worthwhile in habitations.

I have few windows because I think the inside of a house should be inside. If you look outside and you have a nice view you forget where you are. But I think people should get involved with the house instead.



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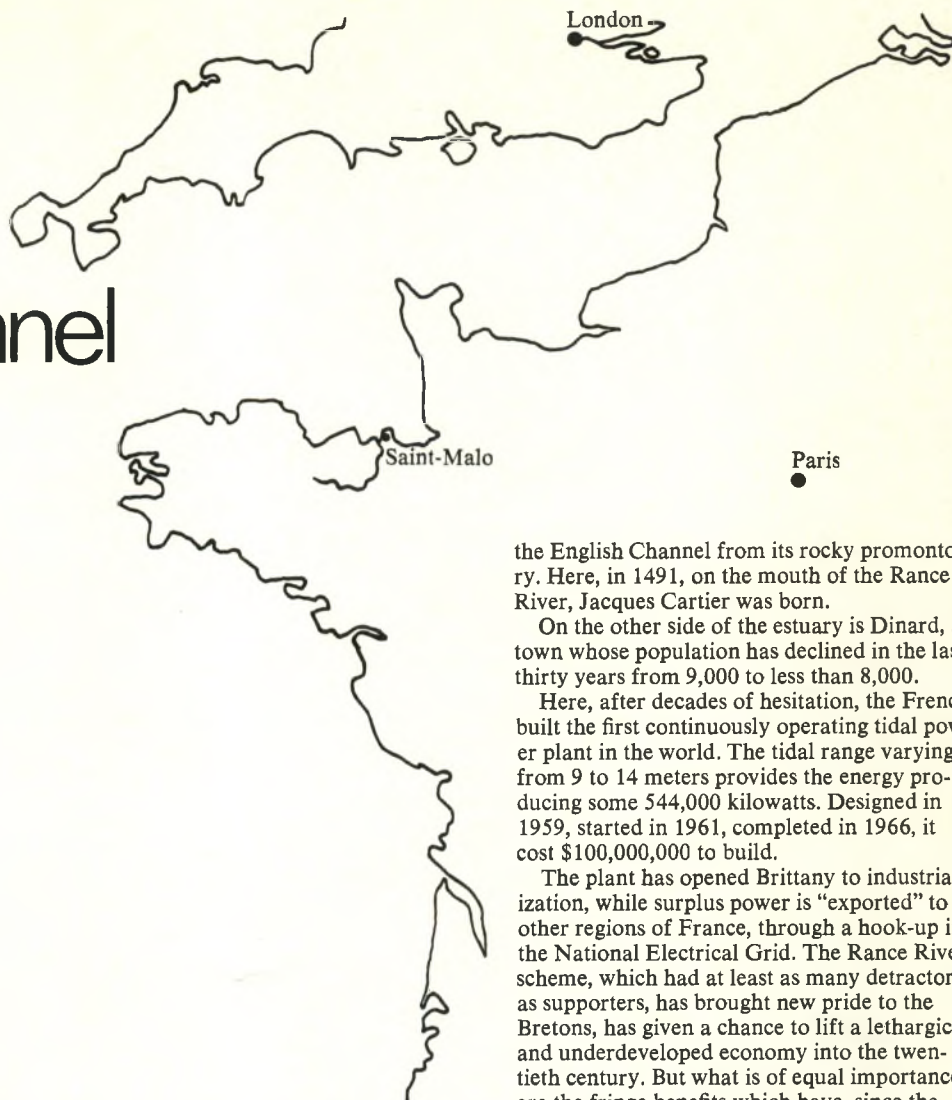
*J'ai aménagé peu de fenêtres, pensant que l'intérieur du logis doit précisément demeurer «intérieur», autrement dit nettement séparé de l'extérieur. Si, de votre fenêtre, vous êtes confronté à un paysage distinctif, vous oubliez où vous êtes et je pense que les gens devraient davantage se replier vers l'intérieur.*



# French Power from the English Channel

by Roger H. Charlier

Near Jacques Cartier's birthplace, an unusual French achievement generates urbanization in a most unlikely spot.



Man has always been aware of the seas around him. Man has disdained the sea. He has viewed it with superstition. Ignoring Aristotle's exhortations to careful and actual observation, his imagination turned the sea into the home of monsters of terrible and horrifying aspect illuminating the margins of his crude maps. He derided the Greeks for the importance they gave the sea. If he sailed it, fished it, worshiped it, he saw no necessity, for centuries, to understand it. Yet, it strangely fascinated him, which is perhaps why its foreign world frightened him. Henri Rochard, in "Pensées", conveyed this unique feeling.

Elle mue, et sur elle-même se retourne, la  
masse grise  
Qui ne mugit, mais par un doux mur-  
mure mourant grise  
En se dominant pour ne pas me troubler  
Méditant, me laissant dans ma torpeur.  
Près de moi l'aimée, la serrant près  
J'oublie le monde qui vit, m'entoure et  
tais  
L'ardeur secrète puisée dans son attrait  
mystérieux qui m'attire vers elle  
Et éveille le désir de la pénétrer en ses  
insondables profondeurs  
Ma douce rêverie s'étend et cette infor-  
me miroite mes souvenirs  
Toujours plus haut ils s'entassent, m'en-  
toure pour se tapir  
Ils caressent comme pour forcer  
me à vivre.  
Pour moi vivre, lorsqu'enfin je sais l'oi-  
bleu?

The growth, wealth, power, success—and occasionally decline—of harbors and of the cities, often metropolis, nestled close to them makes fascinating reading, however, who would ever have imagined that some of the most awe-inspiring tides would foster the birth of entirely new cities?

With some nostalgia, Canadians and New Englanders might recall the grandiose schemes to harness the tides at the Bay of Fundy, in Passamaquoddy Bay, on the Saint John River, and neighbouring locations. About fifteen years after Dexter P. Cooper had ventured the idea of making the tides work to generate electricity and to develop this area, the United States Corps of Engineers actually began the construction of a tidal power scheme on Cobscook Bay in Maine. This was 1935. Workers were brought to the region and a village—Quoddy—was stamped out of the ground for five thousand people. Alas, work came to a standstill in mid-1936, when the United States Congress failed to come through with appropriations. Of Quoddy Village nothing remains today except a segment of Federally-owned land.

While proposals of re-floating a tidal power scheme have been recently examined by the Canadian and United States agencies, back in the "old world", the gigantic Channel tides have contributed to development, industrialization and, even, some urbanization in France's heretofore "forgotten and neglected" Brittany.

Saint Malo, a town of 14,000, and home of many famous 17th and 18th century privateers has, since the 9th century, protruded into

the English Channel from its rocky promontory. Here, in 1491, on the mouth of the Rance River, Jacques Cartier was born.

On the other side of the estuary is Dinard, a town whose population has declined in the last thirty years from 9,000 to less than 8,000.

Here, after decades of hesitation, the French built the first continuously operating tidal power plant in the world. The tidal range varying from 9 to 14 meters provides the energy producing some 544,000 kilowatts. Designed in 1959, started in 1961, completed in 1966, it cost \$100,000,000 to build.

The plant has opened Brittany to industrialization, while surplus power is "exported" to other regions of France, through a hook-up in the National Electrical Grid. The Rance River scheme, which had at least as many detractors as supporters, has brought new pride to the Bretons, has given a chance to lift a lethargic and underdeveloped economy into the twentieth century. But what is of equal importance are the fringe benefits which have, since the scheme's completion, accrued through the building of a road on top of the dam.

This new two-lane motorway, fourteen meters wide, cuts the distance between Dinard and Saint-Malo by 35 kilometers. To the oracles of doom who heralded the ruin of tourism, one of the heretofore main sources of income of Brittany, proponents of the power station, now point to the fact that the dam has done nothing to spoil the surrounding countryside, has even opened new vistas of the river, and has attracted crowds of tourists. Their number has steadily increased and busloads come to view both the picturesque countryside and the scientific achievement of the dam.

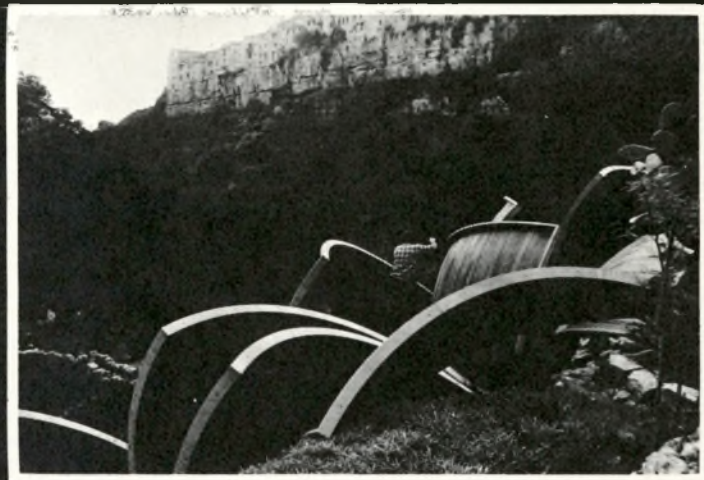
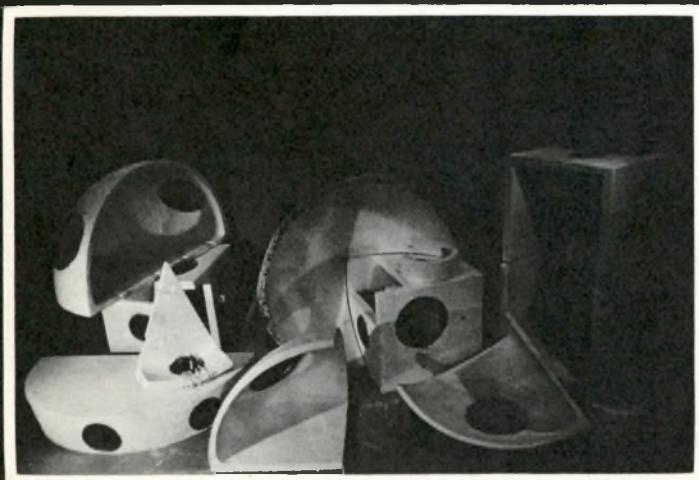
The fishing industry has remained unaffected and original fears in that regard have been allayed. On the other hand, the isolation of Saint Malo and Dinard has been ended. For better or for worse, city growth has followed. A new community, furthermore, owes its very birth to the tidal power scheme. The entirely planned Cité de la Gougeonnais has been stamped out of the ground. Though the plant work-force numbers only 83 men, the road across the dam, the shorter distance to cross the Rance, the development of industry will contribute to the expansion of the new town which already has nineteen duplexes, with more under construction.

While the underwater cities are still far ahead of us, the ocean, again has attracted man, and though it is on the shore, created another city and boosted the growth of at least two others.



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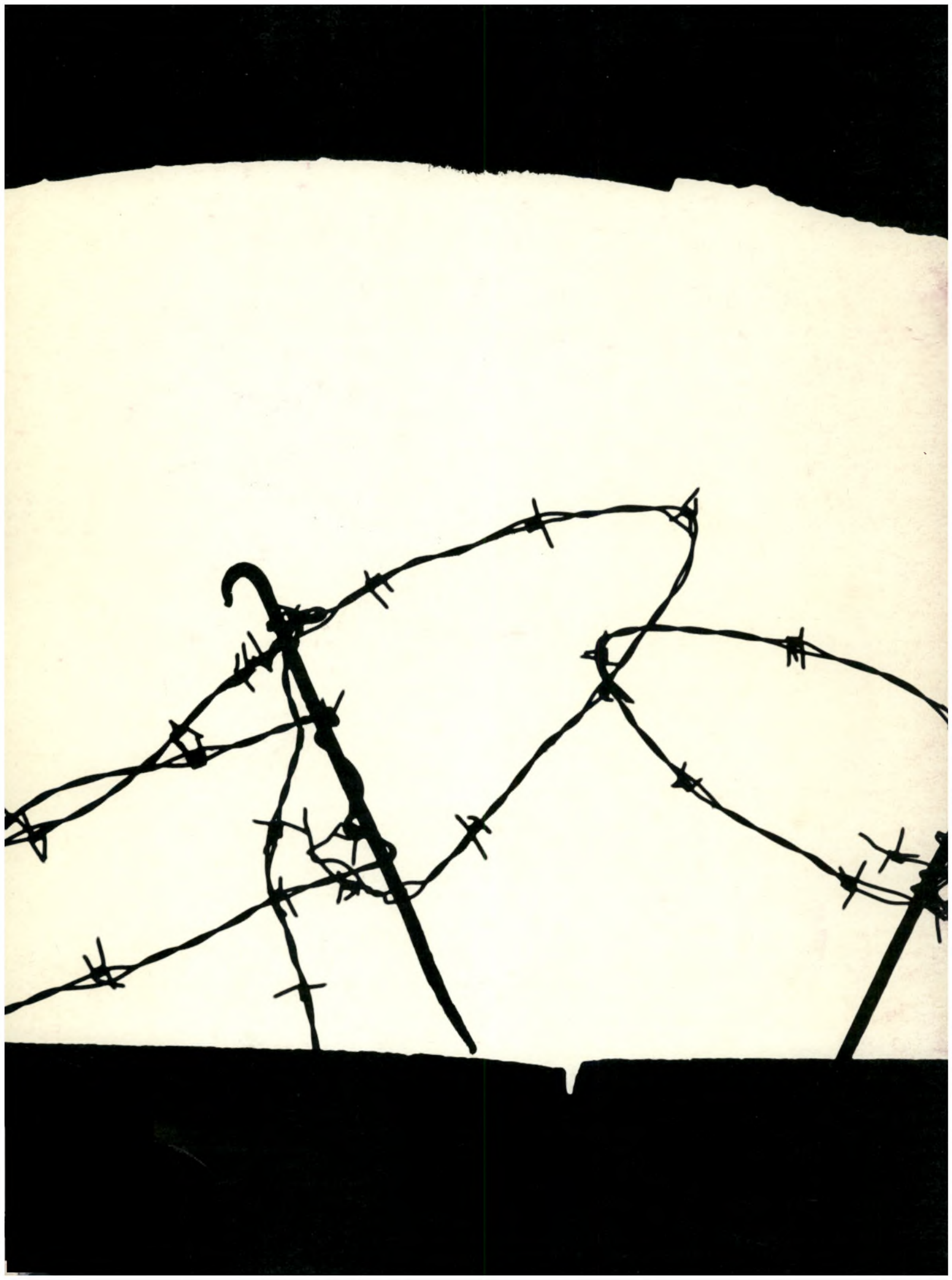
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# habitat

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### Note

These articles were written in 1970. Therefore between preparation and printing it is possible adjustments to legislation may have taken place in some instances.

### Remarque

Ces articles ont été rédigés en 1970. C'est pourquoi, entre leur préparation et leur impression, il est possible que, dans certains cas, on ait apporté quelques modifications aux lois en cause.

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## Ecology and Our Pollution Problems

W. E. Johnson

and J. R. Vallentyne



To appreciate the complexities of our modern environmental pollution problems requires an ecological perspective. Ecology is defined as the science of the interrelationships between living organisms and their environment. The total assemblage of plants, animals and microorganisms which live in an area are interconnected by an intricate web of relationships with each other and with the non-living environment. Any area with such interacting and inter-dependent living and non-living components is known as an ecosystem—or ecological system.

Lakes, rivers, oceans, grasslands and forests are all examples of natural ecosystems. Similarly, an aquarium, a garden plot or a farm can be considered an ecosystem, although completely man-dominated and man-regulated. When the ecosystem concept is expanded to include all parts of the earth inhabited by living organisms, the entire system is called the biosphere. The total number of species of plants and animals that play their separate roles in natural ecosystems varies from a few thousand, in the case of relatively simple ecosystems, up to more than a million for the biosphere as a whole. Their detailed life histories and interactions both among themselves and with non-living components of the environment are so incredibly complex and interwoven that an encyclopedia could not fully describe the little that is known. However, in the complexity of this pattern there lies a common thread that serves to unite them all. This is the story of the eater and the eaten, in which different types of feeding relationships can be grouped into a relatively limited number of feeding levels. These are schematically shown in Figure 1.



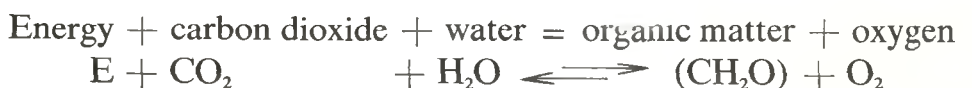
The sun is the primary source of energy for the earth's ecosystems. Green plants are the producers. Through photosynthesis, they utilize the energy of the sun to convert carbon dioxide and water (plus other inorganic chemicals in the environment) into organic compounds and release oxygen as a by-product. These organic compounds of plant tissue, in turn, serve directly or indirectly as the food energy for all other living organisms, including man. When broken down by oxygen in the process of cellular respiration, energy is released and is used for growth and metabolism. In this manner, energy is passed from the sun to the green



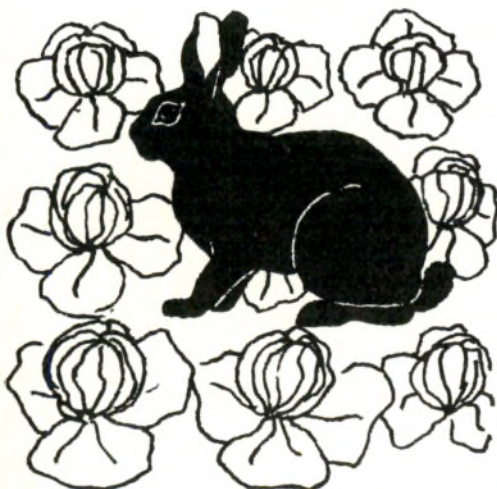
plant producers and then cycled through the ecosystem by various routes, depending on the feeding relations. For example plants may die and be decomposed directly; or, they may be eaten by primary consumers (herbivorous animals), some of which may in turn be eaten by secondary consumers (carnivorous animals), the dead bodies and wastes of which are then devoured by the decomposers. Thus energy from the sun is constantly entering and passing through the earth's ecosystems through such food chains.

In addition to the flow of energy through food chains, the ecosystem concept requires the recycling of chemical elements. For although the sun provides a continuing outside source of energy, the earth's ecosystems have no extraterrestrial source of the chemical elements essential to life. This recycling is accomplished through food chains when the organic material of plants and animals is metabolized and broken down and transformed by the decomposers and returned to the environment as simple inorganic chemicals which can be reused by the green plant producers.

To give but one example of recycling as it operates in nature, consider the processes of photosynthesis and respiration. As shown below, the reaction to the right is photosynthesis; to the left it is respiration.



Oxygen was originally formed on the earth as a waste product of photosynthesis. As photosynthesis started to increase several thousand million years ago, oxygen began to accumulate in the atmosphere. Non-photosynthesis micro-organisms already in existence then began to utilize it. This permitted the more efficient combustion of organic matter, making possible the existence of higher forms of animal life; and at the same time ozone ( $\text{O}_3$ ) was formed in the upper atmosphere from oxygen ( $\text{O}_2$ ) shielding the earth from the biologically harmful ultraviolet radiation. The long constant levels of oxygen and carbon dioxide in the earth's atmosphere, on which nearly all life on earth depends, is maintained through the balanced reciprocal reactions of photosynthesis and respiration in the earth's ecosystems.





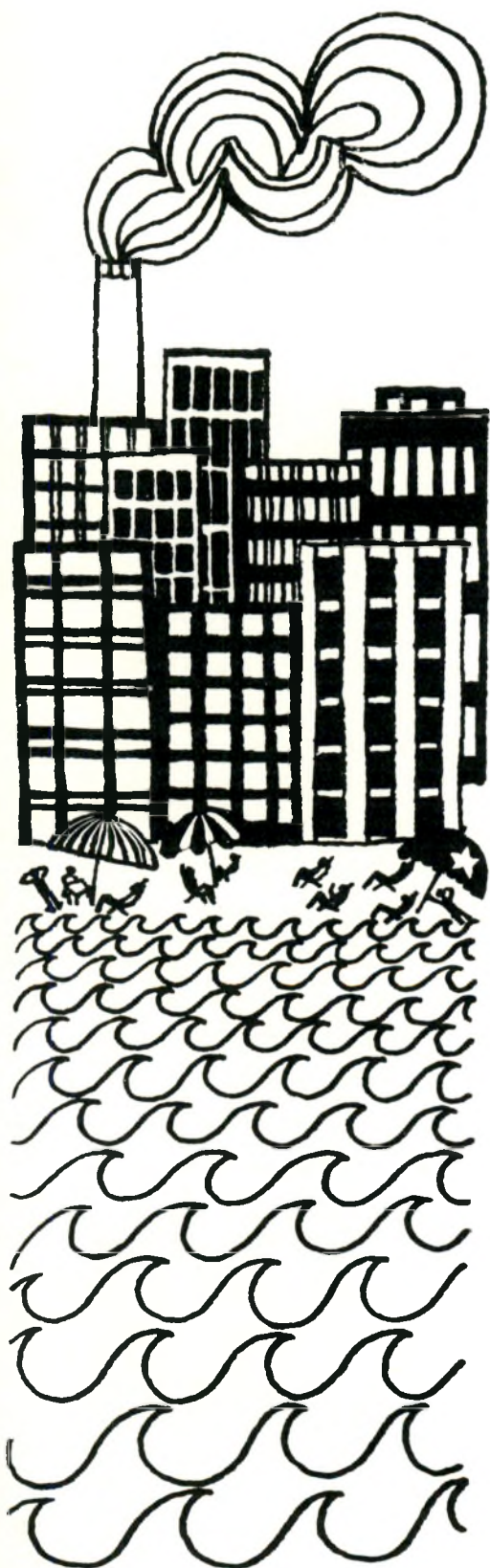


It is a recognized principle of ecology that the interactions of living organisms and the environment are reciprocal. That is, the environment not only determines the conditions under which life exists, but the living organisms influence the conditions of the environments of air, soil and water. The total result is that the earth's ecosystems tend to maintain themselves and their environments in a state of balance and stability which man has long recognized as the balance of nature.

Primitive man lived very close to nature and was an integral part of the local ecosystems in which he lived. Indeed, he was little different than any other large animal in the ecosystem and his simple natural wastes were decomposed and recycled just as those of other consumers. As civilization has developed however, man has developed an ever increasing capacity to modify his environment and to upset the balance of the earth's ecosystems. Two significant changes have occurred in the recent past. First, there has been a phenomenal growth in the world's human population (see Figure 2). The estimated world population doubled in the 200 years from 1650 to 1850, from  $\frac{1}{2}$  billion to one billion; it doubled again in the next 80 years to 2 billion in 1930, and has almost doubled again to more than 3.6 billion in 1970. Second, there has been a tremendous growth of industry and technology, particularly in recent decades.

Throughout this period, unrestricted economic growth has been the paramount goal of man. Domination and exploitation of the world's resources has been synonymous with progress. Although this progress has greatly increased the material comforts of man, it has not been without cost. As we now suddenly realize, the cost has been a serious deterioration of the environment in which we live. We have pursued the earth's resources with the "frontier" attitude that they were unlimited, and spread our wastes as though the capacity of the earth's ecosystems to absorb them was unlimited. A few examples will serve to illustrate how our wastes are upsetting the balance of natural ecosystems and degrading our environment.

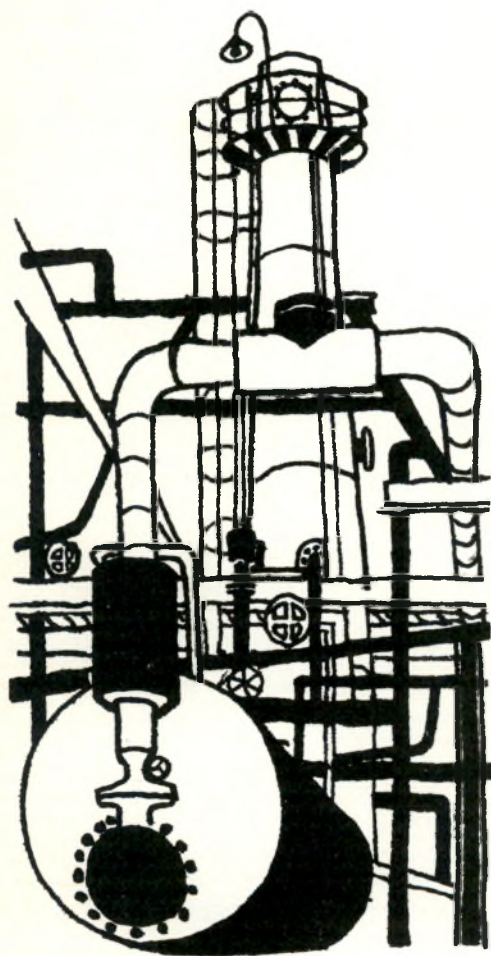
One type of pollution problem, common throughout all of human history but accentuated by recent population growth and urbanization, is that associated with the disposal of human phy-



biological wastes. It has two aspects, one associated with organic pollution and the other from the liberation to water of nutrients that trigger the growth of aquatic plants. These problems were accentuated in the last century following the recognition that diseases such as Asiatic cholera were transmitted by drinking water from wells infected with sewage from diseased persons. As a result of this discovery in 1855, modern communal systems of water supply, flush toilets and disposal of sewage effluent to streams and lakes came into being. The effect was to replace the previous percolation of wastes through soil (in which organic wastes and nutrients are removed by natural processes) with a system in which wastes, with or without treatment, are discharged directly to water. The old adage "rain to the river, sewage to the soil" went out the proverbial window with more alacrity than an Italian lover on the appearance of a husband.

Many communities in Canada still remain without effective waste treatment in terms of removal of organic matter. Montreal is perhaps the most notorious example. In no case in Canada does any community treat wastes for the removal of phosphates or other nutrients that trigger the growth of plants when added to water. One of the serious deficiencies that has resulted from sewage treatment operations is the failure to realize that the liberation of phosphorus and nitrogen compounds to water leads to a re-synthesis, by algæ and other aquatic plants, of the organic compounds removed during sewage treatment. In the presence of supplies of other nutrients normally present in the aquatic environment, one pound of phosphorus can generate five hundred pounds of living algæ, creating serious problems in areas where water is utilized for water supply and recreation. One need only add to this that an average citizen eliminates three pounds of phosphorus per year as household waste. The recent experience on Lakes Erie and Ontario demonstrates how drastically the effects of nutrient pollution can upset ecosystem balance. These large lakes are widely affected, but the most serious degradation of their aquatic environment is in the very vicinity of the large urban centers of population where good water supply and a pleasing æsthetic and recreational environment are most needed.



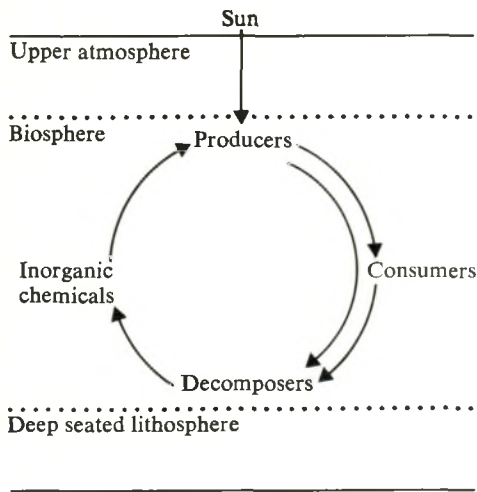


Another type of pollution problem is that associated with industrialization and technological developments.

An ever increasing crowding of people and industries into larger urban areas is causing problems of air pollution in these centers. However, the problem is not just a local environmental problem. For example, one of the main air pollutants in urban areas are the oxides of sulphur. Sulphur dioxide has been demonstrated as the cause of various respiratory ailments; however, sulphur dioxide from such urbanized industrial areas is more than a health problem and more than a local problem. It can destroy vegetation in a widespread surrounding area. Its effects can be even more far-reaching: The acidity of lakes and streams in the south-western part of Sweden has increased one hundred-fold during the past one hundred years due to sulphur dioxide in rain water transported from the industrial areas of the Ruhr Valley in Germany and the region around Manchester in England. Salmonid fish in these lakes have recently been killed as a result.

As a result of rapid technological developments of the past few decades thousands of new and exotic chemicals have come on the market and into widespread common use, and an estimated 500 such new potential pollutants come into use each year. The wastes from these complex materials are sometimes virtually indestructible and are completely new to the organisms of the earth's ecosystems. The problems of accumulation of DDT and other chlorinated hydrocarbons, mercury and other toxins in biological food chains—and in humans—are common throughout Canada and the world. Some of these materials can kill humans, and affect the reproduction of birds and other animals. We are still ignorant of their total long term effects on the earth's ecosystems, but some of the possibilities are indeed frightening.

It was a common practice many years ago in mines to keep a small bird in a cage as an indication of possible danger to man. It is common practice to utilize fish in our rivers and municipal water supplies in the same sense. Some birds, fish and other living organisms in our environment have recently been dying. It is a warning that we cannot ignore.



**Fig. 1**  
**The ecosystem concept.**

**The non-living matter:**

**Sunlight**

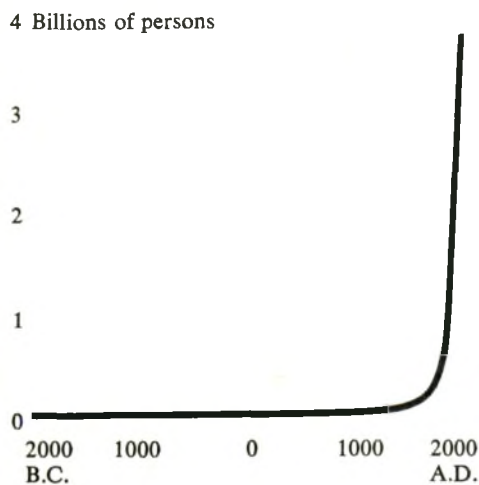
**Inorganic chemicals** in soil, water and air required for the growth of photosynthetic plants.

**Living organisms:**

**Producers:** the green plants which harness the energy from sunlight through photosynthesis and convert inorganic chemicals into organic matter.

**Consumers:** the animals which feed on the plants (the herbivores or primary consumers) and the animals which feed on other animals (the carnivores or secondary consumers).

**Decomposers:** the bacteria and other microorganisms which break down the dead producers and consumers and return their chemical compounds to the ecosystem in simple form for re-use by the plants.



**Fig. 2**  
**The world population.**





L'équilibre  
de l'écosystème  
par Roger Leblanc

Il semble impossible par le biais de l'aménagement et de l'urbanisme sous leur forme ou selon leur pratique actuelle de justifier rationnellement la nécessité des relations naturelles dans l'environnement; il importe donc que cet apport méthodologique et scientifique découle des lois mêmes de l'écologie.

*Choix des valeurs*

«De toute évidence, le problème fondamental de l'homme et de la nature ne consiste pas à procurer un arrière-plan décoratif aux activités de l'homme, ni même à améliorer la triste apparence des villes; il consiste à maintenir la nature comme source de vie, comme milieu, comme enseignement,... et surtout à redécouvrir le corollaire inconnu de la nature chez l'homme, l'origine de toute signification<sup>1</sup>.»

Il faut considérer dès lors la place de la nature dans l'univers des hommes et la place de ceux-ci dans la nature; mais plutôt que de proposer une image standard de leurs relations, il s'agit de trouver les aspects déterminants des processus naturels qui contiennent leurs propres valeurs. C'est à partir d'eux que la forme de vie doit être choisie, ce sont eux qui doivent déterminer le schéma non seulement des lieux d'activités mais aussi de tout leur développement.

*Régénération des valeurs (conduisant à l'écologie)*

«Les communautés se développant et se stabilisant dans le temps, elles tendent à devenir plus efficaces dans l'utilisation de l'énergie. La structure communautaire elle-même se stabilise, permettant aux organismes dominants de se reproduire; un tel cycle ordonné est le signe d'une communauté équilibrée utilisant l'énergie disponible pour se garder en état d'agir<sup>2</sup>.»

Les mots énergie et ressources impliquent immédiatement un fait: les ressources n'existent qu'en vertu de certains objectifs. La signification de «ressources» pour l'homme dépend en quelque sorte beaucoup plus de la culture que de la biologie. De même, lorsqu'il est question de ressources, il se produit un va-et-vient entre l'écologie et l'économie. L'homme, toutefois, constitue toujours une partie de la biosphère et les ressources demeurent toujours une partie de l'environnement; pour l'homme civilisé, ces ressources sont habituellement classées selon qu'elles sont renouvelables ou non renouvelables, les premières étant celles qui possèdent la capacité inhérente de se régénérer si elles sont pondérées.

Paradoxalement, à mesure que l'homme devient davantage obnubilé par les systèmes urbains et davantage séparé de la nature, il semble désirer un plus grand contact avec ce monde qu'il n'a pas encore tout à fait rayé de ses activités; il en est toujours une partie et il ne peut échapper à l'embarrassante question de la quantité de nature qu'il peut détruire sans se détruire lui-même. Pour sa propre satisfaction, pour son propre avenir, il se doit de développer une «conscience écologique».

Par contre, à l'opposé de la connaissance résultant des découvertes dans d'autres sphères scientifiques, la compréhension écologique n'est pas accessible subitement; elle doit être construite graduellement par l'intermédiaire d'une compréhension générale et de synthèse.

#### *Définitions écologiques*

Les individus (plantes ou animaux) et les populations (groupes d'individus en relation) ne vivent pas seuls dans la nature mais en association. Ces rassemblements d'organismes ne sont pas l'effet d'une accumulation au hasard; au contraire, ils sont spatialement distribués et s'organisent en utilisant l'énergie et les matières premières provenant de cette distribution. Une telle communauté structurée de plantes et d'animaux, à l'intérieur d'un environnement qui la contrôle, forme un écosystème, unité de base en écologie et représentant le plus haut niveau d'intégration dans les systèmes écologiques.

Un écosystème est constitué de deux grandes parties: l'environnement physique et la communauté biologique. A l'intérieur de cette dernière, les composantes biologiques de l'environnement s'additionnent aux composantes physiques. Toutefois, l'environnement lui-même, comprenant à la fois ses parties physiques et biologiques, se comporte comme un tout. Dans l'écosystème, l'environnement physique procure l'énergie, les matières premières et l'espace vital dont la communauté biologique a besoin et qu'elle utilise pour sa survie et pour sa croissance.

La partie biologique du système consiste habituellement en quatre ou cinq niveaux d'énergie; ces niveaux trophiques reposent sur la quantité originale d'énergie se perpétuant dans la communauté.

Le cheminement de l'énergie se manifeste selon deux grands modes de dépendance des organismes: l'autotrophie et l'hétérotrophie. L'autotrophie est un mode de nutrition qui consiste à se nourrir uniquement de substances minérales comme l'eau, le gaz carbonique, les nitrates, les sels ammoniacaux,... La plante verte peut, grâce à sa chlorophylle, capter l'énergie lumineuse solaire et la mettre en réserve sous forme d'énergie chimique. Cette opération se nomme la photosynthèse. Au cours de la photosynthèse, l'énergie chimique est emmagasinée dans des substances organiques complexes que la plante synthétise à partir des éléments minéraux. Les végétaux chlorophylliens ne montrent donc de dépendance qu'à l'égard du monde minéral: ils peuvent fabriquer leur nouvelle matière vivante en absorbant exclusivement des aliments minéraux et en puisant leur énergie de fabrication à même les radiations lumineuses solaires. La plante verte n'a donc pas besoin d'un autre vivant pour lui préparer les matériaux de son alimentation; elle est autotrophe.

L'hétérotrophie, deuxième mode de dépendance des organismes dans leur nutrition, se rencontre chez tous les animaux et chez les plantes non chlorophylliennes. Elle est un mode de nutrition impliquant la présence obligatoire de substances organiques.

La perte de l'énergie elle-même lors de son cheminement s'accroît avec les niveaux de consommation. Les plantes captent l'énergie solaire avec une efficacité d'environ 0.1%. Les herbivores captent environ 10% de l'énergie accumulée dans les plantes et les carnivores de premier ordre environ 10% de l'énergie contenue dans les herbivores; c'est-à-dire que l'efficacité des carnivores de premier ordre vis-à-vis de l'énergie contenue dans les plantes est de 1%; elle est de 0.001% vis-à-vis de l'énergie solaire; les carnivores, dont l'homme, sont de très mauvais transformateurs d'énergie.

La définition de la végétation est également très importante; la végétation est le terme utilisé pour désigner la couverture végétale totale de toute aire déterminée. Une végétation est généralement formée d'une ou plusieurs communautés ou associations de plantes groupées selon une mosaïque ou un complexe en contenant un plus ou moins grand nombre. C'est une caractéristique géographique de grande valeur puisqu'elle détermine la physionomie de la plupart des surfaces solides de la terre, quelle qu'en soit l'échelle. La végétation devient donc un élément indispensable de l'environnement.

#### *Position écologique*

«L'écologie révèle le modèle dynamique des relations entre la vie et les conditions qui la permettent; ce modèle doit être compris et respecté si l'aventure humaine doit continuer. Tel est son service à l'humanité. Les bénéfices qu'il est possible d'en retirer doivent alors être le produit d'une grande vigilance. Les impératifs de la nature exigent le même soin dans l'attention portée au paysage que dans la création des œuvres techniques<sup>3</sup>.»

«Il semble donc inutile de suggérer, puisque l'écologie et l'économie ont des racines communes, qu'elles peuvent avoir en commun des principes qu'il serait dangereux pour l'homme d'ignorer. Peut-être l'intelligence humaine peut-elle parvenir à surclasser la nature! Mais, entre-temps, une civilisation s'appuyant largement sur l'utilisation de modèles conceptuels devrait soupeser le risque d'ignorer le modèle mis en place avant elle au cours de l'évolution dynamique des écosystèmes naturels qui la contiennent<sup>4</sup>.»

#### *Variations et types d'écosystèmes*

Il semble admis que les ressources naturelles doivent être conservées. Cette idée pourrait peut-être recevoir plus d'attention.

Il faut se souvenir premièrement que presque tous les types terrestres d'écosystèmes se sont réalisés avant que l'homme devienne une force écologique dominante.

De plus, comme il a déjà été démontré, tous les organismes y compris l'homme sont dépendants des ressources de l'environnement pour l'énergie alimentaire et pour les matières premières. La quantité d'eau, d'air, de roche,... sur terre est limitée mais elle est si grande que dans les circonstances actuelles de température, elle sera toujours suffisante pour les besoins et les désirs de l'homme. Toutefois, des insuffi-



sances locales ou temporaires de ressources inorganiques peuvent se produire et effectivement se produisent.

Ce type de destruction s'est produit en majeure partie avant qu'on se rende compte de ce qui arrivait et avant que les principes écologiques de productivité dans la gestion des terrains soient connus.

Ce sont des écosystèmes naturels locaux qui ont été, intentionnellement ou non, modifiés par l'explosion des populations. Comme ils agissent en tant qu'environnements globaux c'est-à-dire comme un tout, les effets dévastateurs ne sont pas simplement des manifestations évidentes de leur destruction et de leur remplacement, mais des adversaires subtils et à long terme; et comme le nombre des humains augmente, il se produit graduellement un passage constant et croissant pour les écosystèmes d'un état naturel à un état modifié. Toutes les précautions doivent être prises pour éviter d'introduire de nouveaux facteurs nuisibles (non nécessaires) soit dans les écosystèmes naturels, soit dans les écosystèmes modifiés. De ces facteurs, il pourrait résulter de tels déséquilibres dans les écosystèmes locaux que le bien-être même de l'homme serait en danger et que des réactions en chaîne pourraient aggraver bien davantage la situation actuelle.

Lorsque la végétation «climax» et la vie animale sont détruites ou sérieusement endommagées sur de grandes étendues, il est presque impossible de revenir à une situation normale sans l'aide de l'homme même; il n'y a tout simplement plus assez d'individus pour repeupler ces étendues avant que d'autres organismes dominent ces environnements.

«Dramatique dans son impact sur les écosystèmes naturels et modifiés de toutes sortes, la plus sérieuse de ces menaces est celle des écosystèmes urbains géants. Pour satisfaire aux désirs et aux besoins de l'homme, toutes les composantes naturelles sont éliminées; seul, le climat des écosystèmes originaux subsiste, et il est tellement altéré localement par la chaleur, les retombées de poussières et les fumées qu'il demeure rarement le même. Les écosystèmes naturels disparaissent des grandes agglomérations urbaines pour laisser la place à des écosystèmes synthétiques ou artificiels qui sont le résultat de ce qui a paru essentiel à l'homme au cours des siècles<sup>5</sup>.»

La modification des écosystèmes forestiers, de pâturage et aquatiques ne s'est pas produite de la même façon que si ces écosystèmes avaient évolué naturellement. Pourtant, s'il devient nécessaire d'accroître le nombre et la portée de ces écosystèmes modifiés, cette modification doit être le résultat d'une gestion scientifique fondée sur des principes écologiques.

Malheureusement, beaucoup d'écosystèmes ont déjà été détériorés par une occupation et une densité exagérées bien avant que cette gestion soit disponible. Ce sont ces écosystèmes qui vérifieront l'adéquation de cette gestion, notamment pour la reconstruction d'écosystèmes productifs aux endroits même où l'environnement a été détruit par l'activité extrême de l'homme. Par contre, il est facile d'en constater le faible rendement; un choix logique s'impose: soit utiliser le sol à son optimum en laissant les processus écologiques jouer sur les sols urbains propices, soit bâtir un sol vraiment artificiel à la mesure de nos besoins et de nos désirs en éliminant complètement un sol naturel alors inadéquat.

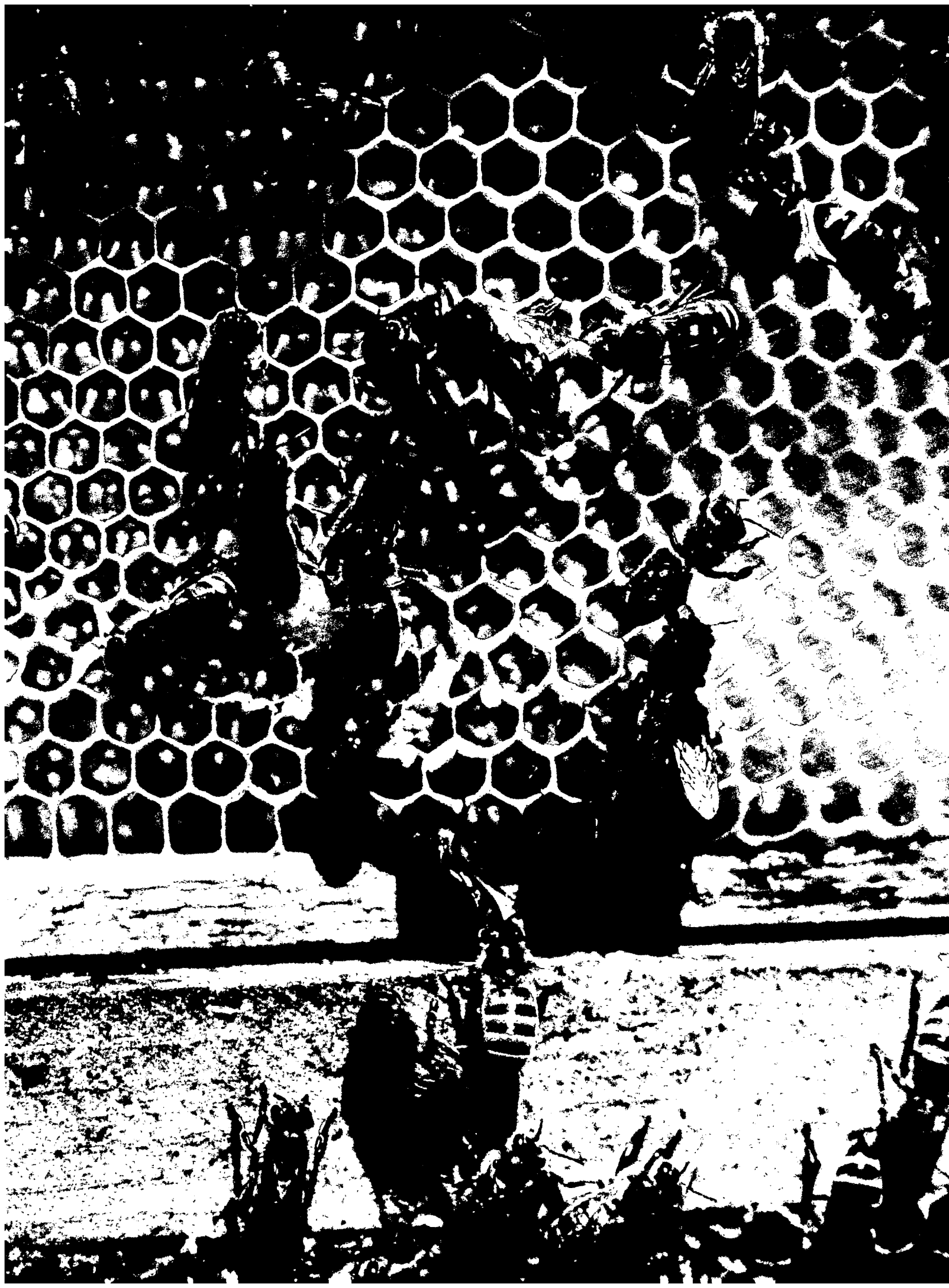
Certains écosystèmes synthétiques sont entièrement ou presque faits par l'homme. Pour créer de tels écosystèmes, l'homme construit un environnement propre à la vie des individus et des populations, sans y incorporer nécessairement tous les éléments exigés pour un cycle complet. Il peut pousser l'expérience jusqu'à devenir le seul être vivant dans l'écosystème créé ainsi qu'il le fait pour les sous-marins, pour les avions et surtout pour les vaisseaux spatiaux. L'échelle pourrait en fait atteindre celle des villes.

#### *Modalités de changement des écosystèmes*

«Il faut évidemment se souvenir qu'en dépit de son ingéniosité, l'homme ne peut vivre sur terre que grâce aux conditions globales physiques et biologiques qui lui sont encore favorables; mais les facteurs de l'environnement agissent parfois si rapidement qu'il ne peut réaliser que trop tard les événements subits non favorables. Il est entendu que l'équilibre de l'écosystème terrestre se transformera éventuellement d'une manière radicale; l'homme n'appartiendra peut-être pas à ce nouveau système. Il lui revient donc de comprendre son environnement et de le protéger des facteurs dangereux éventuels; aucun autre organisme n'a déjà eu ce choix<sup>6</sup>.»

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# Enhancing the quality of the environment: current Federal legislation and programs

by E. Roy Tinney and J. G. Michael Parkes

Why is it that the majority of Canadians, even though so fortunately endowed with vast empty spaces and enormous natural resources, spend most of their lives in a degraded environment? The country has an abundance of water through its vast system of rivers and lakes; it possesses great tracts of excellent agricultural land, extensive forests, a profusion of fish and wildlife, some of the world's most beautiful scenery, outstanding recreational opportunities and more than two million square miles of still essentially unoccupied land.

Notwithstanding this immense space and widely dispersed natural wealth, some 95% of all Canadians are concentrated in pockets along a southern belt from coast to coast often beside polluted harbours, lakes and rivers, breathing polluted air, squeezed between neighbours, and subjected to noise, unsightliness and the odours of cities needing restoration. Closed swimming beaches are now commonplace from coast to coast. Mercury, oil slicks and algae abound.

Canadians have developed a system which is highly efficient in producing great affluence in goods and services, but often at a cost of seriously damaging the physical surroundings. This damage not only endangers the existence of many ecosystems but it also creates a hidden drag on the economy. While every industrial country is in the same plight today to some degree, it is surprising to find that the level of environmental degradation in southern Canada, and even parts of northern Canada, is parallel to that in most industrial countries, despite our relatively sparse population. Before examining this paradox, let us first look at the nature of the problem of environmental pollution.

## **The Origins and Complexities of Environmental Degradation**

"Environment" is a word with many connotations. In one sense it may refer only to the physical world that exists around us. But it also denotes the culture in which we live with its social atmosphere, institutions and sets of values of which it is composed. To the ecologist and biologist the word conveys the habitat and external influences surrounding a particular organism, including the plants and animals that are its source of food and the predators and parasites that prey upon it.

Environment in its broadest sense means, therefore, the entire world. It means physical world, both natural and man-made, the biosphere containing living organisms from the lowliest micro-organisms to man himself and the set of institutions and social values which man has created. However, such a topic is too broad for our brief discussion and for this reason we will deal with the physical environment and the biosphere, which are of such vital importance to the social environment that man creates.

If we degrade the quality of the physical environment both the biosphere and our culture are doomed. But it is also true that if we destroy only certain elements of the biosphere, particularly the micro-organisms, the physical environment is endangered because the biosphere is one of the essential cleansing mechanisms. This interdependence, so frequently overlooked in the past, is now recognized as crucial to the preservation of the environment generally.

The physical environment consists of the natural, material surroundings, i.e., the land and the inland waters of the earth and the atmosphere and oceans which envelope the world. It includes such man-made tangibles as houses, offices, factories and other places of work and play; and systems for transportation, communication and the like. Generally speaking, man's ability to control the quality of his environment is directly related to the degree he can isolate a segment of it. Thus, in our homes we can regulate noise, odour, light, dust, and set temperatures and humidity levels with considerable precision. We can also grow luxurious and exotic plants and keep unusual collections of animals provided we isolate them in separate man-controlled environments. Since we spend the greater part of our lives indoors, such environmental quality control is of enormous significance to civilized man and yet we frequently overlook the contribution that our socio-economic system has made to the creation of this special environment so essential to modern living.

But, when we move out of doors, the same technology has been far less successful in minimizing noise and odour particularly within our towns and cities; it has only moderate control over dust and noxious, gaseous emissions and little, if any, control over temperature and light. Outside man-made enclosures, we have simply been trying, with less than satisfactory results, to reduce the discharge, primarily by means of mandatory prohibitions, of such objectionable substances as sulphur dioxide, mercury, DDT, and so on, which our technology produces.

Our immediate task is to change the nature of our socio-economic-technical system, to reduce the quantities of wastes which are produced and to render those that are produced less harmful to the biosphere and man's activities. The range and variety of wastes and residues are large because pollution has many forms. They may appear as noxious chemicals and organic wastes from domestic sewers, farms and industry, as offensive junk piles and litter, as scars created by mining, logging and road building, or as heat escaping from power plants and industrial cooling systems.

#### *Suggested Causes of Environmental Degradation*

It is frequently suggested that the pollution dilemma is the result of modern technology or of economic growth, or of the population explosion, but none of these simplistic explanations really pinpoint the true cause for the degradation of the environment. Admittedly most of our technology is production-oriented and it spews forth thousands of new chemicals yearly which enter our environment essentially untested. Nevertheless, man still needs more technology directed toward the very serious world problems of inadequate food production in less developed countries, toward more effective world distribution and transportation systems, and for adequate birth control measures. In highly industrialized countries we need, especially, new technologies for the protection and enhancement of environmental quality. In short, we need, not a moratorium on technology as some suggest, but a significant shift of its emphasis toward world problems, a control on those elements of it that spill untested substances into the

environment and an expansion of it to counteract the harmful effects of the pollution that now exists.

Similarly, our socio-economic system is geared to satisfy consumers' wants, and indeed creates those "wants" for more and more products, for example, paper, synthetics, fabrics, gleaming white clothes, and not for meeting our desires for a clean and attractive environment. Again it is not economic growth per se that is harmful. What seems to be at fault is the kind of economic system that we have developed, a system which either ignores or tolerates the degradation of the environment by allowing the indiscriminate production and disposal of wastes and residues. Our socio-economic system also deliberately urges greater per capita consumption of material goods, resulting in a rapidly increasing quantity of wastes.

It is claimed, with increasing frequency, that the population growth must be curtailed if the objective of a clean and attractive environment is to be achieved. While such a view is hardly contestable for the world as a whole, including Canada, it does not necessarily follow that on environmental grounds Canada cannot accept more people from the overcrowded countries. Indeed other countries with a population density many times that of Canada are no more polluted and some are considerably less polluted. Given a better environmental quality management system, Canada could probably support a significantly larger share of the world's population with a higher level of environmental quality than it currently enjoys.

#### *The Changes Needed in Our Socio-Economic-Technical System*

Most people agree that the prime orientation of our present socio-economic-technical system is toward the increase of material wealth. This orientation obscures many of the costs, which must be made explicit as new elements in our appraisal of social and private well-being or welfare, i.e., wealth. In the classical example, the factory owner who freely disposes smoke and fumes ignores the real social cost inflicted on the members of the community in the form of bronchial diseases, soiled fabrics and buildings, obscured vision, damaged forests, farms and the like. Such a cost of waste disposal is "external" to the producers' profit maximization calculations. Furthermore, it is evident that with increasing waste disposal into our environment, the formerly abundant wealth in land, water and air becomes a progressively scarcer and more highly valued element in the appraisal of our well-being and welfare that is, our wealth. Because of the relative novelty of excessive pressures and waste loadings into our environment, appreciation of the damage done remains as yet somewhat uncertain. Even though we desire a readjustment and reallocation of resources, to achieve a better environment, the normal market mechanism is unable to respond.

The difficulties are further increased, of course, by the fact that the ownership of our environment, as a resource, is poorly defined. Air and water, for example, are traditionally regarded as "common property" available to all without social cost or charge. The first user of the environmental resources



freely pre-empts their use by lowering their quality. In future, producers and consumers in our modern world cannot be permitted to ignore the social cost which they thrust upon others when they cast their wastes and residues into the environment and they must be made liable for the damages they cause. The traditional concept of public nuisances is too ineffectual and more definitive legal concepts must be found to allow the individual "owner" of a common property to protect his rights.

In conventional economics, welfare and well-being are usually measured by the value of goods and services produced. The increase in the Gross National Product is normally considered to be indicative of the growth of the nation's wealth. Yet, it is becoming apparent that at the same time as our free gifts of nature are turning into scarce goods, with values attached to them, our general affluence has tended to bring more and more of the currently non-measurable, non-quantifiable elements into our sense of welfare and well-being. After our direct material needs are met, we are increasingly conscious of the contribution that recreation, scenic beauty, social justice, and the like, make to our wealth. As the value of these non-quantifiable elements is lowered by environmental degradation our true aggregate wealth may well be decreasing, despite the apparent rise in GNP.

Government policies are concerned primarily with the relevant social costs and values involved, the meaning of which, however, remains often largely elusive and vague. It is suggested that in the modern world, the safeguarding of our physical environment from degradation will rest largely upon the success with which we can control and focus our continuously developing technology to maximize the new valuations that we place upon the elements of our true wealth. It is apparent that our institutions and the mechanisms for allocating increasingly scarce common property and our valuations of the "higher things", in terms of welfare and well-being, are about as primitive as they were a century ago, when the frontier society existed. The market mechanism has failed to operate automatically because our valuations, our definitions of property rights, and so on, are poorly defined in relation to our current needs.

Whose responsibility is it to develop the requisite new concepts and to protect the community's ownership right in the common property resources? Surely such responsibility rightly belongs to the community's organ of power, i.e. to its government. The root causes of environmental degradation, through pollution, lie not only in the failure of the market, but equally, and perhaps more egregiously, in the failure of all governments to design a strategy for environmental quality control that contains the institutions and mechanisms which would protect and rationally allocate the common property resources. This is the task before governments today.

The public perception of environmental degradation in Canada is developing rapidly, but there always exists a danger that with increasing polemics amongst the other interests, the subject may lose its glamour and attractions. It is imperative that we soon develop a clear understanding of why environmental disruption occurs, what its costs and consequences

are and what alternatives exist for the improvement of the situation. It would be unfortunate, indeed, if the opportunities for innovation provided by the current public interest were lost without putting new measures, mechanisms and institutions in place.

The basic elements for effective management of environmental quality to which we must give our immediate attention are, among others:

1. A new evaluation of the environment as a resource and as a constituent of welfare and well-being.
2. A conscious and determined reconciliation of the conflicts of interests which will obviate gross distortions in the distribution of "environmental wealth".
3. A clear and unambiguous delineation of property rights in the common property resources of the environment.
4. The establishment of means to enforce these property rights effectively, and
5. The development of a set of policy instruments, mechanisms and programs whose combined effect will achieve the four objectives above.

An array of possible instruments and mechanisms exists to accomplish this realignment including direct regulation, waste disposal and effluent charges, subsidies and other incentives, research, education, planning, as well as many others. These instruments operate with differing degrees of efficiency and they have different degrees of equity. These are the wrenches, pliers and even the hammers in the environmental manager's kit of tools.

### **A Federal Strategy for Environmental Quality Management**

It is frequently stated that we need only a set of rigid national standards with severe penalties against those who violate them, i.e., we simply need to crack down hard on polluters. In a totalitarian system that gives high priority to environmental concerns (which itself is an unlikely happenstance) such an approach would probably succeed, but in democratic, free enterprise societies the system of standards and fines has been a dismal failure. We need instead more sophisticated measures to regulate the system at points where effective influences can be made. If we attack environmental quality management only at the end, i.e., by standards, we come face to face with those who want to preserve their income and employment. Such a head-on confrontation between environmental concerns and immediate necessities of livelihood has traditionally resulted in decisions in favour of jobs and profits. But while standards and fines alone are not sufficient they are important and indeed necessary instruments in the total array of mechanisms for water quality management.

During periods of high public concerns some "wins" can be made by environmentalists but a more successful and enduring approach is to influence the system at many points. The trick is to identify the "pressure points" and to learn the techniques of applying such pressure. The accompanying diagram shows one "system" for the generation of residuals and their disposition in water. The left hand column of Chart I displays the seven basic elements of such systems, whether for air,

water or soil, and the right hand column suggests some, but by no means all, of the instruments, mechanisms, or programs which the Federal government can use to alter the behaviour within each element. The selection of the most appropriate array of alternatives from this right hand column and the relative priority attached to each would constitute a Federal environmental quality management system. Clearly the available options go far beyond fines and standards and the opportunity for success is accordingly vastly increased.

### **Current Federal Legislation and Mechanisms**

To understand the complete Federal program one must examine the Federal role set forth by the B.N.A., the current legislation, and other mechanisms now employed. The following discussions describe the constitutional position of the Federal government relative to that of the provincial governments, followed by a summary of each of the pertinent pieces of legislation. Chart 2 then attempts to display the elements of this Federal legislation and programs on a departmental basis.

#### *Constitutional Aspects\**

Canada, in common with virtually all Federal countries, faces problems of divided jurisdiction in the management of her resources. The inherent difficulty in Canadian resource management is that it straddles the two groups of constitutional powers, Federal and provincial, created by the British North America Act as passed by the British Parliament in 1867. The distribution of rights and responsibilities under this Act is very complex, particularly with regard to air, water and land management, and the situation can be very confusing to the layman. One aspect affecting this distribution of powers is that of proprietary rights.

#### *Proprietary Rights—Provincial*

By virtue of Section 109 of the British North America Act, the provinces are entitled to substantial proprietary rights. The Act states that with certain exceptions, "all lands, mines, minerals and royalties" which were owned before Confederation "shall belong to the provinces." One exception to this section involved public lands in the Canadian west. The proprietary rights to these lands were held by the Federal government in the prairie provinces until 1930. In that year, an amendment to the Constitution transferred these rights to those provinces, so that in effect all provinces have approximately the same proprietary rights with regard to resources.

It is important to note that only "land" and "minerals" are mentioned in Section 109. No mention is made of "water" or to other natural resources. This is because the law has never recognized ownership of such commodities as fish, wildlife or water while they remain in their natural state. In the case of water, because of its "fugitive nature," it must be captured and reduced to a possession, such as a pail or a reservoir, before it may be owned. However, by making ownership of public lands provincial, Section 109 has given usufruct, or rights of use, of the water and its contents to the province for its own exploitation.

#### *Proprietary Rights—Federal*

Federal proprietary rights in resources are nevertheless significant. Section 108 of the British North America Act states that: "The public works and property of each province... shall be the property of Canada" (at the time of Confederation in 1867.) These include "Canals, with lands and water power connected therewith; public harbours; rivers and lake improvement; and... lands set aside for general public purposes."

In addition there are several other ways by which the Federal Crown may acquire property rights over various aspects of resource management. Section 117 of the British North America Act provides for the rights of Canada to assume any lands or property, if required for the defence of the country. Also, the Federal government has recognized expropriation powers in connection with other Federal activities; in addition, the Crown may purchase land like any other citizen. It is important to note that the Federal government has full proprietary rights in the Yukon and Northwest Territories equivalent to those held by the provinces.

#### *Legislative Rights—Provincial*

The right to legislate in respect of resources and the power to make laws concerning resource rights is also divided between the Federal and provincial governments. Ownership of minerals and lands means automatic provincial power to legislate in respect to their use. Federal rights to legislate are derived from the British North America Act insofar as certain aspects of resources may be considered of significant national interest. For example, the Federal government controls strategically vital minerals such as uranium.

In the British North America Act, a number of sections give the province legislative rights over resources. Under Section 92, the provinces may pass laws relating to the management and sale of the public lands belonging to the province, property and civil rights in the province and "Generally all matters of a merely local or private nature in the province." Further jurisdiction is found in clauses relating to local works and undertakings, municipal institutions and agriculture. Taken with their proprietary rights, provincial power would present a formidable force in dealing with resource management problems in the environment, if it were not for certain impediments.

Provincial powers are tempered by a number of relevant factors. First, no provincial statute may encroach on rights beyond provincial boundaries. Secondly, all Federally incorporated companies are immune from provincial law concerning "all matters which are a vital part of their operations." Thirdly, because of unequal distribution of wealth, many provincial governments cannot finance all the operations they have the power to carry out.

#### *Legislative Rights—Federal*

The Federal government derives considerable power from its legislative rights under the British North America Act in the field of resource management. Under the Act, the federal government has exclusive jurisdiction in coastal and inland fish-

\* This constitutional analysis is based upon the statement by Professor Dale L. Gibson in his paper *The Constitutional Context of Canadian Water Planning*.



# Government of Canada

## Current Programs and Policy Instruments to Enhance Environmental Quality

Chart specially prepared for this issue of Habitat by the Department of Energy, Mines and Resources  
E. Roy Tinney and J. G. Michael Parkes

Program and Instruments	Dept. of Energy, Mines and Resources <sup>+</sup>	Dept. of National Health and Welfare <sup>+</sup>	Dept. of Agriculture	Dept. of Fisheries and Forestry*	Central Mortgage and Housing Corporation	Dept. of Indian Affairs and Northern Development	Department of National Revenue	Ministry of Transport	Department of Justice	National Research Council	Dept. of Regional Economic Expansion	Dept. of Industry, Trade and Commerce	Privy Council Office	Department of Public Works	Treasury Board	Department of National Defence	Department of External Affairs
1. Specific Acts Air Water Soil	Govt. Reorganization Act Canada Water Act*	Proposed Clear Air Act The National Health and Welfare Act Food and Drug Act Radiation Emitting Devices Act	Pest Control Products Act—Bans DDT use Compensation available The Fertilizers Act Animal Contagious Diseases Act The Canada Grain Act	The Fisheries Act The Fisheries Act (amended to 1970) also, the Forestry Act Fish Inspection Act	National Housing Act National Housing Act	Northern Inland Waters Act Arctic Waters Pollution Prevention Act Migratory Birds Convention Act* National Parks Act	Income Tax Act Income Tax Act	The Motor Vehicle Safety Bill—The Railway Act The Canada Shipping Act The National Harbours Board Act—The Navigable Waters Protection Act—The Dept. of Transport Act—Aeronautics Act—Air Regulations	Criminal Code <sup>‡</sup>	National Research Council Act—National Research Council Act—NRC Act	Special Areas Legislation ARDA Agreements	Dept. of Industry Act Statistics Act—Atomic Energy Control Act					Boundary Waters Treaty 1909—International Joint Commission
2. Research Air in house supported Water in house supported Soil in house in supported	Fuels Research Centre Canada Center for Inland Waters* Inland Waters Branch Marine Sciences Branch (BID) NATO and NACWRR (see subsidies) Resources Research Centre	Analytical Laboratory interprets data from air samples program. Occupational Health Division research Public Health Engineering Division study of waste water treatment techniques.		Fisheries Research Board—pollution abatement in fish plants Arctic marine ecology pollution tolerance of fish Chemical Control Research Institute The Bedford Institute Marine Ecology Laboratory and Fresh Water Institute	Study of long range financial requirements of municipal sewage treatment programmes.	Canadian Wildlife Service program on studying effects of oil and resource exploitation in the far North. Also major wild life counts in Canada National Parks Planning Branch				Noise abatement research							IJC—Air pollution study of Detroit-Windsor area with National, Health & Welfare
3. Tax Incentives Air Water Soil		Food and Drug Directorate examines foods imported and home grown. Studies of radioactive fallout, chromosome damage.	Research Branch to regulate agricultural purity				Tax rebates provided for companies installing anti-pollution equipment through accelerated write-off clause.										
4. Loans Air Water Soil	Canada Water Act* (for implementation of plans)				Provides partially forgivable loans on sewage treatment projects.						Conditional Loans to Municipalities in Special Areas						
5. Subsidies and Grants Air Water Soil	NACWRR*									National Research Council Grants to universities	Grants to municipalities in special areas for pollution control under ARDA						
6. Prohibitions and Standards Air Water Soil	Water quality standards and proposed Effluent standards under CWA in designated basins*. Limitation in phosphate content in detergents Fines of \$5,000/day.	Set standards for control of air pollution of Federal establishments Radiation Protection Division Setting levels of waste treatment at Federal facilities. Licences and safety precautions established for ultrasonic microwave and lasers.	Compensation Act provides for payment to farmers for any crop loss through pesticide pollution			\$5,000/day or \$100,000 and seizure of ship and cargo pollution regulations for Northern waters Canadian Wildlife Service Migratory bird hunting Regulations National Parks Act regulations for sanitation in parks.		Regulations for Smoke Emission—National Harbours Board Regulations Legislation for oil pollution at sea Also regulation of noise from aircraft over airfields	Criminal Code—Enforcement of EMR & Fisheries Acts		Potential control of industrial air pollution						International Oil Pollution Treaty—the International Convention for the Prevention of Pollution of the Sea by Oil
7. Charges and Fees Air Water Soil	Proposed Water Quality Management Agencies under CWA will establish effluent fees on designated basins*		Prohibition of mercury or other poisonous compounds in treating grain Registration of fertilizers containing pesticides	Fines up to \$5,000. for each offence administered by Conservation Protection Service													
8. Data Collection Air Water Soil	Water Survey of Canada* Hydrometric network of Inland Waters Branch Surveys & Mapping Branch	Air sampling networks* Public Health Engineering Division* Radiation Monitoring Service		Fisheries Resources Development Service*				Meteorological Branch* data collection facilities				Dominion Bureau of Statistics Dominion Bureau of Statistics Dominion Bureau of Statistics		Reporting surveillance of northern coastal waters			Data collected by IJC on problems in Great Lakes Souris, St. Croix Rivers
9. Setting Environmental Quality Criteria Air Water Soil	ICW*	Development of regulations for motor vehicle emission criteria for Federal establishments waste treatment (air & water). Shellfish Certification Program—quality control of shellfish on East Coast. Drinking water criteria under Canadian Drinking Water Standards.		Environmental Quality Directorate*		Canadian Wildlife Service liaison with other departments.		Meteorological Branch Report for Canadian Standards Association on Haze		Associate Committee on Scientific Criteria for Environmental Quality (air, soil, water).							
10. Coordination Air Water Soil	ICW,* <sup>†</sup> CCRM <sup>‡</sup> Water Survey of Canada* ICR* Fed./Prov. Consultative Committees	Coordination with Provinces, municipalities on national air sampling program. Cooperation with I.J.C. in water pollution. Advises atomic Energy Control Board.	FICP <sup>‡</sup>	Environmental Quality Directorate*				Liaison with Dept. of Health, Occupational Health Div. on air pollution					Science Secretariat Science Secretariat International Committee on Environmental Affairs		Budget allocation and approval		ICW IJC
11. Public Information Air Water Soil	Public relations section also Clause of CWA EMR with CCRM	Monthly reports on National Air Sampling Program Public Health Advisory Committee—information on drinking water standards	Information on pesticides	Journal of the Fisheries Research Board of Canada	Habitat (bi-monthly magazine)	Canadian Wildlife Service Hinterland Who's Who National Park Information and Publicity.											Publication of IJC Studies Public Hearings by IJC
12. Problem Shed Planning Air Water Soil	Under Section 4 of CWA headed by Water Planning and Operations Branch*					Northern watersheds pollution control under Arctic Waters Pollution Prevention Act. Mackenzie River Study					Special areas assistance ARDA programs			Construction of docks, canals and waste treatment works at Federal facilities etc.			
13. Construction of Works		Specification of treatment works from Federal facilities for both air and water pollution			Encourage construction of sanitary installations to Federal specifications from CMHC												

1. National Advisory Committee Water Resources Research.  
2. Interdepartmental Committee on Water.  
3. Canadian Council of Resource Ministers.  
4. Interdepartmental Committee on Resources.  
5. Federal Interdepartmental Committee on Pesticides.

6. The contravention of any prohibition outlined in any Federal statute automatically is a criminal offence if so designated by the Act. The Criminal Code (Section 165) provides for a public nuisance clause that may be applied to all contraventions of prohibitions of Federal acts.

\* Although it was not clear at the time of preparation of this chart, it appeared from the Throne Speech of October 8, 1970 and a subsequent debate in the House of Commons, that these elements would be transferred to a new department of the Environment.

† As of 26 October 1970, sections of these Departments concerned with Environmental Quality were transferred to the Dept. of Fisheries and Forestry.



# Gouvernement du Canada

## Programmes et moyens actuellement mis en oeuvre pour rehausser la qualité du milieu naturel

Ce tableau a été préparé spécialement pour ce numéro d'Habitat, par le Ministère de l'Énergie, des Mines et des Ressources  
E. Roy Tinney et J. G. Michael Parkes

Programmes et moyens	Ministère de l'Énergie, des Mines et des Ressources <sup>+</sup>	Ministère de la Santé nationale et du Bien-être social <sup>+</sup>	Ministère de l'Agriculture	Ministère des Pêcheries et Forêts	La Société centrale d'hypothèques et de logement	Ministère des Affaires Indiennes et du Nord Canadien	Ministère du Revenu national	Ministère des Transports	Ministère de la Justice	Le Conseil national de recherches	Ministère de l'Expansion économique régionale	Ministère de l'Industrie et du Commerce	Conseil Privé	Ministère des Travaux publics	Le conseil du Trésor	Ministère de la Défense nationale	Ministère des Affaires extérieures
1. <b>Lois particulières</b> air eau sol	La Loi sur les ressources en eau du Canada* Les lois sur la réorganisation du gouvernement	Loi proposée visant la pureté de l'air La Loi sur le ministère de la Santé nationale et du Bien-être social La Loi sur les aliments et drogues La Loi sur les émissions radioactives	La Loi sur les produits antiparasitaires défend l'utilisation du DDT Indemnité offerte La Loi sur les engrais chimiques La Loi sur les épizooties La Loi sur les grains du Canada	La Loi des Pêcheries La Loi des Pêcheries (modifiée en 1970) ainsi que la Loi sur les Forêts La Loi sur l'inspection du poisson	La Loi nationale sur l'habitation La Loi nationale sur l'habitation	La Loi sur les eaux intérieures du Nord La Loi sur la prévention de la pollution des eaux arctiques La Loi sur la prévention de la pollution des eaux arctiques La Loi sur la Convention concernant les oiseaux migrateurs* La Loi sur les parcs nationaux	La Loi sur l'impôt sur le revenu La Loi sur l'impôt sur le revenu	Projet de loi sur les véhicules à traction automobile—La Loi sur les chemins de fer—La Loi sur la marine marchande du Canada—La Loi sur le Conseil des ports nationaux—La Loi sur la protection des eaux navigables—La Loi sur le ministère des Transports—La Loi sur l'aéronautique—Les règlements aériens	Le Code criminel <sup>1</sup>	La Loi du Conseil national de recherches La Loi du Conseil national de recherches La Loi du Conseil national de recherches	Loi sur les zones spéciales Ententes en vertu de l'ARDA (Aménagement rural et développement agricole)	La Loi sur l'Industrie La Loi sur la Statistique La Loi sur le contrôle de l'énergie atomique					Le traité sur les eaux limitrophes de 1909—Commission mixte internationale
2. <b>Recherche</b> air (à l'intérieur) (subventionnée) eau (à l'intérieur) (subventionnée) sol (à l'intérieur) (subventionnée à l'intérieur)	Le centre de recherches sur les combustibles Le centre canadien des eaux intérieures* La direction des eaux intérieures La Division des sciences de la mer (BID) OTAN et CCNRRH (Comité consultatif national des recherches sur les ressources hydriques (voir subventions) Centre de recherches sur les ressources	L'interprétation des données recueillies par le programme d'échantillonnage de l'air par le laboratoire analytique La Division de l'hygiène du travail Recherche par la Division du génie sanitaire Étude des techniques de traitement des eaux usées		L'Office de recherches sur les pêcheries—réduction de la pollution dans les usines de traitement du poisson La tolérance de la pollution des poissons dans l'écologie des mers arctiques Institut de recherches en expression chimique Le laboratoire d'écologie marine et l'Institut d'eau douce du Bedford Institute	Étude à long terme du traitement des eaux d'égout par les municipalités	Le programme du Service canadien de la faune visant à étudier les effets de l'huile et des explorations d'envergure dans les régions nordiques Également, le comptage de la faune principale du Canada Service de planification des Parcs nationaux				Recherches visant à réduire le bruit							CMI (Commission mixte internationale)—Étude sur la pollution de l'air de la région Détroit-Windsor avec la collaboration du ministère de la Santé nationale et du Bien-être social
3. <b>Stimulants fiscaux</b> air eau sol		La direction générale des aliments et drogues examine les aliments importés et les plantes de croissance domestique Études des retombées radioactives, les dommages causés aux chromosomes	La Division de recherches vise à atteindre une meilleure qualité de produits agricoles				Réductions d'impôts prévues pour les compagnies qui installent de l'équipement anti-pollution à leurs usines, en vertu de la clause visant l'amortissement ralenti du capital										
4. <b>Prêts</b> air eau sol	La Loi sur les ressources en eau du Canada* (pour l'exécution des plans)				Accorde des prêts dont une partie peut être remise pour l'installation d'équipement pour lutter contre la pollution de l'air et de l'eau et la construction d'usines de traitement des eaux usées						Prêts conditionnels aux municipalités situées dans des zones spéciales						
5. <b>Subsides et subventions</b> air eau sol	CCNRRH**									Subventions du Conseil national de recherches aux universités	Subventions aux municipalités situées dans des zones spéciales en vue de développer la lutte contre la pollution aux termes de l'ARDA						
6. <b>Interdictions et normes</b> air eau sol	Les normes de qualité de l'eau et des canalisations de sortie proposées aux termes de la LREC dans les bassins désignés à cette fin* L'usage limité de phosphate dans les détergents Amendes de \$5,000 par jour	Établir les normes de lutte contre la pollution de l'air pour les établissements du gouvernement fédéral Division de la radioprotection Établissement des niveaux de traitement des déchets dans les services et installations du gouvernement fédéral Permis et mesures de précaution adoptées à l'égard des microondes ultrasoniques et des rayons lasers	La Loi sur les indemnités prévoit le paiement d'une indemnité aux cultivateurs pour les pertes de récoltes résultant de la pollution par les pesticides			\$5,000 par jour ou \$100,000 en plus de la saisie des bateaux et de leur cargaison aux termes de la réglementation à l'égard de la pollution des eaux nordiques Service Canadien de la faune Les règlements de chasse des oiseaux migrateurs La Loi sur les parcs nationaux Les règlements d'hygiène des parcs		Normes sur l'émission des gaz Le Conseil des normes des ports nationaux La Loi sur la pollution par l'huile des eaux marines Également, la réglementation du bruit causé par les avions au-dessus des terrains d'envol	Le Code criminel—Application des lois sur EMR (Énergie, Mines et Ressources) et sur les pêcheries		Le contrôle possible de la pollution de l'air par l'industrie						Le traité international sur la pollution par l'huile—La convention internationale pour la prévention de la pollution des eaux marines par l'huile.
7. <b>Sanctions et droits</b> air eau sol	Gestion de la qualité de l'eau suagérée* Les organismes relevant de la LREC établiront les droits de canalisation vers des bassins désignés		Interdiction d'utiliser le mercure ou tout autre poison dans le traitement des grains Enregistrement des engrais chimiques contenant des pesticides	Amendes allant jusqu'à \$5,000 pour chaque violation de la loi appliquée par le Service de la protection de la conservation													
8. <b>Compilations des données</b> air eau sol	Relevés hydrologiques du Canada* Division du réseau hydro-métrique des eaux intérieures Division des levés et de la cartographie	Réseaux d'échantillonnage de l'air Division du génie sanitaire* Service de contrôle des radiations		Service de l'expansion des ressources des pêcheries*				Division de la météorologie Services de compilation des données			Bureau fédéral de la statistique Bureau fédéral de la statistique Bureau fédéral de la statistique				Inspection des eaux côtières et compte-rendu.	Données recueillies par la Commission mixte internationale sur les problèmes des Grands Lacs et des rivières Souris et St. Croix	
9. <b>Établissement des critères de qualité du milieu naturel</b> air eau sol	CIE* (Comité interministériel sur les eaux)	La création de règlements visant les émissions de gaz nocifs causées par les véhicules automobiles Critères régissant le traitement des déchets (air et eau) aux établissements fédéraux Programme d'attestation de la qualité des coquillages de la côte est Les critères visant l'eau potable en vertu des normes de l'eau potable au Canada		Direction de la qualité de l'environnement*		Les relations entre le Service Canadien de la faune et les autres ministères		Division de la météorologie Rapport de l'Association Canadienne des normes à Haze		Comité associé chargé d'étudier les critères scientifiques de la qualité du milieu naturel (Air, sol et eau)							
10. <b>Coordination</b> air eau sol	CIE <sup>1</sup> , CCR** (Conseil Canadien des ressources) Relevés hydrologiques du Canada* CIRH* (Comité interministériel sur les ressources hydriques) Comités consultatifs fédéraux-provinciaux	Coordination avec les provinces et les municipalités relativement au programme national d'échantillonnage de l'air Collaboration avec la C.M.I. (Commission mixte internationale) Recommandations du Conseil de contrôle de l'énergie atomique	Comité interministériel fédéral sur les pesticides	Direction de la qualité de l'environnement*				Relations avec la Division de l'hygiène du travail du ministère de la Santé sur la pollution de l'air				Secrétariat des sciences Secrétariat des sciences Comités international sur les affaires du milieu naturel		Attribution et acceptation du budget.		ICW—Comité interministériel sur les eaux IJC—Commission mixte internationale	
11. <b>Information</b> air eau sol	La section des relations publiques ainsi que les dispositions de la LREC EMR et le CCR (Conseil Canadien des ressources)	Rapports mensuels du programme national d'échantillonnage de l'air Comité consultatif de la Santé publique—renseignements sur les normes de l'eau potable	Renseignements sur les pesticides	Journal de l'Office Canadien des ressources en pêcheries	scm. Habitat (Revue bimestrielle)	Le Service Canadien de la faune Le bulletin des célébrités de l'arrière-pays Renseignements et publicité relatifs aux parcs nationaux											La publication des études entreprises par la CMI (Commission mixte internationale) Réunions publiques de la CIE (Comité interministériel sur les eaux)
12. <b>Programme de gestion intégrale des ressources en eau</b> air eau sol	Aux termes de l'article 4 de la LREC sous la direction de la planification et des entreprises de l'eau*					La lutte contre la pollution des bassins hydrauliques du Nord aux termes de la Loi sur la prévention de la pollution des eaux arctiques Étude de la rivière Mackenzie				Programme d'aide aux zones spéciales aux termes de l'ARDA				La construction de bassins, canaux et usines de traitement des eaux usées avec l'aide du gouvernement fédéral, etc.			
13. <b>Exécution des travaux</b>		Détails des ouvrages de traitement d'après les services du gouvernement fédéral pour lutter contre la pollution de l'air et de l'eau			Favoriser la construction d'installations sanitaires selon les normes prescrites par la scm.												

1. Comité consultatif national des recherches sur les ressources hydriques.  
2. Comité interministériel sur les eaux.  
3. Conseil Canadien des ressources.  
4. Comité interministériel sur les ressources hydriques.  
5. Comité interministériel fédéral sur les pesticides.  
6. Une infraction aux Lois du gouvernement fédéral devient automatiquement un délit criminel selon les dispositions de ladite Loi. Le Code criminel (article 165) prévoit une clause de dommage public qui pourra être appliquée pour toute infraction aux lois fédérales.

\* Bien qu'il n'y eût rien de définitif au moment de la préparation de ce tableau, il semble, d'après le discours du Trône du 8 octobre 1970 et un débat subséquent à la Chambre des communes, que ces éléments feront partie d'un nouveau ministère de l'Environnement.

+ Le 26 octobre dernier, des sections de ces ministères qui s'intéressent à la qualité de l'environnement ont été rattachées au ministère des Pêcheries et Forêts.



eries, navigation and shipping (in both inland waters and marine international waters), and the criminal law.

This considerable power means, for instance, that provincial constructions such as bridges, power dams, flood control projects or other resource management schemes, must conform to Federal navigation regulations. Similarly in fisheries, the Federal government controls the regulatory aspects of fishing such as conservation, anti-pollution measures and fishing rights. The provinces handle proprietary and marketing aspects of fishing only, unless additional Federal power has been delegated to it.

Under certain international treaties, such as the Boundary Waters Treaty of 1909, the Federal government has responsibilities with regard to pollution of boundary waters. The full extent of this Treaty has not been realized, and without provincial co-operation in this area, meaningful results against large scale pollution problems are difficult to obtain.

Since the Federal government is responsible for legislation pertaining to the Criminal Code, any contravention of prohibitions established under the Code are criminal offences. Pollution could be made an offence under the Code. Furthermore, if another Federal act designates certain prohibitions regarding the pollution of our water, violations of these prohibitions become criminal offences even though not under the Criminal Code.

In addition to these powers, the Federal government may pass laws "from time to time" respecting agriculture. In the past this has provided the authority for direct Federal planning and development of farm water supplies, land drainage and irrigation works. The limit of this power has not been tested, but there are implications for pollution control.

Finally, a very general provision in the British North America Act enables the Federal government to make laws for "the Peace, Order and Good Government of Canada" in matters not exclusively assigned to the provincial legislatures. There has been considerable debate as to the extent of the powers created in this preface to the specific outline of Parliamentary powers. Some legal scholars have predicated that if a subject matter of legislation has great national significance such as pollution, there would indeed be jurisdiction for utilizing such a general power for initiating legislation. This step was taken in drafting the Canada Water Act, although the Act itself is based on a number of other constitutional positions.

In summary, there is a divided jurisdiction over resources management in Canada. The Federal government has clear responsibility in fisheries and navigation; provincial proprietary rights extend over all lands, minerals and royalties. Both parties share responsibilities in agriculture, as well as other aspects of resource management. However, it is not just a case of dividing up resource responsibilities and pursuing different programs piecemeal. To be effective and efficient, joint Federal-provincial consultation, negotiations and co-operation are essential. In the past this has sometimes meant interminable wrangling, bickering and little action. Yet the urgency of the environmental pollution problem, its crisis significance for all Canadians, and its effect on the very quality of our way of living provide the catalyst for the co-operation missing

in the past. In addition new legislation, particularly the Canada Water Act, is predicated on joint Federal-provincial co-operation. It is useful at this stage to review what current Federal legislation is applicable in enhancing the quality of the physical environment.

### *Current Legislation*

The Government of Canada has enacted a number of pieces of legislation which have direct bearing on problems of environmental quality and resources management. Chart 2 displays a breakdown of these Acts into sub-elements.

#### *1. The Canada Water Act*

This new Act proclaimed on September 30th, 1970 is enabling legislation allowing the Federal government to participate in co-operative efforts between the two senior levels of government in Canada in attacking the problem of comprehensive water resource management generally and particularly water quality management. Its purpose is to provide for the management of the water resources of Canada, including research, data collection, planning and implementation of programs relating to the conservation, development and utilization of water resources.

The Act is divided into four parts: Comprehensive Water Resource Management; Water Quality Management; Nutrient Control; and a General Section on the powers of inspection, offences and the establishment of Advisory Committees.

This Act enables the Federal and provincial governments to tackle the problem of water pollution jointly on a broad front. Any body of water in which water quality is of urgent national concern may be jointly designated as a water quality management area. Pollution of waters in such areas would be punishable by a fine of up to \$5,000 a day for each offence. In circumstances where water quality in a basin has drastically deteriorated, or where the preservation of a high level of quality is by far the largest problem in a basin, the Federal and provincial governments may agree to work together on water quality management through a Joint Water Quality Management Agency. These agencies would prepare plans for governmental approval and subsequently design and operate sewage treatment facilities where necessary, using loans provided by senior governments and levying charges on users for the use of these plants. Also, the agencies would police the effluent standards for waste being discharged into the stream and continuously monitor water quality conditions. Based on approved plans, they will determine when, and if, effluents may be discharged into a basin and may levy appropriate fees for the discharge of effluents of approved quality.

The Act contains special provisions for unilateral action by the Federal government on international and boundary waters and other interjurisdictional waters if the quality of those waters is of urgent national concern provided all reasonable attempts to achieve provincial co-operation have failed.











This act sprang from the Department of Energy, Mines and Resources but in the Speech from the Throne of October 8, 1970, and subsequent debates, it was announced that it would be transferred to a new department of the environment.

## 2. *The Canada Shipping Act*

This act, revised in 1952 with amendments to 1968, provides for Oil Pollution Prevention Regulations. The Regulations are divided into those covering: Canadian waters; non-Canadian waters; General and Enforcement.

The Act applies to ships of every nationality while they are in Canadian waters, except ships of war. Every ship must carry an oil record book, and any person who commits an infraction or contravention of the regulations is liable for a \$5,000 fine or six months in prison or both. Prohibited zones are established under the Act within which no oil may be dumped. These zones include all sea areas within 50 miles from the nearest land. Inspection and enforcement is carried out under the Minister of Transport who may designate any member of the Public Service of Canada, the R.C.M.P. or provincial, municipal or harbour police as departmental agents. Air pollution regulations in the form of density levels for smoke emissions from ships are also included.

Recently, proposed anti-pollution amendments to the Shipping Act have been introduced into Parliament and have received second reading. These amendments would, if passed, raise the maximum fine to \$100,000 for pollution of the sea by oil in Canadian waters; enable the government to prosecute the owners of a vessel should a spill occur; provide for bonds to be posted by ship owners up to 14 million dollars; provide for a clean-up fund by charging 15¢ per ton of oil landed or shipped from any Canadian port; and provide for inspection procedures and penalties up to \$25,000 for each infraction.

## 3. *The Fisheries Act*

This Act, revised in 1952 and amended in 1970, contains pertinent sections on water pollution. Under the Act, no person may deposit or permit the deposit of wastes of any type in any water frequented by fish or in any place under any conditions where such waste may enter such waters. Exceptions to this clause may occur when these waters form part of a Water Quality Management Area pursuant to the Canada Water Act. In such a case, the standards for disposal would be the concern of the agency established by the latter Act. Any person who violates the prohibition under the Fisheries Act is liable to a fine of \$5,000 for each offence. The courts also may order any person committing such an offence to cease any activity which is likely to result in committing a further offence. "Waste" under the Act is defined as any substance that, if added to any waters would degrade or alter the quality of these waters to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man, much the same as in the Canada Water Act.

In addition, the Minister of Fisheries and Forestry may require any person, who proposes to construct any new work which might result in the deposit of waste in waters frequented

by fish, to submit plans or specifications for inspection. If the Minister decides that such construction would violate the Act he may, with the approval of the Governor-in-Council, require modifications to be made or prohibit the construction entirely. The Act provides for inspectors to be appointed to carry out these provisions.

This Act employs the mechanisms of research through the Fisheries Research Board and other ecological studies (Chart 2, No. 2), as well as prohibitions and standards (Chart 2, No. 6) which designate \$5,000 fines. Data collection is also carried out (Chart 2 No. 8).

## 4. *The Navigable Waters Protection Act*

This Act contains a number of provisions concerning disposal of solid wastes or other materials in navigable waters which might hinder navigation. The Act is administered by the Ministry of Transport.

## 5. *The National Harbours Board Act*

This Act, passed in 1952, establishes the National Harbours Board which has jurisdiction in Canada's major harbours: Halifax, Saint John, Chicoutimi, Quebec, Three Rivers, Montreal and Vancouver. Certain provisions restrict anyone within the harbour confines draining or discharging into the water anything which causes a nuisance, endangers life or health or damages property. Also, no ballast or rubbish may be disposed of unless decided by the Board.

Under this Act, the mechanism of prohibitions and standards is utilized (Chart 2, No. 5) to regulate oil pollution in harbours.

## 6. *Regulations Under the Animal Contagious Diseases Act*

These regulations prevent garbage, old vehicles, manure or other refuse to be landed or discharged in any port in Canada, except under strict conditions.

## 7. *The National Parks Act*

This Act, passed in 1952, provides for the Federal government to make regulations for the preservation, management and control of Canada's National Parks, including the prevention of and remedying of any obstruction or pollution of waterways. Regulations are included regarding sanitary facilities and the prevention of nuisances such as rubbish (Chart 2, No. 6).

## 8. *The Migratory Birds Convention Act*

This Act, passed in 1952, provides for the Federal government to make regulations protecting migratory, migratory insectivorous and migratory non-game birds that inhabit Canada during the whole or any part of the year. Under these regulations, no one may knowingly place oil or oil waste substances upon waters frequented by these birds. This Act is also likely to be transferred from the Department of Indian Affairs and Northern Development to a new environmental department.

Under this Act, the instrument of prohibitions and standards (Chart 2, No. 6) is used to provide hunting regulations.



#### 9. *The Criminal Code*

Under the Criminal Code, any person who commits a common nuisance and endangers the lives, safety or health of the public, or causes physical injury to any person, is guilty of an indictable offence and is liable for imprisonment for two years. Contravention of any prohibition established in a Federal statute is a criminal offence. Pollution of water, soil and air, have thus far not been prohibited under this Code, but the potentiality for doing so is generally accepted.

#### 10. *The Income Tax Act*

Under regulations passed under this Act, a special depreciation allowance on water or air pollution control equipment may be deducted from the yearly income of the purchaser of such equipment, and as well includes a special and accelerated rate of capital cost allowance. In addition, the purchaser may claim the lesser of (a) 50 per cent of the capital cost of such equipment such as acquired for the purpose of preventing, reducing or eliminating pollution, or (b) the amount by which the capital cost exceeds the aggregate of the amounts deducted in computing his income for previous taxation years.

Under this Act, the mechanism of tax incentives (Chart 2, No. 3) in the form of rebates is provided for companies installing this pollution abatement equipment.

#### 11. *The Boundary Waters Treaty of 1909*

As this Treaty is an Empire Act, the Federal government may legislate upon matters which normally would be within provincial jurisdiction. The power to implement treaties by internal legislation was given to the Federal government under the B.N.A. Act, but the operation of that section is limited to treaties entered into between the "British Empire" and foreign countries. Under this Treaty, the International Joint Commission was established to investigate and make recommendations to resolve disputes regarding the use of international boundary waters. The Commission's report on all its water pollution investigations have recommended water quality objectives to be met in maintaining the waters of those streams under reference of the 1909 Treaty. Industrial waste standards, and water quality objectives for various border areas have been developed by the IJC. A major study was completed this year on the quality of the Lower Great Lakes and connecting channels which now forms the guide for international action on these important boundary waters.

#### 12. *The International Rivers Improvements Act*

This Act applies to river improvement activities having transboundary ramifications. The provinces may legislate regarding the purely internal aspects of international waters.

#### 13. *The Railway Act*

The Board of Transport Commissioners made the so-called "Air Pollution and Smoke Control Regulations." These regulations apply to all railway companies subject to the Railway Act, but only in municipalities that have passed by-laws for the regulation, control or prohibition of smoke or other air pollutants and that have a municipal officer of a municipal

smoke abatement bureau duly appointed.

Since air quality management resides with the provinces, the Federal role is considerably limited, but new air legislation is anticipated.

#### 14. *The Arctic Waters Pollution Prevention Act and Northern Inland Waters Act*

These Acts were passed last year and are designed to protect northern areas from pollution, and promote the management of the inland waters resources of the Yukon and Northwest Territories. The N.I.W. Act sets up a water quality management system. The A.W.P.P. Act establishes a 100-mile quarantine area in Arctic waters and strict regulations on the shipment of oil through the Arctic archipelago. The Acts are administered by the Department of Indian Affairs and Northern Development.

Under the Arctic Waters Pollution Prevention Act, no person or ship may deposit wastes of any type in the Arctic waters or in any place on the mainland or island where such wastes would enter the waters. The Act dovetails with the Canada Water Act in that the section on waste deposit does not apply when a water quality management area is set up under the Canada Water Act. Also, any person who engages in exploration, development or exploitation of any natural resource adjacent to or under Arctic waters must provide evidence of financial responsibility in the form of insurance or an indemnity bond. With regard to ship waste regulations, any person found guilty under this section is liable for a \$5,000 fine or in the case of a ship a \$100,000 fine per day as well as seizure of ship and cargo. Any person obstructing a pollution prevention officer is liable for a fine of \$25,000.

The Northern Inland Waters Act covers approximately 40% of the land area of Canada including the Yukon and Northwest Territories. Under this Act the Yukon Territory and Northwest Territories Water Boards are created. Water Management areas will be designated and the Boards will provide for the conservation, development and utilization of the water resources within the Territories.

This Act also included the provisions under the Canada Water Act should a water quality management area be established under the latter. Also, it may be seen by Chart 2 that under prohibitions and standards (No. 6) and problem shed planning (No. 12); mechanisms and instruments for enhancing environmental quality are included.

#### 15. *The Pest Control Products Act*

This Act, passed in 1969, bans the general use of DDT except for certain particular functions. Permits must be applied for to the province in which the use is intended. The mechanisms of prohibitions and standards (Chart 2, No. 6) and subsidies and grants (Chart 2, No. 5) are employed to enhance environmental quality.

#### 16. *The National Housing Act*

This Act enables Central Mortgage and Housing Corporation to provide partially forgivable loans for construction or expansion of sewage treatment projects.

Under the Act the instrument of loans to municipalities or provinces for constructing or expanding sewage treatment projects is employed (Chart 2, No. 4). In 1969, this loan fund provided 50.2 million dollars to municipalities, an increase of 27 per cent over the previous year.

#### 17. *The Proposed Clean Air Act*

Subsequent to the writing of this paper the proposed Clean Air Act has been tabled by the Government before the House.\*

In summary, the Federal Acts, upon which programs to enhance environmental quality are based, are many and varied to provide the array of effective instruments necessary to change the waste production and treatment system. Constitutional impediments to the establishment of a Federal presence in resources management, generally under the domain of the provinces, have been circumvented in many cases by passing regulations in areas of clear Federal jurisdiction with the intent of providing a spin-off effect. For example, tax deductions for pollution abatement equipment under the Income Tax Act will hopefully improve environmental quality. Shared programs such as those under the Agricultural Rehabilitation and Development Administration also contribute to an integrated Federal-provincial resolution of environmental problems. It is hoped that with the passage of such legislation as the Canada Water Act, a much firmer consolidation of efforts towards tackling water problems will result, and that this in turn could lead to similar legislation in other aspects of resources management.

In looking at these regulatory Acts, however, one must also recall that the government organization acts which set up the departments have an overwhelming influence. The degree of coordination, the mandate for initiatives and programs, and the specific objectives of the government are often more meaningful to environmental matters than the specific acts.

#### **An Assessment**

Returning finally to the original query "Why is the Canadian environment degraded?" one can suggest that as a generality Canadians do not have a sufficiently sophisticated array of policy instruments, mechanisms, and programs in their socio-economic-technical system either to reduce the total production of wastes or to render them harmless to the environment. In particular there have been insufficient economic forces in play to reduce the consumption of those goods which result in high levels of pollution; there is a shortage of measures to induce changes in manufacturing processes or product designs, or to encourage re-use of wastes; there is little attempt to put together regional waste collection systems; there are no Federal legal means by which the waste disposer can be held liable for the damage he causes by polluting the air, soil and water; there has been no Federal agency chiefly responsible for protecting the environment; there is no major program to inform the general public regularly of the state of the environment; no group exists to set broad environmental objectives; there is no common understanding of the scientific criteria defining the tolerance of flora and fauna to contaminants

or describing the effect of quality on man's use of the environment.

But if there are such weaknesses in the Canadian system there is also a broad understanding on the changes that are necessary; initial steps to put them in place have been made, particularly in the water field. In the past session of Parliament a number of laws were enacted which greatly strengthened the anti-water pollution program. These acts contained innovative steps to provide a quarantine zone against pollution of Arctic waters, to provide a total management approach to water quality control, and to provide for prevention of new construction, if pollution abatement plans are inadequate. The Canada Water Act, in particular, avoided the constitutional thicket by resting its strategy on Federal-provincial co-operation.

These are important advances and more were heralded in the Speech from the Throne, October 8, 1970, and the ensuing debate. Foremost is the planned creation of a new department of the environment. Taken together these are encouraging improvements. Indeed, at the current rate of progress, the Canadian system could be sufficiently strengthened in the next few years to end the threat to our habitat and see the gradual restoration of environmental quality.

Perhaps the most difficult mechanism to put in place will be the assignment of liability to the polluter and the establishment of an effective program to test each of the many hundreds of new products, particularly chemicals, produced each year for their ecological effect before being introduced to the consumer. An equally difficult step will be to get international accord to safeguard our coastline from oil spills and protect our global atmosphere from basic changes in its composition, particularly its oxygen and carbon dioxide content.

But clearly the most significant step to be taken and one with the greatest effect for each Federal tax dollar invested would be to imbue in the minds of young Canadians an ethic for the protection and preservation of their great environmental heritage. No laws or governmental programs would be as influential, no mechanisms for enforcement as effective, as a sense of pride and stewardship for our environment.

#### **Chart I**

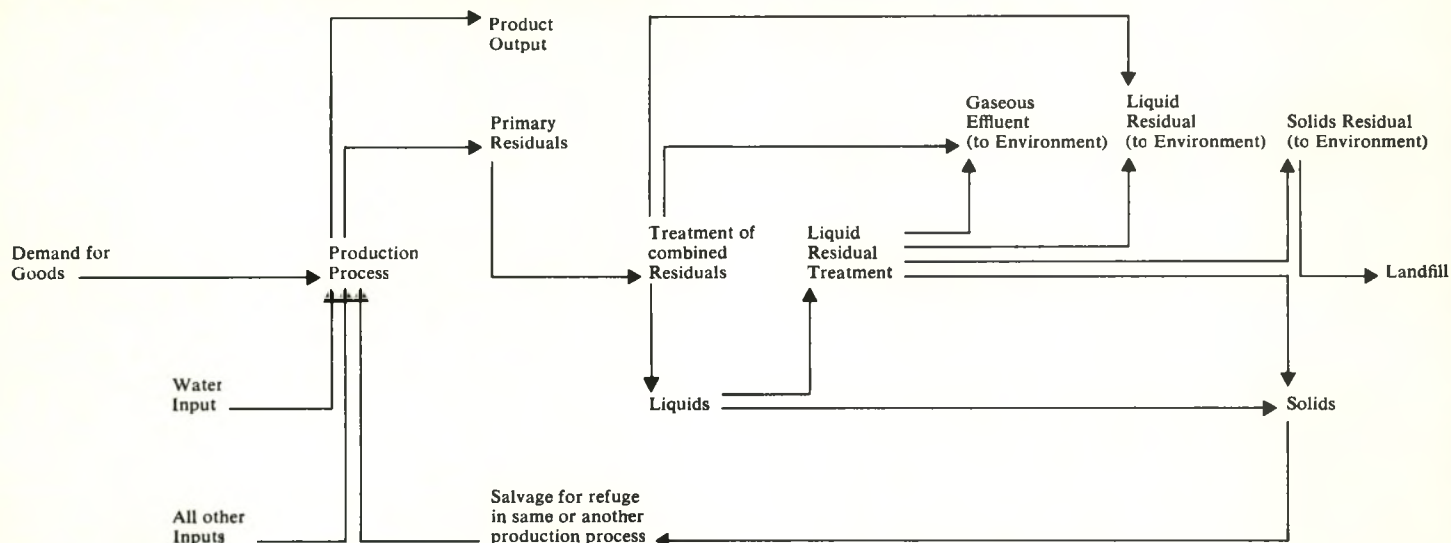
##### **Some Available Instruments and Mechanisms to Improve the Environmental Quality Management Systems**

System Element	Some Control Instruments or Mechanisms For Influencing the Total System
1. <i>Final Demand Sector Goods and Services (Consumer desires)</i>	Alter quantity and nature of the goods and services desired by (a) public education to influence public attitudes toward consumption (b) taxes on those goods and services that are large contributors of pollution (c) restrictions on use of certain goods and services—e.g. use of DDT.



**Diagram 1**

**Water and other Residuals Generation and Disposition**



**2. Production of Goods and Services**

Controls on manufacture of goods, e.g. restriction on the formulation of detergents; incentives to change designs and processes;—e.g. loans or subsidies to achieve a non-polluting car; incentives to use by-products and to re-cycle, e.g. effluent discharge fees; research on how to produce less-polluting goods and create less-polluting manufacturing processes; assignments of liability for pollution damage; requirements for ecological tests of new products.

**3. Storage, Collection and Transportation of Wastes and Residues**

Creation of waste management agencies; consolidation of regional governments; research on better waste handling methods; economic incentives to create control collection systems.

**4. Waste Treatment and Transformation**

Effluent discharge standards and prohibitions; effluent discharge fees; research on waste treatment and by-products; financial incentives, e.g. government loans for construction of treatment plants.

**5. Government Apparatus**

Revision of the constitution to permit a more rational apportionment of responsibilities and powers between governments; consolidation of environmental agencies into manageable, sufficiently inclusive departments; explicit statement of overall environmental quality objectives; formulation of a total environmental strategy; reallocation of fiscal and human resources to higher priority aspects of the environment defined by the strategy; problem-shed plan-

**6. Direct Public Influence**

**7. Receptors (people, flora, fauna and inanimate objects affected)**

ning, e.g. comprehensive river basin planning; research on management systems; new improved legislation; and judicial machinery.

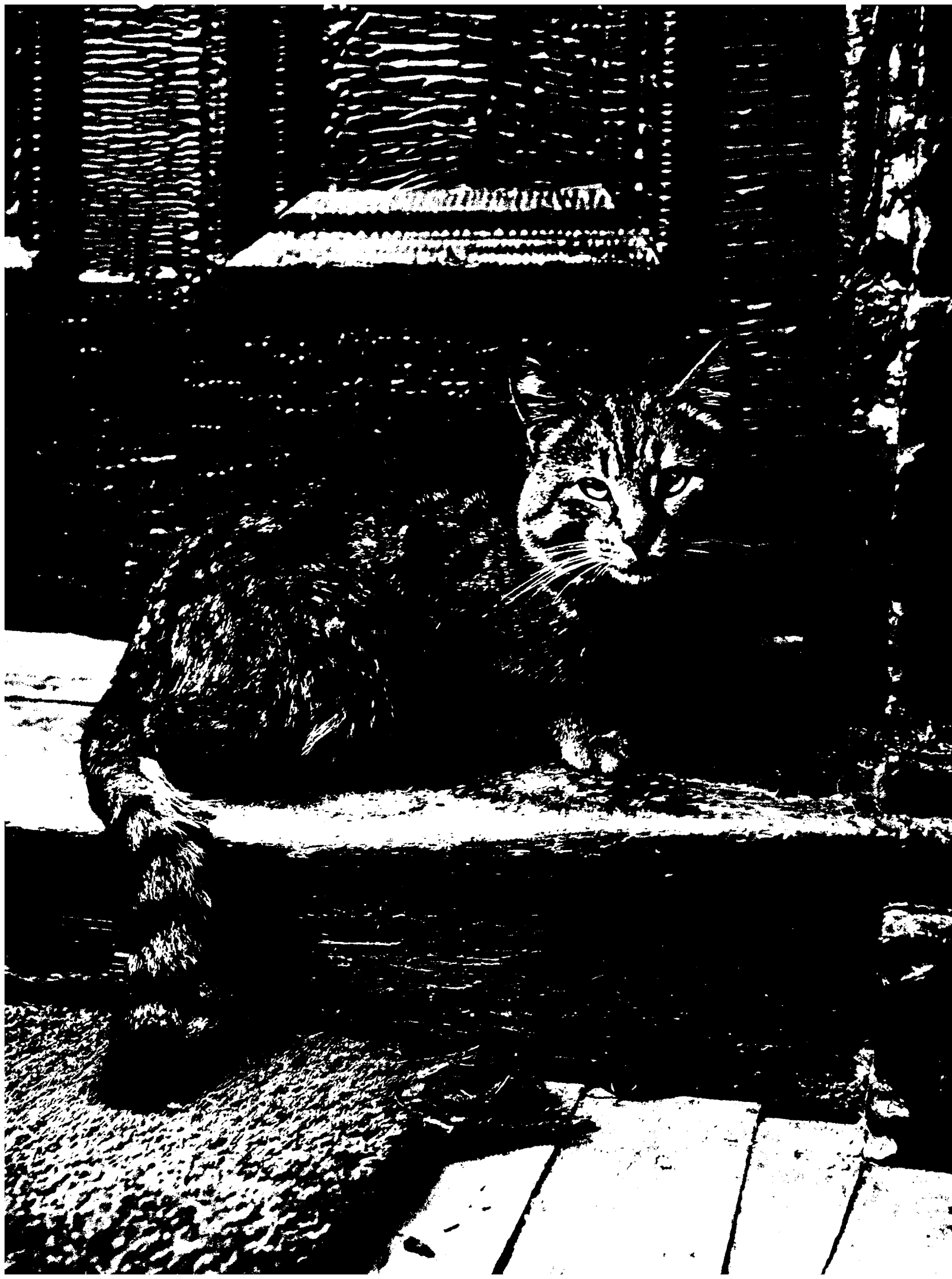
Encouragement of anti-pollution pressure groups; dissemination of information on a wide range of environmental matters; use of private sector in research and policy advisory roles; education to create an "environmental ethic" in young Canadians.

Research on effects of environmental quality on human beings—physically, mentally and spiritually; research on quality criteria to preserve the biosphere; research on economic impacts; research on impact of degraded environment on flora and fauna and on man-made structures, e.g. effects of dust falls, corrosive air emissions; research on restoration of diminishing species.

\* On February 9, 1971, Parliament gave first reading to a proposed act relating to air quality and the control of air pollution. This act received second reading ten days later. Under the proposed Clean Air Act, air pollution is defined as a condition of the ambient air arising from the presence of air contaminants that either endangers the health of human and animal life or that causes damage to plant life or to property. Within the scope of this proposed act, the minister of the environment may establish a system of air pollution monitoring stations throughout the country, conduct research into air pollution, formulate comprehensive plans for its control, and publish information relating to air quality control. In addition, national ambient air quality objectives may be established. As well, national emission standards and guidelines would be specified where: 1) there is a significant danger to the health of persons, and 2) it is necessary to discharge international obligations—global air pollution as well as trans-boundary. This act also includes regulation of the composition of fuels and inspection powers. Federal-Provincial Agreements may be negotiated in order to facilitate these standards. Any person violating the national air quality regulations may be fined up to \$200,000 for each offence. Any emergent situation involving an extremely hazardous air contaminant may be declared a national emergency by the Government.

**Reference**

A. Ayres & A. Kneese—"Pollution and Environmental Quality, The Quality of the Urban Environment, ed. H. S. Perloff, (Baltimore Md: Johns Hopkins Press, 1969 pp. 25-71), with modifications.







# La qualité du milieu naturel: Lois et programmes du gouverne- ment fédéral

par E. Roy Tinney et J. G. Michael Parkes

Le Canada présente un paradoxe: favorisé par la nature, notre pays possède de grands espaces, d'immenses richesses naturelles, une faune abondante et de belles possibilités dans le domaine récréatif. Plus de deux millions de milles carrés de son territoire sont encore à l'état naturel. Malgré cette immensité et la vaste répartition des ressources, 95 pour cent de la population du Canada occupe une bande étroite sise au sud du pays, d'un océan à l'autre. Le Canadien habite à proximité de ports, de lacs et de cours d'eau contaminés, respirant la pollution; il vit à l'étroit, dans le bruit des villes en mal de planification.

Le Canadien sait faire fructifier admirablement ses ressources, mais parfois aux dépens de son environnement. La détérioration du milieu naturel est le tribut du confort moderne.

En général, l'aptitude de l'homme à conserver la qualité du milieu naturel est fonction de la possibilité d'en isoler certaines parties: à l'intérieur des habitations, il est possible d'échapper dans une certaine mesure au bruit, aux mauvaises

odeurs et à la poussière, tout en exerçant un certain contrôle sur la température, l'humidité et l'éclairage. Ceci est fort important puisque nous passons la majeure partie de notre temps à l'intérieur.

Mais à l'extérieur, les techniques ne sont pas à la hauteur de la tâche: il est presque impossible de réduire le bruit et les odeurs et difficile encore de régler la température et l'éclairage. Hors des bâtiments qui l'abritent, l'homme se contente de limiter l'apport de substances nocives. Il est donc essentiel de modifier sans tarder les cadres sociaux, techniques et économiques afin de diminuer la masse des déchets et protéger le milieu naturel.

D'aucuns prétendent que la pollution est le résultat de l'évolution technique, de l'expansion économique ou de la surpopulation. Toutes ces causes s'appliquent à divers degrés, mais là n'est pas la source fondamentale de la pollution. Il est vrai que nos techniques tendent à la production et que nombre de nouveaux produits chimiques circulent dans le milieu naturel sans avoir été mis à l'essai au préalable. Il faut donc mettre au point de nouvelles techniques qui permettront de protéger le milieu naturel et de garantir sa qualité tout en s'attaquant aux graves problèmes de la limitation de la population et de l'insuffisance de la production alimentaire dans les pays en voie de développement. Il ne faut pas condamner la technique mais plutôt la réorienter.

Nous disposons de divers instruments et mécanismes qui permettront de réorienter la technique: la réglementation, les sommes affectées à la lutte contre la pollution et au traitement des eaux usées, les subventions et autres stimulants d'ordre financier, la recherche, l'éducation, la planification et tant d'autres dont l'efficacité et l'équité varient et qui sont les outils du gestionnaire de la qualité du milieu. Il faut élaborer une stratégie qui réunisse utilement mécanismes et politiques plutôt que s'en remettre à la simple réglementation dont nous connaissons déjà l'insuffisance.

Afin de bien saisir la portée du programme fédéral de restauration du milieu naturel, il faut étudier le rôle constitutionnel de l'administration centrale, les mesures législatives actuelles et les autres mécanismes en place. La partie III du mémoire traite des cadres constitutionnels qui régissent les rapports entre l'État central et les Provinces, puis résume les mesures statutaires pertinentes. Au tableau 2 on trouvera les éléments des programmes et mesures législatives au palier fédéral répartis selon les ministères intéressés.

En résumé, les lois fédérales sur lesquelles reposent les programmes de restauration du milieu sont fort diverses et nombreuses; elles prévoient les instruments indispensables à la transformation des méthodes de traitement des rejets. Dans certains cas, il a été possible de contourner les obstacles dressés par la Constitution en ce qui touche à l'activité fédérale dans le domaine de compétence provinciale, en matière de lutte contre la pollution, grâce à l'adoption de certains règlements dans la sphère strictement fédérale pour produire les effets désirés par force centrifuge: les prêts fédéraux aux municipalités, par exemple, faciliteront l'aménagement des usines de traitement des eaux d'égout et donc la protection du milieu naturel.



# Prince Edward Island

## **Water Supply and Pollution Control in the Province of Prince Edward Island**

by A. J. Hiscock

An Act To Establish The Prince Edward Island Water Authority was passed in 1965. Prior to 1965 the Pollution Control policies of the Province were carried out by the Division of Sanitary Engineering, Department of Health. Since the spring of 1967, the Water Authority has become a functional body and the Authority has control of:

- a the use of all surface, ground, and shore waters;
- b the allocation of the use of waters;
- c pollution originating within the jurisdiction of the Province;
- d alterations of the natural features of any water course or lake and the natural movement of water therein.

We, in Prince Edward Island, may be considered fortunate to the degree that our industrial pollution problems are of one type, in the food processing category, and we are not faced with the problems of toxic wastes from mine operations, or effluents from pulp and paper industries. Being an Island Province, we are not directly involved with international or interprovincial waters.

The four main forms of pollution which we have to recognize in Prince Edward Island are as follows:

- a the discharge of untreated domestic sewage into our tidal waters;
- b the discharge of untreated industrial wastes;
- c pollution of our water courses (siltation, pesticides, and over-enrichment);
- d salt-water intrusion into the fresh water supplies of the Province;

With regards to the treatment of domestic sewage, it is interesting to note that nine of our smaller communities have taken advantage of the sewage treatment plant loans available through the Central Mortgage & Housing Corporation for the construction of adequate treatment of their domestic sewage. The larger urban areas (Souris, Montague, Charlottetown, Summerside), which represent approximately 45 per cent of the Island population are currently discharging raw sewage into tidal waters.

In the preparation of a 15 year Federal/Provincial program for social and economic advancement for the Province, as negotiated with the Department of Regional Economic Expansion, the question of pollution was thoroughly reviewed, and programs have been set up to provide funds for pollution abatement in the Province. Under the Development Plan, the following programs have been approved:

### **1. Industrial Waste Treatment Program**

Under the Development Plan 1.2 million dollars is provided to cover the complete capital cost for the construction of waste treatment facilities for the four major food-processing plants (Seabrook Farms, New Annan; Langley Fruit Packers Ltd., Montague; Campbell & Burns, Central Bedeque; and Seabrook Farms Plant, Sherwood).

Also, the Government has established a policy whereby all new industries being located in the Province will have to provide a suitable waste treatment facility as part of their initial capital cost.

### **2. Urban Services and Development Program**

Under the Urban Services & Development Program, 5.065 million dollars has been approved for designated growth centres. The Urban Services & Development Program envisages the development of some five designated growth centres in the Province. These centres are the current areas of population concentration, and with adequate treatment facilities being provided, the major sources of domestic sewage pollution in the Province will be eliminated. The funds being provided under the Program are for water and sewer services and sewage treatment in growth centres. This is a cost-sharing program with the municipality being responsible for approximately 40 per cent of the capital cost. The Federal contribution in this program is restricted to participation by Central Mortgage & Housing Corporation through their Sewage Treatment Plant loans.

### **3. Groundwater Studies**

With all the water supplies for industry, commercial and domestic use being derived from groundwater, it is imperative that we have a complete knowledge of the availability of groundwater in this Province. We are already experiencing salt-water intrusion problems due to overpumping in coastal areas. Under the Development Plan, the groundwater project has been approved where the Province can obtain the necessary expertise to conduct our own investigations. A Soil & Water Program in the amount of 1.065 million dollars has been approved, and as of July, 1969, a Provincial Hydrologist has been hired and is currently active in groundwater studies at Summerside and Georgetown.

### **4. Development Control**

The development of this Province's potential as a recreation and tourist area is contingent on adequate pollution control facilities being provided. The Development Plan is a source of necessary funds for pollution control, and we must be prepared to meet this financial commitment if we are to prevent further deterioration of the quality of our natural environment. The objectives of the Water Quality Management Program, as outlined in the Development Plan for this Province, are to protect and enhance the capacity of water resource to service the widest possible range of use in the most efficient manner. This is a positive program for the Province, and the Government has set the target date of 1975 to clean up the major industrial and domestic sources of pollution.

# Labrador Newfoundland

## **Newfoundland and Labrador Clean Air, Water and Soil Authority—Its Aims and Objectives**

by H. T. Doane

### *History*

The Newfoundland and Labrador Water Authority has a little more history than you might think. Probably the proper place to begin is with the late Harry Walters who, as Director of Fishing and Hunting Development for the Newfoundland Government, represented Newfoundland at several of the water conferences held in the Maritimes in 1964 and 1965 and carried back with him ideas of a Water Authority. As a result of his efforts and those of Dr. Stewart Peters, among others, the Water Resources and Pollution Control Act 1966-1967 was passed. This Act provided for a Water Authority consisting of public servants and provided that the Water Authority would:

1. Control pollution of water in the Province and
2. Own and operate water utility systems which were then being built or proposed by the Atlantic Development Board.

It was under this Act that the first staff for the Water Authority was acquired in January 1970 and in April of the same year a new Act to replace the old one was passed by the House of Assembly providing for the creation of a Clean Air, Water and Soil Authority. The Authority is now operative and has taken over the staff, duties and prerogatives of the old Water Authority.

### *Aim*

The aim of the Clean Air, Water and Soil Authority, in common with other regulatory agencies, is to control pollution of the air, water and soil and to protect and enhance the quality of the environment.

### *Objectives*

The following objectives for the Newfoundland and Labrador Clean Air, Water and Soil Authority could be listed.

1. To effectively prevent pollution of air, water and soil caused by new development. To this end, all plans for construction of any works which would emit smoke, vapour, waste water or other waste, require approval of the Minister of Mines, Agriculture and Resources who is responsible for the administration of the Clean Air, Water and Soil Authority Act.
2. To reduce the ill effects of existing municipal, industrial and individual activities on air, water and soil resources.
3. To operate about 25 water systems, so as to economically provide high quality water to certain fish plants, other industries and municipal units in the Province.
4. To develop and adopt a set of water quality objectives for receiving waters throughout the Province, and a set of effluent objectives to be used in setting standards for individual water users throughout the Province.
5. To adopt a set of design standards for water pollution works.
6. To meter all our water supplied, fresh and salt, for the dual purpose of making out bills (the charge is 14 cents per 1,000 gallons) and to learn about consumption magnitude and patterns.
7. To have all public water supplies disinfected, probably with chlorination, as soon as possible. There are some in the province that are not now chlorinated.

8. To study the Exploits River Basin to determine the steps to take in developing its potential in various fields, e.g. fisheries, recreation, power, water supply.

### *Means*

There are indications that the government takes pollution seriously and is not prepared to see the environment ruined for any reason. In order to achieve the aim and objectives of the Authority, it is necessary to make arrangements to establish good working relationships with many other agencies of the several governments and industries operating in the province. At present, the Authority is engaged in a review of legislation to identify those areas of conflict, of overlap and possibly of gaps in jurisdiction, so as to be able to make recommendations to government for elimination of these conflicts and duplications.

### *Composition*

The Water Authority, as laid down in the Act, consists of the five Deputy Ministers of respectively, Health, Economic Development, Municipal Affairs and Housing, Fisheries and Resources. Each member has designated one man on his staff to be in day-to-day consultation with Water Authority staff so that joint inspections, agreements, demarcation lines and co-ordinated action may be taken when appropriate.

The Chairman, C. W. Powell of the Board of Commissioners of Public Utilities, is independent of government. One to five other members are also independent, i.e. not representing departments. Total membership therefore may be eleven. The Authority's staff includes a General Manager.

### *Operating Function*

The main operating function of the Clean Air, Water and Soil Authority is the requirement in the Act, contained in Sections 20 and 22 that any water or sewage works, must have the approval of the Minister before construction is begun. This reflects the Authority's belief, in common with other regulatory agencies, that it is much better to prevent mistakes and bad installations than it is to try to correct them after they have been made. For this reason, top priority is given to consideration of new projects.

### *Present Situation*

At present there are about thirty operating sewage treatment plants, of the package type, ranging in size up to 1,000,000 gallons capacity. Three further units with capacities of 12,500, 80,000 and 200,000 gallons have been tendered for. Unfortunately, many of these are not operating at full potential and some are barely operating at all. These plants are the subject of a project, presently under way, to gather information and determine their performances and ways to improve them.

The Authority has found several rivers with serious pollution in them and this was pointed out in the Atlantic Development Board Report. The most serious situation is on the Exploits River where industrial waste from a pulp mill, a mine and municipal waste from two or three towns are discharged into the river with serious ill effects. The Humber River which receives raw sewage from one town is also largely choked with pulpwood on Deer Lake and from the lake to Humber Arm. The condition of Wabush Lake on the Churchill River in Labrador gives us cause for concern because of the



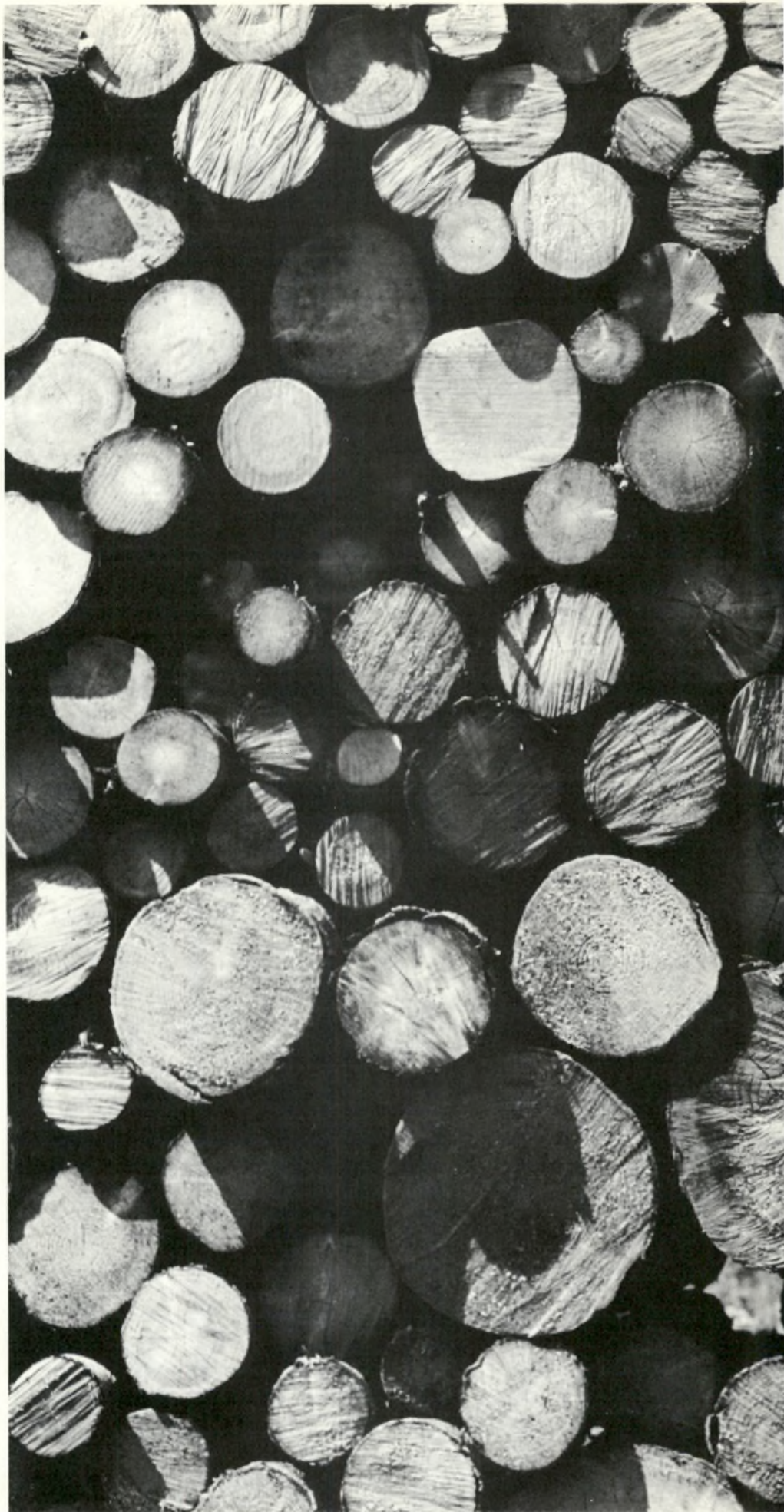
discharge of large quantities of iron mining tailings. The St. John's area with its concentration of population has problems with water quality in lakes and streams in the metropolitan area. These problems are not insurmountable but a bad situation has developed because of the previously prevalent feeling that there was plenty of water and it could not be polluted or, it we did pollute a small amount did not really matter since there was an abundance of water.

There are water systems for fifty nine communities in Newfoundland and we have two water treatment plants, one belonging to the Authority in Ramea and the other belonging to the town of Clarenville. In these plants water is given the full treatment from pre chlorination, pH adjustment, flocculation, coagulation, clarification, filtering and final pH adjustment and chlorination.

Since the passing of our new Clean Air, Water and Soil Authority Act, the Authority has received numerous complaints about obnoxious smells. Fish meal plants are a common source of foul odors, and piggeries, which are becoming quite numerous, also raise complaints. These are investigated in each case. It is considered, however, that cases of nuisance or annoying smells will have to wait while the Authority deals with instances where damage is likely to occur.

#### *Conclusion*

The Clean Air, Water and Soil Authority is just beginning to fulfill the function envisaged for it by the old Water Authority members and the government. Although a start has been made, there is much more to be done in the line of substantial reductions in pollution from a few existing installations, both municipal and industrial. There is certainly a great challenge ahead in relation to the new industrial developments which are presently under way in Labrador City, at Stephenville on the West Coast and in the Come-By-Chance area. It will be a real accomplishment to achieve pollution control for these industries.









# Nova Scotia





## How Nova Scotia is Combating Pollution

by E. L. L. Rowe

The province of Nova Scotia, a late industrial developer, is just encountering the problems of pollution which have long plagued its highly industrialized sister provinces to the west. Largely a rural farm, forestry and fisheries based economy until recent years, the province soon came to realize, with the influx of industry, that the possibility of contamination of natural water, air and land resources was very real if regulations for control and means of enforcing them were not soon devised.

Although the Nova Scotia Water Act was originally enacted in 1919, it has been revised many times since then, and today encompasses a great many areas which were not recognized as being crucial at that time. Since 1919, the Crown, in the Right of the Province of Nova Scotia, has affirmed its jurisdiction for water resources in the province. The original Water Act dealt mainly with the uses of water courses by the forestry industry which was a booming activity at that time. Change in the state of the industry at that time. Change in the state of the water was of little or no concern, and pollution was a word not yet contained in the legislation.

However, in the revised Water Act of 1967, amended in 1968 and again in 1970, pollution is very clearly defined:

"(f) 'pollution' means any alteration of the physical, chemical, biological, or æsthetic properties of the waters of the Province, including change of the temperature, taste or odour of the waters, or the addition of any liquid, solid, radioactive, gaseous or other substance to the waters or the removal of such substances from the waters, which will render or is likely to render the waters harmful to the public health, safety, or welfare, or harmful or less useful for domestic, municipal, industrial, agriculture, recreational or other lawful uses, or for animals, birds or aquatic life."

The Nova Scotia Water Authority, now the Nova Scotia Water Resources Commission was organized late in 1963. It is the agency responsible for the development, utilization, treatment and management of water resources, including the provision of adequate pollution control measures, throughout the province. The NSWRC concerns itself with the protection and conservation of this vital resource when it matters most, at a time of accelerated industrial growth.

Despite the fact that a great deal of emphasis has been put on industry as a serious polluter of air, land and water, it was early recognized by the NSWRC that a far greater threat to the province's water courses was pollution resulting from the disposal of raw and partially treated sewage by municipalities along rivers, lakes and the seashore. Industries can have their facilities controlled to minimize the problem because, although their volume of effluent is high, the problem of collection over a wide area is much simpler than in towns. And since much of Nova Scotia's industry is just being established in the province, regulations to provide for effluent treatment facilities can be more easily enforced.

Domestic sewage, however, presents a different problem. Sewage treatment facilities are expensive, presenting a heavy tax burden on the citizens of a municipality which finds that it must finance millions of dollars to provide the necessary plant. But in this area, assistance at the municipal level is offered for improve-

ment of sewer and treatment facilities. A 20% grant on eligible items of the total capital cost of collector sewers, trunk mains and sewage treatment plants is provided by the province under the Water Act, for municipal authorities.

Under the National Housing Act, Central Mortgage and Housing Corporation may make loans for up to two-thirds of the cost of a project and for a term as long as 50 years. If the work is in place before March 31, 1975 25% of the loan may be forgiven, together with 25% of the interest paid or accrued.

In a decade the population of Nova Scotia has increased by 65,000 people to a current estimated total of 760,000. The increase in population has been accompanied by an industrial drive that has changed the province's economic structure. Gleaming manufacturing plants have mushroomed and the accompanying serious hazard of pollution was recognized by the provincial government in the late 50's.

Although legislation concerning the province's water resources has existed since 1919 there was not, until 1970, legislation to govern the overall environment—land, air and water. This legislation took the form of "An Act Respecting the Study and Control of Environmental Pollution." This, then, constitutes the fourth Act dealing with pollution matters in Nova Scotia, the others being the Water Act, the Public Health Act and the Towns Act. Co-operation among the authorities responsible for the various Acts allows for a concerted effort in combatting a common enemy. For instance, no sewage or water treatment plant may be constructed in the province without a joint certificate of approval from the Department of Public Health and the Nova Scotia Water Resources Commission. In all cases, the Department of Municipal Affairs, must approve borrowing authority for loans to municipalities to construct sewage and water treatment facilities.

The primary responsibility for water, air and land pollution control in Nova Scotia, however, is vested in the Nova Scotia Water Resources Commission by means of the Water Act and the Environmental Pollution Control Act. In addition, the Public Health Act provides, in general terms, for the prevention of pollution and of conditions hazardous to health. Two municipal statutes, the Towns Act and the Municipal Act, also contain certain provisions recording the municipalities' right to pass by-laws on a number of subject involving certain aspects of environmental pollution.

The Public Health Act states that it is the duty of the Department of Public Health "to provide for safe and potable water supplies, for control of the sources of water and systems of distribution, and for the purposes of preventing contamination or pollution of water that is used for human consumption."

The Act also points out the responsibility of the Department "respecting plumbing and drainage of buildings and premises and... respecting public drains and sewers and for preventing pollution of lakes and streams."

It is the Water Act and the Environmental Pollution Control Act in which are found the bases for definitions of pollution. Under the Water Act, "no municipality or person shall discharge or deposit any material of any kind into or in any well, lake, river pound, spring, stream, reservoir or other water or water course or on any shore or bank thereof or into or in any place that may cause pollution or impair the quality of the water for beneficial use."

In the "Act Respecting the Study and Control of Environmental Pollution" which was assented to on April 24, 1970, in Nova Scotia, pollution "means any alteration or variation of the physical, chemical, biological or æsthetic properties of land, air or water which results or may result from any act or omission over which the Legislature of Nova Scotia has jurisdiction."

Penalties for infractions under the Water Act range from one hundred dollars and/or six months in jail for offenses by an individual, to a penalty of one hundred dollars a day for municipality and a fine of not more than five hundred dollars a day in the case of corporations.

The new Act established the Nova Scotia Environmental Pollution Council composed of representatives of the Department of Lands and Forests, Department of Highways, Department of Public Health, Department of Municipal Affairs, Department of Trade and Industry, the Nova Scotia Water Resources Commission and one or more persons in the public service appointed by the Governor in Council.

The Council is empowered:

"(a) to investigate and inquire into any activity or situation that causes or appears to be the cause of or may cause pollution;

"(b) to consider and prepare plans and programs to combat, eliminate or mitigate pollution or any particular kind of pollution;

"(c) to co-ordinate the work and efforts of departments, boards, commissions, agencies and officers of the Province respecting any matter relating to the control of pollution;

"(d) to co-operate with any public or private body or any person in any matter relating to the control of pollution;

"(e) to perform such other acts and duties as may be assigned to the Council by the Governor-in-Council of the Minister."

It is the Minister in charge of the Water Act to which the Council reports its findings. The Council, in turn, may require any department, board, commission or agency of the Province or any officer of the Province to investigate and report to the Council on any matter related to pollution or the control of pollution.

In circumstances where pollution is suspected or detected, the Minister may direct the Nova Scotia Water Resources Commission to investigate and make a report to the Minister. Upon the Commission's investigation determining that remedial action should be taken, an order by the Minister may be given the Commission "to combat, eliminate or mitigate a cause of pollution."

Any failure to comply with an order served by the Commission or any person who fails to take any action required by the order or who continues to act in a manner prohibited by the order is guilty of an offence. Upon summary conviction, such a person is liable to a penalty not exceeding five thousand dollars.

There is also an additional penalty provided. If a person is convicted he shall be liable "to a penalty not exceeding one thousand dollars per day for each day that a person fails to take any action required by an order or who continues to act in a manner prohibited by an order."

It is hoped that through the Environmental Pollution Control Act, the Water Act and other relevant Acts the Province will stem the increase of pollution. The first objective of the Nova Scotia Water Resources Commission, however, is to prevent new pollution.



# New Brunswick

## Water Pollution and its Control in New Brunswick

by E. S. Fellows

At present the only New Brunswick legislation dealing mainly with pollution as such, is the Water Act which, as its title implies, relates only to water. Air pollution can be dealt with as a public nuisance or as a health hazard under other legislation, but intensive study is now being given to the drafting of legislation dealing with pollution of water, air and soil. It is expected that this will be introduced at the 1971 session of the Legislative Assembly.

The Water Act is administered by the New Brunswick Water Authority—a nine-member body which had its origin as a three-member board under a 1958 amendment to the Water Resources and Pollution Control Act. The members of the Authority are drawn from both the private and public sectors of the economy. Their backgrounds and expertise cover the recreational, biological, industrial and municipal use of water as well as engineering and municipal and industrial planning. Although the greater part of its work is devoted to pollution control and abatement, the Authority is also responsible for the allocation of water and for the control of alterations to the banks and beds of streams, rivers, and lakes and of the natural movement of water in them.

At various stages in its development, the Water Authority has been attached to the Department of Lands and Mines, the Department of Municipal Affairs, and now to the Department of Natural Resources. The administrative arm of the Authority is the Water Branch of the Department. The work load of the Branch is handled by a permanent staff of eight professionals, five technicians and a clerical staff of four. These are augmented by students in the summer months when effluent-quality and water-quality surveys are conducted. As has already been mentioned, this staff is responsible for other aspects of water management besides pollution control, including responsibility for the construction of major water-supply systems.

New Brunswick has most of the pollution problems that plague other parts of the country, but many of them are on a much smaller scale than those of more industrialized and more densely populated areas. It has its automobile pollution, its industrial fumes, its litter, its pesticides and its smoking garbage dumps, but water pollution has been and remains the outstanding environmental problem.

In common with the other Atlantic Provinces, most of New Brunswick's industrial and municipal wastes are discharged into tidewater. However, the major exception to this generalization is the drainage basin of the Saint John River. This great river system carries wastes from many industries and municipalities, it serves the greater part of the province's agricultural land, it is the nursery of a large population of salmon and other game fish in the

forested headwaters of a number of its tributaries, it is by far the largest source of the Province's hydro-electric power, it has high recreational value, and it is surpassingly beautiful.

Added to this, the Saint John River forms part of the boundary between Canada and the United States, and several of its tributaries rise in the States and flow across the border. Similarly some tributaries rise in Quebec and discharge into the Saint John in New Brunswick.

For all these reasons a large part of the pollution-control effort has been centred in the Saint John River basin. There now remain only five sewer New Brunswick municipalities in the fresh-water portion of the basin which do not yet have sewage treatment, and all of these communities have been ordered to make good this deficiency by the end of 1971. Some 20 cities, towns, and villages in the drainage basin already provide waste treatment.

In terms of sheer volumes of organic and chemical pollutants, the biggest source of contamination in the basin is a pulp mill located at Edmonton. This mill is presently discharging wastes with a biological oxygen demand (BOD) of about 300,000 pounds a day. This plant is required to install process changes and pollution-abatement facilities, which will result in a reduction of the BOD loading by at least 80 per cent by the end of 1971, or face appropriate penalties. Two other long-established industries on the river have built pollution-abatement systems within the past two years, and a new pulp mill in the Valley has installed what is probably the most effective waste-water treatment facilities in operation at any pulp mill in Canada.

The only serious Canadian source of pollution in the basin which may remain after 1972 are two, or at most three, plants producing potato starch. This industry is an extremely marginal one, but yet provides a badly needed outlet for low-grade potatoes. An important decision will soon have to be made as to whether these plants must be closed down or whether some form of public financial aid for waste treatment should be provided.

There are some 14 municipalities in other parts of the province which have installed sewage treatment, and several more have made firm commitments to do so within the next year or two.

Municipal water-pollution abatement probably receives more generous financial support from the senior levels of government in New Brunswick than in any other province. In addition to the Canada-wide program administered by Central Mortgage and Housing Corporation, the provincial government makes annual grants to municipalities for the collection and treatment of sewage. These grants amount to one-half of the first year's simple interest on the total capital cost of collection and treatment facilities (including that portion forgiven

by C.M.H.C.) each year for a period of 30 years, or proportionately more for shorter terms. Just what this amounts to in any given case depends upon the prevailing rates of interest. However, during the winter of 1969-70, the combined C.M.H.C. and provincial financial assistance together amounted to almost 80 per cent of the capital cost of sewage collection and treatment facilities, calculated as at the end of a 20-year debt-retirement period, as compared to what the cost would have been without such assistance. The Federal and provincial inputs were almost exactly equal, but the provincial contribution is entirely in cash whereas part of the federal share is in the form of a preferred interest rate on its loan.

The Water Act contains a clause which enables the Lieutenant Governor-in-Council to set up corporate bodies to finance, build and operate sewage works and water works. In the past two or three years, this provision has been used twice to establish special Commissions to deal with sewage-disposal problems on a regional basis. The first of these Commissions has built and is operating a four-million-dollar sewage collection and treatment system jointly for the City of Fredericton and the adjacent Town of Marysville and the Villages of Nashwaaksis and Barker's Point. The second Commission has a similar task with respect to the Town of Shediac, the neighbouring Village of East Shediac and the nearby, unorganized summer cottage communities, trailer parks, and camping areas. These represent interesting developments in joint provincial-municipal action and inter-municipality co-operation.

There are, of course, a number of small treatment installations serving schools, hospitals, isolated subdivisions, motels and other institutions or commercial establishments which are remote from public sewage-systems. These receive no special government financial assistance for pollution control, but, along with the industrial and municipal installations, they are subject to inspection by the Water Authority.

The Water Authority has made it a practice to require secondary treatment, or the equivalent, for practically all municipal systems that have been installed under its aegis. The reason for this is that by far the greater part of the capital cost of such systems is incurred in the collector sewers and primary treatment facilities. The great amount of extra pollution-abatement attributable to the secondary phase can thus be bought relatively cheaply. Therefore, although New Brunswick lags behind some provinces in the percentage of its population served by sewage treatment of some sort, few other provinces, if any, enjoy as consistently high a level of treatment of municipal wastes. By the end of 1971 there will be very few other provinces, if any, enjoy as consistent sewage, into fresh waters, which has not been given secondary treatment. Many tidewater municipalities, of course, also treat their sewage.

There is no province-wide policy of grants to industry for pollution-abatement, but, because of special conditions prevailing in the Saint John Valley and because the construction of the Mactaquac hydro-electric development has complicated pollution control, the Government and the New Brunswick Electric Power Commission have made funds available for grants to long-established industries for waste treatment. In addition, the Atlantic Development Board established a special fund for grants to existing industries situated on the fresh-water stretches of any river in the Atlantic Provinces. The ADB grants are paid on the basis of measured performance after the "clean-up" is accomplished.

Almost since its inception, the Water Authority has followed a policy of not allowing any *new* industrial plant or any *new* municipal sewer system to be installed without assurance that its effluent would be acceptable, by modern standards, for discharge to public waters. This is not to say that the expected results were always achieved, but the few failures have been only partial, and they will be corrected in the next round of improvements.

Collectively the largest water polluters in the province are the pulp and paper mills of which there are nine in operation and one under construction. Fortunately, most of these mills are located on tidewater. There are two other pulp and paper mills in the State of Maine located on boundary rivers shared with New Brunswick. As in the case of other new industries, those pulp and paper mills built or enlarged during the past 10 or 12 years have been required to install approved pollution-abatement facilities. Last winter, however, the Minister of Natural Resources, Hon. W. R. Duffie, ordered all pulp and paper mills in New Brunswick to install adequate primary treatment of their effluents by the end of 1971 and, in cases of chemical-pulp mills, to provide secondary treatment as soon as they are enlarged or their pulping processes are changed.

One of the more difficult water-pollution problems in New Brunswick arises from the extreme toxicity of copper to salmon and other game fish. Where acceptable levels of copper for human consumption may be about 1,000 parts per billion (ppb), 40 or 50 ppb can be lethal to fish, and they will try to avoid much smaller concentrations. Sub-lethal levels of copper can also severely affect fish reproduction. This and other problems associated with sulphide ores pose formidable difficulties for the base-metal mining companies and government agencies concerned with water pollution and aquatic biology.

Other New Brunswick industries with effluent-disposal problems include vegetable and fish processing, distilling, meat and poultry packing, brewing, dairies and creameries, fertilizer manufacture, chlorine and caustic soda manufacture, oil refining, wood preserving and base-metal ore refining to name the more important ones. Most of these are relatively new

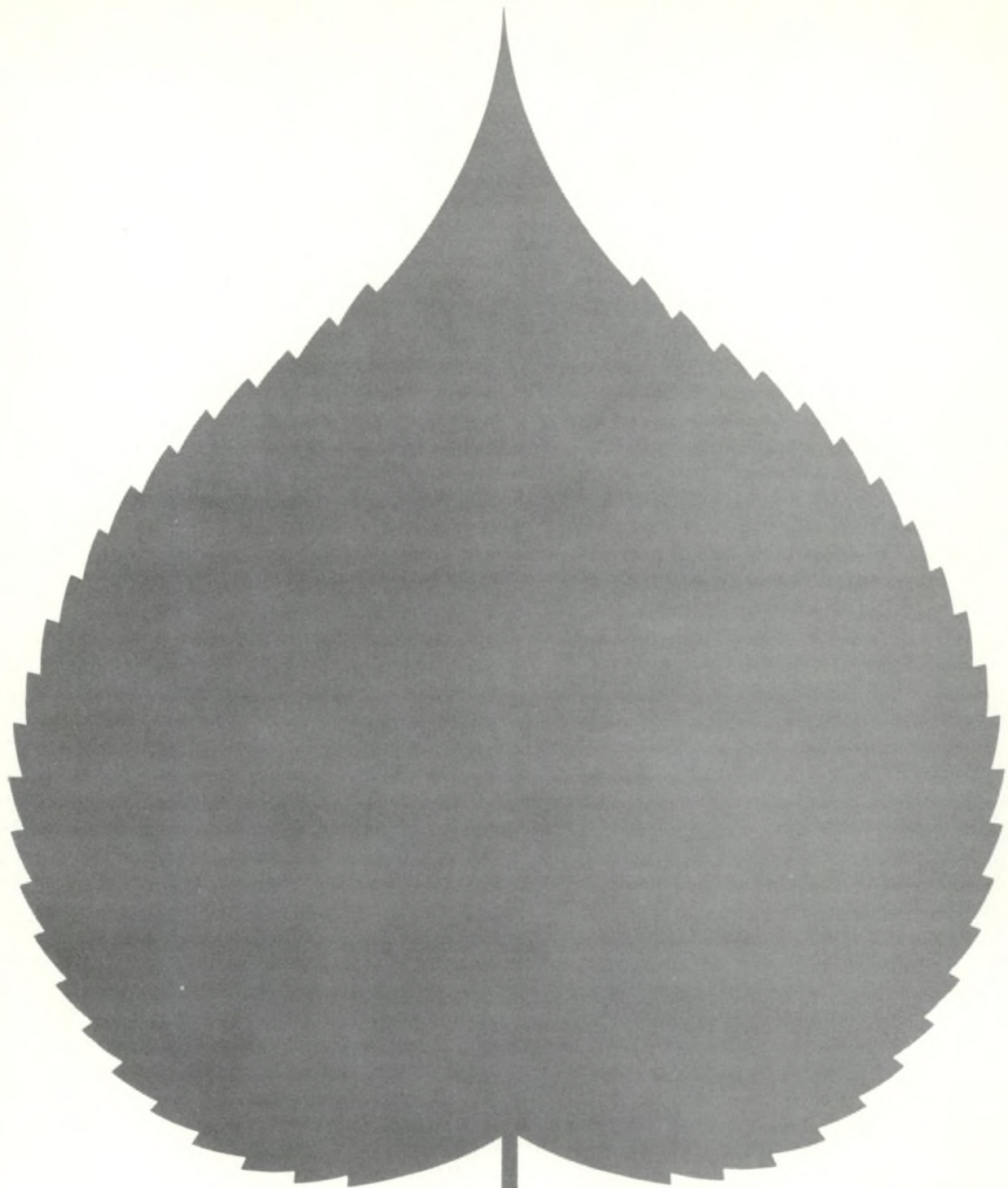
and apply waste treatment of some sort, unless their effluents contain no harmful ingredients. A number are connected to municipal systems, but, a few are old-established plants where the installation of treatment facilities will be difficult at best or perhaps prohibitively expensive at worst.

The matter of maintaining effective communication between all agencies involved in pollution control and co-ordinating their activities is becoming increasingly difficult. Some years ago the New Brunswick Water Authority initiated a series of informal, semi-annual water conferences to which representatives of all provincial and Federal agencies, with an interest in pollution, were invited. At first these conferences were organized on a provincial basis, but later they took on a regional character. They were a most useful and effective means of informal communication and served to keep all interested parties aware of new problems, new techniques, and new developments. However, the growing proclivity toward more and more meetings with fixed objectives and the introduction of more formal procedures for co-ordinating the activities of government agencies concerned with pollution have led to the discontinuance of these conferences.

Two new agencies of co-ordination in which New Brunswick is involved are the Canada-New Brunswick Committee for Water Resources Matters and the Federal-Provincial Saint John River Basin Board. Both of these bodies are composed of equal numbers of federal and provincial members—four of each in the first instance and three of each in the second—who represent the principal government organizations interested in water management. Both are advisory in character but, while the first-named has very broad terms of reference, few specific duties, and no limitations as to time, the second has the specific task of developing and recommending water management policies for a given drainage basin within a specified period of time, namely, three years.

There are a number of other water pollution problems which cannot adequately be discussed here. Oil spills, toxic agricultural sprays, the thoughtless dumping of garbage and trash into waterways, soil erosion and consequent siltation of rivers, lakes, and reservoirs come quickly to mind. For the most part, these are spasmodic problems which cannot be corrected simply by building structures and instituting treatment processes. They entail much public education, contingency planning, and the imposition of practicable and enforceable regulations. All this will take time and patience. However, in the matter of eliminating the worst sources of continuing water pollution, New Brunswick has made steady progress. Within two years it will have reached the point where total water pollution will be decreasing despite a growing population and increasing industrial activity.





## Land use and gardening practises

by K. F. Nielsen

Whether for food or for beauty, the successful growing of plants involves numerous problems. They must be nurtured and watered, and they must be kept free from insects and diseases that can destroy them.

Incentives for plant production and the economics of this production, are usually quite different in the city than in the country. In the city, people are more concerned with appearances than the economics of plant production. The farmers are most concerned with making a profit on their investments.

This brings us to the doorstep of the most important issue in pollution - people. There is a continuing transfer of people from rural to urban areas. Hence, we have a growing body of people who do not measure the use of agricultural inputs in terms of economics. The hazard of misuse consequently increases.

## Perspective

We can classify city farming problems into two main groups as they relate to pollution:

1. Those that affect only the homeowner.
2. Those that affect others.

In the first category, the homeowner has problems raising his plants, keeping weeds and diseases from killing them, and making them a complimentary part of his interests whether for beauty or for food. If he does not fertilize properly, his plants do not look good. If he does not kill the insects and diseases that infest his garden, he will suffer a reduced harvest. By and large, the neighbors may not be pleased with poor looking and unsightly grounds next door but the problem is hardly one of pollution as we have been thinking of it.

In the second category, if the homeowner, by neglect, increases the weed, insect and disease populations in his yard, he can be accused of polluting the neighborhood because these pests do not stay at home. On the other hand, if he sprays for weed control in his garden or lawn and some of the chemical drifts into his neighbors' yard and causes damage, he is also polluting the environment.

There are few, if any, good reports of appreciable chemical pollution in either category in the city. The greatest concern in the city has been about too many weeds, too many insects, too much disease, too little fertilizer. Very little has been heard, or measured, about too much control of these factors with chemicals.

## Potential problems

Cultural practices and chemicals are used by home gardeners for at least four reasons:

1. To control weeds.
2. To control insects.
3. To control diseases.
4. To build up soil fertility.

The cultural practices include the use of hoeing, pruning and burning diseased refuse, watering, fertilizing and growing varieties that are resistant to pests. These practices are the main considerations in good steady management which can keep the problems under control.

Chemical means are used to control problems that are not controlled in other ways and where immediate action is necessary. Care must be exercised in using chemicals because they can be poisonous when certain limits are exceeded.

## Weeds

Chemicals are effectively used in the control of weeds in lawns. The compounds most frequently used are 2,4-D, MCPA and Dicamba. In shrubs and gardens, weeds should be controlled by hoeing because of the hazards of killing wanted plants with the chemicals.

Much research work has been done to learn of harmful effects of these compounds to animal life. Nothing conclusive has been obtained which would link these compounds with problems when they are used as recommended.

## Insects

Chemical sprays offer about the only practical way of controlling most insects that a home gardener would encounter.

These chemicals pose a problem as far as animal life is concerned because there are similarities in physiological processes. For these reasons, instructions for using insecticides must be carefully followed.

Recent legislation has restricted the use of most of the commonly known insecticides such as DDT, dieldrin, parathion and lindane. They may be used only for those purposes outlined in the Federal Pest Control Products Act.

As with herbicides, vast sums of money are being spent, by developmental and control agencies, to ensure that critical limits of effectiveness and use are known for the chemicals released.

## Fertilizers

The fertilizer plant nutrients most needed are nitrogen and phosphorus and potash. Where fertilizers are not used the health of plants is adversely affected and they become more susceptible to attack by insects and diseases. Home gardeners use fertilizers to improve appearance of their landscaping plants and to improve yields of their vegetables.

There are three main factors affecting the possibility of contamination with fertilizers:

- a The kind of fertilizer used.
- b The amount applied.
- c The watering practices followed.

Nitrogen may be leached through the soil or washed off when extremely improper watering follows an application of fertilizers. There are broad tolerances before any is lost. It is doubtful if any is lost from applications to gardens.

Phosphate is fixed chemically when it comes into contact with the soil and does not move any more than about  $\frac{1}{2}$  inch from the site of application. It is impossible to leach phosphates through the soil, and seldom is it ever possible to carry it in run-off water.

## Present efforts

The most important public cause that must receive attention, as far as land use and gardening practices are concerned, is one of education. We are living in a chemical age in which chemicals play a part in most of what we eat, drink, wear or otherwise use.

Unfortunately, we are always faced with the problem that rumor can out-run fact and when emotions constitute the only basis of decisions, trouble usually follows. All chemicals have become suspect as far as pollution is concerned.

We need to know the facts. Much work has been done and is currently underway to get the facts about the possible harmful effects of agricultural chemicals and fertilizer. *Perhaps it can be concluded that there is not much of a problem either in the rural or urban communities with these compounds as long as the directions for use are followed.* The more people there are, the more mistakes there will be. A point is reached where useful products and practices have to be changed or legislated against because people misuse them.

However, it is reasonable to be optimistic about the future and believe that food can be grown and properties landscaped in such a way as to pose no serious problems to present or future generations.



# Québec

## **La lutte contre la pollution au Québec**

par Jean A. Roy et Raymond Giroux

Sous la direction du docteur B. Bundock  
A l'instar des autres pays à fort degré d'industrialisation et d'urbanisation, le Québec subit les conséquences des nouveaux développements technologiques et fait face, lui aussi, à des problèmes plus ou moins aigus de pollution suivant les régions.

La détérioration du milieu ambiant: eau, air, sol, devient de plus en plus évidente dans les grandes villes du Québec.

La lutte contre la pollution s'effectue principalement dans le domaine des eaux, mais ce n'est pas un choix prémédité. Il répond à des conditions naturelles et historiques: la concentration de la population le long des grandes voies d'eau, et en particulier le long du St-Laurent, et la présence sur le territoire québécois de milliers de lacs dont la plupart ne sont pas encore baptisés. Les lacs situés près des agglomérations urbaines, rendez-vous des villégiateurs, souffrent autant de la pollution que les cours d'eau desservant les régions industrialisées.

Il ne faudrait pas croire que seule l'agglomération urbaine de Montréal est touchée par le problème de la pollution de l'air. De nombreux autres centres industriels de petite ou moyenne taille, répartis à travers tout le Québec, sont aux prises avec la même situation, toutes proportions gardées, évidemment.

### **I L'air**

La Commission d'enquête Castonguay-Nepveu sur la santé et le bien-être affirme dans le volume IV de son rapport que la pollution de l'air vient au premier rang des causes de morbidité et d'invalidité à cause de sa relation avec les maladies respiratoires. Le gouvernement du Québec est pleinement conscient de la gravité du problème et de la nécessité d'y trouver une solution qui soit à la fois durable et efficace. Cela exige une étude en profondeur de toutes les données du sujet et une évaluation juste de ses résultats.

#### **1. La législation**

Au Québec, la lutte contre la pollution atmosphérique relève en principe de la juridiction du ministère de la Santé. Cependant, suivant la Loi de l'hygiène publique du Québec, les municipalités sont tenues d'observer et de faire observer cette loi ainsi que les règlements faits sous son empire. D'autre part, pour quelque quinze cités ou villes du Québec, y compris les communautés urbaines, les pouvoirs ont été délégués aux administrations municipales qui ont leur propre bureau de santé. C'est ainsi que la ville de Montréal a pu adopter des règlements concernant la lutte à la pollution atmosphérique et possède actuellement son propre service de contrôle et d'inspection à l'intérieur de ses limites territoriales.

Actuellement, le Québec n'a pas de loi concernant spécifiquement la pollution de l'air. Cependant, la Loi de l'hygiène publique prévoit l'élimination de toutes conditions dangereuses pour la santé publique ou de toutes nuisances, ce qui peut signifier les inconvénients provenant de la fumée, de vapeurs ou de gaz.

D'autre part, l'article 2 du chapitre VI des règlements provinciaux d'hygiène, concernant les établissements industriels, prévoit que nul établissement industriel ne peut être établi sans que les plans et devis en soient soumis au ministre pour approbation lorsqu'il s'agit d'établissements dont les opérations sont susceptibles

de charger l'atmosphère de gaz, de vapeur, de fumée et de poussières nuisibles à la santé.

Enfin, l'article 41 des mêmes règlements spécifie qu'aucun système d'extraction mécanique des poussières par aspiration ou propulsion d'air ne doit vicier d'une manière dangereuse l'air que respirent les ouvriers à l'intérieur ou à l'extérieur de l'usine et aucune nuisance ou dommage à la propriété ou à la santé publique ne doit en résulter.

#### **2. La lutte contre la pollution**

La lutte contre la pollution de l'air dépend depuis 1960 de la Direction générale de l'hygiène du milieu, au ministère de la Santé. Dès cette époque, la Direction a installé dans la ville de Montréal deux postes d'échantillonnage d'air, l'un au parc Jarry, et l'autre, au Jardin botanique. En 1963, le poste du Jardin botanique a été doté d'une tour météorologique d'une hauteur de 200 pieds. Cette tour sert à déterminer la température différentielle entre les niveaux de 35 et 200 pieds en vue d'établir la fréquence des inversions de température qui ont une influence marquée sur la dispersion des polluants.

Le ministère de la Santé a actuellement en activité 41 postes d'échantillonnage d'air, soit 9 dans la région de Montréal, 11 dans la région de Trois-Rivières, Cap-de-la-Madeleine, 5 à Sorel-Tracy, 5 à Beauharnois, et 11 à Joliette. Des postes seront bientôt installés dans la région métropolitaine de Québec. De plus, pour certains problèmes particuliers, il est nécessaire que des ingénieurs et des techniciens fassent des déterminations dans les cheminées ou dans un secteur déterminé pour recueillir des données pour des émissions spécifiques de polluants. Tous ces résultats sont compilés et analysés suivant différents paramètres au centre de traitement électronique des données. Des spécialistes en informatique travaillent au développement des nouveaux programmes dans le but de prédire les niveaux de pollution occasionnés par certaines sources importantes.

### **II L'eau**

La lutte contre la pollution des eaux au Québec dépend principalement du ministère de la Santé et de la Régie des eaux, mais plusieurs ministères ont des juridictions qui influent sur la prévention de la pollution.

Le ministère des Richesses naturelles s'occupe de la gestion directe du domaine public fluvial et lacustre, des travaux et ouvrages en cours d'eau, de la recherche scientifique et juridique.

Le ministère des Terres et Forêts réglemente le rejet des déchets de bois dans les cours d'eau.

Le ministère du Tourisme, de la Chasse et de la Pêche veille à ce que tout effluent d'eaux usées, déversé dans un lac ou un cours d'eau, ne crée pas de conditions défavorables à la chasse et à la pêche, aux sports aquatiques et à la récréation.

#### **1. Le ministère de la Santé**

La responsabilité de l'hygiène publique incombe au ministère de la Santé, qui contrôle par conséquent la qualité des eaux de consommation. La Direction générale de l'hygiène du milieu voit tout d'abord à vérifier et contrôler systématiquement les eaux de consommation. Ce contrôle doit comprendre premièrement la surveillance de la qualité des eaux brutes, effectuée quatre fois par année, à la prise d'eau, et deuxièmement, la surveillance de la qualité des eaux au robinet, la fréquence des relevés

variant selon la population desservie. Dans le même cadre, des techniciens vérifient occasionnellement les usines de traitement des eaux. Le programme de contrôle a été entrepris, en 1970, dans les comtés de Brôme, Missisquoi, Argenteuil et Terrebonne, qui comprennent une population d'environ 230,000 habitants.

Le ministère de la Santé veille également à l'assainissement des eaux dans les régions touristiques ou les zones de délasserment. Le programme qui se poursuit depuis trois ans comprend six étapes.

- a Un relevé analytique de la pollution microbienne.
- b Un relevé sanitaire et la classification des installations septiques.
- c Une animation sociale en vue d'amener les citoyens à créer sur chacun des plans d'eau des comités d'action contre la pollution.
- d Une action conjointe avec les comités de citoyens pour inviter les autorités municipales à adopter un règlement sur la construction et l'entretien des installations septiques et à embaucher un inspecteur pour les faire respecter.
- e L'organisation de cours sur tout le territoire pour la formation des inspecteurs municipaux et le recyclage des plombiers et entrepreneurs qui construiront les installations septiques.
- f La reconstruction progressive des installations septiques qui ne répondent pas aux normes.

Le ministère est également responsable de la surveillance et du contrôle des plages et des piscines. Ce travail, effectué depuis trois ans dans les régions de Montréal et de Québec, a permis l'étude de quelque quatre-vingt plages au cours de l'été dernier. Le ministère doit aussi voir à l'assainissement dans les petites agglomérations dépourvues de tout système municipal d'égouts, au contrôle de la fluoration de l'eau et à la disposition des déchets.

## 2. La Régie des eaux

La Régie des eaux exerce le contrôle et la surveillance de la qualité des eaux de surface et souterraines, et peut dans cette optique poursuivre toutes les enquêtes, faire toutes les recherches et toutes les visites qu'elle estime nécessaire. Elle est nanti de tous les pouvoirs requis pour forcer une municipalité ou une personne légale à prendre les mesures qui s'imposent pour parer à toute pollution d'eau existante ou prévenir toute pollution de l'eau.

Actuellement, les structures administratives existantes ne permettent pas d'exercer une gestion rationnelle des ressources en eaux du Québec. Cependant, en juillet 1968, devant l'ampleur prise par les problèmes d'ordre juridique et administratif, le gouvernement du Québec a créé une commission d'étude des problèmes juridiques de l'eau.

La commission a pour but de réunir toute la documentation nécessaire, de recueillir les suggestions du public, des organismes communautaires ou publics et des juristes, et de faire au gouvernement des recommandations sur les meilleurs moyens à prendre pour mettre systématiquement en valeur le patrimoine hydraulique du Québec. La commission remettra son rapport en 1971.

En mai 1969, le gouvernement a de plus formé un comité interministériel de l'administration des eaux. Son principal mandat est de veiller à l'application des recommandations intérimaires que peut faire la commission d'étude des problèmes juridiques de l'eau. Le comité doit également prendre les mesures appropriées pour apporter des solutions aux problèmes de la pollution des eaux.

## III Le bruit

Le ministère de la Santé s'occupe des problèmes causés par le bruit depuis une vingtaine d'années: c'est en 1950, en effet, que le gouvernement du Québec a fait l'acquisition d'un premier décibel-mètre pour ses laboratoires de Montréal. En 1963, le ministère de la Santé a acheté son premier appareil d'analyse par ondes portatif et muni d'un microphone capable de subir les dures conditions de l'industrie et des mines sans se détériorer: ce type d'appareil a permis de répondre aux nécessités créées par un article de la loi ordonnant une compensation pour la surdité due à une exposition prolongée au bruit industriel trop intense.

L'équipement actuel comprend maintenant quatre appareils d'analyse dont deux de type amélioré répondant aux critères maximaux actuellement requis pour certaines études spécifiques.

Une très forte proportion des activités actuelles est allouée à des études de bruit correspondant à des réclamations pour surdité d'origine industrielle sur demande de la Commission des accidents de travail. Le reste des activités se partage entre des études de bruit industriel en vue de la protection des ouvriers et les études de bruits communautaires.

Le problème du bruit est en ce moment l'objet d'un intérêt de plus en plus grand au Québec. Dans ce cadre, la section du bruit de la Direction générale de l'hygiène du milieu du ministère de la Santé est appelée à de grands développements, non seulement pour évaluer sur demande les différentes sources de bruit et faire les recommandations appropriées, mais pour établir une étude systématique du bruit dans les industries et leur entourage, pour conseiller et aider les différentes localités du Québec, pour établir et entretenir des liens de travail entre les différents ministères, les universités, les municipalités, pour poursuivre des recherches sur la mesure et la réduction du bruit ainsi que sur l'amélioration des méthodes de protection, enfin pour poursuivre le programme éducatif déjà commencé, par des cours, des conférences et des films documentaires.

Un tel programme nécessitera sans doute un personnel plus nombreux, comportant le concours non seulement de spécialistes des techniques de mesure du bruit, mais aussi le concours de spécialistes en bien d'autres branches des connaissances humaines: urbanisme, architecture, informatique, électronique, etc... Nous sommes entraînés dans l'immense tourbillon du progrès qui doit, tôt ou tard nous emporter vers ces développements.

## IV Le sol

Le combat pour la préservation des sols s'exprime en particulier par la lutte contre les pesticides. Celle-ci a pris son départ en février 1965 lors de la création du comité interministériel des pesticides, comité où étaient représentés les ministères de l'Agriculture, du Tourisme, de la Chasse et de la Pêche, et de la Santé, ainsi que la Régie des eaux.

Le comité avait pour but de réviser la politique globale au sujet des pesticides, de définir les problèmes prioritaires et de proposer des solutions, de déterminer les responsabilités respectives des ministères et des organismes en cause, et de faciliter la collaboration et la coordination interministérielle. Le comité s'est adjoint, depuis 1967, des représentants du ministère de la Voirie et de l'Hydro-Québec.

Le principal résultat des recherches entreprises par le comité interministériel sur les

pesticides a été l'interdiction, en vigueur depuis le 22 mars 1970, de presque tous les usages du DDT.

L'interdit est venu à la suite des conclusions du comité, à savoir que la persistance du DDT, sa résistance à la dégradation et sa concentration le long de la chaîne alimentaire étaient dangereuses pour la santé humaine. Seulement trois exceptions sont reconnues, pour les pomiculteurs et les producteurs de céleri, en vue de combattre les punaises vertes et pour les planteurs de tabac, en vue de combattre les vers gris. Le DDT pourra également être utilisé lorsqu'une épidémie menacera la végétation.

La cueillette du DDT a eu lieu l'été dernier, et elle a obtenu un franc succès grâce à la collaboration du public et des distributeurs. Cette cueillette était fondée sur le principe du dépôt volontaire, sans aucune obligation de la part des détenteurs.

Le prochain objectif du comité interministériel est la préparation d'un projet de loi sur les pesticides, projet qui sera réalisé en collaboration avec le ministère de la Santé nationale et du Bien-être social.

## V Une politique globale

Les pages précédentes nous permettent de constater qu'il est devenu essentiel et urgent d'établir une politique globale de l'environnement.

L'élaboration d'une telle politique présuppose une recherche pour déterminer les critères scientifiques de la qualité de l'environnement, une recherche sur l'aménagement du territoire, spécialement des centres urbains, une recherche dans le secteur des transports, tant en ce qui concerne le véhicule (routier, ferroviaire, naval, aérien) que le réseau, une recherche dans les procédés industriels pour en limiter les rejets, une recherche sur les équipements pour le traitement des déchets solides, liquides, gazeux et dans divers autres secteurs.

Toutes ces recherches devraient être réalisées à l'intérieur d'une politique québécoise des sciences, politique nécessairement coordonnée avec celle du Canada, des États-Unis et des autres pays du monde.

Il faut également prévoir l'instauration d'une politique de l'énergie, en ses aspects qui ont trait à la santé de l'homme et à son milieu.

La mise en vigueur d'une politique globale de l'environnement nécessitera vraisemblablement des réformes importantes dans les structures administratives actuelles. Le nouveau système devra prévoir la centralisation au niveau de la planification et de la recherche, mais la décentralisation au niveau de l'exécution.

Les autorités gouvernementales ont déclaré récemment qu'un organisme unique sera créé au Québec pour s'occuper de la lutte contre la pollution, ceci dans le but d'éviter la duplication des efforts et de remédier à l'inconsistance de l'exécution des politiques et à l'absence d'une vue d'ensemble du problème du milieu.

Les observateurs avertis remarqueront qu'il s'agira pour le secteur eau du troisième changement important en moins de dix ans. En effet, le secteur est passé du ministère de la Santé à la Régie d'épuration en 1961, de la Régie d'épuration à la Régie des Eaux en 1965 et enfin de la Régie des Eaux et autres à l'organisme unique à une date indéterminée.

Pour que le nouvel organisme puisse travailler avec efficacité, il faudra le doter de personnel compétent en qualité et en nombre et des moyens nécessaires pour relever le défi. L'amélioration du milieu coûtera donc très cher. Il faudra tout d'abord planifier, c'est-à-dire se



fixer un objectif, faire l'analyse complète de la situation actuelle, établir les moyens à prendre pour atteindre l'objectif en regard de la situation.

Ensuite, il faudra élaborer un programme ou un plan d'action global en définissant les coûts de réalisation et les bénéfices qu'on peut en retirer. Ceci permettra aux législateurs de faire un choix, d'établir les priorités et de délier les cordons de la bourse en conséquence avec l'appui de la population.

Dans la lutte contre la pollution atmosphérique, la Direction générale de l'hygiène du milieu, de concert avec le contentieux, a préparé un premier document de travail concernant une législation sur la pollution atmosphérique. Ce document a été soumis à dix-sept (17) organismes représentant des groupes d'industries, certains ministères du fédéral et du provincial, des municipalités dont Montréal et aussi certaines universités afin d'obtenir leur appréciation et leurs commentaires. Ces commentaires élaborés et très intéressants ont permis de préparer un second document de travail qui a été transmis à vingt-cinq (25) organismes. Les commentaires de ces organismes ont été analysés et ont permis de mettre au point un projet de loi-cadre.

La législation proposée devait contenir:

- 1 La création d'un centre de décision responsable de l'élaboration de la loi et des règlements, et de centres régionaux responsables de leur application.
- 2 L'approbation des plans et devis, non seulement pour les nouvelles industries ou les autres sources stationnaires de pollution avant leur constitution, mais aussi pour tout agrandissement ou toute modification pouvant entraîner des changements dans la qualité et la quantité des substances évacuées.
- 3 Les pouvoirs de déterminer la qualité de l'air par des études météorologiques et par le dosage des matières polluantes, et d'établir des normes sur la qualité de l'air ambiant.
- 4 Les pouvoirs de classer les sources de pollution de l'atmosphère, de déterminer la ou les classes sujettes aux dispositions de cette loi et des règlements, et de réglementer la qualité des combustibles.
- 5 Un pouvoir d'ordonnance du ministre lorsqu'il est d'avis que la pollution du milieu ambiant a atteint un niveau pouvant présenter un danger pour la santé du public: il devra alors aviser la ou les personnes responsables de l'émission des matières polluantes considérées comme dangereuses de cesser immédiatement.

6 Le pouvoir de réglementer toutes les sources de pollution atmosphérique, y compris les véhicules-automobiles.

7 Le pouvoir de faire de la recherche, de verser des subventions aux universités et aux autres organismes et de leur confier l'étude de certains problèmes relatifs à la pollution atmosphérique.

8 Le pouvoir d'informer le public, d'organiser des programmes éducatifs et de mettre sur pied des comités consultatifs avec les autres ministères, les autres gouvernements, les associations, les industries ou toute personne.

9 Le pouvoir d'appel pour toute personne qui se croit lésée par une décision du ministre suivant la procédure inscrite dans le projet de loi.

La mise en vigueur d'une loi sur l'environnement doit être suivie d'un programme articulé, comprenant la préparation de règlements généraux et de normes, le contrôle réel de la pollution et l'information du public.

Les principes énoncés dans l'avant-projet de législation proposé devraient en général se retrouver dans une loi plus globale sur l'environnement et, dans le plus bref délai possible, on devrait voir au maintien et à l'application des mesures préventives dont l'efficacité est déjà scientifiquement établie.

Les pages précédentes ne constituent qu'un aperçu des problèmes de l'environnement au Québec et des solutions qui sont proposées. Le travail déjà effectué représente une infime partie de l'œuvre à venir. Le Québec vient d'entreprendre une nouvelle étape par la nomination d'un ministre d'État responsable du problème spécifique de la qualité de l'environnement. A l'heure des politiques globales, la concentration des décisions concernant l'environnement était devenue essentielle et sera concrétisée d'ici peu de temps. Les énormes investissements exigés par la conservation de la nature nécessitent une orientation rationnelle. Le Québec se la donne actuellement.

Conférence prononcée par M. Jean Marier, Ing., M.Sc. à Montréal, le 1<sup>er</sup> décembre 1970, à l'occasion d'un symposium organisé par la Société canadienne du Génie chimique et par la Chemical Economics Division of the Chemical Institute of Canada.

Texte et illustration fournis par les bons soins de M. Jean Marier, Ing., M.Sc., directeur intérimaire du Service de l'assainissement de l'air de la Communauté urbaine de Montréal.

# Plan d'action de la communauté urbaine de Montréal à l'égard de la pollution de l'air

Le contrôle de la qualité de l'air est, depuis le 1<sup>er</sup> janvier 1970, une responsabilité de la Communauté urbaine de Montréal dans les vingt-neuf (29) municipalités qui la composent. Le Parlement de la Province de Québec a reconnu son importance grandissante et l'a placée sur le même pied que d'autres responsabilités essentielles, telles que l'approvisionnement en eau potable, la police, l'assainissement des eaux d'égout, le transport en commun, la planification de l'aménagement, qu'il a confiées au nouvel organisme.

Le décision du Parlement est survenue à un moment opportun pour le contrôle de la qualité de l'air. On conçoit facilement que l'air n'a pas de frontières, particulièrement sur le territoire de la Communauté, où les municipalités s'agglomèrent les unes aux autres, leurs limites s'entrecroisant d'une façon souvent fantaisiste. L'identification de certains agents contaminants de l'air, en fonction de la direction des vents, révélait déjà clairement que ces polluants atmosphériques étaient souvent libérés dans des villes autres que celles qui en étaient affectées; qu'un contrôle de ces contaminants était devenu nécessaire, mais ne pouvait être effectué autrement qu'à l'échelle régionale. Sa délégation à la Communauté a donc répondu à un besoin immédiat et pressant.

Il est intéressant de souligner que les limites géographiques de la Communauté, limites tout à fait naturelles, coïncident présentement avec celles sur lesquelles sévissent certains problèmes régionaux et, en particulier, le problème de la qualité de l'air. En principe, il faut qu'un tel contrôle soit exercé par une seule autorité, uniformément, à l'aide d'une unique législation sur tout le territoire où, d'une part, sont localisées toutes les sources d'émissions de contaminants qui créent le problème et où, d'autre part, résident les gens qui en sont affectés.

Le territoire de la Communauté correspond d'une façon remarquable à ces deux normes. Du fait des larges cours d'eau qui entourent la Communauté et agissent comme «tampons», ce n'est qu'exceptionnellement que des sources décelées dans la Communauté peuvent manifester les effets de leurs contaminants à l'extérieur de son territoire ou que des sources existant hors de celui-ci peuvent être perçues par les résidents à l'intérieur. Nous chercherons, au sein de la Communauté, à obtenir une plus grande qualité de l'air et protégerons, ce faisant, les agglomérations humaines qui l'entourent. Quant aux sources localisées à l'extérieur, nous solliciterons l'action des autorités qui ont juridiction sur elles, lorsque des études révéleront notre intérêt direct à leur contrôle.

La Communauté urbaine de Montréal considère comme extrêmement grave la menace qui pèse actuellement sur la qualité de l'air. Il y a quelques années, les contaminants reconnus dans l'air des grandes agglomérations humaines étaient considérés simplement comme une incommodité permanente. On remarquait que certains d'entre eux souillaient les vêtements et les édifices ou encore les attaquaient chimiquement. D'autres étaient une cause d'inconfort pour les personnes résidant dans le voisinage immédiat de leurs sources. L'ignorance des autres effets de la pollution de l'air a été la cause principale de certaines lenteurs à l'établissement de contrôles à ce sujet.

Des accidents survenus dans certaines villes du monde, où la pollution de l'air a atteint un degré tel que des décès en ont résulté, ont suscité un peu partout des études approfondies visant à préciser les effets des contaminants atmosphériques sur la santé. On commence à préciser les degrés de pollution susceptibles de causer la mort, ainsi que d'autres stades à partir desquels l'organisme est perturbé pour la durée de l'exposition aux contaminants ou, parfois,

endommagé d'une façon permanente. La Communauté a tenu compte de ces niveaux dans sa législation et s'est fixée, en ce qui concerne certains contaminants, une limite destinée à protéger les gens, non seulement contre la mort, mais également contre tout effet possible, même mineur et sporadique.

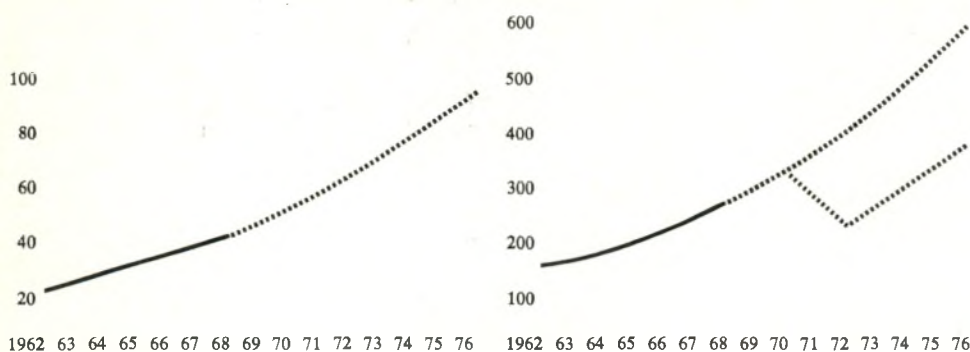
De plus, la Communauté adopte les vues des écologistes qui déterminent certaines indications relatives au fait que la population terrestre a atteint ou va atteindre bientôt des proportions telles qu'elle menacera la nature. Notre «environnement» est un prodige de conception, mais demeure une constante des plus complexe. Nous avons appris qu'il est constitué de plusieurs cycles de substances vitales à tous les organismes: cycle de l'eau, cycle du soufre, cycle de l'azote, cycle de l'oxygène, cycle du carbone. Il existe un mouvement perpétuel dans chaque cycle, mais chacun repose sur un équilibre naturel: l'eau tombe des nuages en grande quantité et elle est évaporée de la mer en telle quantité que le volume des nuages et le niveau de la mer demeurent constants.

De même, l'azote se retrouve dans l'air, l'eau et le sol où il peut former cinq ou six différentes combinaisons avec d'autres substances. Comme l'eau, son cycle est dynamique. Toutefois, lorsqu'on le mesure dans l'air, il y réside toujours dans les mêmes proportions par rapport aux autres constituants et forme un équilibre. Quand on se rend compte que tous les cycles sont interdépendants et réagissent les uns sur les autres, que chaque substance dans ces cycles est continuellement transformée par des forces physiques, telles que la température, la lumière, l'humidité, et par des organismes tels que les bactéries, les plantes et les animaux; que les forces physiques et les organismes maintiennent leur propre équilibre en relation avec la concentration des substances transformées par eux, il est facile d'imaginer la possibilité de dérèglement de notre environnement. Les hommes n'ont



Consommation totale d'huile  
Barils (Imp) x 10<sup>6</sup>

Émission d'anhydride sulfureux  
Tonnes x 10<sup>3</sup> par année



pas atteint ce stade jusqu'à présent parce que les quantités des contaminants rejetés dans l'environnement étaient encore faibles, mais la situation est sur le point d'évoluer de façon alarmante. On rejette déjà dans l'air de la Californie, d'une façon artificielle, 1/15 de la quantité d'oxydes d'azote que la nature y envoie; le DDT et le mercure s'accumulent dans les organismes des poissons et des oiseaux à des doses mortelles; les phosphates altèrent le régime naturel des lacs et des rivières. Nous devons donc considérer la pollution de l'air, non seulement comme un inconvénient, non seulement comme une menace directe à la santé, mais aussi comme un danger possible à l'environnement dont nous dépendons tous pour survivre.

Il n'y a pas lieu, cependant, d'être pris de panique devant ce problème. D'abord, la panique est l'ennemi des solutions rationnelles et il faut se souvenir que l'humanité a été placée face à des problèmes sérieux qui ont menacé son existence et qu'elle les a résolus d'une façon satisfaisante. Les problèmes auxquels nous faisons allusion ont été causés, tout comme la pollution de l'air, par deux facteurs analogues: l'urbanisation et le progrès technologique avec ses séquelles, industries multiples et production innombrable et variée.

Nous évoquons, lorsqu'il s'agit de dresser un parallèle, la protection contre les incendies. Il est survenu, dans le passé, des catastrophes: le feu naissant dans un bâtiment s'étant propagé, dans certaines circonstances données, à des villes entières qu'il a anéanties. L'analyse des circonstances qui ont causé ces catastrophes a amené l'introduction, dans des législations appropriées, de toutes sortes de restrictions dans la construction des bâtiments, leur isolement, l'emploi obligatoire de matériaux moins combustibles, l'incorporation aux bâtiments de systèmes protecteurs, l'organisation de services de lutte contre les incendies. Aujourd'hui, la hantise du feu se propageant à une

ville entière a disparu, lorsque cette ville est bien organisée et qu'elle a établi les contrôles préventifs au stade de la construction. Le contrôle est encore incomplet et se voit constamment amélioré, mais il a déjà obtenu la confiance publique. Nous pouvons et devons agir de même dans le cas de la pollution de l'air.

La Communauté urbaine de Montréal est pleinement consciente de la nécessité d'améliorer la qualité de l'air. Elle avait à peine trois mois d'existence lorsqu'elle a adopté une législation qui se compare favorablement aux législations les plus restrictives et qui est même futuriste sur certains points.

Le règlement touchant la pollution de l'air est le premier recueil de mesures législatives imposées à la population par la Communauté, les quelques autres règlements adoptés antérieurement visant à l'établissement de structures internes.

La Communauté a tracé un programme bien défini. Elle cherchera d'abord à obtenir que le brûlage des combustibles pour le chauffage de bâtiments, la production de vapeurs ou d'énergie ait lieu avec tous les contrôles et toutes les précautions nécessaires pour diminuer au maximum les quantités de contaminants dans les domiciles comme dans les édifices commerciaux ou industriels.

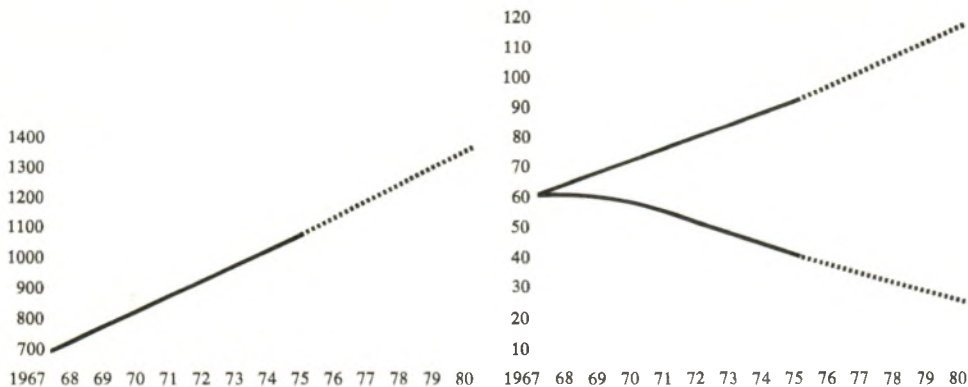
De telles mesures ont déjà été prises dans plusieurs municipalités de la Communauté et ce avec succès, tel que le révèle le calcul des premières retombées à Montréal depuis 1959. Le niveau moyen de ces poussières lourdes, exprimé en tonnes par mille carré par mois, a été abaissé de 47 à 16. Cet exploit a déjà été signalé avant aujourd'hui, quoiqu'il semble encore assez ignoré du public. Nous n'avons pas l'intention, en l'évoquant à nouveau, de nous reposer sur nos lauriers et de nous en servir comme prétexte pour ne pas aller plus avant. Loin de là, car les restrictions touchant le brûlage des combustibles, non seulement seront

maintenant étendues à toutes les municipalités de la Communauté, mais encore elles seront désormais plus sévères. Le degré d'opacité des fumées permises par le règlement de la Communauté a été abaissé de 2 à 1, selon l'échelle Ringelmann. De plus, des méthodes précises sont spécifiées pour le nettoyage et l'entretien des appareils de chauffage.

Nous avons cru devoir, toutefois, reparler de l'abaissement du taux des poussières retombées pour fournir la précision suivante à ceux qui s'inquiètent pour l'avenir et considèrent l'environnement du globe infailliblement, irrémédiablement voué à la détérioration totale: il est possible, et cela s'est fait ici, non seulement d'empêcher la pollution d'augmenter dans l'air, malgré la multiplication et l'accroissement continuels de ses sources, mais encore d'en diminuer la teneur et de se rapprocher de plus en plus des conditions d'antan. La nature seule, sans intervention de l'homme, est cause d'une retombée de poussières de cinq à dix tonnes par mille carré par mois. Un grand pas a donc été fait pour retrouver les conditions naturelles. Le processus de réduction ainsi accompli peut être répété à l'encontre des autres contaminants.

De fait, la Communauté vise déjà à la diminution de l'anhydride sulfureux contenu dans l'air baignant son territoire. C'est là un autre objectif de son programme. Les mesures nécessaires à l'amorce de ce programme ont déjà été prises. Le règlement relatif à la pollution de l'air interdit, déjà depuis le 1<sup>er</sup> octobre 1970, l'utilisation ainsi que la distribution pour utilisation de certains charbons et de certaines huiles à teneur trop élevée en soufre et qui étaient auparavant vendus et brûlés. Le soufre, qui constitue une partie intégrante de ces huiles et charbons, est la source de l'anhydride sulfureux émis dans l'air lors de leur combustion.

Nombre de véhicules x 1000

Émission du monoxyde de carbone  
Tonnes x 10<sup>4</sup> par année

La Communauté a exigé d'avance que la teneur en soufre soit réduite d'un autre cran le 1<sup>er</sup> octobre 1971, puis d'un autre, à la même date, l'année suivante. Il a été précisé aux fournisseurs d'huile et de charbon que cette purification progressive de leurs combustibles sera intensifiée jusqu'à ce que la qualité de l'air qui a été déterminée à propos de l'anhydride sulfureux et qui est déjà définie dans la législation comme objectif à poursuivre, soit atteinte. Durant les trois prochaines années, la concentration de ce gaz dans l'air sera abaissée progressivement à plus de la moitié de ce qu'elle a été jusqu'à présent.

Il serait idéal d'atteindre immédiatement cet objectif et d'adopter tout de suite les moyens de l'atteindre. Cependant, cela n'est pas possible. D'une part, nous dépendons dans la proportion de 80 p. 100 des huiles pour nous fournir la chaleur nécessaire durant les froids rigoureux de notre hiver; d'autre part, les fournisseurs d'huile ne peuvent prendre que graduellement les mesures nécessaires à l'épuration de leurs produits.

Le fait que l'air ne sera pas débarrassé de l'anhydride sulfureux, dès le premier hiver, au degré désiré et préconisé par les hygiénistes, cause de l'inquiétude à beaucoup de gens. Il nous apparaît nécessaire d'apporter le plus d'éclaircissements possible sur la signification de la limitation à un dixième de partie par million d'anhydride sulfureux par vingt-quatre heures dans l'atmosphère de la Communauté. Depuis que la teneur de cette substance dans l'air est fournie aux organes d'information chaque jour de l'année, la limite en question, qui a été adoptée par la Communauté comme un objectif de pureté de l'air à atteindre, d'ici quelques années, a été qualifiée de limite de danger. Le mot: «danger», ici, n'ayant pas été défini par les organes d'information, certains s'inquiètent pour leur vie dès que la limite est juste dépassée.

Il nous faut dire que cette limite est une concentration en-dessous de laquelle aucune altération pathologique, si mineure soit-elle, ne doit se produire. Elle a été ainsi définie par le Service de santé de Montréal, dans le rapport qui a donné lieu à la législation adoptée pour la Communauté. Il faut que la concentration d'anhydride sulfureux s'élève bien au delà de cette limite pour causer des décès et ce, chez des personnes gravement affectées déjà par des maladies respiratoires.

Entre la limite d'un dixième de partie par million et la dose capable de faire mourir des personnes malades se situe une zone de concentrations que nous aurons à subir durant l'hiver de 1970-1971. Les effets de l'anhydride sulfureux sur ces concentrations seront transitoires et surmontables et comme ils ne se répéteront pas les années à venir, ils ne laisseront pas de trace permanente, d'après les autorités médicales qui ont étudié le problème.

Les concentrations des principaux contaminants de l'air seront déterminées constamment sur le territoire de la Communauté et si, à certains moments, en raison de la stagnation de l'atmosphère, elles atteignent des niveaux prédéterminés où il y a danger d'effets permanents sur les humains ou encore de mortalité, des mesures visant à réduire ou à arrêter certaines activités génératrices de pollution sont prévues et deviendront alors obligatoires en vertu d'un nouveau règlement adopté par la Communauté.

Actuellement, les personnes particulièrement vulnérables parce qu'elles sont déjà atteintes de maladies respiratoires, pourront se protéger en évitant le plus possible de sortir à l'extérieur, car la concentration de l'anhydride sulfureux est toujours beaucoup plus basse à l'intérieur qu'à l'extérieur des bâtiments.

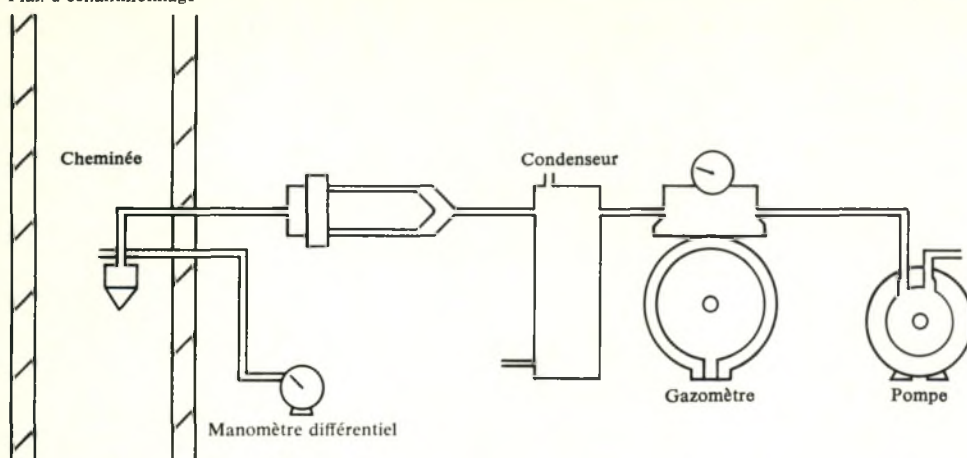
Un troisième point du programme de la Communauté, pour assurer un air de la plus grande qualité possible, est la lutte contre la pollution causée par les véhicules,

surtout les véhicules automobiles. Ces derniers sont responsables de la presque totalité du monoxyde de carbone trouvé dans l'air, d'une partie des hydrocarbures et des vapeurs nitreuses qui y sont présents et qui, dans certaines circonstances, peuvent se combiner pour former des oxydants, substances très toxiques. Les études actuellement faites n'ont pas révélé que les oxydants s'élevaient ici à un niveau inquiétant, mais elles seront poursuivies pour parer à tout changement de circonstances. Par ailleurs, les déterminations du monoxyde de carbone ont démontré que le gaz approchait des concentrations capables de produire chez les humains certains légers effets physiologiques ou atteignait même ce point. La réduction du monoxyde de carbone et, en même temps, des hydrocarbures, peut être effectuée par des dispositifs incorporés aux automobiles lors de leur fabrication et le contrôle du bon fonctionnement de ces dispositifs par les garagistes. Les gouvernements supérieurs pouvant seuls efficacement exiger ces dispositifs et leur bon état de marche, la Communauté a fait auprès d'eux et continue de faire les demandes nécessaires pour qu'ils les adoptent. Le gouvernement fédéral vient de prendre quelques décisions à cette fin et nous espérons que le gouvernement provincial les complètera sous peu. De son côté, la Communauté reprendra sous peu l'échantillonnage du monoxyde de carbone, pour définir la purification de l'air qui sera assurée par ces mesures. Au fur et à mesure que les nouvelles automobiles modifiées remplaceront les présentes, la teneur en monoxyde de carbone et en hydrocarbures sera abaissée.

Un autre point du programme de la Communauté concerne les incinérateurs. Nous nous empressons de dire ici que nous regardons le brûlage des déchets, à l'endroit même où ils sont produits, comme la méthode la plus hygiénique et la plus économique de les éliminer, si l'on ne tient pas



Plan d'échantillonnage



compte de l'air. Les bactéries pathogènes pouvant être contenues dans les déchets sont immédiatement détruites par le feu et les cendres, dont le volume est réduit, sont transportées et enfouies dans des terrains appropriés avec un minimum de frais. Toutefois, l'expérience a démontré clairement que la plupart des incinérateurs en usage dans la Communauté polluent l'air intensivement et le public s'élève de plus en plus fortement contre leur utilisation, et ce, à juste titre. Il a été, par conséquent, interdit de s'en servir dorénavant à moins que leurs propriétaires ne les munissent d'appareils anti-pollution efficaces. Plusieurs propriétaires se sont déjà conformés au règlement de la Communauté à ce sujet; les autres, encore récalcitrants, sont avertis puis traduits en Cour s'ils persèverent dans leur attitude. Trente poursuites ont déjà été intentées ces derniers temps pour des délits de cette nature.

Le programme de la Communauté englobe enfin les industries. Plusieurs d'entre elles se classent parmi les plus grandes consommatrices de combustibles et sont les plus touchées par les restrictions imposées aux émissions d'anhydride sulfureux et par l'obligation de n'utiliser que des combustibles à basse teneur en soufre, restrictions et obligations auxquelles elles devront se conformer. Une limite bien précise des quantités de poussières qu'elles peuvent émettre est également fixée et le règlement exigera de certaines d'entre elles des efforts considérables pour la purification de l'air qui les entoure. Enfin, celles qui rejettent dans l'air divers déchets chimiques, autres que l'anhydride sulfureux et les poussières, devront limiter ces déchets de façon à ne pas menacer la santé à quelque degré que ce soit. Déjà, plusieurs municipalités ont contraint un certain nombre d'industries à limiter leurs émissions de contaminants. La Communauté intensifiera ses efforts en ce sens, avec comme objectif de faire de toutes les industries, des industries «propres», par-

faitement incorporées au milieu urbain où résident des millions d'individus. A cette fin le concours des chimistes est nécessaire. Avec la même intelligence et la même ardeur employées à trouver une multitude de procédés pour fabriquer une multitude de produits, ils doivent aujourd'hui, améliorer, modifier ou changer ces procédés pour qu'à l'avenir, ils se poursuivent en vase clos.

Enfin, certains se demandent combien coûtera la lutte contre la pollution de l'air. Il est impossible de le déterminer comme il était impossible, il y a cent ans, de dire combien devait coûter la protection contre le feu. Comme cette dernière activité, la protection de la qualité de l'air se révélera une œuvre permanente, nécessitant périodiquement de nouvelles mesures avec les développements technologiques qui ne cesseront de s'effectuer à un rythme de plus en plus accéléré. Nous possédons peu de chiffres sur les mesures prises actuellement. Il n'est pas possible d'évaluer financièrement les dommages actuels ou possibles à la santé et la recherche d'un tel coût serait purement théorique. Nous ne pouvons pas décider si, oui ou non, nous lutterons contre la pollution de l'air en évaluant ce qu'il nous en coûtera, compte tenu des dommages que nous subirons. La réponse ne peut qu'être affirmative, puisqu'il s'agit d'une nécessité.



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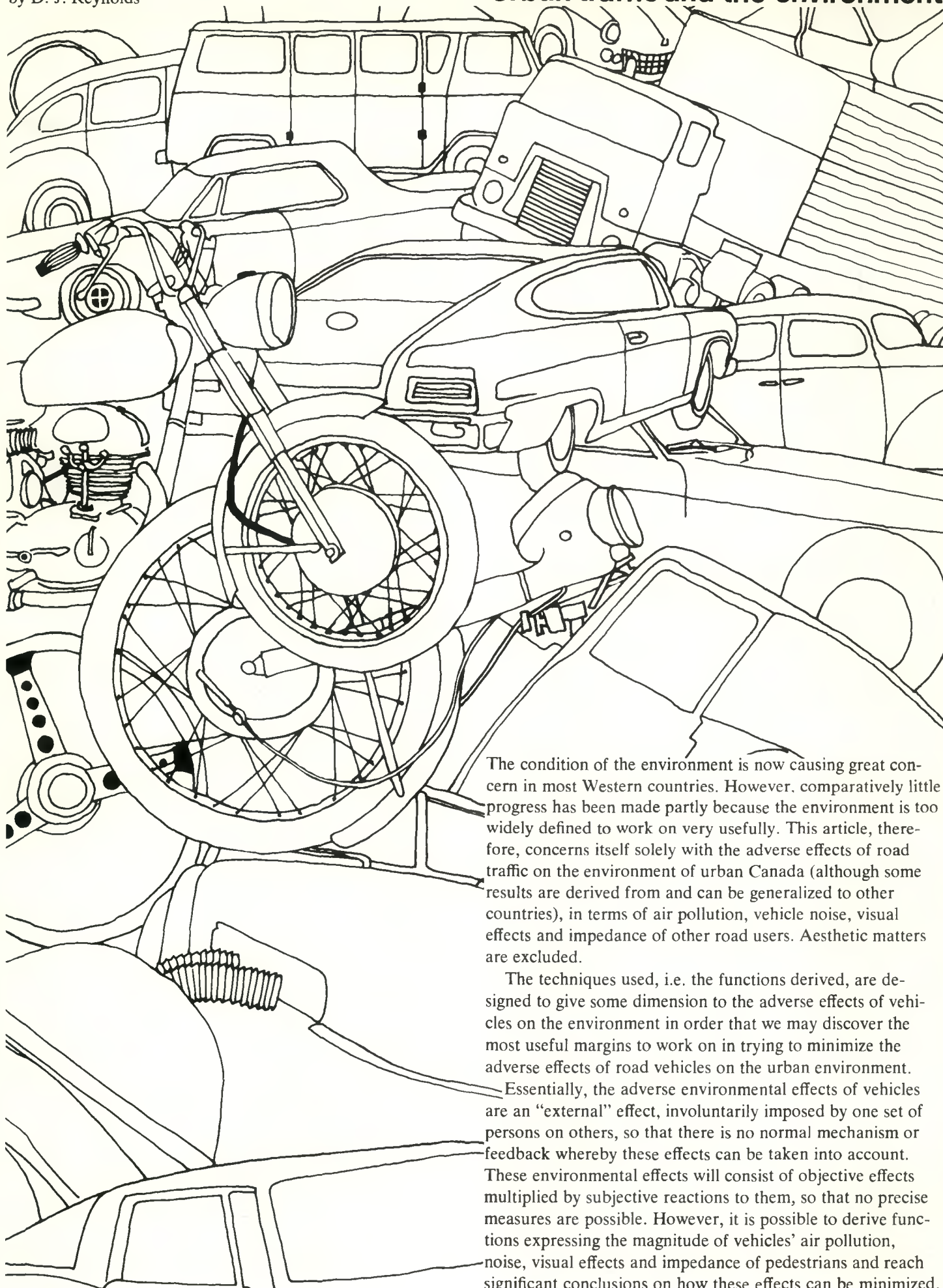
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## Urban traffic and the environment



The condition of the environment is now causing great concern in most Western countries. However, comparatively little progress has been made partly because the environment is too widely defined to work on very usefully. This article, therefore, concerns itself solely with the adverse effects of road traffic on the environment of urban Canada (although some results are derived from and can be generalized to other countries), in terms of air pollution, vehicle noise, visual effects and impedance of other road users. Aesthetic matters are excluded.

The techniques used, i.e. the functions derived, are designed to give some dimension to the adverse effects of vehicles on the environment in order that we may discover the most useful margins to work on in trying to minimize the adverse effects of road vehicles on the urban environment.

Essentially, the adverse environmental effects of vehicles are an "external" effect, involuntarily imposed by one set of persons on others, so that there is no normal mechanism or feedback whereby these effects can be taken into account. These environmental effects will consist of objective effects multiplied by subjective reactions to them, so that no precise measures are possible. However, it is possible to derive functions expressing the magnitude of vehicles' air pollution, noise, visual effects and impedance of pedestrians and reach significant conclusions on how these effects can be minimized.

Much discussion of the environment in Canada and apparently most other advanced countries of the world is now taking place, but it is difficult to make progress for various reasons. In part this may be because the environment is such a wide concept that, being everyone's business, it is difficult to work on to the requisite width and depth. It may be that the term environment is widely and vaguely defined to include all sources of satisfaction and dissatisfaction in our lives—recreation, wild life, ecology, aesthetics, air and water pollution, the adverse effects of road traffic—and also all the physical, economic, social, administrative and political aspects of life.

Since, ultimately, everything tends to depend on everything else, this view may be entirely natural, but it is far too wide and amorphous to enable us to narrow down, structure and define the separate aspects of the environment so that we can work on them in some depth and detail so as to better understand them and what it may be possible to do about them.

From the nature of road traffic and the environment it is clear that (in the economist's terminology) we are mainly concerned with "externalities"—one set of people with their behaviour and equipment imposing losses on others who are involuntarily exposed to them, such that the persons imposing the losses cannot take account of them in choosing their behaviour and equipment, and the persons suffering the losses have no direct remedy or 'feedback' apart from a limited ability to avoid noxious conditions. The losses or costs involuntarily imposed by urban traffic normally take 4 forms:

- i Fumes and air pollution.
- ii Noise.
- iii Visual intrusion—the sight of many vehicles, either moving or stationary.
- iv Impedance of others (i.e. pedestrians).

Carrying on to structure the effects of road traffic on the environment it seems that we must be concerned with total problems, e.g. the whole problem of air pollution (including the contribution of road traffic) if this should be critical, and the partial problems of road traffic itself. In addition we must consider both the objective and subjective effects of road traffic on persons involuntarily exposed to them.

Therefore to complete this preliminary structuring of the effects of road traffic on the environment it seems that we are concerned with two problems at different levels:

- a Total objective effects on the environment, if these appear to be objectively critical and harmful, e.g. air pollution.
- b Partial subjective effects, which take the form of subjective irritation, made up of objective effects and subjective reactions to them.

### **Total Objective Critical Effects on the Environment and the Contribution of Road Traffic to Them**

Of the effects of urban road traffic, it seems unlikely that noise, visual effects, and impedance will contribute to a total objective and critical effect on the persons involuntarily exposed to them, for example, an adverse effect on their health. It seems fairly clear, therefore, that the most critical total effect in which urban road traffic plays a part will be air pollution and its effects on the health of the persons exposed to it. If only because of the widespread attention and concern which this question is receiving in Canada and North Amer-

ica, it is necessary to consider urban air pollution, and the contribution of the vehicle to it, seriously. However, it is not generally possible to consider the effects of air pollution on ecology as the latter represents such a long complex chain of gainers and losers that the possibilities for doing this seem remote.

### **Air Pollution**

Having structured and narrowed down the environmental problem in terms of road traffic we are now faced with the problem of giving it dimensions. By adapting some data from the USA,<sup>1</sup> it is possible to place some broad orders of magnitude on air pollution in Canada and the contribution of the road vehicle to it on the evidence available at the time of writing (early 1970).

The tonnages of air and pollution may be taken as preliminary measures. The land area of Canada is some 3½ million square miles. Each square mile has some 30 million tons of air above it, giving a total of about 100 trillion ( $100 \times 10^{12}$ ) tons of air into which pollutants can be discharged. If Canadian road vehicles produce the same annual volume of pollutants per vehicle as U.S. vehicles in 1966,<sup>1</sup> and other outputs of pollutants are at the same per capita rate, we can expect some 15 million tons of pollutants to be discharged in 1970, of which road vehicles would account for about 9 million tons, the average road vehicle accounting for about 1 ton of pollutants per annum.

Overall, therefore, the air pollution problem in Canada is negligible since the annual discharge accounts for less than one millionth of the tonnage of the atmosphere. However, if we consider the distribution and concentration of pollution a somewhat different picture emerges. The urbanized area of Canada (as defined) accounts for about 0.1% of the total or about 3,500 sq. miles, and if half the vehicle pollution and ¾ of the non-vehicle pollution is discharged in this area we will have 9 million tons of pollutants annually discharged into some 100 billion tons ( $100 \times 10^9$ ) of air above, a concentration which, though still very small and dispersible by wind, is some 600 greater than average. Finally, on the same line of reasoning, in the 9 major cities, if the output of pollutants per vehicle were the same as the 1966 U.S. level, and other sources per head were equal to the U.S. level, we would expect some 5 million tons of pollutants (of which half would be attributable to road vehicles) to be annually discharged into some 30 billion tons of air above, a concentration some 1000 times the national average and almost twice the national urban average. It must be remembered that this level of pollution will be experienced by almost half the population of Canada.

These global figures are of limited significance, but they do illustrate that total and vehicular pollution (subject to wind speed, inversions\* etc.) tend to be inversely related to population density. On this ground alone we would expect the average level in Canada to be less than 10% of the average U.S. level and, if the population densities of our growing and spreading cities do not increase, the degree of air pollution in

The abnormal situation which occurs when a blanket of warm air traps cold air beneath and normal atmospheric turbulence ceases.



these cities from road vehicles will only increase at about the same rate as the increase in vehicles per head, that is by about 40% by end-century. Insofar as the emission of pollutants per vehicle is reduced below 1966 U.S. levels, the future increase will be correspondingly less.

However the overall tonnage of pollutants is a misleading measure as the outputs of the various pollutants from vehicles and other sources differ, and they each have different direct and indirect effects on health, comfort and so on. Therefore, based on the 1966 levels of pollutants emission by vehicles<sup>1</sup> and from other sources,<sup>2</sup> an attempt can be made to build up a picture of 1970 outputs of pollution in the 3,500 sq. miles of urban Canada.

**Table 1**  
**Estimated Air Pollution in Urban Canada. 1970\***

Pollutants	Annual Output by Road Vehicles (million tons)	Output by Other Sources (million tons)	Totals	% of Total	% attributable to Road Vehicles
Carbon Monoxide	3.3	0.4	3.7	40	90
Sulphur Oxides	0.1	1.9	2.0	22	5
Hydro-carbons	1.2	0.5	1.7	19	63
Particles	0.1	0.8	0.9	10	11
Nitrogen oxides	0.3	0.5	0.8	9	38
Totals	5.0	4.1	9.1	100	55

From Table 1 it can be seen that in tonnage terms by far the biggest urban pollutant, accounting for 40% of the total, is carbon monoxide, and of this total road vehicles account for about 90%. The next most important pollutants are sulphur oxides (about 20%) in which, however, the road vehicle plays a small part, followed by hydro-carbons (19%) in which the road vehicle plays the major part, followed by particles and nitrogen oxides in which road vehicles play minor parts. Overall the road vehicle seems to be the major contributor to the tonnage of urban pollutants, accounting for about 55% of the total.

The direct and indirect effects on health of these pollutants are complex, controversial and do not seem to be fully known.<sup>1</sup> The biggest source of urban pollution, carbon monoxide, is odourless but toxic and, added to other sources of carbon monoxide (for example from smoking) combines with the hæmo-globin in the blood to reduce the supply of oxygen to the body to produce reduced vision, slow reactions, headaches and, in extreme concentrations, death. Although its effects are not cumulative over long periods, exposure is an important factor in increasing the concentration in the blood so that most standards for safe levels of carbon monoxide are expressed in terms of so many parts per million for so many hours exposure, for example 50 parts per million for an 8 hour exposure.<sup>1</sup>

More detailed measurements of carbon monoxide concentrations at offstreet stations in 15 major U.S. cities indicate average carbon monoxide levels of about 7 parts per million (ppm) with maxima up to 32 ppm.<sup>1</sup> At stations 10 to 30 ft. from the kerb, however, the figures can be some 2 to 7 times these levels, maximum brief concentrations can exceed 100 ppm, and in conditions of still air these levels can be doubled in periods of peak traffic.<sup>1</sup> Indeed in extreme cases highly localised concentrations for short periods can reach 360 ppm.<sup>2</sup> However concentrations in Canadian cities seem to be less than these, for the largest cities in Canada seemed to have an average downtown concentration of about the same as the average downtown concentration in the 15 major U.S. cities.<sup>3</sup> The various standards proposed for the maximum permissible levels of carbon monoxide concentration range from 10 to 50 ppm for an 8 hour exposure,<sup>1</sup> so that although these concentrations can be exceeded it is unlikely that more than

## A Current Exhaust Control System

A great deal of time, effort and money is being spent in attempts to curb the family car's contribution to both noise and air pollution. Muffler efficiency is being increased and engine modifications are being developed which, it is hoped, will drastically reduce the volume of air pollutants generated under normal operating conditions.

The pollutants generated in the operation of the standard internal combustion engine are, generally speaking, the result of incomplete combustion of the air-fuel mixture. It follows, therefore, that in order to reduce or, preferably, eliminate the large volume of undesirable hydrocarbons, carbon monoxide and oxides of nitrogen being exhausted into the atmosphere, engine modifications are needed which will improve the level of fuel combustion. The ultimate aim being complete burning with its relatively harmless by-products—carbon dioxide, water and nitrogen.

This is the pattern being followed by the nation's largest producer of automobiles, General Motors of Canada, in the design of its 1971 family of truck and car engines (and the course adopted by the majority of other major motor vehicle manufacturers.) It is conceivable that the introduction of new fuels or different forms of propulsion may, at some future date, provide a better answer to this particular pollution problem but, at the moment, improved combustion of petroleum products appears to offer a satisfactory interim approach.

To attain this end, General Motors has devised what it refers to as a *Controlled Combustion System*—an exhaust control system

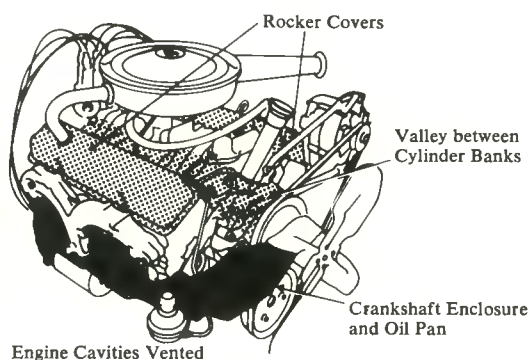
very few people (bus, taxi-drivers and traffic police) will suffer such exposure and special measures can be taken to protect them.

The effects on health of hydro-carbons, the other source of pollution for which road traffic is primarily responsible, are less well understood. They have little direct effect at the concentrations usually present in polluted atmospheres, but some hydro-carbons interact with oxides of nitrogen in sunlight to produce smog, eye irritation, and damage to vegetation. This photo-chemical reaction also produces ozone which has damaging effects on vegetation and materials, and has irritating effects on the eyes, throat and lungs.\*

\* It should perhaps be noted that conditions in Los Angeles, which is notorious in these respects, are the result of a fairly unique combination of circumstances, and are unrepresentative of what will occur in low density car-owning cities.<sup>2</sup> Indeed pollution in Los Angeles seems to be decreasing,<sup>4</sup> for in spite of an 11% increase in vehicles from 1965 to 1969, the tonnage of pollutants seems to have fallen by 12%.

The only other pollutants attributable to cars which are worthy of mention are nitrogen oxides, which can produce damage to plants, and discolouration of the atmosphere, but with uncertain effects on health at normal concentration, and the lead which results from fuel additives. Although lead is emitted in very small concentrations and its influences on health are uncertain at the atmosphere concentrations experienced, its effects are toxic and may be cumulative and because of these hazards (and effects on exhaust emission controls) there is a trend towards reducing lead additives in gasoline.

*Chevrolet Closed Positive Engine Ventilation System for Small Displacement V8 Engines*

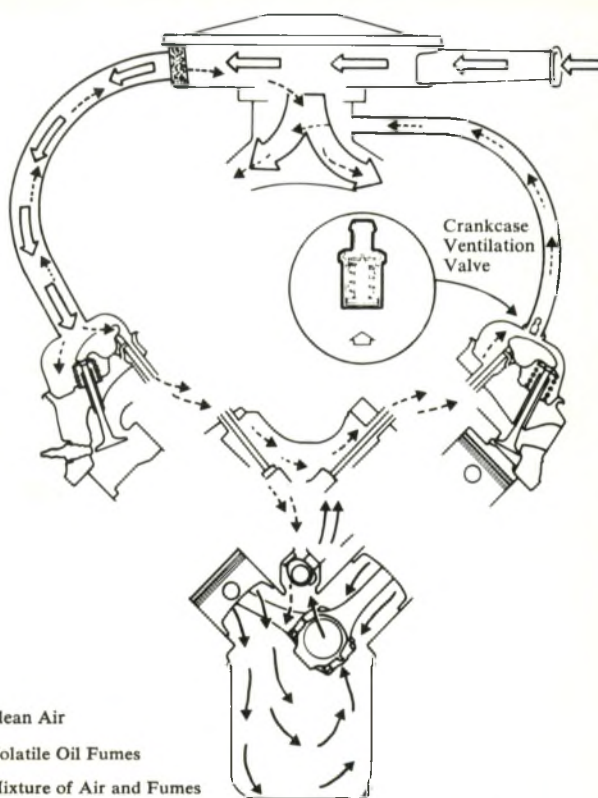


using specifically designed engine components which will control emission by minimizing the initial formation of harmful by-products. In other words, components which, through correct adjustment of carburetion, timing and other functions improve the level of combustion achieved within the power plant.

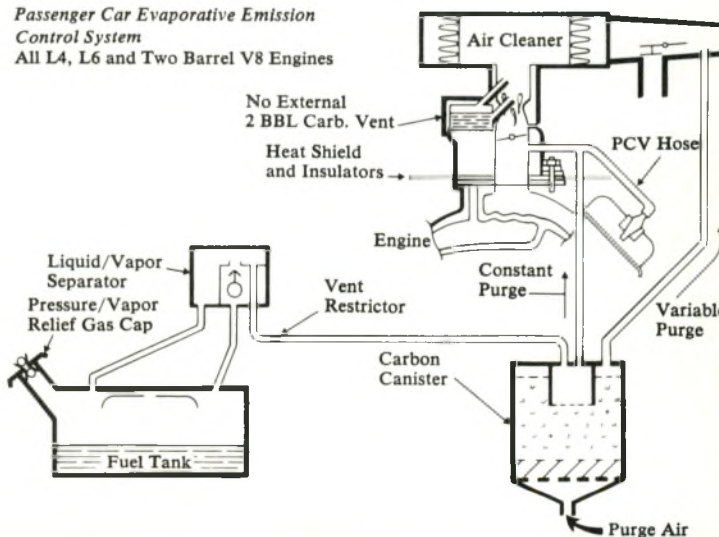
Two other systems developed by GM, also designed to improve combustion, are an *Air Injection Reactor System* and a *Heated Air System*. The former, which incorporates all components of the Controlled Combustion System, is an exhaust emission control system which utilizes the injection of air into the engine exhaust parts. The Heated Air System is designed to warm the air entering the carburetor when the underhood temperature is low, thereby improving the burning characteristics of the air/fuel entering the combustion chamber.

Other sources of automobile air pollution are the evaporation of gasoline from the fuel tank and the generation and exhausting of volatile gases from the crankcase.

Two additional systems designed to control these are referred to by GM as the *Evaporation Control System* and the *Crankcase Emission Control System* respectively. The first of these removes the volatile fumes from a sealed gas tank, passes them through a canister containing activated carbon and introduces them into the engine at the carburetor. In the second system, fresh air is supplied to the crankcase from the air cleaner, mixed with blow-by gases and channeled through a positive crankcase ventilation (PCV) valve into the induction system.



*Passenger Car Evaporative Emission Control System All L4, L6 and Two Barrel V8 Engines*





## Factors Affecting Output of Pollutants and Ways of Reducing Them

Having established as far as possible the objective magnitudes and effects of vehicle pollution, we can now turn towards the causes of vehicle pollution with a view to its future reduction so as to at least reduce the objective dangers to health and offset the impending increase in vehicles per head.

Turning to the present internal combustion engine and the gasoline engine in particular, it has been established that if gasoline is combined with sufficient air (at least 14.7 lbs per lb of fuel) complete combustion takes place to produce only carbon dioxide, nitrogen and water.<sup>1,2</sup> In practice, for various reasons (chiefly concerned with flexibility of performance), the gas/air mixture is richer than this, producing incomplete combustion which produces, in addition to carbon dioxide, nitrogen and water, the pollutants listed in Table 1 above. Because of its leaner mixture, higher compression ratio and fuel injection into the cylinder, the diesel engine is more economical of fuel and less pollutant than the gasoline engine (apart from smoke emissions), but even where heavy fuel taxation favours its use (as in Europe) it has not been adopted for car use on any scale, presumably because of its smell, noise and poorer acceleration.

Returning to the gasoline engine, in general the richer the mixture (fuel/air ratio) and the greater the power requirements, the greater the output of pollutants per vehicle mile. Thus they are at a maximum during idle, deceleration and acceleration, and at a minimum whilst cruising at moderate and constant power.<sup>1,2</sup> To a limited extent, therefore, pollution per vehicle mile can be reduced by road design and road investment, in particular by eliminating at-grade intersections, investing in urban freeways (preferably with low speed limits) and encouraging dispersal of traffic. In general pollution can also be reduced by eliminating serious congestion, for British research<sup>2</sup> has shown that an increase in traffic volume sufficient to reduce journey speed from 15 m.p.h. to 7½ m.p.h. would tend to quadruple pollution.

To go further than this, it is necessary to examine the sources of pollution in the gas-engined vehicle. Some U.S. research<sup>1</sup> has indicated that the sources and outputs of pollutants from a typical non-pollutant controlled 1966 car were as follows:

**Table 2**  
**Annual Outputs of Pollutants From Typical Non-pollutant Controlled 1966 U.S. Car.**

Source	Output of Pollutants. Lbs per annum			
	Carbon Monoxide	Hydro-Carbons	Oxides of Nitrogen	Total
Crank-case		130		130
Evaporation		90		90
Exhaust	1700	300	90	2090
Totals	1700	520	90	2310

Now the significance of Table 2 is that by crank-case control\* and by reasonable and attainable current standards of exhaust control (applicable in California since 1968) the output of pollutants per vehicle mile could be more than halved, and the progressive raising of standards could reduce total emissions by up to 86%, to only 14% of the total given in Table 2.<sup>1</sup>

Even though such a programme may be optimistic—some of the improvements may be eroded as vehicles age, and new vehicles only gradually replace the old—there seems little doubt that by following the U.S. in imposing higher standards for new vehicles, it should be possible to reduce pollution per vehicle sufficiently to off-set future growth in vehicles per head, and sufficiently to secure a reduction in total pollution in our cities.

To secure a reduction in the degree of urban pollution (annual tonnage of pollutants  $\pm$  tonnage of air above urban areas) sufficiently to off-set a growth of 40% in vehicles per head by end-century, will only require a 30% reduction in pollutant output per vehicle; any greater reduction will tend to reduce the degree of total pollution. However, although the degree of urban pollution may be reduced in the future it will still be necessary to consider very carefully, imperfectly known dangers (for example lead), extreme conditions of windlessness and inversion, and highly localised concentrations of pollutants (particularly of carbon monoxide) with a view to segregation and otherwise reducing the exposure of vulnerable people.

But there seems little doubt that by following through the higher standards imposed by the U.S. on new road vehicles we can look forward to a reduction in the degree of vehicle pollution, and perhaps in total pollution, in Canada. This is entirely to be expected for because road vehicles have been such serious pollutants, and because so little had been done to reduce their pollution until recently (1963) a considerable improvement should be possible for comparatively little effort and cost.

## Other Methods of Reducing Vehicle Pollution

Many other methods for reducing the output of pollutants from urban transport must be considered. Most radically it is proposed that cars should be banned in favour of public transit systems, but in view of the possibilities for progress by other means, such a ban would be almost impossible to justify, and any lesser degree of aid to transit (e.g. free transit) would probably only attract a small proportion of car users in most cities.

Less radical measures include the encouragement or insistence on the use of smaller cars (of conventional design) which with smaller fuel consumptions, tend to emit less pollutants. However, if smaller cars have lower power/weight ratios they will probably tend to worsen urban congestion, and if enforced on a large scale would probably be well away from the car preferences of most families, although smaller (second) cars will undoubtedly play an increasing part in the urban scene.

Other forms of fuel for internal combustion engines (methane or propane) can be considered with higher costs and

\* Already imposed on new vehicles by the state of California, the U.S. Federal Government and by the province of Ontario.

benefits as compared with the improved gas-engined vehicle, and other forms of motive power (electricity, steam, gas turbine) are possibilities.<sup>1</sup> The latter have some clear technical and pollutant advantages over present cars, but all seem to encounter serious problems of power, weight, range or cost, and the sub-panels of technologists advising on these matters in the U.S. seemed to hold out little hope of technological advance to compete with the gas-engined car in these areas,<sup>1</sup> even though considerable efforts are being made to do so.

It seems, therefore, that the most promising and simplest way of reducing urban pollution by road vehicles is by following up the higher standards and methods being imposed for new vehicles of present design in the U.S.A. By these means, there is a good prospect of reducing both vehicle and total pollution, although under extreme conditions air pollution will still remain as something of a problem and danger.

### Subjective Effects of Road Vehicles on the Urban Environment

Having covered the possible objective critical effects on the environment, it is now possible to pass on and consider the effects of road vehicles on the environment purely as subjective irritants in the Buchanan sense.<sup>5</sup> That is to say, we will be considering the subjective effects on the people involuntarily exposed to vehicle fumes, noise, appearance and impedance, these effects being the product of the objective outputs of such as fumes, noise, and so on, and people's subjective reactions to them.

In doing this, we will be concerned with two kinds of problem, first to establish the major factors and variables in each effect (e.g. fumes, noise etc.) and, more serious, to establish the dimensions of each effect. That is to say, the major problem is to establish how many vehicles impose how much in the way of fumes, noise, on how many people involuntarily, and what their subjective reactions are.

At the outset it must be admitted that this is a formidable task for the factors and magnitudes cannot be precise, cannot be measured in precise units and the final total magnitudes must be subjective. But by moving to a certain level of abstraction and simplification and then bringing the analysis down to earth, it is possible to put some dimensions on these vague magnitudes and discover the factors which may best be varied in order to minimize the adverse effects on the environment.

Initially, we must recognize that the urban environmental problem, in the sense used here, is essentially a matter of normally mobile vehicles imposing their effects on a comparatively static population of pedestrians, residents, workers, and the like, so that we have to think in terms of traffic flows past many points at each of which people are involuntarily exposed to the effects of traffic. More simply, in a given city we can think in terms of a typical traffic flow  $q$  (in vehicles per hour) past a typical point at which a typical population  $p$  is exposed to its effects. It makes no essential difference that the same person at *different times* can be both source and sufferer, that a few people may gain positive pleasure from involuntary exposure to traffic,\* and that the people exposed

to traffic may either become conditioned and more tolerant of traffic, or more sensitive and repelled by it. It may be noted also that congestion and accidents (which are best dealt with by other means) are excluded from consideration, as are the appearance of structures and signs connected with traffic, which are best dealt with as part of aesthetics.

### The Subjective Effects of Air Pollution

Since the effects of vehicle pollution are additive, they are clearly a function of traffic flow  $q$ , the objective output of pollutants per vehicle  $o_p$ , the typical subjective reaction to them  $s_p$ , and the number of persons affected  $p$ . Further, since pollution by vehicles is normally lighter than air and is normally dispersed in 3 dimensions, and by wind of speed  $V$ , it will be a function of  $\frac{I}{D^3 V}$  where  $D$  is horizontal distance from the traffic flow  $q$ .

## Reducing noise: A landscape architect offers some technical solutions

by Ismet Gürses

### Introduction

Protection of our living environment from noise hazards, especially from traffic, should be of primary concern for all. Planners, architects and engineers are becoming more conscious of the far-reaching intrusive and detrimental effects of noise pollution.

There are many general definitions of "noise", since each individual reacts and relates to it in different ways. But generally 30-50 phon\* is an acceptable level in recreation and residential areas. The following table notes the effects of increasing noise levels.

Lack of understanding environmental design and construction can lead to serious problems related to noise. These problems are obvious in our rapidly changing cities. The outcome of poorly designed traffic circulation patterns is a situation we can readily ascertain, but the side-effects of noise are more difficult to comprehend even for the concerned professional designers.

The noise factor should be taken into account early in the planning phases. Zoning by-laws related to right-of-way and building setbacks should be developed after enough data have been accumulated and carefully studied, especially near expressways and highways.

\* Some environmental research at a shopping centre in Vancouver<sup>6</sup> however suggests few pedestrians like traffic. Adapting this work it is possible to say that 84% of pedestrians were sensitive to the appearance of parked cars, 75% to vehicle noise (at 65dBA) and 62% to vehicle fumes.



Thus the total subjective effects of air pollution by vehicles may be written:

$$E_p = \frac{(f) q o_p s_p p}{D^3 V}$$

where  $q$  = traffic volume in vehicles per hour.

$o_p$  = output of pollutants per vehicle.

$s_p$  = subjective reaction per person exposed.

$p$  = number of persons exposed.

$D$  = average horizontal distance between source and population exposed  $p$ .

$V$  = wind speed.

Considering this function it appears that, in any given city with a given set of habits, subjective reactions to pollution, and wind and meteorological conditions, that  $q$ ,  $s_p$ ,  $p$  and  $V$  must be regarded as parameters, leaving only the output of pollutants  $o_p$  and the distance  $D$  as margins to work on in attempting to minimize the effects of pollution.

Since the subjective effects of pollution seem to be a function of  $\frac{1}{D^3}$  at first sight distance between source and sufferer seems to be the best factor and margin to work on, for example by segregation between traffic and the population adversely affected. However, since this may be a costly and difficult margin to work on, and since the output of pollutants per vehicle appears to be so amenable to reduction (see above) it seems that both margins should be considered, the output of pollutants per vehicle primarily, segregation by distance secondarily.

group	typical noise levels	source	effect
1	30-65 phon	clockwork quiet street conversation	acceptable
2	65-90 phon	automobile train heavy truck	susceptibility to psychic influences, organic reflections
3	90-120 phon	factory jet airliner	detrimental to human hearing
4	120+	pain wave	mechanical damage to the organism

\* Phon-, a unit of loudness used in measuring intensity of sounds. Sound level is expressed in decibels (db). Bel or decibel is a logarithmic unit of measurement.

**Siting and location of buildings, structures**  
Service units (garages, entrances, kitchens, indoor recreations spaces...) should be situated on the noisy side, in the case of setting a building parallel to the noise source; more passive activities taking place on the opposite side.

Another acceptable solution involves the provision of adequate open space in the layout of a combination of buildings with different heights and functions. This solution is validated by the localization of green areas in relation to their active and passive characters.

The most effective method for reducing noise, generated from streets, railroads, expressways and highways, is through a separation of levels which can be accomplished by raising or lowering the road level in relation to the surrounding topography. Walls and embankments, covered with plant material, may further reduce not only the sound and dust filter effect but also provide a necessary visual relief (Figs. 1-3).

Our knowledge of the effects of noise in residential areas is very general. In many instances, more specific research and study is required and the resulting data must be included in the district zoning charts. The data about "excessive noise" must be enforced with legal restrictions. Many communities attempt to deal with noise problems in their ordinances, but limitations are general and prohibitive.

#### Planting

Investigations into the relationship between planting and environmental requirements have been in an embryo stage until recently. Surveys of Dr. G. Beck\* in planted areas of cities show that there are solutions available for controlling adverse noise levels. His research includes measurements and evaluations of the vegetation structure of areas taking into account differences in species and size, related to seasonal and local climatic conditions. The following table shows some planting groups in different db values, recommended by Dr. Beck for practical uses:

#### 2 - 4 db

Hinoki Dwarf Cypress  
(*chamaecyparis obtusa nana*)  
European Privet (*ligustrum vulgare*)  
Sib. Peashrub (*caragana arborescens*)  
Mahaleb Cherry (*prunus mahaleb*)  
Blueleaf and Tatarian Honeysuckle  
(*lonicera korolkowii*, *l. tatarica*)  
Jetbead (*rhodotypos scandens*)  
Singleseed Hawthorn (*crataegus monogyna*)  
Scarlet Firethorn (*pyracantha coccinea*)  
Japanese Rose (*rosa multiflora*)  
False Spiraea (*sorbaria sorbifolia*)  
Sawara Cypr. (*chamaecyparis pisifera*)

\* Investigation concerning planning for noise abatement in open areas... Dissertation, TU Berlin, 1965.  
Plants used as tools against noise. A research study prepared in the Institute of Landscape Architecture of TU, Berlin, (1967).

#### 4 - 6 db

Pfitzer Pyramid Juniper  
(*juniperus chinensis pfitzeriana*)  
Eur. White Birch (*betula pendula*)  
Speckled Alder (*alnus incana*)  
Bloodtwig Dogwood  
(*cornus sanguinea*, *c. alba*)  
Wingnut (*pterocarya fraxinifolia*)  
Amur Honeysuckle (*forsythia intermedia*  
*lonicera maackii*)  
Plumleaf Hawthorn (*crataegus prunifolia*)  
Ledebour Honeysuckle (*lonicera ledebourii*)  
Boxelder (*acer negundo*)  
Poplar (*populus canadensis*)  
Eur. Filbert (*corylus avellana*)  
Littleleaf Linden (*tilia cordata*)

#### 6 - 8 db

Hoary Mockorange (*philadelphus pubescens*)  
Eur. Hornbeam (*carpinus betulus*)  
Common Lilac (*syringa vulgaris*)  
European Beech (*fagus sylvatica*)  
English Holly (*ilex aquifolium*)  
English Oak (*quercus robur*)  
Straggley Gooseberry (*ribes divaricatum*)  
Rhododendron

#### 8 - 10 db

Berlin Poplar  
(*populus berolinensis*)  
Bigleaf Linde (*virburnum lantana*,  
*v. rhytidophyllum*, *tilia platyphyllos*)

#### 10 - 12 db

Planetree Maple (*acer pseudoplatanus*)

## The Subjective Effects of Traffic Noise

The first point to be made about noise is that since a louder noise tends to mask a lesser one,<sup>2,7</sup> traffic flow will not necessarily be the critical factor in the irritation arising from noise.\* Second, arising from this is the fact that traffic noise is not a simple function of traffic flow but rather a function of the sound output of the noisiest vehicle within it.

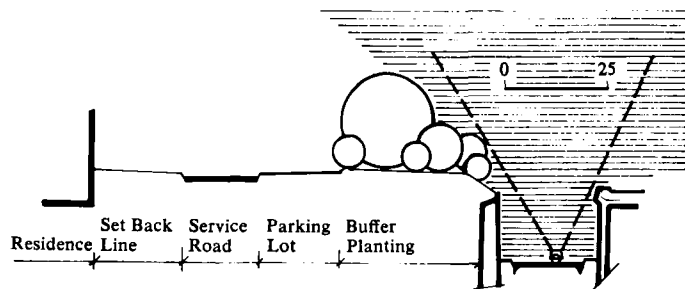
A further point to be made is that the objective measurement of noise and subjective reactions to it raise some considerable problems, but briefly the objective problems seem to have been resolved by measuring traffic noise in the terms of decibels on the *A* scale (*dBA*). This is a logarithmic measure with 0 *dBA* as the threshold of hearing, 120 *dBA* as the level of pain, and about 60 *dBA* as normal conversation level.

\* Although a study of residential areas in New York, Boston and Los Angeles, has indicated that traffic was the highest ranking conscious noise source, closely followed, however, by children and neighbours, with other special local factors of importance, for example, sonic boom by aircraft in Los Angeles.

el.<sup>7</sup> This scale is such that a doubling in intensity of a steady noise results in an increase of 3 *dBA* at a given distance, and a doubling in distance from a steady source of noise results, in the absence of obstacles, to a decrease of 3 *dBA* in sound level.

Turning to the subjective reactions to traffic noise levels measured on this scale, above about 60 *dBA* the measure seems to correspond linearly with subjective reactions to noise, in that for example the mean subjective rating of vehicles' noise in a British study was about 1 at 60 *dBA*, 4 at 75 *dBA*, and 7 at 90 *dBA*.<sup>7</sup> Thus although we have the logarithmic measure of *dBA* it seems we are concerned with its linear reduction when trying to minimize the subjective effects of noise.

**Figure 1**  
Leveling and landscaping of a tunnel stretch at Westring-Ulm/Donau, West Germany.



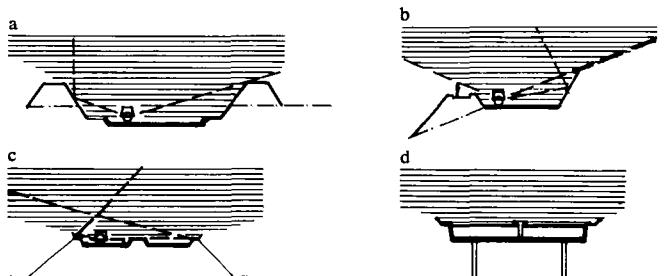
The establishment of a buffer zone can, however, only be successful by considering the following factors:

- There is a close relationship between sound level and the size of foliage of a definite species of plant. As the size of foliage increases the sound absorbing capacity increases.
- Perpendicular posing of the foliage to a noise source increases the sound absorbing capacity.
- Foliage density of deciduous trees (measured within a cubic foot) influences the amount of sound absorption. A buffer planting with a mixture of tall, large and low-crowded trees and shrubs has been found to significantly reduce noise levels in large city areas. Coniferous trees are less desirable and only provide a satisfactory effect in reduction of noise when planted in a mixture with deciduous.
- Acer pseudoplatanus* (Planetree maple) exhibits maximum sound absorbing capacity. The foliage duration is also long compared to other plants effective usually for periods up to 5 months (June to October).
- The effectiveness of buffer plants is more dependent on the structure and composition of the planting than the width. However, a buffer planting should be a minimum of 100' wide in open areas of natural zones.
- Existing ground covers such as various grasses, ferns, corn should be accepted in areas adjacent to buffer planting as additional sound absorbers.

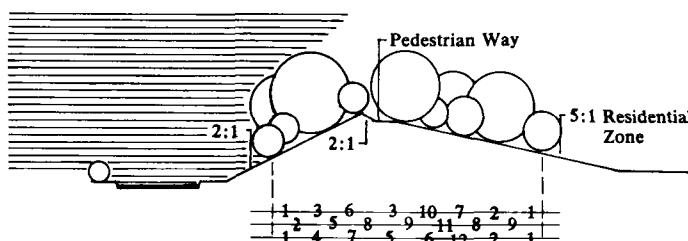
## Conclusion

Research and a new sense of responsibility are needed to overcome the undesirable environmental effects of excessive noise.

**Figure 2**  
In dealing with noise, a depressed roadway is better than a raised one. While a raised highway may reduce the noise level by 5 db, a depressed one will suppress the level by 10 db.



**Figure 3**  
Advantages of embankment (with planting) in noise abatement is evident. Generally, the plants should be chosen from native material and embankments must be between 10' high, with a 2:1 slope. An example from West Germany, Ulm.



- Rosa canina*
- Sorbus suecica*
- Prunus serotina*
- Quercus pedunculata*

- Rosa multiflora*
- Prunus mahaleb*
- Cornus sanguinea*
- Ligustrum vulgare*

- Acer campestre*
- Alnus glutinosa*
- Rosa virginiana*
- Cornus mas*



Against this background, and under North American traffic conditions and composition, it seems best to analyze traffic noise as follows: it is possible to conceive of a steady "tube" of noise arising from typical cars on the highway<sup>8</sup> (this noise falling off by a 3 dBA per doubling in distance) upon which are superimposed moving "hemispheres" of noise arising from the noisiest vehicles, this noise however falling off at a rate of 6 dBA for every doubling in distance.<sup>8</sup>

In this situation, the subjective effects of the noise emitted by a given traffic volume at any one time may be written as:

$$E_n = (f) p (N - \log D_a)$$

where

$p$  = population adversely affected.

$N$  = noise level in dBA of noisiest vehicle at source.

$D_a$  = actual distance in feet between noise source and population  $p$ .

This function is derived from, and agrees reasonably well with, work in the U.S.A. and at the National Research Council of Canada.<sup>9</sup> In order to minimize the subjective effects of noise, therefore, we must try to minimize  $E_n$ , which in practice means the minimization of  $N$ , the noise level of the noisiest vehicle, and/or the maximization of  $D_a$ , the distance between the noise source and the population affected, or the introduction of other barriers to sound. These aspects will be examined in turn.

### The Noise Output of the Noisiest Vehicles

The sound output of the noisiest vehicle in a given traffic flow is bound up with two factors i) the state of the individual vehicle ii) the type of vehicle and its sound emission when in good condition.

Concerning i) the source of excessive noise in vehicles is usually a defective muffler, and since this can add up to 15 dBA to sound output at 100 ft. it is obvious that this is an important factor to work on.

Concerning ii) we must consider the sound outputs of the various classes of vehicle as measured at a standard distance from them. Before this is done however it must be noted that whilst engine noise (both from the engine itself and the exhaust) and transmission noise are normally the loudest sources of noise up to 30 m.p.h., above that figure wind noise and tire noise tend to predominate, particularly for the larger vehicles, and noise levels tend to increase substantially with vehicle speed.

Including the effects of speed some data collected for Ottawa<sup>9</sup> show noise levels for typical vehicles at 15 ft. from the highway and is given in Table 3.

**Table 3**  
**Sound Levels of Typical Vehicles at Distance of 15 ft. in Ottawa**

Type of Vehicle	Speed m.p.h.	Average sound level dBA
Car	30	75
	60	83
Truck (tractor-trailer)	30	85
	60	93
Average of 3 motorcycles (full throttle)	30	85
	60	85

From this table it seems clear that the most common type of urban vehicle, the car, is generally speaking the quietest, leaving the relatively few trucks and motorcycles as the obvious vehicles to control if traffic noise is to be reduced. This could be done by successively imposing and enforcing lower standards of noise emission (and in view of the tendency of noise to increase with speed), acceleration, and the rest, the noise problem could be aided by the construction of freeways with low speed limits. An excellent example of these are the parkways of Ottawa which, in reducing speed, noise and pollution—whilst providing an attractive environment in the form of trees and plant life—are almost ideal from the environmental point of view.

### Distance From Source and Other Methods of Reducing Impact of Noise

The logarithmic measure of noise measurement and the effect of distance from source, mean that substantial reductions in noise levels can be obtained with small increases in distance from source, particularly at distances close to that source. An example is given in Table 4 of the effect of distance from a noise source of 100 dBA.

Thus it can be shown from Table 4 that an increase in distance from 10 to 100 ft. would (without shielding) reduce noise levels from 80 dBA to only 60 dBA, that is the noise level from a typical Canadian car would be reduced from "noisy" to "quiet" on the British subjective rating, and reduce the noise level to that of normal conversation.

Other methods of reducing the impact of noise are to elevate (or depress) freeways,<sup>8</sup> producing (for a 20 ft. elevation) a noise reduction of 10 dBA at 100 ft. from the freeway, this reduction diminishing to zero at about 500 ft., and by the erection of sound barriers such as walls, hedges and trees. The presence of even a single building seems to reduce noise levels by 10 to 20 dBA, and although walls, hedges, and the like would have a lesser effect than this, they could help to reduce the impact of noise, and could also enhance the aesthetics of cities.

### The Visual Effects of Vehicles

In view of its comparative simplicity, and because people probably have the greatest subjective reaction to them, it is necessary to consider the visual effects of parked vehicles first.

**Table 4**  
**Example of Effect of Distance on Intensity of Noise (unshielded)**

Distance from Source ft.	Intensity of Noise at that distance dBA
10	80
20	74
30	70½
40	68
50	66
60	64½
70	63
80	62
90	61
100	60

If the shape, size and colour of road vehicles cannot be made more attractive, or less repulsive, to the eye of the involuntary observer, then the subjective effects of parked vehicles will be proportional to the number of parked vehicles  $q_s$ , the typical subjective effect per parked vehicle per person  $s_s$ , and the number of people adversely affected  $p$ . The subjective effect of parked vehicles will also be related inversely to distance  $D$  such that to the individual eye the image of a vehicle will be reduced in the ratio  $\frac{1}{D}$ , and if sight distance is less than

$D$  (because of a visual barrier) then the visual impact of parked vehicles will be reduced to zero.

The only possible margin to work on then, seems to be distance, in particular by introducing visual barriers that are more attractive than the parked cars. Thus the introduction of hedges and trees (which seem to have fundamental attractions) into downtown and suburban parking lots would probably be a considerable aesthetic gain.

There are greater difficulties in considering the visual effects of moving vehicles, partly because people may find it difficult to disassociate them from noise and fumes, partly because of dimensional problems connected with sight distance. There seems little doubt, however, that the visual impact of moving vehicles could also be reduced, together with the impact of noise and fumes, by the introduction of barriers such as walls, hedges and trees.

### Delay to Pedestrians

Since in practice the pedestrian must normally give way to the moving vehicle, the latter impose delays on pedestrians which seems to be a linear function of traffic flow  $q$ .<sup>6</sup> If  $s_d$  is the average subjective value of one second's delay per pedestrian, and  $p$  is the average number of pedestrians delayed then the total delay imposed on pedestrians,  $E_d$ , may be written:  $E_d = (f) q s_d p$ .

As total pedestrian delay builds up, it may be reduced by according pedestrians special rights of way at special crossings, or at signal-controlled intersections, following current practice. More radically, traffic and pedestrians may be segregated by moving towards the Buchanan concept of the environmental area<sup>5</sup> and diverting traffic around it by various means, road design, restriction and so on, the rational aim being towards the minimization of the number of pedestrians encountered in carrying out a given vehicle journey. More widely, traffic arrangements can be made to minimize the number of houses passed in carrying out a given journey. However, although the environmental area still seems to be a valuable concept, it appears to be difficult to implement for few, if any, environmental areas in the sense of those intended by Buchanan seem to have been installed, although one version, the pedestrian street, seems to have been successful on the limited scale on which it has been adopted.

### Summary and Conclusions

i) Since the term environment is too wide and vague to usefully work on, the environment has been strictly defined to

cover only the external effects imposed by vehicles involuntarily on other people, in particular air pollution, noise, the appearance of vehicles and impedance to pedestrians.

ii) In considering these environmental effects it seemed clear that we were dealing with two kinds of problems, total objective effects where these constituted an objective danger to health, etc. and partial subjective effects, that is when vehicles only seem to produce subjective irritation.

iii) The biggest total objective effect in which road vehicles play a part, seemed to be air pollution in the cities, the greatest problem appearing to be carbon monoxide, originates almost entirely from internal combustion engine vehicles.

iv) Of the total air pollution in Canadian cities it was estimated that vehicles contributed about 55% of the total. This degree of pollution attributable to vehicles would tend to rise by about 40% by the end of the century owing to future increases in urban vehicles per head and their use. However, since pollutant outputs per vehicle mile could be reduced by up to 86%, it was concluded that by various means and standards, the degree of pollution arising from vehicles and total pollution, could probably be reduced in future, although it would still remain something of a threat in congested cities, under windless conditions, to exposed persons.

v) Concerning the subjective effects of vehicles' fumes, noise and appearance it has been concluded that these could be minimized either by attacking the source or by increasing distances between source and sufferer, or by the erection of barriers such as walls, trees and hedges which could also enhance the aesthetic appearance of cities.

vi) To minimize the delay imposed by vehicles on pedestrians, special rights of way can be accorded to the latter, or more radically and widely, environmental areas could be considered around which traffic could be concentrated on special facilities such as freeways and segregated from involuntary sufferers.

vii) It may be noted that low urban population density tends to reduce the adverse impact of vehicles' noise, fumes and appearance, although by increasing distances between origins and destinations, the pedestrian's situation is worsened in this respect.

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# Ontario

## **Pollution Legislation in Ontario**

by J. C. Thatcher

**In recent years, Ontario has taken strong measures toward gaining greater control over pollution of its environment. New items of legislation have been passed; older acts have been strengthened and broadened through amendment; enforcement has been toughened; and considerable reorganization of government departments has been undertaken to better co-ordinate the provincial effort.**

The province's role in pollution control is basically defined by three major pieces of legislation:

1. The Air Pollution Control Act
2. The Waste Management Act
3. The Ontario Water Resources Commission Act

In addition, The Pollution Abatement Incentive Act, under which grants can be obtained towards the purchase of pollution abatement equipment, plays a lesser but important role within the government's program.

All legislation is enforced by various agencies within the Department of Energy and Resources Management:

1. The Air Pollution Control Act by the Air Management Branch, which is responsible for pollutants entering the atmosphere.
2. The Waste Management Act by the Waste Management Branch, which is responsible for the disposal of wastes on land.
3. The Ontario Water Resources Commission Act by the Ontario Water Resources Commission, which is responsible for sewage treatment and disposal, and the pollution of water from any source.

The work of these agencies is, of course, interrelated and, in turn, connected with the activity of other branches and departments within the government, including:

- The Conservation Authorities Branch of the Department of Energy and Resources Management with respect to waste deposited below the high water level of water-course systems.
- The Department of Agriculture and Food with respect to the production of agricultural waste and disposal of dead animals.
- The Department of Municipal Affairs with respect to political boundaries and land usage.
- The Department of Lands and Forests with respect to land usage on Crown Lands.
- The Department of Mines and Northern Affairs with respect to the disposal of mining residues.
- The Department of Health with respect to private septic tank systems.

Overall efforts are co-ordinated through the Advisory Committee on Pollution which is made up of departmental representatives. An example of joint work is a report submitted last March on environmental management of lakes and rivers in the province's cottage areas. It was prepared by the Departments of Energy and Resources Management, Health, Lands and Forests, Municipal Affairs and the Ontario Water Resources Commission. The report contained proposals for combatting the increasing pollution of Ontario's recreational waters and their adjacent land areas, a problem that has resulted from inadequately controlled development in the past.

Organization of the government's pollution agencies within one department is a recent development. Before 1969, the Air and Waste Management Branches were with the Department of Health. They were moved to Energy

and Resources Management last year to provide better co-ordination of renewable resource programs. This year, the process of making the department more totally concerned with the problems of pollution was taken one step further with the transfer of several non-related agencies to other departments. The Ontario Northland Transportation Commission, Petroleum Resources Section and Ontario Energy Board were moved to the recently reorganized Department of Mines and Northern Affairs. The Energy Administration, Energy Studies and Fuels Safety Sections were moved to the Labor Department. These adjustments have made pollution control the major function of the Department of Energy and Resources Management.

#### **The Air Pollution Control Act**

The Air Pollution Control Act, 1967 gave the Ontario Government complete control over all sources of air pollution. Previous legislation had left such control at the municipal level with the province functioning in an advisory capacity. This arrangement proved inadequate, however, due to a lack of effective action by the majority of municipalities. Only four of them employed full-time staff. The remainder operated on a part-time complaint basis. It was obvious that serious headway could only be made by a centralized authority.

The Act became operational on January 2, 1968. Since then, its scope has been increased considerably through the adoption of a wide variety of amendments and regulations. Of special importance have been those regulations which established an air pollution index; criteria for desirable ambient air quality; and standards governing the emission of air contaminants from motor vehicles, ferrous foundries and asphalt paving plants. Non-legislated guidelines that have been developed include criteria for incinerator design and operation and a suggested code of practice covering the establishment of livestock buildings and the disposal of animal wastes.

Under the Act, the Air Management Branch, as enforcing agency, possesses broad powers allowing it to:

Conduct air quality and meteorological studies and monitoring programs.  
Establish acceptable air quality levels.  
Inspect and regulate all sources of air pollution: industrial, residential, institutional.  
Order, after investigation, the discontinuance of the discharge of any air contamination.  
Initiate legal action for violation of either a regulation under the Act, or a Minister's Order to improve a pollution situation.

For purpose of administration and enforcement, the Province is divided into Regions and Districts which are staffed by qualified engineers and inspectors. In each, surveys are conducted of all sources of gas and particle emissions. Included are not only combustion emissions but also process emissions from any industrial process which has an effect upon the atmosphere.

When a source of pollution in excess of acceptable levels is located because of such a survey, or as the result of a complaint to the Branch, an investigation is initiated and steps taken to remedy the situation. This may consist of a simple order or a negotiated abatement program with completion date attached.

Examples of recent programs are those which have been established for the International Nickel Co. of Canada Limited at its Sud-

bury area complex, and Union Carbide Canada Limited at its Welland plant. The International Nickel program calls for the significant reduction of sulphur dioxide emissions from several installations by 1978. The Union Carbide program requires suspended particulate emissions to be brought under certain controls by 1974.

#### *Air Pollution Index*

One especially notable result of the air quality work across the province has been the establishment of an air pollution index and alert system which is presently in operation in Toronto and Hamilton and will gradually be extended to other cities in the province. The index is based upon continuous measurements of sulphur dioxide and suspended particulate content. As certain index levels are reached the government can order the progressive curtailment of pollution producing operations.

#### *Grants*

Under the Act, grants can be made to universities and other organizations for research and training of persons in the field of air pollutions, and to municipalities to assist in the administration and enforcement of air pollution by-laws. The 1970 research budget is \$318,000.00. By the end of July, ten grants totalling \$135,775.00 had been allocated to separate individuals at three Ontario universities and the Ontario Research Foundation.

#### *Control of Automobile Emissions*

Regulations governing the emissions from automobiles went into effect at the start of the 1969-model year. To enforce them, spot checks are made of cars both in the factory and on the road to ensure that specified anti-pollution devices have not been removed and that they are working efficiently. The road checks were started in Toronto in October, 1969. In May, 1970, mobile testing vans began visiting 13 other cities in the province as part of a summer program that will last until early October. As of this writing, four court cases are pending for removal of devices.

#### *Suggested Code for Livestock Buildings and Animal Wastes*

"A Suggested Code of Practice for the Establishment of New Livestock Buildings, Renovation or Expansion of Existing Buildings, and Disposal of Animal Wastes" was prepared jointly this year by the Departments of Energy and Resources Management, and Agriculture and Food.

The Code is only a recommended guideline but one that Ontario farmers are being urged to follow. Due to both a general population increase in farming areas (subdivision construction near farming operations) and a rapid trend towards more intensive livestock and poultry enterprises (increased production of birds and animals on the same acreage), greater animal wastes are being produced and, in many cases, adequate provisions are not being made for their disposal. Serious odor problems, therefore, have developed affecting both rural and urban people.

The Code provides fair and satisfactory measures for dealing with the problem. Key measures stress the need for enough land on which to dispose of wastes; sufficient waste storage capacity (e.g. underground tanks); and adequate distances between livestock and poultry buildings and neighbouring human dwellings.

Farmers following the Code can invite inspection of their premises. If they are considered to be operating within it, they receive a letter of approbation to that effect.

#### **The Waste Management Act**

The Waste Management Act, effective as of September 1st this year, provides Ontario with a comprehensive approach to the problems of waste management disposal. It comes ten years after a paragraph was introduced into the Public Health Act allowing for the making of regulations "governing, regulating and restricting storage, collection, and disposal of refuse and the location and operation of refuse disposal areas", and four years after the creation of a waste management section with the Public Health Engineering Service.

Under the Act, the province has complete control over all solid and liquid wastes which must be hauled away for disposal. Of principal concern are:

- Domestic and commercial refuse.
  - Industrial and institutional wastes, both hazardous and non-hazardous.
  - Incinerator residues.
- The scope of the Act includes control and regulation of:
1. Waste collection and transportation, whether by municipal collection systems (operated by the municipality itself or on its behalf by a contractor) or private systems operated by or for industries and private citizens.

2. Waste disposal areas:

- Dumps.
- Landfill areas.
- Incinerators (municipal, commercial and private).

Excluded altogether from the jurisdiction of the Act are the following types of waste:

- Sewage, controlled by the Ontario Water Resources Commission (municipal disposal systems) and the Department of Health (private disposal systems).
- Agricultural wastes and dead animals (Department of Agriculture and Food).
- Radioactive wastes (Federal Government).

Abandoned automobiles and litter are excluded temporarily. As enforcement agency, the Waste Management Branch has the power to:

- Established standards in the field of waste management and disposal.
- Inspect and enforce regulations governing collection, transportation, treatment and disposal.
- Initiate legal action for violation of either a regulation or a Minister's order that has been issued to improve a waste management system or waste disposal site not in conformity with the Act or regulations.

The work of the Branch is closely related to the other pollution control agencies within the Department. Waste, when burned, for example, involves the Air Management Branch because of possible air pollution. Similarly, waste deposited in or near water may become a problem for the Ontario Water Resources Commission.

Permission to operate a waste management system or disposal site under the Act is granted through the issuing of a Certificate of Approval. The construction of new or the alteration of old facilities cannot be undertaken without one. The continued operation of existing systems and sites is dependent upon application for a certificate by March 1st, 1971. If, after inspection, an existing collection and transportation system or disposal site is found to be inade-





quate, a provisional certificate will be issued on condition that the necessary improvements be made by a specified date. In the case of a completely inadequate disposal site, time again will be given for relocation.

First priority under the Act is essentially the upgrading of municipal and commercial solid waste disposal, and initial regulations have been directed towards that end. Regulations must next be drafted for liquid and hazardous wastes which presently constitute a serious disposal problem. Also under investigation are abandoned automobiles and litter. Both, however, will require considerable study and development work before legislation can be passed to incorporate them.

#### **The Ontario Water Resources Commission Act**

The Ontario Water Resources Commission Act of 1957 provided the province with a comprehensive approach for the development of water resources and the control of water pollution.

The Ontario Water Resources Commission itself had been formed the year before in reaction to a growing crisis over increasing water shortages and inadequate pollution control systems. Existing facilities and procedures were proving unable to accommodate the greatly accelerated growth of the post-war period with its larger industrial areas and sprawling subdivisions. At the same time, increasing capital costs and high interest rates were straining the financial resources of municipalities seeking to meet the demand of this growth.

By the mid-1950's, the situation had become critical. Water shortages were growing more acute and the construction of needed pollution control systems had fallen far behind demand. A government committee investigating the situation recommended the creation of the Commission recommended the creation of the Commission with power to effect solutions.

Under the 1957 legislation, since broadened and strengthened by amendment, the Commission can:

- Control and regulate the collection, production, treatment, storage, transmission, distribution and use of water for public purposes.
- Finance, build and operate both water and sewage works and make arrangements with municipalities and persons for the purpose of supplying water and receiving and treating sewage.
- Conduct surveys of surface and ground waters both to determine where pollution exists and to prevent unnecessary wastage of water (permits must be obtained from the Commission before large amounts can be taken from wells and streams).
- Prohibit the deposit of pollution causing materials into any waters.
- Bring legal action against agencies and persons causing water pollution.

Enforcement procedures to remedy major pollution from industrial and municipal sources generally take the form of negotiated programs with dates attached for completion. A recent example is the program under which the Dow Chemical plant at Sarnia is decreasing its share of the pollution of Lake St. Clair and the St. Clair River. Mercury spillage from the company's operations has already been greatly modified. In addition, plans are being developed concerning oil spillage and the presence of high amounts of suspended solids in some of its wastes.

In the construction of pollution control projects the Commission can:

1. Enter into direct agreements with municipalities on an individual or area basis to arrange, on their behalf, financing, construction and operation of works on terms satisfactory to the municipalities involved (In such cases, the municipalities can take an active part in the operation of these projects through the appointment of local advisory committees.)
2. Utilize provincial funds to build such works (including area pipelines) for the service of municipalities, and institute charges related to the actual use of the services provided.

#### **Great Lakes Program**

Of perhaps prime concern to the Commission is the Great Lakes water system, its investigations of which are carefully co-ordinated with the International Joint Commission. Of current importance are the proposals to make nutrient removal (mostly phosphorus compounds) a part of sewage treatment.

This program, to cost approximately \$30 million, calls for nutrient treatment facilities in every shore municipality from Sarnia to Cornwall by 1975. Top priority is being given to municipal systems bordering Lake Erie and Lake St. Clair which are expected to have the new process installed by 1973. Four plants in the Toronto area are to be modified according to the 1975 deadline.

#### **The Pollution Abatement Incentive Act**

To encourage the adoption of pollution control programs, the Government this year passed The Pollution Abatement Incentive Act. Under the Act, the Minister of Energy and Resources Management is authorized to make grants to municipalities, institutions, companies or individuals towards the purchase of pollution abatement equipment.

The maximum amount of the grant is equal to the Provincial retail sales tax paid for the equipment and is only paid upon proof of payment of the sales tax. Where the equipment is used solely for pollution abatement, the grant equals the total sales tax paid. Where the equipment is also used for other purposes, the grant is of a lesser amount, proportionally equal in terms of the retail tax, to the equipment's role in pollution abatement.

#### **Legislative Policy**

Ontario's present pollution legislation provides for substantial control of the Province's environment. The various acts and regulations involved, however, are regularly amended and added to as new developments occur in the field of pollution control. The goal is legislation both comprehensive in scope and as relevant as possible to current conditions.

#### **Bibliography**

##### **Ontario Legislation**

The Air Pollution Control Act and Regulations  
The Waste Management Act  
The Ontario Water Resources Commission Act  
The Pollution Abatement Incentive Act  
The Public Health Act

##### **Departmental Publications**

A Suggested Code of Practice for the Establishment of New Livestock Buildings, Renovation or expansion of Existing Buildings, and Disposal of Animal Wastes.  
Comprehensive Plan, Waste Management Branch  
Air Management in Ontario  
Water Management in Ontario

The Government announced in the Speech from the Throne on March 30, 1971 that a new department of the environment would be created having responsibility for all provincial programs concerned with protecting the environment and combatting pollution. It also announced that an environmental council would be established to investigate and report upon potential new pollution hazards.

At the same time a land bank program was also announced which would preserve land for recreational and greenbelt areas.



# Manitoba



## **The Clean Environment Act** by Peter Warner

### **Introduction**

#### *Preamble*

Before proceeding to a detailed consideration of Manitoba's Clean Environment Act certain general matters will be considered to put the subject in perspective.

In considering legislation it is important to consider its presumed objectives so that some assessment can be made as to what extent the legislation fulfils or falls short of achieving its aims. In this context, to put pollution legislation in perspective, a brief consideration of what is meant by "pollution" is necessary.

During the past few years the term pollution has become more and more embracing and has moved from the traditional view that pollution concerned only sources of major contamination of air and water, to a consideration of many detailed aspects of the whole environment including soil. This has now been extended to include, for example, such concerns as radiation, noise and thermal pollutions. In short pollution may now be taken to include any alteration of the environment by

mankind that affects the quality of his life, his health and his very existence.

Within the above perspective we can say that in Manitoba, pollution legislation has existed for years in many, if not nearly all, regulations under The Public Health Act and in a number of other Acts falling under several provincial government departments. Further pollution control in the province has also been mediated through certain Federal Acts for example, the Fisheries Act and the Navigable Waters Protection Act. Some contribution to pollution control, in connection with the Red River, has also been made by the International Joint Commission created under The Boundary Waters Treaty between Canada and the United States. In the traditional areas of pollution, in Manitoba for many years there has been some control of air pollution under the Regulations of The Public Health Act and water pollution legislation was confined to surface waters under the now repealed Pollution of Waters Prevention Act.

#### *General Description of Act*

The first major attempt to co-ordinate and integrate a program for pollution abatement





and control in Manitoba came with the proclamation of The Clean Environment Act on June 15th, 1968 which replaced The Pollution of Waters Prevention Act. The new Act called for the appointment, by the Lieutenant-Governor-in-Council, of a Commission to which the Act gives the duty of... "general supervision and control over all matters relating to the preservation of the natural environment...." It also gives more specific duties in connection with licensing persons or agencies discharging contaminants or wastes into or onto the air, soil or water-inasmuch as the Act states that no person may so discharge without a valid and subsisting licence from the Commission.

The Commission is empowered under the Act to issue licenses with such terms and conditions as it deems fit and for such periods as it may think necessary, except where otherwise provided for in the Act. It is by setting the terms, conditions and periods of licences that the Commission can exert its main influence in controlling polluters or potential polluters. Also the Commission may exert control through regulations that may be restricted to a

part of the province only. These regulations are made by the Lieutenant-Governor-in-Council.

One important aspect of the Commission's activities has been that resulting from a requirement of the original Act to the effect that before issuance of a licence a public hearing must be held. This has been an extremely valuable procedure for the edification of the Commissioners, the public and others but, at the same time, very time consuming resulting in delays which gave rise to a requirement for amendments to the Act that were passed by the Legislature in July 1970. Under the original Act some 50 to 60 licences have been issued, in about two years, out of a possible total of several thousand. It is expected that the amendments to the Act and administrative changes within the Commission will facilitate its business in future.

#### **Detailed Consideration of The Clean Environment Act**

##### *General*

As mentioned, The Clean Environment Act provides for the appointment of a Commission consisting of not less than three members ap-

pointed by the Lieutenant-Governor-in-Council, one of whom will be designated as Chairman and one as Vice-Chairman. Currently the Commission consists of seven senior civil servants, three of which are from the Department of Mines and Natural Resources, two from the Department of Health and Social Development (who are Chairman and Vice-Chairman), one from the Department of Agriculture and one from the Department of Industry and Commerce. The general powers and duties of the Commission are set out in Sections 11 and 12 of the Act:

"11. The Commission has general supervision and control over all matters relating to the preservation of the natural environment, and the prevention and control of contamination of the environment.

"12. The Commission may investigate any matters respecting the contamination of the environment and in the course of the investigation it may summon witnesses and take evidence."

With respect to all hearings held under the Act, including those that will be referred to below, the Commission has "...like protection and powers..." as commissioners appointed



under Part V of The Manitoba Evidence Act. These powers enable the Commissioners to subpoena witnesses, to require documents to be produced and to enter into and inspect premises. The Commissioners may also enlist the assistance of the police and commit persons to jail for refusal to answer questions.

The key to the more specific provisions of the Act is the general requirement that, with certain exceptions to be mentioned below, no person shall discharge contaminants or wastes into or onto the air, soil or water without a valid and subsisting licence. In this connection it is worth quoting the definitions in the Act of "contaminants" or "wastes" because these appear, subject to legal opinion, to cover most things that one can think of:

"1(d) 'contaminant' means any substance whether gaseous liquid or solid

(i) that is foreign to or in excess of the natural constituents of the environment, or

(ii) that affects the natural, physical, chemical, or biological quality of the environment and that is, or may be, injurious to health or safety of a person, or injurious or damaging to property or to plant and animal life, or that may interfere with visibility or the normal conduct of transport or business, and "contaminant" has a similar meaning;"

"1(j) 'waste' includes rubbish, slimes, tailings fumes and smoke of mining factory and industrial works, effluent or sewage, or waste products of any kind whatsoever;"

Exclusions to the requirement to obtain licences to discharge contaminants and wastes are as follows:

1. There is a general exception in that air is defined as the atmosphere but not that within buildings or within the underground workings of mines. Thus the Commission has no jurisdiction with respect to licensing discharges or emissions within buildings or mines.

2. There are exceptions for minor matters, such as emissions from domestic heating installations, the domestic burning of leaves; the effluents from domestic residences or outside toilets, or discharge of treated wastes into the soil, in compliance with The Public Health Act; emissions from heating installations for apartment blocks, hotels etc., and incinerators provided they conform to the regulations of the Act and those of The Public Health Act.

3. The use of fertilizers in the prescribed manner for agricultural purposes.

4. The application of pesticides or herbicides by official agencies (government, municipality, railway company or public utility) to rights of way or by farmers on their own property in compliance with the regulations under the Act where applicable.

5. The discharge and emissions of materials covered under other Acts of the Legislature—for example, the burning of weeds etc., under The Noxious Weeds Act, the distribution of pesticides under The Pesticides Control Act and the discharge of mining and allied wastes in compliance with The Mines Act.

6. Discharge of treated wastes into the soil or wastes into water within the boundaries of the Metropolitan Corporation of Greater Winnipeg in compliance with The Metropolitan Winnipeg Act. This is presumably in the Act because the Metropolitan Corporation has been conducting their own pollution control program with respect to soil and water over the past decade or more.

7. Persons who, before the coming into force of the Act on June 15th, 1968, were li-

censed under other Acts or had agreements with the government to discharge may be exempted by Order-in-Council under Section 5 of the Act. At present no such exemptions have been issued.

The exceptions appear numerous and the question could well be asked: What control would the Commission have over persons discharging wastes under one of the exceptions (or persons currently without a licence) where it was felt that damage was occurring to the environment? The Commission would be able, under its general powers, to investigate the matter and under Section 15 would be able to order such persons to cease discharging. However, the order may only be issued after a hearing, of which seven days notice is given.

#### Licences

It should be noted that while the Act provides for licences to be issued for the discharge of contaminants or wastes into the environment, it does not require approvals for the construction of facilities or plants, although the Commission can, and does, take cognizance of features of construction that may affect the quality of a discharge.

The Act as recently amended provides for three types of licence:

1. Provisional Licences
2. Interim Licences
3. Ordinary Licences.

1. *Provisional Licences*: this type of licence was introduced at the time of amendments and is one which the Commission may grant without advertisement or public hearing, not in excess of three years, to a new industry wishing to establish itself in the province. Under the un-amended Act, advertisement and a public hearing were mandatory in connection with every licence. It was felt that new industry tended to be reluctant to approach the Commission and expose itself to a public hearing where a release of its tentative plans might jeopardize its future. This would result in the possibility that plans and actual construction would be far advanced and much money invested when that industry approached the Commission who might feel the need to require modifications. The Provisional Licence permits industry to approach the Commission at an early stage. At the expiry of a provisional licence in three years, it would be necessary for the industry to apply for an ordinary licence.

2. *Interim Licences*: are those that persons may apply for in connection with a discharge that was taking place at the date of coming into force of the Act on June 15th, 1968. An Interim Licence may not be granted for a period in excess of 5 years. It is legal opinion that an eligible applicant has a right to be issued an Interim Licence.

It would seem that the purpose of an Interim Licence is to allow the Commission to issue a licence with such terms and conditions as would ensure that the operation licensed would be brought up to standard within a period of five years.

The amendments to the Act modified the necessity for the Commission to hold mandatory hearings in connection with Interim Licences (and with Ordinary Licences, see below). Now it is necessary to advertise that Interim Licences have been applied for and to invite objections if there be any. If no objections are

lodged with the Commission, it may dispense with a public hearing and proceed to issue the licence. If an objection is lodged a public hearing must be held.

3. *Ordinary Licences*: are all licences other than Provisional and Interim Licences. To these the Commission may set any period and such terms and conditions as they deem fit. The requirements for public hearings are the same as those for Interim Licences except that the Commission may not refuse a licence without a public hearing.

Licences are not transferable and they are subject to review at any time by the Commission at a public hearing. The Commission may, without notice or hearing, suspend a licence for a period of fourteen days during which time a hearing may be held and the suspension extended or the licence cancelled unless the licensee complies with the requirements of the Commission.

#### Penalties

Provision is made for fining an individual \$100.00 per day and a corporation \$1,000.00 per day for contraventions of the Act, its regulations or any order of the Commission.

#### Appeal

Any person, effected by an order or decision of the Commission, who is dissatisfied, may appeal to the Municipal Board within one month of the date of decision. The whole matter must be heard in full by the Municipal Board who may confirm, vary or quash the order or decision and can direct the Commission to take certain actions with which the Commission must comply. The orders or decisions of the Municipal Board are final.

#### Inspectors

Provision is made for the appointment of inspectors by Order-in-Council. Inspectors have wide powers of entry to examine premises, plant, documents and records. They have the power to take such samples as may be required for the purpose of evidence.

#### Reporting of the Commission

The Commission is obliged to report to the Minister in an annual report that shall include: investigations conducted and all transactions connected with orders and licences and "such other matters as the minister may require." Otherwise the Commission does not appear to be required to make reports of any kind and it may make rules governing its procedure except that a quorum of a majority of its members is required. The Commission may hire officers and employees as necessary and they must be civil servants. Monies for the operation of the Commission are paid out of the Consolidated Fund authorized by the Legislature.

The recent amendment provides that the responsible Minister shall be "...the member of the Executive Council charged by the Lieutenant Governor in Council with the administration of this Act;." The original Act indicated the Minister of Health as being responsible and currently the Commission reports to the Minister of Health and Social Development. The amendment is in line with similar amendments for Acts other than The Clean Environment Act and is general governmental policy—otherwise there is no specific reason for this change.

### **Authority for agreements**

Recent amendments to the Act provide for the Minister to make agreements with the governments of Canada or other provinces or their agencies respecting the control of pollution. This would complement the Canada Water Act and the proposed Canada Air Act and enable the Minister to integrate and co-ordinate anti-pollution measures proposed by the Federal government. The power to make inter-provincial agreements is of particular importance to Manitoba since, for all practical purposes, its waterways flow into it from outside its borders; also it would facilitate such operations that straddle provincial borders for example, the mines at Flin Flon.

### **Crown bound by Act**

The recent amendments also provide that the Crown (in Manitoba) shall be bound by the Act. This means that all provincial government agencies will be required to apply for licences and be subject to hearings like any private agency. This appears to be a most important step in that it indicates the provincial government is willing to set the example in the supremely important area of pollution control. There is no reason not to expect that Federal government agencies would voluntarily follow suit to provide Manitoba with a pollution control program that would be uniformly applied to all polluting or potentially polluting agencies in the province to the satisfaction of the public whose very existence is at stake.

### **Discussion**

At the outset it should be emphasized that the views expressed from this point onwards are those of the author and are made in the light of his three years of experience as Chairman, briefly, of the Provincial Sanitary Control Commission during the drafting of The Clean Environment Act and subsequently of the Clean Environment Commission since its inception.

#### *Uniqueness of Single Pollution Control Body*

The Act is relatively brief and comparatively flexible and, until the Alberta Environment Conservation Act was assented to in April 1970, was unique in Canada in providing, with few exceptions, an instrument for the co-ordination and integration for a total anti-pollution program for a province. One notable exception is that noise pollution does not clearly fall under the provisions of the Act, although it would appear to fall under the general provision of The Public Health Act.

#### *Terms and Conditions of Licences are Control*

The key features of the Act that provide for pollution control are the terms and conditions that the Commission apply to licences. As soon as all polluting or potentially polluting agencies in the Province are licensed and there is an adequate inspection program, it can then be said Manitoba has a comprehensive pollution control program.

#### *Value of Public Hearings*

One of the most valuable aspects of the Act is the power given to the Commission to conduct public hearings. They are informative to the public, to the Commission and thereby to the government, and to those who might contribute to pollution. They are a salutary experience to applicants and others and may have as great or a greater effect than fines in the climate of an informed public opinion.

### *Defects in Operation*

With the Act in its unamended form, it is unfortunate that the above important and valuable features have contributed to one of the main defects in the operation of the Commission. The requirement of the original Act for mandatory hearings in connection with every licence has resulted in the slow processing of applications from applicants that need urgent attention because of present practises or those who wish to proceed with construction quickly or to complete it in the short period that our climate provides. It is hoped that recent amendments and administrative changes will solve these problems; if not, experience indicates that it is essential for provisions to be made for speedy action to deal with unsatisfactory situations and to process applications.

It is further unfortunate that the Commission's preoccupations with the above problem has not allowed it to deal with wider issues that fall well within its competence. This has led to some doubts as to the Commission's efficacy and ability to encompass a total anti-pollution program. However, there appears to be no bar in the legislation that would prevent the Commission from becoming an influential body that could devise a total anti-pollution program with planning and priority setting functions. In any event if deficiencies were to become evident they could be corrected by additional amendments or legislation. It is hard to conceive of an Act, barely two years old, that could have embraced all conditions in the rapidly changing field of pollution.

### *Proper Affiliation—Health*

Finally, there has been much discussion as to the proper affiliation of The Clean Environment Act and its Commission: should it be with Health when so many other departments of governments are involved? The answer seems clear: the ultimate threat of pollution is to the existence of mankind, short of that it is to his health, man's prime concern. If these threats are removed, then it is his quality of life and the aesthetics of his environment that make man's life worth living—that is to say it affects his mental state or mental health. All these factors are implicit in The Clean Environment Act and have to be balanced against man's needs for congregating in communities, his need for industry and the jobs that it brings. All the factors mentioned above would appear to fall under the general terms of The Public Health Act where "The minister has the supervision of all matters relating to the preservation of the life and health of the province,..." and this is further evidenced by the fact that nearly all regulations under The Public Health Act refer to matters connected with pollution.

### *Clean Environment Act Extension of Public Health Act*

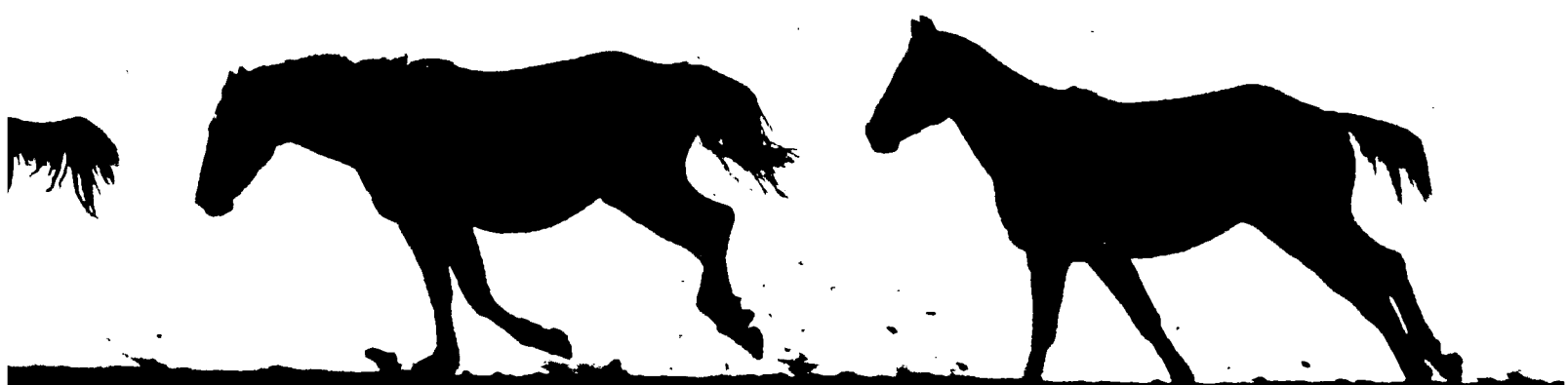
The Clean Environment Act would appear to be an extension of The Public Health Act with the additional features indicating that its concerns spread far wider than traditional "health" matters and that aesthetic considerations are not excluded as indicated in the above definition of contaminant quoted above.

### **Final Comment**

The strength of any legislation is dependent upon public support. With that assured it would seem that The Clean Environment Act can be made into an effective instrument in the battle against pollution in Manitoba's new century.









# Saskatchewan

## **Pollution Control Legislation**

by Allan Guy

### **Interdepartmental Committee Co-ordinates Pollution Control**

Pollution control in Saskatchewan took a significant step forward in May, 1970, with the formation of a government Interdepartmental Committee on Environmental Pollution. The new committee will co-ordinate the work done by separate government agencies on the detection, evaluation, prevention and control of pollution.

The committee is composed of one representative appointed by each of the Ministers of Health, Natural Resources, Agricultural, Mineral Resources and the Minister in charge of the Saskatchewan Water Resources Commission. The Minister, Hon. Allan R. Guy, is responsible for the committee.

Members are Dr. C. A. R. Dennis, representative of the Department of Public Health and chairman of the committee; D. A. G. Smith, Mineral Resources; H. S. Maliepaard, Natural Resources; M. H. Prescott, Water Resources Commission; and A. J. Webster, Agriculture. G. W. Howard, secretary and director of administration for the Water Resources Commission, is serving as secretary to the committee.

The committee was set up because environmental pollution has been and is presenting some problems which cross the boundaries of jurisdiction and concern of more than one provincial government agency. Examples of these are the effects of pesticides on the natural environment and the mercury contamination of fish.

While pollution is not as serious a problem in Saskatchewan as in many other areas of the country, the Provincial Cabinet felt that this special committee should be formed as a means of ensuring that pollution does not become a problem in the years ahead.

### **Terms of Reference**

The Committee's terms of reference are:

1. To co-ordinate the activities of provincial agencies responsible for air, water, soil and any other form of pollution with a view to the protection of the total environment;
2. To identify deficiencies in existing control programs, and those areas not subject to control, and to recommend appropriate action;
3. To recommend the establishment of such advisory committees for specific purposes, as may be required, and to review the progress of such committees; and
4. To deal with and recommend appropriate action on any pollution matter.

### **Government Concern for Total Environment**

The purpose of the committee is to ensure that the government carries out all its responsibilities in environmental pollution control.

There is growing concern about the state of our environment which is reflected in the increased number of requests for information from the public. To this point in time, pollution control in Saskatchewan has been fragmented and therefore there is a need to co-ordinate activities in this vital area.

The formation of the committee is the first step towards providing Saskatchewan with a responsible means of co-ordinating existing activities and identifying gaps in regulations or public information programs. The Saskatchewan Government wishes to obtain a pollution-

free province and has assured the committee members of Cabinet's full support.

It is important here to make the distinction between pollution control and pollution prevention. In Saskatchewan there are only two pollution control agencies—the Saskatchewan Water Resources Commission and the Department of Public Health. As control agencies they have the expertise and the legislative authority to set standards for waste management and to ensure that these standards are met.

These two agencies are assisted in their pollution prevention program by other agencies of the provincial government. The Department of Mineral Resources administers the Pollution Prevention Regulations for the mineral industry. The Department of Natural Resources has no legislative authority but works with control agencies to ensure wildlife and other resources are protected.

The Department of Agriculture assists in pollution prevention by advising farmers on application and use of pesticides as well as recommending farming practices.

### Water Pollution Legislation

The Water Pollution Control Branch of the Saskatchewan Water Resources Commission exerts primary control over water pollution through the Water Resources Commission Act. The branch is responsible for the administration of regulations and the issuance of approvals for municipal and industrial water and sewage works and pollution surveys.

Three other agencies are also involved in prevention of water pollution:

1. The Department of Mineral Resources administers the Mineral Resources Act and the Oil and Gas Conservation Act.
2. The Department of Natural Resources is responsible for the administration of the Pollution of Waters Prevention Act. This Act will be rescinded at the next sitting of the legislature because of amendments to the Water Resources Commission Act.
3. The Department of Public Health administers certain provisions of the Public Health Act which are relevant to the question of health hazards arising from water pollution.

### Air Pollution Legislation

The Minister of Public Health has primary responsibility for air pollution control through the Air Pollution Control Act. In addition, the Public Health Act provides in general terms for the prevention and abatement of conditions hazardous to health.

### Soil Pollution Legislation

There is no specific act controlling soil pollution. The Water Resources Commission Act provides for the prevention of depositing any material near water that may cause pollution. The Air Pollution Control Act makes provision for the control of gas or particulate matter which can affect soil or vegetation. Control of industrial solid waste disposal is covered by the Public Health Act. In addition, the various municipal statutes contain provisions enabling municipalities to pass bylaws to control certain activities which contribute to local "soil pollution." Prevention of soil pollution arising from the mining industry is one of the objectives of the Pollution Prevention Regulations for the Mineral Industry, 1970, as administered by the Department of Mineral Resources.

### Agency Activities in Pollution Control and Prevention

The *Department of Natural Resources* has no responsibility for pollution control as such. DNR is, however, active in providing information for control agencies such as the Saskatchewan Water Resources Commission. The Department has had occasion to request other agencies for assistance through control measures and has received good co-operation. The Department of Mineral Resources and SWRC have brought pressure on industry to clean up pollution problems identified by DNR.

DNR has no legislative authority other than the Pollution of Waters Control Act. This Act, however, has not been used since the Saskatchewan Water Resources Commission assumed legislative authority for water and it will be repealed. Fish are protected by the Federal Fisheries Act, but DNR provides assistance at the field level for provincial and Federal control agencies.

The *Department of Agriculture* has no control legislation at the present time. The Department is in the process, however, of drafting legislation respecting the application of biocides and fertilizers. The Federal Pest Control Products Act would serve as model legislation, but would be interpreted to meet the special needs of Saskatchewan. The Department also has an interest in disposal of wastes if they could be used as fertilizers on the land.

The *Saskatchewan Water Resources Commission* generally supervises all matters concerning the pollution of water.

Control of water pollution is primarily achieved through a system of approvals governing the construction and operation of sewage works. This involves inspection of sewage works, sampling and analyzing of effluents and the receiving streams.

In addition to controlling pollution resulting from the discharge of effluents from municipal and industrial sewage works, the Commission is involved in the control of pollution resulting from:

- a cattle feedlots and other intensive livestock and poultry operations;
- b watercraft;
- c waste disposal grounds;
- d chemicals used for algæ and aquatic weed control;
- e herbicides used for brush clearing operations adjacent to water bodies;
- f private sewage disposal systems directly, if sewage flows exceed 4,000 gallons per day, and indirectly if sewage flows are less than 4,000 gallons per day;
- g normal agricultural activities where stock are involved;
- h any other activity which may result in water quality impairment.

In general, chemicals or materials applied to or spilled on the land may affect, at some point in time, either surface or ground water. The Commission will be involved in soil-related pollution when chemicals used to control insects and plants are applied to the land and subsequently enter water bodies via runoff.

Where effluent is applied or discharged to the land the Commission may be required to see that such practices do not cause pollution of the soil or ground water.

The *Department of Mineral Resources* for many years has been involved in the prevention of pollution by the mineral industry through many of the Acts administered by this department.

The Pollution Prevention Regulations for the Mineral Industry, 1970, were proclaimed on January 1, 1970. These regulations bring together the requirements of the mineral industry with respect to existing air and water pollution control legislation. In addition, the regulations bring several previously unregulated areas under control.

These are:

1. the siting or location of, the construction method, and method of operation of waste disposal basins;
2. the discharge of radionuclides into bodies of water (the provinces of Ontario and Saskatchewan have established MAC values for radionuclides in water);
3. the pollution of ground water through seepage or deep-well injection.

The regulations make the *Department of Mineral Resources* the centre for communication between the mineral industry and the pollution control agencies of government in the establishment of new mines.

The *Department of Public Health* has the responsibility for air pollution control and prevention. The Act and regulations are administered by the Occupational Health Branch through its provincial officers.

Regional or city medical health officers and public health inspectors have authority under the Act to abate air pollution arising out of incinerators, fuel burning equipment and open fires. Responsibility for the abatement of air pollution from industry, mines and all other sources rests with the Minister of Public Health.

The Air Pollution Advisory Committee, a technical advisory committee, established under the Air Pollution Control Act advises and makes recommendations to the Minister of Public Health on all matters pertaining to the effects, prevention and control of air pollution.

The Sanitation Regulations under the Public Health Act allows regional or city medical health officers to exercise control over the disposal of solid wastes by requiring that every city, town and village provide a system for the proper collection and disposal of garbage.

The Department of Public Health has no direct responsibility in the field of community noise problems, but the Occupational Health Branch, because of its expertise in occupational noise problems, operates a program of surveillance of community noise complaints and their assessment when the complaint justifies them.

The Occupational Health Branch has the responsibility for a radiological health program which is concerned with radiation hazards at work, from isotopes and x-rays and is concerned with accidents involving radiation emitting sources.

The Provincial Laboratory provides the necessary backup services to allow other government agencies to maintain effective control programs. For example, the laboratory performs the majority of the analyses required by the Pollution Control Branch of the Saskatchewan Water Resources Commission.

The laboratory recognizes as its responsibility the monitoring of the amounts of toxic materials in foodstuffs and man. Analyses concerned with the air pollution program are carried out by the Occupational Hygiene Laboratory.



## Penalties

Failure to comply with various control Acts and regulations can result in penalties in the form of fines and revocation of the approval to operate.

An individual who violates provisions of The Water Resources Commission Act with respect to water or soil pollution is subject to a fine, for a first offence, of not less than \$10 and not more than \$100 and a further fine not exceeding \$25 for each day the offence continues. For a second or subsequent offence, the fine is not less than \$100 and not more than \$500 plus a maximum of \$50 for each day the offence continues.

A corporation is fined not less than \$100 and not more than \$1,000 for a first offence and up to \$250 for each day the offence continues. For second or subsequent offences, the fine is not less than \$1,000 not more than \$5,000 and up to \$500 for each day the offence continues.

In the case of violations of the Air Pollution Control Act and regulations, an individual, if found guilty, is liable to a fine of not less than \$5 nor more than \$25 and a corporation not less than \$100 or more than \$500. If the offence continues, further fines not exceeding \$25 per day for individuals and \$500 per day for corporations may be imposed.

## Grants

Under the Water Pollution Control Assistance Act, 1969, the Saskatchewan Water Resources Commission may make grants not exceeding 10 per cent of the capital cost or \$500,000, whichever is lesser, to any city to assist in the financing of the capital cost of water pollution control works, if the works are not constructed for the purpose of handling storm water.

The provincial government will make non-repayable grants to towns and villages for a portion of the capital cost of water and sewerage works. A grant is based upon need related to maintaining reasonable water and sewerage service charges that must be levied against users in order to repay the capital debt.

The Minister of Public Health may make grants to municipalities to assist them in employing personnel to control air pollution and administering bylaws. He may also make grants to universities and other organizations for research in the field of air pollution and the training of persons in that field.

## Record of Pollution Improvement to Date

1. *Saskatchewan Water Resources Commission*  
Although the record of pollution control for municipal sewerage systems is statistically impressive in that only seven out of a total of 363 systems do not have sewerage treatment facilities, the seven account for 27 per cent of the urban population served by sewerage systems. However, the Commission has received commitments from six of the seven communities, comprised of two cities and four towns, that treatment facilities will be provided by 1971. With treatment facilities installed at Prince Albert (population 28,000), and Saskatoon (population 130,000), 93 per cent of the urban population presently contributing untreated sewerage to provincial water bodies will be eliminated.

In the area of water pollution arising from industrial waste discharges, some progress has been made but there is still room for improvement. The Moose Jaw River, which receives wastewater from a refinery complex and a rail-

yard, has been subjected to a fairly detailed study of water quality and on the basis of recommendations made to the major polluters, corrective action has been instituted.

The major source of industrial pollution on the South Saskatchewan River originated with a chlor-alkali plant at Saskatoon. Subsequent to finding high levels of mercury in fish taken from the river below the plant, the Commission requested and obtained immediate action from the company in reducing the level of mercury in the plant waste discharge to the river from some 45 pounds per day down to less than one-half pound per day.

On the North Saskatchewan River a kraft pulp mill poses the greatest potential threat to water quality. With increasing production the existing treatment facilities have become over-taxed with the result that effluent quality has fallen below the Commission's requirements with respect to BOD and suspended solids. Company officials are currently studying the engineering aspects related to improvements in treatment capacity.

Since the province is still agriculturally oriented, despite the development of oil, potash and mining endeavours, intensive livestock operations have materially increased in the last decade. Large cattle feedlot enterprises have been established in the past with little consideration given to the potential water pollution problems from such endeavours. The Commission now requires operators of such establishments to construct and operate in such a manner to ensure that water pollution does not occur.

## 2. Department of Mineral Resources

Under "The Pollution Prevention Regulations for The Mineral Industry, 1970" mining companies are preparing the data necessary to complete application for permission to discharge industrial waste. The data will provide the government with information on the nature of wastes, the environment into which the wastes are to be discharged, and the measures employed to keep waste disposal within the limits of the pollution control agencies.

Since 1930, the Mines Branch of the Department of Mineral Resources has approved the plans for the location and design of the waste disposal basins at mining operations.

## 3. Department of Public Health

The air sampling program has provided for a network of sampling stations in Regina, Saskatoon and Moose Jaw which are providing data with respect to air quality in major urban areas in the province. This program is essentially long-term and is designed to detect changes in air quality.

In addition to urban air sampling a network of stations has been established around three potash mines. The collected data from the total air sampling program have been of assistance in establishing ambient air standards.

The development of regulations under the Air Pollution Control Act has provided a means whereby air pollution complaints can be assessed and appropriate remedial action taken.

The air pollution control program has demonstrated local areas of concern but in general the quality of air in Saskatchewan compares favourably with other areas in North America.

by Murray H. Prescott  
and Neil M. Oakley

# Sewage treatment: it's application in Saskatchewan

Today Federal and provincial authorities alike deplore water and soil pollution as a threat to the whole Canadian economy. Pure, clear water is one of the essentials of life and we are losing it at an alarming speed. Municipal and industrial effluent in some parts of Canada has needlessly destroyed fine rivers, streams, lakes and ponds, making them unfit for human consumption and enjoyment.

While almost everyone else has been talking about pollution, an intensive province-wide program has been under way in Saskatchewan for the last ten years. It hasn't been heard much about because pollution isn't a subject politicians can speak of in glowing terms. Nevertheless, quietly and without fanfare, more than ten million dollars is spent on water and sewer works each year to cure provincial effluent problems.

Modern water and sewer installations in Saskatchewan's towns and villages have been so effective that the outdoor privy is rapidly becoming an historical relic. The Saskatchewan Water Resources Commission estimates that almost every Saskatchewan community, with a population of more than 200, is served by water or sewage facilities and the great majority of municipalities now have both services.

One of the factors in the surge of municipal water and sewer construction was the provincial government's offer, several years ago, to purchase up to 50 per cent of any municipal debentures to build public utilities. In addition, the government established the Municipal Water Assistance Board through which local governments are able to obtain non-repayable grants covering a portion of the capital cost of water and sewage works. Although the grant calcula-

tion is somewhat complicated, it is based on need related to maintaining reasonable water and sewer service charges that must be levied against users in order to repay the capital debenture debt. This program and the Federal winter works scheme set the stage for municipal participation at reasonable cost.

But the big breakthrough in pollution control came with the development of new methods of effluent treatment and National Housing Act loans for municipal sewage collectors and treatment plants through Central Mortgage and Housing Corporation. The perfection of sewage lagoon design brought costs within the limited financial capacity of smaller municipalities while National Housing Act facilities enabled these communities to borrow 66 per cent of the costs, repayable over several years, and to get 25 per cent rebates in the process.

In 1969, the government passed legislation to provide financial assistance to the cities of the province which had been excluded from participating in the Municipal Water Assistance Board program. Under the terms of The Water Pollution Control Assistance Act, a city may receive a non-repayable grant equal to ten per cent of the capital cost of sewage treatment works to a maximum of \$500,000.

Some of the larger municipalities, faced with the need to increase the capacity of existing sewage treatment facilities, have installed aeration equipment. Although the conventional lagoon does provide a suitable degree of treatment, if properly sized, spring odour problems have plagued some communities. By incorporating aeration, areal requirements for lagooning are reduced and odour problems are overcome.

The National Housing Act system came into operation in December, 1960, and by the end of May, 1970, Central Mortgage and Housing Corporation had loaned nearly \$13 million for 276 Saskatchewan municipal projects worth \$16 million. Federal rebates for completed works returned \$1.89 million to the municipalities concerned. Thus the program is satisfactory, with five out of every nine people in the province are being directly served by the new sewage systems.

Each project is first designed by local authorities and then approved by the Saskatchewan Water Resources Commission before submission to Central Mortgage and Housing Corporation in Saskatoon or Regina. Provincial and Federal staff review the proposal to ensure that the municipality is not just designing for today's problems, but for tomorrow's as well. Capacities must be sufficient to take care of current and future needs.

Central Mortgage and Housing Corporation does not impose too many controls but careful consideration is given to every application because Federal rebates are involved—as well as loans. Because public money is involved, someone has to make certain it is spent for good and proper reasons. For this reason, each project must be approved prior to the awarding of tender for construction.

This means some definite eligibility requirements must be met. The Federal funds are limited to work associated only with the installation of trunk collectors and sewage treatment facilities. A trunk collector is a sewer line that collects effluent from the whole municipality. The smallest street sewer from the house and on down the



street is a lateral. Several street laterals flow into a branch and several branches flow into the trunk.

Federal officials say that in small towns the collector is the pipe which starts at the end of the municipal system and goes from there to the sewage treatment facility. The treatment facility is also eligible for National Housing Act assistance, whether it is a full-scale treatment plant or a small lagoon. In larger municipalities such as Moose Jaw and Prince Albert, Federal funds are also available for some sewers within the city limits because they are of such a size and depth they would not normally take street connections.

When the Central Mortgage and Housing Corporation program came into being 73 cities, towns and villages serviced with water and sewage works and an additional 18 centres had sewerage systems. A decade later, the number of communities that have both water and sewage works has increased to 305 while the number with only sewage works has increased to 48.

Municipalities including Esterhazy, Churchbridge, Duval, Rocanville, Langenburg, Young, Viscount and Allan have all experienced population gains in recent years because of potash. Officials in these communities are in unanimous agreement that home builders would have built elsewhere if modern water and sewer systems were not available.

Other villages and towns installed the services without any expectation of population growth or business expansion. They hoped that sewer and water would probably enable them to maintain their economy. But in many cases, the modern services have strengthened the tax base, meant

construction of new schools, some new homes and a new business or two. Lately, these same municipalities are installing hard surfaced streets and considering provision of storm sewers.

In the current year, Central Mortgage and Housing Corporation has allocated a total of five million dollars to Saskatchewan for financing sewage works capital costs. The City of Saskatoon with a primary treatment plant under way could have used virtually all the available funds for the proposed six million dollar project. Prince Albert with a planned 1.75 million dollar primary plant would have used the balance of the available funds. Working with the Saskatchewan Water Resources Commission, priorities were established and Saskatoon and Prince Albert were allocated sufficient funds to cover 1970 construction. This permitted the Corporation to make funding available to another 30 centres designated by the Commission as needing new or improved treatment facilities in order to abate pollution.

It costs money to provide sophisticated treatment facilities required by our affluent society. National Housing Act participation through Central Mortgage and Housing Corporation is a great boon to all municipalities but it would cost a great deal more if society was allowed to destroy its resources, among them perhaps the most precious and indispensable resource known to man—fresh water.





Sewage treatment  
across  
Canada:  
Federal  
loans and  
forgiveness

Net loans approved and amount of Federal forgiveness for municipal sewage treatment loans (sec. 36F)—by province, metropolitan, major urban, other areas by county. Montant net des prêts approuvés et montant de la remise fédérale sur les prêts consentis aux municipalités pour l'épuration des eaux vannes (art. 36F)—par province, centre métropolitain, grand centre urbain, comté et autres centres.

	1961-1970 (Jan.-June) 1961-1970 (Janv.-Juin)	Approvals Approbations Loans		Forgiveness Remise
		Prêts	\$000	\$000
Newfoundland Terre-Neuve		23	2,500	640
Metropolitan Area Région métropolitaine		2	912	235
St. Johns Other Parts Autres centres Census Division Territoire de recens.		21	1,588	405
" "	01	4	146	37
" "	02	—	—	—
" "	03	1	15	5
" "	04	1	48	12
" "	05	1	257	66
" "	06	11	1,009	255
" "	07	—	—	—
" "	08	2	96	25
" "	09	—	—	—
" "	10	1	17	5
Prince Edward Island Île du Prince Edouard		17	420	105
Counties Comtés		17	420	105
Kings		3	50	14
Prince		8	171	42
Queens		6	199	49
Nova Scotia Nouvelle- Écosse		43	5,859	594
Metropolitan Area Région métropolitaine		5	1,662	342
Halifax		5	1,662	342
Major Urban Area Grand centre urbain		4	325	71
Sydney-Glace Bay		4	325	71
Counties Comtés		34	3,872	181
Anapolis	01	2	253	—
Antigonish	02	—	—	—
Cape Breton	03	3	71	7
Colchester	04	7	355	50
Cumberland	05	2	245	25
Digby	06	—	—	—
Guysborough	07	1	17	—
Halifax	08	4	1,713	—
Hants	09	2	128	33
Inverness	10	2	499	—
Kings	11	9	361	42
Lunenburg	12	—	—	—
Pictou	13	1	137	—
Queens	14	—	—	—
Richmond	15	—	—	—
Shelburne	16	1	93	24
Victoria	17	—	—	—
Yarmouth	18	—	—	—
New Brunswick Nouveau- Brunswick		34	4,585	367
Metropolitan Area Région métropolitaine		5	489	123
Saint John		5	489	123
Major Urban Area Grand centre urbain		2	10	—
Moncton		2	10	—
Counties Comtés		27	4,086	244
Albert	01	—	—	—
Carleton	02	1	68	18
Charlotte	03	1	143	36
Gloucester	04	2	180	46
Kent	05	5	130	32
Kings	06	1	249	2
Madawaska	07	5	117	35
Northumberland	08	1	59	—
Queens	09	1	9	—
Restigouche	10	4	118	29
Saint John	11	—	—	—
Sunbury	12	—	—	—
Victoria	13	2	145	25
Westmorland	14	2	116	18
York	15	2	2,752	3
Quebec Québec		275	52,337	8,779
Metropolitan Areas Régions métropolitaines		100	34,319	4,846
Hull (Portion) Hull (Une partie)		1	152	39
Montréal		86	26,337	4,183

1961-1970 (Jan.-June) 1961-1970 (Janv.-Juin)	Approvals Approbations		Forgiveness Remise
	Loans Prêts	\$000	
Québec	13	7,830	624
Major Urban Areas			
Grands centres urbains	12	2,168	767
Chicoutimi-Jonquière	1	7	—
Drummondville	2	200	50
St-Jean	1	257	269
St-Jérôme	3	208	52
Shawinigan	2	181	45
Sherbrooke	—	—	—
Trois-Rivières	2	1,294	326
Valleyfield	1	21	25
Counties			
Comtés	163	15,850	3,166
Abitibi	01	4	196
Abitibi T.D.	76	—	—
Argenteuil	02	1	38
Arthabaska	03	—	—
Bagot	04	2	153
Beauce	05	8	236
Beauharnois	06	2	223
Bellechasse	07	2	169
Berthier	08	2	164
Bonaventure	09	6	633
Brome	10	1	9
Chambly	11	2	64
Champlain	12	1	31
Charlevoix-E.	13	1	23
Charlevoix-W.	14	2	46
Chateauguay	15	2	553
Chicoutimi	16	6	261
Compton	17	1	10
Deux-Montagnes	18	—	—
Dorchester	19	4	375
Drummond	20	2	102
Frontenac	21	2	63
Gaspé-E.	22	4	228
Gaspé-W.	23	1	33
Gatineau	24	—	—
Hull	25	—	—
Huntingdon	26	—	—
Iberville	27	—	—
Île Jésus	29	—	—
Joliette	30	1	71
Kamouraska	31	2	70
Labelle	32	—	—
Lac-St-Jean-E.	33	1	30
Lac-St-Jean-W.	34	3	96
Laprairie	35	—	—
L'Assomption	36	1	145
Lévis	37	2	119
L'Islet	38	2	104
Lotbinière	39	6	508
Îles-de-la-Madeleine	28	1	102
Maskinongé	40	1	300
Matane	41	2	680
Matapédia	42	1	7
Mégantic	43	2	98
Missisquoi	44	3	169
Mistassini T.D.	77	—	—
Montcalm	45	5	389
Montmagny	46	3	248
Montmorency #1	47	1	58
Montmorency #2	48	—	—
Montréal	49	—	—
Napierville	50	2	329
Nouveau Québec T.D.	78	—	—
Nicolet	51	7	683
Papineau	52	3	162
Pontiac	53	3	162
Portneuf	54	—	—
Québec	55	1	271
Richelieu	56	2	236
Richmond	57	—	—
Rimouski	58	5	232
Rivière-du-Loup	59	1	55
Rouville	60	—	—
Saguenay	61	4	692
Shefford	62	4	1,006
Sherbrooke	63	3	220
Soulanges	64	3	374
Stanstead	65	3	211
St-Hyacinthe	66	3	194
St-Jean	67	2	478
St-Maurice	68	—	—
Témiscamingue	69	3	535
Témiscouata	70	—	—
Terrebonne	71	12	2,342
Vaudreuil	72	2	451
Verchères	73	2	326
Wolfe	74	—	—
Yamaska	75	2	87
Ontario	346	195,567	30,622
Metropolitan Area			
Régions métropolitaines	264	116,536	17,040
Hamilton	39	18,069	2,024
Kitchener	25	4,849	1,170
London	24	11,082	2,242
Ottawa (Portion)	13	12,064	2,919
Sudbury	6	2,303	584
Toronto	141	55,877	7,171
Windsor	16	12,292	930
Major Urban Areas			
Grands centres urbains	72	31,753	6,160
Brampton	3	1,439	368
Brantford	5	710	179
Fort-William - Port Arthur	9	4,373	1,105
Guelph	5	1,774	132
Kingston	6	609	149
Niagara Falls	3	2,959	714
Oshawa	4	910	87
Peterborough	2	795	201
St. Catharines	14	6,419	814
Sarnia	3	3,001	750
Sault Ste. Marie	4	2,801	558
Timmins	3	591	147
Welland	11	5,372	956
Counties			
Comtés	210	47,278	7,422
Algoma T.D.	01	1	163
Brant	03	1	369
Bruce	04	4	1,374
Carleton	05	1	127
Cochrane T.D.	06	9	1,479
Dufferin	08	2	396
Dundas	09	1	129
Durham	10	4	370
Elgin	11	2	626
Essex	12	7	2,030
Frontenac	13	—	—
Glengarry	14	1	124
Grenville	15	2	383
Grey	16	10	2,125
Haldimand	17	5	962
Haliburton	18	—	—
Halton	19	4	724
Hastings	20	8	2,588
Huron	21	4	928
Kenora T.D.	22	11	2,323
Kent	23	15	4,793
Lambton	24	1	239
Lanark	25	4	525
Leeds	26	6	1,608
Lennox & Addington	27	3	321
Lincoln	28	5	357
Manitoulin T.D.	29	1	96
Middlesex	30	3	199
Muskoka T.D.	31	3	215
Nipissing T.D.	32	4	268
Norfolk	34	4	970
Northumberland	35	3	791
Ontario	36	4	967
Oxford	37	3	675
Parry Sound T.D.	38	2	617
Peel	39	1	274
Perth	40	5	374
Peterborough	41	—	—
Prescott	42	—	—
Prince Edward	43	1	171
Rainy River T.D.	44	2	1,350
Renfrew	45	5	1,974
Russell	46	3	447
Simcoe	47	21	3,801
Stormont	48	9	5,088
Sudbury T.D.	49	2	248
Thunder Bay T.D.	52	—	—
Timiskaming	53	5	736
Victoria	55	1	255
Waterloo	56	3	499
Welland	57	5	1,142
Wellington	58	5	439
Wentworth	59	—	—
York	60	4	619
Manitoba	121	18,961	4,373
Metropolitan Area			
Région métropolitaine	36	15,095	3,607
Winnipeg	36	15,095	3,607
Other Parts			
Autres centres	85	3,866	766
Census Division			
Territoire de recens.	01	5	173
" "	02	7	242
" "	03	10	234
" "	04	7	133
" "	05	4	82
" "	06	4	744
" "	07	8	1,184
" "	08	4	114
" "	09	—	—
" "	10	4	63
" "	11	9	235



1961-1970 (Jan.-June) 1961-1970 (Janv.-Juin)		Approvals Approbations Loans Prêts		Forgiveness Remise \$000 \$000	
"	"	12	4	90	22
"	"	13	6	105	27
"	"	14	1	20	5
"	"	15	3	67	17
"	"	16	—	—	—
"	"	17	4	201	61
"	"	18	3	92	13
"	"	19	2	87	22
"	"	20	—	—	—
Saskatchewan		278	13,163	1,889	
Metropolitan Areas					
Régions métropolitaines		10	6,032	253	
Regina		2	1,095	200	
Saskatoon		8	4,937	53	
Other Parts					
Autres centres		268	7,131	1,636	
Divisions		01	16	375	96
Divisions		02	9	155	36
Divisions		03	8	193	49
Divisions		04	4	114	29
Divisions		05	24	560	139
Divisions		06	25	378	87
Divisions		07	13	1,117	283
Divisions		08	13	168	42
Divisions		09	17	696	174
Divisions		10	15	377	55
Divisions		11	25	610	140
Divisions		12	12	196	49
Divisions		13	15	345	78
Divisions		14	15	476	88
Divisions		15	26	500	124
Division		16	15	290	70
Division		17	12	407	85
Division		18	4	174	12
Alberta		143	22,992	1,870	
Metropolitan Areas					
Régions métropolitaines		27	17,949	999	
Calgary		8	10,700	119	
Edmonton		19	7,249	880	
Other Parts					
Autres centres		116	5,043	871	
Divisions		01	2	188	4
Divisions		02	6	668	169
Divisions		03	4	124	27
Divisions		04	3	42	7
Divisions		05	6	175	31
Divisions		06	9	210	50
Divisions		07	9	146	25
Divisions		08	9	622	52
Divisions		09	3	256	47
Divisions		10	14	343	87
Divisions		11	12	436	79
Divisions		12	9	589	31
Divisions		13	5	217	31
Divisions		14	4	164	29
Divisions		15	21	863	202
British Columbia Colombie-Britannique		142	46,395	5,456	
Metropolitan Areas					
Régions métropolitaines		45	33,206	3,964	
Vancouver		39	28,709	3,797	
Victoria		6	4,497	167	
Other Parts					
Autres centres		97	13,189	1,492	
Census Division					
Territoire de recens.		#1-10	—	—	—
A—Columbia Riv. Upper		-11	1	95	24
B—Kootenay Riv. Upper		-12	5	1,373	70
C—Elk & Hatlead Rivers		-13	2	191	3
Census Division					
Territoire de recens.		#2-20	—	—	—
A—Columbia Riv. North		-21	—	—	—
B—Columbia Riv. South		-22	1	69	17
C—Kootenay & Slocan Lakes		-23	1	100	—
Census Division					
Territoire de recens.		#3-30	—	—	—
A—Okanagan & Shuswap Upper		-31	12	1,473	84
B—Similkamcen River		-32	3	443	94
C—Kettle River		-33	1	22	—
Census Division					
Territoire de recens.		#4-40	—	—	—
A—Harrison Lake		-41	—	—	—
B—Howe Sound		-42	1	29	7
C—Vancouver		-43	—	—	—
D—New Westminster		-44	—	—	—
E—Chilliwack		-45	10	1,015	127
Census Division					
Territoire de recens.		#5-50	—	—	—
A—Victoria		-51	—	—	—
B—Duncan		-52	4	202	37
C—Nanaimo		-53	5	354	82
D—Port Alberni		-54	3	299	75
E—Courtenay		-55	3	1,013	86

1961-1970 (Jan.-June) 1961-1970 (Janv.-Juin)		Approvals Approbations Loans Prêts		Forgiveness Remise \$000 \$000	
F—Vancouver Is. N.	-56	1	13	3	
Census Division					
Territoire de recens.		#6-60	—	—	—
A—North Thompson		-61	1	119	—
B—Shuswap		-62	1	26	—
C—Nicola		-63	14	2,338	211
D—Chilcotin South		-64	—	—	—
E—Lillooet East		-65	1	52	34
F—Bridge Lillooet		-66	1	41	10
Census Division					
Territoire de recens.		#7-70	—	—	—
A—Bella Coola Coast		-71	—	—	—
B—Koright Tuleet Coast		-72	—	—	—
C—Powell Riv. Coast		-73	2	57	14
Census Division					
Territoire de recens.		#8-80	—	—	—
A—Nechako-Fraser-Parsnip		-81	4	1,026	203
B—Fraser-Canoe		-82	1	134	—
C—Chilcotin North		-83	—	—	—
D—Cariboo		-84	2	247	57
E—Skeena-Bulkley		-85	2	160	2
F—Nechako Upper		-86	3	210	20
G—Bobbie-Stuart Takto Lakes		-87	1	149	38
Census Division					
Territoire de recens.		#9-90	—	—	—
A—Atlin Lake		-91	—	—	—
B—Stikine-Liard		-92	—	—	—
C—Portland Canalhan		-93	—	—	—
D—Skeena Coast		-94	5	628	103
E—Coast (Browning Ent. to Laredo Sound)		-95	1	633	—
F—Queen Charlotte Is.		-95	1	18	5
Census Division					
Territoire de recens.		#10-00	—	—	—
A—Liard		-01	—	—	—
B—Ainlay-Parsnip		-02	—	—	—
C—Beaton River		-03	2	557	60
D—Kistatinaw Riv.		-04	2	103	26
Canada		1,622	362,779	54,695	
Total Met. Areas					
Régions métropolitaines		494	226,200	31,409	
Total Major Areas					
Grands centres urbains		90	34,256	6,998	
Total Other Areas					
Autres centres		1,038	102,323	16,288	

# Alberta





## Environment Quality Maintenance

by H. L. Hogge

Alberta has experienced a large increase in industrial development and population in the last twenty years, in response to which the provincial government has provided definite programs to maintain the public environment at a useful and safe quality. Currently the programs include the following:

- Design and operational supervision of water-works and sewerage systems.
- Water pollution control.
- Air pollution control.
- Solid refuse disposal control.
- Specialized supervision of major industrial, agricultural and forestry operations.
- Conservation of recreational, holidaying and retreat use capabilities of certain areas of the province.
- Review and assessment of the programs by the Alberta Advisory Committee on Pollution Control.
- Co-ordination of all environment conservation work.
- Liaison and joint work programs with adjacent provinces and the Federal government on general and specific programs.

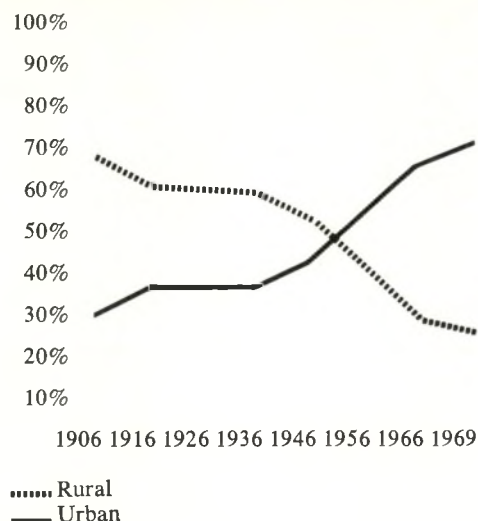
This summary will explain briefly the nature and extent of these activities at this time. However, it would be worthwhile to consider some of the trends in population and industrial-commercial statistics which indicate the changes in our society's living and work routines.

The population of Alberta in 1970 is 1,576,549, and of the two largest urban areas, Calgary and Edmonton, 385,436 and 422,418 respectively. The population trend in Calgary and Edmonton and the percent of the population living in urban and rural areas are shown in Graphs 1 and 2. The change to urban living and the rapid growth of the larger urban centres are quite marked.

Industrial-commercial expansion is also quite definite as shown in tables 1, 2, 3 and 4.

The tendency of our society to foster urban and industrial-commercial growth is confirmed by these statistics. The use of motor vehicles is also increasing and may be symbolic of our ever rising standard of living, (Table 5).

Graph 1  
Percent of Total Alberta Population



Graph 2  
Population in Thousands

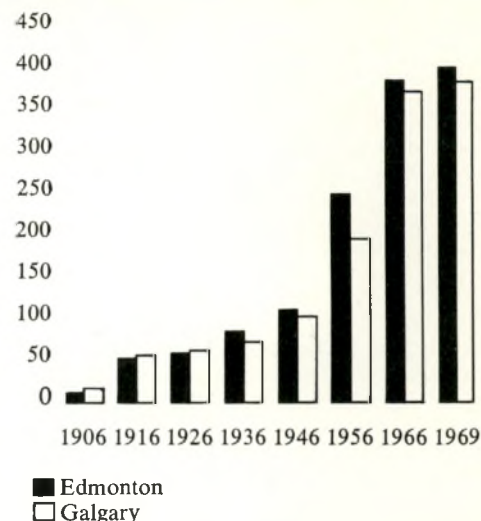


Table 1  
Electrical Energy Generated  
(Thousands of KW hours)

1921	115,580
1931	206,779
1941	322,683
1951	1,036,636
1961	3,794,730
1967	6,803,301

Table 2  
Agricultural Products Sold  
Gross Value in \$

1906	16,428,205
1916	207,838,297
1926	263,913,260
1936	157,332,520
1946	420,000,000
1956	694,646,000
1967	1,006,833,000

Table 3  
Manufacturing  
Gross Value of Production in \$

1905	4,979,932
1915	29,416,221
1926	83,425,631
1936	74,052,010
1946	257,031,867
1956	703,188,739
1968	1,527,200,000

	Sulphur Production (long tons)	Oil Production (mm bbls.)
1956	29,879	143.7
1961	434,396	157.8
1966	1,676,220	202.5
1968	2,989,588	250.7

Table 5  
Motor Vehicle Registration

1911	1,631
1921	39,852
1931	94,642
1941	126,127
1951	259,841
1961	509,298
1968	703,151

### Waterworks and Sewerage Systems

Waterworks and sewerage systems are, of course, essential to urban areas. To operate these on an individual household basis is not practical, so commercial systems are an item of expense which must be associated with urban living. Storm sewer systems to handle precipitation run-off must also be provided.

In Alberta, waterworks, sewerage, and storm sewer systems or extensions cannot be constructed without the approval of the Provincial Board of Health. Design plans must be prepared by registered professional engineers and approval is based on adequacy and suitability of water supply and sewage disposal, and the safety, adequacy and reliability of the distribution and collection systems. All new construction is on the separate sewer system basis, that is, one set for sewage and one for storm waters. The Environmental Health Services Division of the Alberta Department of Health assesses these plans for the Provincial Board of Health, and carries out spot checks on the construction and operation of the systems. Special attention has been given to the training of operators of these systems under a three-year program which has been developed in co-operation with Saskatchewan and Manitoba. Voluntary certification of operators is now in effect.

At the end of 1969, there were 248 sewerage systems serving all urban centres with a population of 300 or over. In fact, 83 percent of communities with a population of 150 to 300 had sewerage systems. Only six of the 248 systems had no sewage treatment facilities, and in 1968 the Provincial Board of Health demanded that these be constructed before the end of 1971.

Municipalities are advised by the Provincial Board of Health as to the degree of treatment required. The minimum is primary treatment, but greater treatment is required when the primary units are not adequate to maintain a suitable quality of water in the receiving waters. Usually this extra treatment is specified as so many pounds of B.O.D. (biochemical oxygen demand) per day in the released waste waters or sewage pond system.

The Alberta government does not provide financial grants for the construction or operation of sewage treatment facilities because this is a municipal responsibility. However, for the past twenty years, the provincial government has loaned money to the municipalities for capital works projects, including water and sewage systems and, of course, sewage treatment units. Money by-law plebiscites are not required when the Provincial Board of Health orders the construction of sewage treatment facilities.

Alberta municipalities have been encouraged by, and have taken advantage of, Central Mortgage and Housing Corporation's program of loaning two-thirds of the estimated cost of out-fall sewer line and sewage treatment facility construction, and allowing a 25 percent grant if the construction is completed within the specified time period.

Enforcement procedures greater than verbal and written review of the degree of treatment specified are seldom required, but methods are provided for.

- The Provincial Board of Health may refuse to approve extensions of the sewerage system, and the provincial government's Local Authorities Board backs this up by refusing to approve municipal borrowings for water and sewer projects without the Board's approval.

- Court action could be taken against the municipality or its council for failing to comply with the Board's request. In addition to the authority given to the Board by the Public Health Act or the regulations made under it, an Order may be issued with the approval of the Lieutenant Governor-in-Council directing that the sewage treatment facilities be provided.
- This year, the Municipalities Assistance Act was amended, allowing the provincial government to require a municipality to spend all or part of the annual provincial grant, payable to it, on measures to alleviate or control pollution. These measures could include the treatment of sewage to a standard set by the Provincial Board of Health.

The Alberta Department of Health carried out two research studies between 1958 and 1963 on the design and operation of sewage ponds, with the financial sponsorship of Federal health research grants. These studies showed the capabilities of different types of treatment ponds, particularly of the anaerobic and the multiple section aerobic types. This greatly assisted in obtaining the required degree of sewage treatment at minimum construction and operating costs.

### Water Pollution Control

The basic water pollution control program in Alberta is under the Provincial Board of Health and the Division of Environmental Health. The primary objective is to retain a useful quality in all surface waters and prevent possible pollution of ground waters. The work is frequently reviewed with the Fish and Wildlife Division of the Alberta Department of Lands and Forests, particularly with reference to the possible adverse effect of pollutants on fish life or general fresh water biota.

Municipal and industrial waste waters cannot be released without prior written approval from the Provincial Board of Health. Such approvals are issued only if the rate of release of contaminants does not down-grade the quality of the receiving water. Usually the approvals state the maximum allowable rate of release of all significant contaminants, and require the larger industries and municipalities to measure the volume and contaminant content of the waste waters, and submit this information to the Board on a monthly basis.

The Division of Environmental Health regularly checks the quality of water, in all rivers and lakes, that may be affected by waste waters, and issues an annual report on each of the main rivers. Periodic checks are made on industrial and municipal waste waters, and if the rate of release exceeds that specified in the approval, follow-up work is done by the Division and, if necessary, by the Board.

Legislation authorizing water pollution control work is contained in the Alberta Public Health Act and regulations made under it. New regulations were finalized in January, 1970, and these also provide for control of the use of pesticides on surface waters or the banks of them.

Enforcement work includes requiring the operator or owner to know the rate of release of contaminants, and periodic checks by the Division. If co-operation and compliance is not forthcoming, court action can be taken. The penalty on conviction is a maximum of \$500 per offense and/or per day. Court actions have been taken under the Federal Fisheries Act by the Department of Lands and Forests. Also, in this regard, an amendment was made this year to the Municipal Taxation Act giving

total or partial exemption from assessment and taxation of land and improvements used (a) exclusively, or (b) mainly for water, soil or air pollution control. The total or partial exemption applies provided the owner has complied with standards set by the Provincial Board of Health.

### Air Pollution Control

The increasing size of urban areas, the density of development, the amount of industrial-commercial activity and the increased use of motor vehicles have created a real need for a program to control the release of contaminants to the atmosphere.

The Alberta program is a province-wide one established under the Public Health Act and administered by the Provincial Board of Health and the Division of Environmental Health in co-operation with the local health and municipal authorities. Industrial and incinerator effluents require Board approval and this is not issued unless control facilities are considered adequate to meet smoke and dust limits. Industrial effluents are assessed on the basis of computer calculated dispersion under specified atmosphere conditions.

Extensive monitoring of air quality in the larger urban centres of Calgary and Edmonton is carried out by the Division. Contaminants being measured include dustfall; SO<sub>2</sub> and H<sub>2</sub>S by exposure cylinders; total particulates by hi-volume samplers; smoke index by paper tape samplers; oxidant; oxides of nitrogen; hydrocarbons (Edmonton only) and carbon monoxide (Edmonton only). Monthly reports are prepared summarizing the data and correlating it to wind speed and direction.

A special study of meteorological factors in Calgary and Edmonton started in 1967 and is still continuing. It includes measurements of temperature inversions, surface temperatures, wind speed and direction, and assessment of the relationship between weather factors and air quality levels.

Air quality measurements are made in the area near significant industrial plants by two mobile laboratories equipped for continuous measurement of wind speed and direction, sulfur dioxide and hydrogen sulfide and, on occasions, other contaminants. Inspection tours are made for periods of two to four weeks. Summary reports are made on each tour and circulated to the Oil and Gas Conservation Board (for all gas processing and sulfur recovery plants), the local municipality, the local health authority, and the company operating the plant.

A research study of air pollution and its effect on people was started in 1969 under financial sponsorship of a Federal research health grant. Special attention is being given to the total amount of particulates of all types in the air of large and small urban centres, and to the respiratory health of people and their impressions of the air quality.

Enforcement methods are the same as those applying to water pollution control. In addition, the Oil and Gas Conservation Board is currently developing a program to undertake approval and supervision of all oil and gas industry projects to control pollution. Enforcement methods include issuance of short deadline clean-up orders, prosecutions or suspension of operations until adequate control steps are taken. Revised and broadened pollution control regulations were added to the Oil and Gas Conservation Regulations in August 1970.





### **Solid Refuse Disposal Control**

Each urban area generates an appreciable quantity of solid refuse requiring regular disposal in order to maintain a reasonably clean and nuisance free residential, commercial and industrial centre; in general terms, some 4 to 5 lbs. per person per day. This refuse, when compacted, would cover an area of 30 acres to a depth of 12 feet for a community of 400,000 persons. The magnitude of the effort required to provide satisfactory and effective disposal for this refuse has often been underestimated by the municipality.

Alberta undertook a study of solid refuse disposal in 1967 by a committee composed of urban and rural municipalities and provincial government representatives. The committee recommended changes in the provincial regulations, and these were reviewed by the Provincial Board of Health. Revised regulations were then enacted. These require that sanitary landfills be used by all municipalities with a population of over 5,000, and modified landfills be used by other urban municipalities. Incineration is allowed only if the incinerator adequately meets air pollution control requirements. All municipalities must meet these new standards by January 1, 1971.

### **Specialized Supervision of Major Production Activities**

The possible effect on the environment by some industrial and agricultural operations is of more concern to rural than urban residents. However, the desirability of multi-use in some areas and the far-reaching effects of some contaminants, particularly water carried ones, emphasizes the need to exercise care in operating these projects.

#### *Oil and Gas Industry*

The oil and gas industry is supervised by the Oil and Gas Conservation Board and its authority was extended this year to include pollution control in all operations from well drilling and operation to gas processing and sulfur recovery plants. The standards of air quality will be set by the Provincial Board of Health and will be enforced by the Oil and Gas Conservation Board. Monitoring of the air in the area near sources of air contaminants will be carried out by the Department of Health. Release of processing plant waste waters to surface waters still requires Provincial Board of Health approval. The Oil and Gas Conservation regulations for this purpose have been finalized and were effective August 1, 1970, although some items are not effective until later dates.

#### *Agricultural Items*

A very important part of environment pollution control is to safeguard the quality of food for people. Special checks are made in Alberta to see that food items are free from undesirable contaminants. Agricultural pesticides and antibiotics are two items that are assessed on a continuing basis.

New legislation has been put into effect recently to allow more detailed supervision of the use of agricultural chemicals. The Alberta Agricultural Chemicals Act was passed at the 1969 session of the Legislature and Regulations Respecting the Use and Application of Pesticides and Regulations Respecting the Use and Handling of Agricultural Chemicals were finalized as of April 1, 1970. In addition, educational courses have been held to acquaint



agriculture and health field staff and also, the applicators of pesticides, with the requirements of the new legislation. The Department of Agriculture participates in the work of the Canada Committee on Pesticide Use in Agriculture and maintains contact with the Federal Department of Agriculture as to the registration of pesticide chemicals.

Some pollution control problems are also associated with agricultural operations and are studied as individual projects. One of these is the disposal of livestock and poultry jointly with the Department of Health.

#### *Forestry*

The harvesting of timber for lumber or pulp wood and the construction of roads in a forest protection area are supervised by the Department of Lands and Forests. Special attention is given to the disposal of waste wood and the control of silting of streams and rivers.

#### *Conservation of Recreational Use of Certain Areas*

The Department of Lands and Forests is active in conserving and developing recreational use of certain areas of the province. In particular, the development of forestry roads in the Rocky Mountains and adjacent foothills, and the provision of campgrounds; provision of provincial parks in more developed areas of the province and close to urban areas; and the setting aside of wilderness areas.

#### **Review and Assessment of Alberta Pollution Control Programs**

In 1967, Alberta established a committee, termed the "Alberta Advisory Committee on Pollution Control", which was to consider pollution problems in Alberta and to critically review the control programs. Members were solicited from the provincial and Federal governments, universities, provincial associations and societies including commercial, industrial, professional, municipal, and fish and game groups. Current membership is 113. The subject of pollution has been divided into 14 items, and each is considered in detail by a sub-committee. The committee has been meeting once each year, while sub-committees usually meet two or three times during the year to draw up a report, including recommendations and suggestions, for the annual meeting. The Minister of Health, Honourable J. D. Henderson is chairman of the Advisory Committee. Needless to say, the government gives the suggestions and recommendations of the committee full consideration.

One of the recommendations made at the 1969 meeting was the need for increased co-ordination and unification of pollution control work. This idea was developed by the government, and the Environment Conservation Act was prepared for the Alberta Legislature and was passed at its 1970 session. This Act provides for a three-man Environment Conservation Authority; an intra-government group from eight government departments and agencies, termed the Conservation and Utilization Committee and one or more public advisory committees. Another of the recommendations was the need to recognize "noise" as a factor of environment pollution control. A sub-committee has been established to consider all factors of noise including sources, effects, standards, and methods of control.

Similarly, there is fairly frequent exchange of information on pollution control programs with the Federal government. Work on estab-

lished committees, and direct correspondence with staff members is the usual method of general information exchange. On occasions, special pollution problems are studied by "ad-hoc" committees and Alberta information and facilities are used to assist the work. Currently, active committees on which Alberta has membership include the following:

- The Canadian Council of Resource Ministers' committee termed "Inter-governmental Steering Committee on Pollution".
- The National Research Council's committee termed "Associate Committee on Scientific Criteria for Environmental Quality".
- Department of National Health and Welfare's committee termed "Public Health Engineering Advisory Committee".
- Department of National Health and Welfare's committee termed "Federal-Provincial Committee on Air Pollution".
- Department of Energy, Mines and Resources' committee termed "Working Party on Air Pollution—Inter-departmental Committee on Resource Satellites and Remote Airborne Sensing".

The foregoing briefly summarizes the current Alberta provincial progress designed to maintain an adequate control of polluting influences. The continuing development of the province is reflected in the growth of urban areas and industrial activity, thus causing an increase in the number and types of sources of contaminants. Currently, emphasis is being placed on strict control of all new sources of contaminants, and maintaining adequate pollution control facilities when there is an expansion of urban or industrial activity.

#### **Co-ordination of Environment Conservation Work**

The variety and extent of problem areas and the essential involvement of many agencies and groups in supervisory control and assessment work makes it desirable to strive for co-ordination and unification of environment conservation programs. Alberta's experience has shown that this is not easily accomplished, but it has indicated that progress made in this direction would be valuable. Designation of work areas such as water pollution on a river-by-river basis, and air pollution as a regional basis, have the advantage of considering all factors contributing to, or resulting from the problem. Similarly, co-ordination of control efforts and requirements by an intra-governmental group can be helpful.

The Environment Conservation Act referred to previously includes items designed to assist in achieving co-ordination of pollution control work.

#### **Inter-governmental Liaison and Joint Projects**

Direct liaison is encouraged between urban and rural municipalities and the Alberta government. Similarly, joint studies of problem areas and assessment of programs is encouraged. The sub-committees of the Advisory Committee, such as Air Pollution Control (Edmonton) and Air Pollution Control (Calgary), and the Solid Wastes Disposal Study Committee all have strong representation from the involved municipalities and municipal associations.

Alberta participates in the work of the Prairie Pollution Control Committee (Alberta-Saskatchewan-Manitoba) and exchanges information on water quality monitoring in common rivers.



# Pollution: the municipal response response response response

Most services provided by a municipality are usually contained within the confines of its own boundaries. However pollution is no respecter of man's imaginary lines drawn on a map. Under the circumstances it is absolutely necessary for a municipality, particularly in this field, to become more concerned with what is happening outside its legal area of jurisdiction. Because of lack of understanding on the complexities of the subject, its causes and effects, much emotionalism on the part of the public has been engendered, and this is reflected to a large extent by the elected officials who wish to understand the problem and provide the means to correct the situation. Politicians at all levels of government are searching for leadership, and we consider this to be best forthcoming from the Federal domain. The Canadian Federation of Mayors and Municipalities (CFMM), however, recognizes that leadership in any field, and particularly in one as complex as this will only be continuous when a body such as ours forcibly demands it and provides continuity.

There is a requirement for guidelines to be established within which each municipality can work forgetting the inter-Federal and -provincial rivalries. The content of the guidelines should be such that they clearly define the problems so that short and long range planning can be established and enunciated. Make no mistake—this is war that all humanity is waging for its very existence.

The Resolutions submitted by the Mayors of Canada to the CFMM for consideration at its annual conferences, thence to be contained in a report to the Federal Government, reflect the feelings of most of the people in Canada, namely that the public recognizes that there is an urgent need to face up to the problem, and that the time is now. But what can be done to combat it? Our populace is searching for an explanation and a firm policy. Confusion and frustration is evident at the municipal level due to the preponderance of senior government departments who, in their respective Acts, have the responsibility for bits and pieces of the problem with no common goals.

The CFMM has strongly supported the idea of the Canada Water Act, but has equally stated in no uncertain terms that it will become just another frustrating piece of legislation unless it is given the total authority for all the fields of pollution. Only in this way can we marshal public opinion, establish guidelines, and provide financial priorities of sufficient magnitude so that permanent lasting results can be obtained. At this point in time the Canada Water Act does not provide for any of these possibilities and indeed unless new amendments are forthcoming within the near future it can only be anticipated that it has added further confusion to this labyrinth of Federal, provincial, and municipal responsibility in an already overcrowded, expensive, and time-consuming effort.

Some years ago when the CFMM established its National Pollution Committee it was proposed that it act only as a watchdog, perhaps with some very superficial advice in the formulation of legislation. Now we realize this is not sufficient, and that we must be prepared to become heavily involved in legislative persuasion so as to achieve results in the most orderly, practical, and expeditious manner, allowing of course for other priorities in our rapidly changing society. Fortunately the CFMM has been able to attract to this Committee top people from all regions and provinces of Canada, both at the technical and political level. Their concern and activity has, we believe, provided a public concentration of attitude toward recognizing the seriousness of the problem, thence to marshal its forces so that priorities on expenditures might be established to achieve the results so urgently required for our modern expanding society.

The Committee's other function in its first few years was to concentrate primarily on the field of financing of sewage treatment facilities. We have now expanded to include a review of the complex problems of harbour pollution common to both fresh and salt water, as well as to have a look at the long and short range effects of air and soil pollution. The Committee recognizes that while the effect on water resources can be visually exposed, the more complex problems of air and soil pollution are being left primarily unattended, although their long term effect may be more disastrous to the ecology.

Amongst other surprises, we have concluded that no-one has worked out the total cost of pollution control programmes for urban areas. This rather astounding fact has led us to volunteer our efforts to obtain the necessary data, for we realize that without prior knowledge of cost we can establish no specific priorities. It is strange that in this modern, computerized society no level of government has any idea whatsoever as to the corrective steps to be taken, the dollars to be allocated or even, for that matter, the ultimate goal to be achieved. If our volunteer effort is accepted by the Federal Government we would hope within the near future to be able to provide detailed information thus assisting in economic planning for long range programmes rather than the present hit-and-miss patchwork so prevalent in the last twenty years. We must recognize that time is short, and results must soon be obtained or irreparable permanent damage may result.

We have also been surprised to learn that, even if the necessary funds were available to build sophisticated plants sufficient to treat effluent to the required standards, there is a shortage of operators and technicians and therefore it is doubtful that we could provide adequate operating skill to achieve the necessary end results. The lead time to train technicians of the quality and quantity required is considered to be not less than three to five

by Jack Davis and A. Penman

# response response response

years, and yet no concerted effort has been formulated in this direction. Here again, the CFMM has proposed a continuing programme which can be integrated into vocational schools as well as on-site practical training providing technicians not only for municipalities but for industry as well.

In October, 1969, the CFMM and the University of Western Ontario jointly sponsored a seminar at the University to study the proposed Canada Water Act. The purpose of the study was not only to offer a critique on the proposed legislation, but to determine the very ingredients necessary to make an Act of this nature function for our somewhat complex Canadian geography. As an outcome of this seminar, in March, 1970, the CFMM and its Pollution Committee appeared in front of the Federal Standing Committee on Natural Resources and Public Works in Ottawa and offered advice relative to the Canada Water Act Bill.

This last year, as a continuance of its programme, the Committee prepared a preliminary research programme of the questionnaire variety. The questionnaire, requesting information as to present programmes, future plans, and estimated capital costs, was forwarded to sixty typical Canadian communities. The results of this questionnaire left much to be desired, for it indicated amongst other things that no two Canadian communities separated their costs in an equitable fashion. We would hope within the very near future to suggest a common bookkeeping formula so that the costs of pollution control can be separated from general municipal budgets.

The Committee has also determined that while there is much confusion in the inland parts of Canada relative to the number of agencies involved in pollution control, the situation for communities bordering harbours is even more chaotic. Other than the obvious moral obligation, there would seem little point in these contiguous municipalities carrying out extensive treatment programmes without some knowledge of the regulations and their imposition relative to shipping, industry, unincorporated hamlets, et cetera, who are using these same harbours for disposal grounds. We hope, soon, to undertake a review to determine the scope and magnitude of the problem so that the bordering municipalities can provide the leadership before the results of indiscriminate pollution permanently overwhelmed the receiving bodies.

Concurrent to the CFMM's stand on pollution, it has been our opinion, through observation, that a pragmatic resolution of the constitutional problem can be achieved. It is our belief that we do not urgently require legal changes in the British North America Act, but merely recognition by the provincial and Federal Governments that the municipalities are generally more able to cope with management problems of the magnitude required for air and water pollution control, providing adequate financial assistance is

provided. For example, we believe it is quite within the powers of senior governments to contract out the services to those who have the continuing ability, and therefore it requires only that they agree as to the magnitude of the problem and as such no constitutional change should delay implementation. It is perhaps true that in the passage of time the results may ultimately require constitutional amendments, but these will come about by acceptance of responsibilities rather than the niceties of legal impediments.

It is also our opinion that an exact duplicated set of fixed standards are not required across Canada, at least in the short term. Comprehending the staggering number of dollars that ultimately are required for both capital and operating costs, a concerted effort should now be put forward in those areas which will gain the greatest economic return, thus allowing for a more determined effort on an all-over basis when financing is improved to the level of obvious benefit.

Most of the major municipalities in Canada are moving to five year financial budgeting. A real and significant pollution abatement programme requires at least this period of time if it is to be carried out on the scale necessary. Thus it becomes essential to have the other two levels of government provide secure long term financing so that results can be obtained most economically and with predictable conclusions. We are, in effect, saying that this type of assistance must be taken out of the political arena and the money established by trust fund or by other means to prevent the on-off again attitude of changing governments, changing philosophies, and changing priorities. We recognize that fundamentally the municipalities are the polluters, and that it was almost by happenstance that the situation took place. Certainly no anticipation of the problem was foreseen in the British North America Act, or surely our legal structure would be quite different today.

Financing is the key to the decision, yet municipalities are presumed to be able to resolve the problem on the limited real estate taxation system. We must all realize that changes are necessary or the public will react in its usual volatile manner, flailing out violently with inherent, attendant chaos. For example, at this moment, we are very concerned at the municipal level that industry is being selected as the scapegoat. While it is true that industry does add significantly to the pollutional load, industry is a manifestation of public demand, not the personal ploy of irresponsible individuals. Perhaps short term abatement can be achieved by creating industrial bankruptcy, but in the long term the economics of our country will suffer, and therefore expediency has been substituted for real programmes.

We of the CFMM are firmly committed to the resolution that pollution control is an urgent challenge and that we must halt and reverse this growing deterioration of our environment.



# Pollution and London

**As long ago as 1306 Britain took its first official measures in smoke abatement. A Royal Proclamation prohibited artificers from using coal in their furnaces and ordered a return to the use of wood or charcoal.**

**Notwithstanding the appointment of various committees later during the 19th and early 20th centuries, actual measures taken were inadequate to control the air pollution problem in the cities, and in London in particular.**

## it can be done

I was a student in London in 1952. It was the year of the "killer smog." For several nights that December it was impossible to move on some streets except by literally feeling your way along a wall or curb. You could hardly see either your hand in front of your face or the blurred light of one street light from the next. Transportation was brought to an almost complete halt. Some 4,000 deaths were directly attributed to the intense and prolonged smog and its effects on respiratory conditions.

As a result, in 1953, the Government set up a Committee on Air Pollution which reported the following year and its recommendations were closely followed in the Clean Air Act of 1956. The Clean Air Council was created by the Ministry of Housing and Local Government under this Act as a consultative group to review progress in pollution abatement and initiate research into its attendant problems.

The new Act made local authorities specifically responsible for clean air and empowered them to declare "Smoke control areas" for all or parts of their districts. The cost of converting to smokeless fuel (coke, gas, oil or electricity) was to be borne 40% by the Central Government, 30% by the local authority and 30% by the householder. For domestic conversion this was the major tool for success since it was estimated that about 80% of smoke emitted into the air came from the domestic chimney. During this period the railways converted

from coal to oil, and much improved technology in the auto industry followed the Ministry of Transport's controls and regulations almost eliminating visible exhaust from motor vehicles.

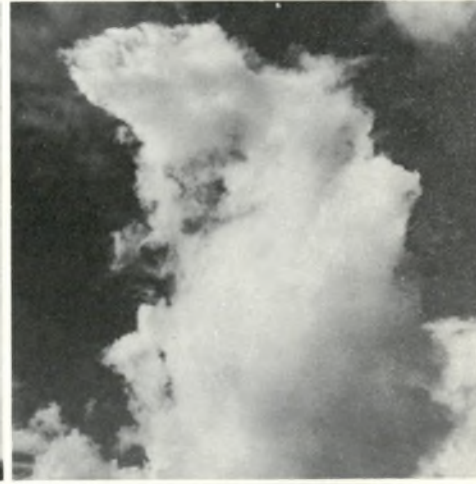
I left London in 1960 but it was a new London that I visited in July of 1970. The city was clean and colorful, the sun shone and the grass was green. The high temperature of 85° on the day I arrived at Heathrow was by no means unbearable, for the air was clear and dry. I could not take the time to visit the Post Office tower or other high vantage points, but the views, I was told, were spectacular. St. Martin's-in-the-Fields was being cleaned of its accumulated grime, as were many fine old buildings. There is a good chance they will stay clean once restored to their original splendour.

Apart from the immediate impact of this change in the face of London, and in the faces of Londoners and its summer visitors, it's exciting to realize it can be done. The conditions there are different in several ways from those generally obtaining in North American cities, especially the climate. Nevertheless there is evidence that anti-pollution measures can be effective. Cleaning up the rivers is the major goal for the 1970's and much has already been done in this area.

Who knows, by 1980 it may be possible to enjoy a swim in the Thames off Westminster Pier!

by Beric Graham-Smith







# British Columbia

## **Pollution Control Legislation in British Columbia**

by V. Raudsepp

British Columbia's present comprehensive pollution control legislation is designed to exercise logical, reasonable methods leading to effective waste management and environmental control allowing at the same time activities essential to continued social and economic progress of the Province.

Although there was an exercise of control over pollution inherent in various legislative measures enacted over the years for such various departments as those of health, forests, agriculture, and so on, the first formal step towards creating a pollution control authority, as it is understood today, came with the formation of a Pollution Control Board in 1956.

The Board, which came under the Minister of Municipal Affairs, was made up primarily of senior civil servants representing various government agencies with interest in pollution control matters. Technical assistance was provided by the Division of Public Health Engineering of the Department of Health Services.





The Board was responsible for ruling on application to discharge wastewaters, for recommending policy with respect to the control of water pollution, and for initiating investigations into any matters involving pollution and its control.

On April 1, 1965, the functions of the Board were transferred to the Water Resources Service under the Minister of Lands, Forests, and Water Resources. Two years later, the 1956 Act was replaced by the Pollution Control Act, 1967, which provided for creation of a Pollution Control Branch of the Water Resources Service. Under a Director of Pollution Control, the Branch was made responsible for handling the administrative and technical aspects of the new Act.

The Pollution Control Board of the Water Resources Service now became an advisory body to the government, prescribing means of, and setting standards for, controlling pollution and acting as an appeal tribunal in matters of appeals against decisions of the Director of Pollution Control Branch.

A brief review of the territorial and operational growth of pollution control shows that under the original 1956 legislation, the general extent of jurisdiction was the Lower Fraser Valley. In 1961, the area was expanded to include all of the Columbia drainage basin lying in the Province and, in 1963, jurisdiction was enlarged to include the entire Fraser River Basin and most of the populated area of the east coast of Vancouver Island. In 1966, Vancouver Island's Strathcona Park also was included.

However, with the passage of the Pollution Control Act of 1967, the entire Province was encompassed, indicating the rapid expansion of pollution control since its formal inception in 1956.

Surprisingly enough, in the light of current active public interest, there appeared to be little public reaction to these measures. In fact, approximately three and a half years ago, following closely after a much-publicized national conference on pollution, held by the Canadian Council of Resource Ministers in 1966, one British Columbia daily newspaper made a local survey of public opinion on the subject and the resulting story carried the headline... "Pollution... Who Cares?"

Today, of course, pollution control legislation and enforcement measures seem hardly able to keep up with the public demand for them. Nevertheless, there has been considerable progress made since the 1967 Act as can be judged from a selection of government news releases on the subject of pollution control since the spring of 1969.

For example, on March 14, 1969, a restructured Pollution Control Board issued a new pollution control policy statement covering discharge of domestic sewage and setting down standards and requirements for compliance.

In July of the same year the Board, in its advisory capacity, made specific recommendations for control of air pollution. Under the 1967 Act, the Board had been required to make half-yearly reports and submit recommendations not more than three years after the legislation had been passed. It has managed to cut this time in half.

In the fall of 1969, the Provincial government entered into an agreement with the Federal government for a four-year water resources pilot study in the Okanagan Basin to develop and test techniques for interjurisdictional planning covering water use for this area and

including many water-use studies, as well as investigations into causes of water pollution.

In January of this year, the Provincial government prepared a statement concerning pollution control requirements in British Columbia for use in discussion with the Federal government at the Federal-Provincial conference in February, 1970.

The statement pointed out that British Columbia is developing a single-agency concept in pollution control with the decision-making based on multi-disciplined and inter-agency consultation. This form is believed to be the most efficient institutional arrangement in view of the socio-economic structure of the Province and it allows integrated use of resources that are under Provincial jurisdiction.

All the new waste discharges into water and on land are being operated and regulated under permits issued by the Director of Pollution Control Branch. The Pollution Control Board acts as first-stage appeal tribunal from the Director's decision and is a multi-disciplined and multi-agency body empowered to set broad standards for pollution control.

The degree of treatment and other terms and conditions of a permit for waste discharge are based on inter-agency consultation involving the Provincial agencies dealing with health, recreation and conservation, agriculture, water, mines, and lands. The Federal Department of Fisheries is also participating in this process through a co-operative arrangement.

Monitoring of the operation of pollution control facilities, required in the permits, is carried out by the Pollution Control Branch.

Work is also going on to bring under pollution control permit all effluent and waste discharges existing prior to passage of the 1967 Pollution Control Act. It is noteworthy that the large pulp mills completed in the Interior since the Act was passed have been required to treat their wastes to such a degree that the final effluent can be discharged into important salmon streams without any significant harm to the environment.

Progress in municipal waste treatment also is evident. As an example, the Greater Vancouver area is required under the Pollution Control Act to install major sewage interceptor and treatment facilities by 1975 at an estimated cost of \$73 million.

British Columbia is giving direct financial assistance to municipal governments with the aim of keeping the annual cost of waste treatment within a manageable limit. In addition, all waste treatment facilities are exempted from property taxation. Furthermore, legislation for municipal aid specifies per capita grants for pollution control.

The control of pollution and its planning is directly connected with the Provincial social economic planning and priorities, and also is strongly associated with the development of natural resources under Provincial jurisdiction.

In order to ensure that a high output of social values and an integrated use of all resources will be achieved, it is intended to pursue avenues for the strengthening and expansion of pollution control legislation by inter-governmental consultation with inter-governmental groups and representatives of public, business and industrial groups.

A further step, in the advancement of pollution control in the Province, was taken in April of this year with the passage of an Act to amend the 1967 Pollution Control Act. This added air pollution control authority to the legislation which already covers water and

land pollution control. In addition there was a considerable strengthening of several other aspects of the Act.

Air pollution from domestic, commercial and institutional services and from such activities as burning of leaves, burning from land clearing, land filling and land grading etc, which are of lesser importance than industrial pollution, were exempted. It was visualized that the municipal governments would regulate and control such air pollution sources under municipal by-laws.

Air pollution from motor vehicles will be controlled under the Motor Vehicle Act, while control of air pollution from burning of weeds, crops or stubble remains under the Noxious Weeds Act, and control of air pollution from pesticides or biocides remains under the Pharmacy Act or Pest Control Products Act (Canada).

All new industrial air contaminant emissions will require a permit from the Director of Pollution Control Branch, effective January 1, 1971. All existing industrial air contaminant emissions must be registered with the Director on, or before, December 31, 1971, with application for a permit required to be made within 60 days of notification from the Director.

Amendments were also made to those sections of the Act dealing with water and soil pollution. Effective from the beginning of this year, all new sewage or waste discharges require permits and all existing sewage discharges which are being operated without permit must be registered with the Director by next December 31. As in the case of industrial air emissions, the Director will then order registrants to apply for a permit within 60 days.

Small sewage flows of less than 5,000 gallons a day are exempted from the Pollution Control Act and are controlled by local health authorities under the Health Act.

A further strengthening of the Pollution Control Act also was made so that its provisions prevail over those of other Acts containing sections dealing with pollution control.

For example, if a municipality has an air pollution control by-law, the industrial air pollution control permits issued by the Provincial Director of Pollution Control Branch will prevail over the provisions of the municipal by-law. However, if the municipal by-law requires a higher degree of treatment than that specified in the Pollution Control Branch permit, the by-law requirements will remain valid.

The Act also made provision for objections to granting of an air pollution control permit to be filed with the Director of Pollution Control Branch by any person living within five miles of the point of emission and by the adjoining municipality.

As in the 1967 Act, the Pollution Control Board of the Water Resources Service continues to be the initial authority for appeal against any decision of the Director of Pollution Control Branch with provision for a final appeal either to the Lieutenant-Governor-in-Council or the British Columbia Supreme Court.

A new section of the Act requires that all new sewage collection systems proposals require approval of the Minister of Lands, Forests, and Water Resources before a municipal by-law is presented to the electors or before construction of the system is begun. Previously, the Minister of Health Services and Hospital Insurance had this authority under the Health Act.



# Yukon Northwest Territories

## **Federal Legislation concerning Pollution Control in the Yukon and Northwest Territories**

by J. K. Naysmith

*During the last 10 years, the Yukon and Northwest Territories have experienced a major expansion in commercial activity, as the mining and petroleum industries expand their search for new ore bodies and oil and gas fields. The search has been rewarding, resulting in such a large mining developments as the Pine Point and Anvil lead-zinc mines. Two major gas fields are under development at Beaver River and Pointed Mountain just north of the 60th parallel, and a number of other gas discoveries have occurred in areas still too remote for economic development. Oil has been found at two locations, and the prospects of discovering a large pool are considered by experts to be very good.*

The manpower and facilities needed to undertake resource exploration and development programs in northern Canada are considerable, and have brought about an expansion of the northern population. New communities accompany new mines, and additional business is generated at central service points such as Whitehorse, Yukon Territory and Yellowknife, Northwest Territories. Oil and gas exploration programs involve a tremendous amount of logistics support in the vast area of the Mackenzie River Valley and Arctic Islands, accompanied by rapid growth of the main service centre of Inuvik, Northwest Territories. Development of an oil field and facilities to move the oil to southern markets would initiate yet another era of economic expansion and population growth in the North.

The increased human presence in a heretofore largely untouched world has, however, raised the spectre of serious and sometimes irreversible damage to the northern natural environment, both in the arctic wilderness and in areas and water courses adjacent to expanding communities.

In northern latitudes ecosystems are in a precarious state of equilibrium, and northern lakes and streams do not have the same capacity for safely absorbing wastes as do waters in southern Canada.

In recognition of the need to act now to prevent deterioration of the northern natural environment before commercial and population pressures advance further, the Federal Government, through the Department of Indian Affairs and Northern Development, has enacted two major items of legislation to control water pollution. In addition, stringent regulations to control the use of northern public lands in the course of natural resource exploration and development are being introduced. These Land Use Regulations will apply to wilderness areas outside community boundaries.

### **Northern Inland Waters Act**

This Act has four main purposes:

1. To provide for the equitable distribution or sharing of rights to the use of northern fresh waters, through a system of water rights licensing.
2. To ensure that the disposition of water rights is done in a manner consistent with immediate and long term regional and national interests.
3. To ensure that all works and undertakings planned for the use, diversion, storage and treatment of water are designed and constructed

to acceptable engineering standards.

4. To establish and maintain the principle that a right to the use of water is dependent on the user accepting full responsibility for returning the water to the natural environment in a condition that meets acceptable water quality standards.

The Act was passed by Parliament in June, 1970, and requires users of water in the north, including communities with engineered water and sewage systems, to apply for a Water Rights Licence. In the course of processing an application, the government will determine the engineering adequacy of the physical structures used to divert, store, or convey water, through inspections and review of engineering drawings and specifications. Before a licence is granted, it must be clear that treatment facilities are adequate to prevent effluent waters from degrading receiving waters beyond their capacity for recovery through dilution and bacteriological action.

At present there are only five communities north of the 60th parallel in Canada with populations in excess of 2,500 persons (Whitehorse, Yellowknife, Inuvik, Hay River, Fort Smith and Frobisher Bay). Approximately 100 small communities with populations less than 1,000 are widely disposed throughout the two territories, which together compose 38 percent of Canada's land mass. Under the Northern Inland Waters Act, the water supply and waste disposal arrangements of all northern communities will be examined, and a program of improvement initiated for each community that is causing unacceptable levels of waste deposition into northern waters.

The Act will be administered primarily in the North, under the direction of Water Boards located in the territorial capitals of Whitehorse, Yukon Territory, and Yellowknife, Northwest Territories. Membership of each board will include one person from each of the Federal Government Departments concerned with the water resources of the territory, plus up to three persons from the Territory. Boards have the responsibility, under the chairmanship of the Regional Engineer of the Department of Indian Affairs and Northern Development, for approving issuance of licences and setting conditions thereon relating to water use and pollution control, for holding public hearings, for maintaining water management records and for delineating water management areas within which formal licensing is required. A key feature of board operations is that the various Federal government activities related to water in northern Canada will be centrally coordinated, in the North.

The Northern Inland Water Act reflects the need for comprehensive river basin planning, by enabling agreements with provincial governments for cooperative management of those rivers and lakes that cross the boundary along the 60th parallel. It also provides for reservation of lands adjacent to water bodies, and for the withholding from use of any lake or stream, to facilitate comprehensive planning.

### **Arctic Waters Pollution—Prevention Act**

The possibility of extensive pollution of the waters of the Canadian Arctic Archipelago has become increasingly apparent in the past few years. The prospect of supertankers carrying out northern oil, and of extensive off-shore drilling for oil raise the spectre of large oil spills in a part of the world where clean-up would be extremely difficult and

costly and in which the natural environment's capacity to dispose and degrade oil is but a fraction of that in southern climates.

Although prepared with oil spillages uppermost in mind, the Arctic Waters Pollution Prevention Act also applies to on-shore installations along the Arctic coast, including community sewage disposal systems. It provides for the submission for government approval of the plans and specifications of any on-shore installation that causes, or could cause, the discharge of waste into arctic waters. The definition of waste is comprehensive, and includes, but is not limited to, any substance that would degrade or alter arctic waters to an extent detrimental to their use by man, or by any animal, fish or plant life useful to man.

The Act, while designed to prevent pollution, recognizes the possibility of it occurring due to accidents or other unforeseen causes. Persons who are responsible for the deposit of waste in arctic waters, whether from ships, off-shore drilling rigs, or on-shore installations such as a tank farm, are financially responsible for all pollution damages, including costs of clean-up and claims from affected persons. Owners are required to carry insurance or provide other proof of financial ability to pay for possible pollution costs. Regulations will set out the amount of insurance that must be carried in each case.

The Arctic Waters Pollution Prevention Act has the same significance and function for communities along the Arctic coast as the Northern Inland Waters Act has for those adjacent to lakes and streams in the Yukon and Northwest Territories. Both control the deposit of waste within strict limits, and provide for inspections to ensure that effluent water quality standards are being maintained. The government is empowered to direct improvement of existing waste disposal systems under both Acts. Engineering plans of new sewage systems must be approved before construction is permitted to commence.

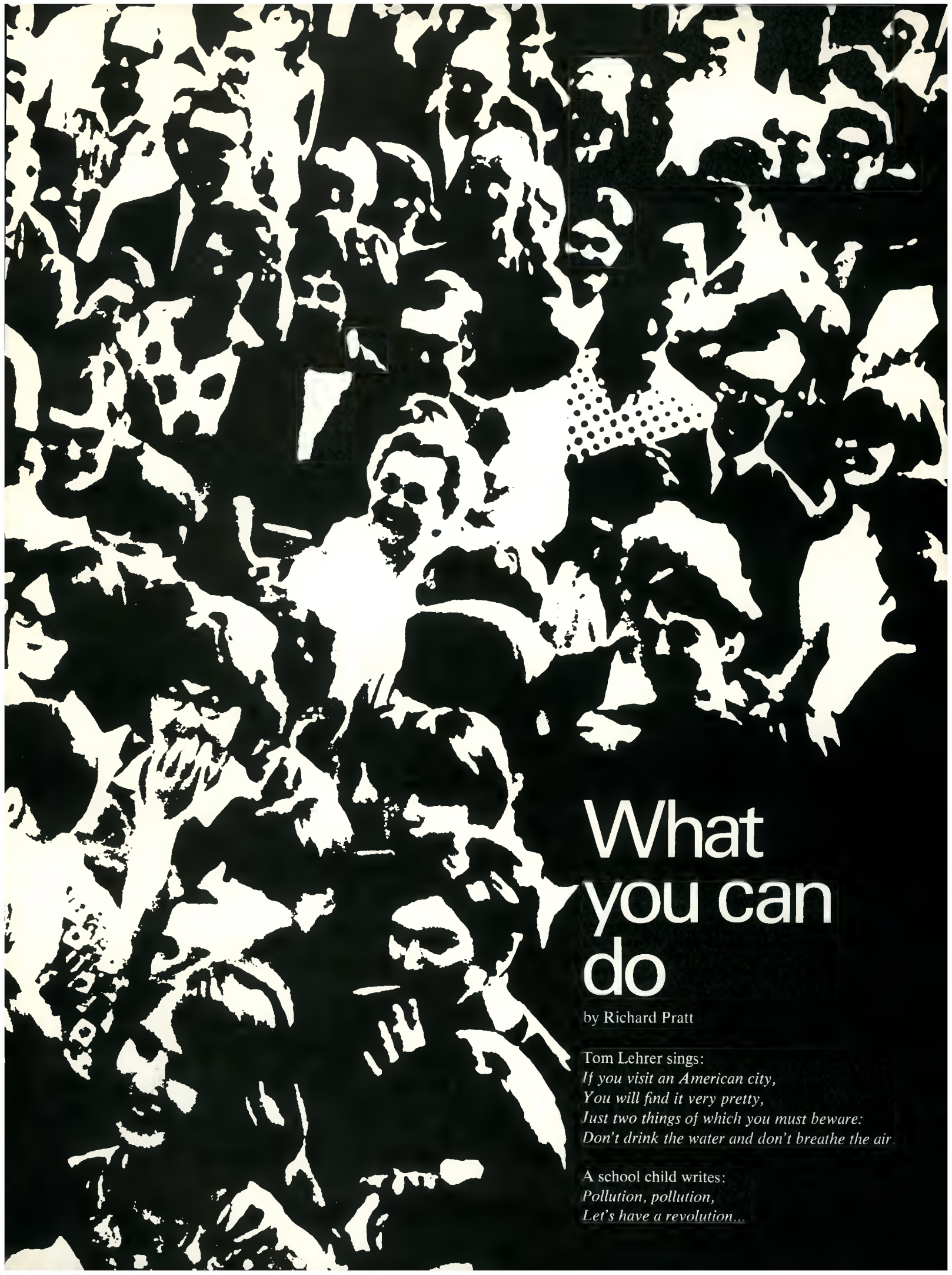
To enforce the new legislation, the Department of Indian Affairs and Northern Development is building up an organization of engineers, administrators and inspectors in the North. Overall supervision will be exercised in each territory by a Regional Engineer, assisted by District Engineers located at strategic centres throughout the North. A number of inspectors will also be employed. Although their primary responsibility will be to enforce the aforementioned Land Use Regulations, they will also undertake tasks related to water management, such as sampling for water quality and inspecting the licensed premises of water users.

The Arctic seas, of the Canadian Arctic archipelago, and the country's northern lakes and streams are, at the moment, relatively free of pollution. Indeed, most northern water bodies are still untarnished by man. This is a fortunate circumstance under which to implement pollution control legislation. It is comparable, for example, to having brought in such legislation in southern Canada 30 years ago. Historical patterns of development in Canada have left Canadians with over a third of the country relatively pollution free, and it is a primary purpose of the new legislation to keep it that way.









# What you can do

by Richard Pratt

Tom Lehrer sings:

*If you visit an American city,  
You will find it very pretty,  
Just two things of which you must beware:  
Don't drink the water and don't breathe the air.*

A school child writes:

*Pollution, pollution,  
Let's have a revolution...*



Does it seem as though everyone is jumping on the "pollution bandwagon?" Not everyone is, but more are joining day by day. If you feel a strong urge to blame someone for pollution, be sure to include yourself—for everybody has had a part in the pollution of our environment. For this reason, personal involvement will be a key solution to the problem and there are many things which individuals could be doing right now.

The automobile is perhaps one of the most easily identified polluters of our time. Granted, it's nice to have a clean car on the outside, but what about the inside? Cars emit hydrocarbons, heavy metals such as lead, carbon monoxide, a deadly gas, as well as oxides of nitrogen. These emissions can be reduced by regular tuning of the engine and checking of the exhaust system. Choosing the correct octane rated gasoline for your car can help to reduce lead emissions.

An exhaust control device is available on all late model Canadian cars and although it is an offence to remove this device, some people do so, and it cuts down the acceleration potential of the vehicle as well as increasing the emission of pollutants. The catalytic muffler, which reacts with some of the oxides, rendering them harmless, is in use on several large vehicles, like trucks and buses. If possible, leave your car at home and use the public transit system. Electric vehicles are ideal, of course, but diesel fueled vehicles are less polluting than gasoline fueled automobiles.

Finally, if you plan on having your car wrecked, check with a local scrap-metal dealer to see if the metal can be reclaimed. A wrecked car will sit on the lot of an auto parts dealer for years as an undesirable blot on the landscape.

The homemaker can make a significant contribution to the fight by familiarizing herself with the phosphate content of various detergents. The phosphates from these detergents find their way into our waterways and cause an increase in the quantity of undesirable algæ blooms. These algæ deplete the supply of oxygen in the water resulting in the death of fish and minute animal life. This tragedy can be avoided by the substitution of soap flakes and a water softener or by using a very low phosphate detergent. However, at present even the phosphate-free detergents are under suspicion because the phosphate has probably been replaced by a nitrate—another nutrient.

A list of the phosphate contents of various detergents should be available at your local supermarket. If a list isn't present, pressure the store manager to have one posted. Local anti-pollution groups will gladly furnish the information.

Garbage dumps are certainly one of the worst offenses to the landscape. Until this country adopts modern methods of garbage disposal, similar to those in use in Europe, landfill sites will continue to be depleted. One such modern method is used in Montreal. Burnables are incinerated under carefully controlled conditions and metals are removed for re-use.

Widespread use of these methods is imperative but in the meantime, there are certain procedures which can be observed by the individual to lessen the problems. Reduce the volume of garbage by crushing cans and cartons. Do not throw out newspapers—give them to charitable organizations or service clubs for resale to paper companies who reuse them for making cardboard.

Use returnable bottles wherever possible. Boycott products in non-returnable bottles and other non-biodegradable packages. A bottle will foul the environment for at least 100 years, a can for at least 10 years.

Littering is a form of garbage disposal. Try to kick the habit. Aside from risking a fine, you are showing a disregard for nature and the environment. Use your pockets or the litter box in the car.

You can improve your garden's productivity by making a compost heap of dead plants, grass, vegetable peelings, tea bags and egg shells. Why not bury your leaves instead of burning them? Plants can be used to protect other plants. Dwarf marigolds surrounding roses will keep aphids away. Ants can definitely be a problem but they dislike mint. Some herbicides like 2,4,5-T are under great suspicion and have been seriously restricted. As a substitute why not get some exercise and try the old fork-trowel?

We all use some sort of pesticide, perhaps an insect spray bomb or a weed killer. Don't use insecticides like D.D.T., aldrin, and dieldrin that threaten long-term harm to the environment and ultimately man. These insecticides do not degrade quickly enough and instead, they build up to concentrations that seriously affect the nervous system of some birds and small mammals. Get out the fly-swatter or use a natural insecticide. This is, an insecticide that is selective to only a few pests and degrades quickly. An example would be pyrethrins—a flower extract.

Camping is becoming a popular holiday pastime. Be sure to take along plenty of large plastic garbage bags and store your refuse until it can be deposited at home or a nearby dump.

If you own a cottage, don't take your garbage out to the middle of the waterway or back into the bush. Don't clean your clothes or your fish in the lake, either. Organize a cottage association so that all vacationers on the lake can be educated. Keep the cottage in a general state of good repair. This will cut down on nuisance insects and the need for an insecticide.

Investigate your sewage disposal system. In Ontario, the privy and well must be at least 50 feet apart. If you have a septic tank, be sure it's not leaking into the waterway. Explore the geology of the land to make sure the tile bed is suitably placed. This may seem like a lot of trouble, but suppose you couldn't swim in the very lake in front of your cottage?

Exercise care when mixing the gas and oil for your boat motor and be sure the engine is properly tuned. If you own a large boat, be sure that the toilet has a sufficient holding tank and is flushed at unloading stations on shore.

Anti-pollution pressure groups are most effective when backed by a large membership. Politicians have the power to legislate and bring an end to pollution, but they are only swayed by numbers. The following is a list of some groups across the country:

- Society for Pollution and Environmental Control, 44 West Sixth Avenue, Vancouver 10, B.C.
- Environmental Crisis Action Committee, Department of Biology, University of Saskatchewan, Saskatoon, Sask.
- Committee of A Thousand, P.O. Box 185, Niagara Falls, Ont.
- Pollution Probe, Zoology Department, Room 215, Ramsay Wright Building, University of Toronto, Toronto 181, Ont.
- Pollution Probe, Carleton University, Ottawa 1, Ont.
- Le Mouvement de Résistance à la Pollution, 6424 St. Denis Street, Montreal, Quebec.

Join one in your area!

We are inclined to think that one person cannot do much harm to the environment. It may seem that tossing one small bag of litter in a stream or on a roadside is alright—if no one sees us. But there is always that finger of guilt—and we know it! There is something everyone of us can do. It took many generations to create pollution and everyone contributed. It will take time, of which there is very little remaining, and conscious individual effort to solve the pollution problem.



ce que

**nous**

pouvons faire

Le Canada est un des rares pays de l'hémisphère occidental qui possède encore un grand nombre de richesses naturelles. Notre voisin du sud nous en fournit la preuve en engageant avec nous des pourparlers et des négociations visant à mettre sur pied une politique continentale de l'énergie qui permettrait aux États-Unis d'améliorer leur état financier par l'utilisation de nos matières premières. Les États-Unis ont besoin de notre eau pour étancher leur soif industrielle et ils ont tellement besoin de nos minéraux qu'ils seraient prêts à niveler certaines parties de nos Montagnes Rocheuses. De même, pour obtenir le pétrole canadien, les compagnies pétrolières américaines risqueraient un drame écologique éventuellement causé par le naufrage de leurs pétroliers dans l'Arctique. Nous avons déjà fait l'expérience de telles conséquences désastreuses lors du naufrage récent du bateau-citerne «Arrow» sur la côte de la Nouvelle-Écosse.

Bien que nous possédions encore toutes nos richesses naturelles, nous ne devons pas oublier que d'autres pays, tels les États-Unis, partageaient autrefois cette bonne fortune et que la cause principale de leur appauvrissement actuel est la pollution. Il est donc important de se demander : «Allons-nous ignorer notre responsabilité envers notre entourage et nos enfants, bientôt nos héritiers, ou allons-nous accepter notre responsabilité puisque c'est à nous qu'il incombe de protéger notre entourage?» Nous devons nous poser cette question dès maintenant parce que notre réponse, si elle doit venir, doit être énoncée immédiatement. Il est encore possible de réévaluer nos priorités, de redéfinir ce «progrès» qui, pour le moment, nous coûte de l'air, de l'eau et de la terre, c'est-à-dire, trois des quatre éléments essentiels à la vie. Il est

encore possible d'aller de l'avant tout en protégeant nos ressources. Et c'est ce que nous devons garantir.

Nous pouvons nous assurer une telle protection par la purification des eaux. Ce n'est pas un rêve mais une réalité basée sur l'usage rationnel des cours d'eau et l'assurance que toute eau utilisée nous reviendra purifiée. L'eau pourrait alors servir indéfiniment au maintien de l'équilibre écologique, de la santé et des loisirs.

Les villes de Montréal, de Hull et des environs offrent de terribles exemples de pollution de l'eau. Ces cités acheminent leurs égouts vers les cours d'eau, tout en admettant que leur système n'assure même pas le minimum indispensable de traitement. Dans combien de temps le St-Laurent et l'Outaouais seront-ils des cours d'eau «morts»? Si vous vous promenez en bateau le long de cette dernière, ne soyez pas surpris de voir un accroissement d'algues et de rebuts huileux, une masse d'excréments et de matières grasses.

Les municipalités ne sont pas les seuls agents de pollution. En effet, les industries doivent également accepter une large part de la responsabilité collective. Et peut-on rester optimiste devant l'attitude de laissez-faire du gouvernement à leur égard, surtout lorsque ce gouvernement a été établi pour protéger l'ordre et le bien-être social?

Mais il est trop facile de blâmer ces deux catégories d'agents de pollution. Que dire de la population elle-même? Selon les statistiques les plus récentes, chaque Canadien, chaque jour, est «responsable» de la production d'une moyenne de quatre livres de déchets. Normalement, ces rebuts sont évacués et accumulés dans un dépotoir et brûlés. Ce processus cause la pollution de l'air! Pourquoi persistons-nous à encombrer et dévaloriser notre paysage, quand il serait si simple de se débarrasser de nos rebuts en les enterrant dans des carrières et

des fosses, à l'abri de la vue et de l'odorat? De ceci résulterait non seulement la purification de l'air, mais aussi la réutilisation de ces terrains pour d'autres fins—jardins publics et centres récréatifs, par exemple. Si les déchets doivent être brûlés, que les autorités construisent des incinérateurs équipés pour contrôler l'émission des fumées. Les avantages de cette solution sont innombrables: l'air ne serait plus pollué au point d'asphyxie et la vapeur qui se dégage du système pourrait être utilisée pour le chauffage ou la réfrigération des édifices avoisinants. La vapeur pourrait être canalisée de la même façon que l'eau des usines de purification et nos déchets auraient une valeur «économique».

Nous pouvons protéger notre milieu ambiant par le processus de récupération. Puisqu'il n'est pas possible que tous les rebuts soient ramassés par les municipalités et puisque certains produits ne se décomposent pas, nous devons adopter une législation visant à interdire la consommation de certains produits. Par exemple, les bouteilles jetables constituent une menace pour nos parcs et centres récréatifs. Quel que soit l'endroit, vous y trouverez des bouteilles de toutes sortes, des boîtes ou pots en plastique ou en fer blanc dispersés par des gens étourdis et négligents. Il y a une solution à ce problème: qu'il soit possible d'obtenir un remboursement pour tous ces récipients et que le montant remboursable soit assez élevé pour que les gens soient attirés davantage par l'argent que par le désordre. Les gens exigent des récipients peu coûteux et il va de soi que les industries sont heureuses de les fournir puisque ainsi elles éliminent les frais de réutilisation et augmentent leurs profits tout en satisfaisant leur clientèle. Une large catégorie de rebuts peut être réutilisée sous d'autres formes; par exemple, les voitures, les poêles, les réfrigérateurs, le papier, les boîtes d'aluminium, etc.



Les options sont claires et simples: désirons-nous de l'eau pure ou de l'eau polluée? Désirons-nous des montagnes de rebuts et peu de terrain de récréation? Sommes-nous prêts à réduire notre production afin d'assurer la survivance de nos ressources? Sommes-nous disposés à voir l'air pollué à grands frais et peut-être même au prix de notre vie? Forcerons-nous les industries à interrompre ce processus?

La réponse à ces questions constitue une responsabilité pour tous les citoyens, notre responsabilité. L'avis des autorités gouvernementales est partagé sur cette question. D'après l'Acte de l'Amérique du Nord Britannique, la pollution est une responsabilité provinciale alors que la pêche et les cours d'eau internationaux sont du domaine fédéral. La contestation constitutionnelle se prolonge et, pendant ce temps, notre milieu se dégrade.

En Ontario, le gouvernement est conscient de l'étendue de ses richesses industrielles. De cette prise de conscience, résulte une collaboration active entre le ministère provincial de la Santé et le ministère fédéral de l'Énergie, des Mines et des Ressources. La province de Québec commence maintenant à s'apercevoir des dégâts que cause la pollution mais, à cause d'un manque d'effectif, elle doit faire face à d'énormes difficultés dans ses efforts pour faire respecter ses règlements contre la pollution. Les autres provinces du Canada partagent des points de vue diversifiés à ce sujet. Le gouvernement fédéral se soucie de n'entreprendre aucune démarche qui pourrait mécontenter un secteur quelconque de l'opinion publique. Prenons, par exemple, le projet de loi C-144—La Loi Canadienne sur l'aide à la conservation des eaux. Cette loi permet au gouvernement fédéral d'intervenir si les provinces ne réussissent pas à faire respecter leurs règlements concernant l'abaissement de la pollution des eaux. Cette intervention fédérale nécessite donc au préalable un jugement défavorable sur les actions des gouvernements provinciaux! Le fédéral osera-t-il?

En général, les députés sont d'accord sur le fait que la situation doit changer. Les électeurs doivent donc dès maintenant faire part de leurs revendications à leurs représentants auprès du gouvernement. La seule façon d'influencer le gouvernement est de s'organiser et de lui soumettre des faits concrets et vérifiés. Les gouvernements sont disposés à écouter et à accepter qu'on les oriente dans la bonne direction. C'est pourquoi notre organisme «Pollution Probe» a connu un certain succès. Au Québec, il existe un organisme «La résistance contre la pollution» qui exerce une pression sur le gouvernement. Plus il y aura de personnes

intéressées et prêtes à agir, plus il sera possible que de tels organismes soient efficaces.

Bien que l'«organisation» ait une action décisive dans la lutte contre la pollution, chaque citoyen doit parallèlement accepter certaines responsabilités. Il se doit de changer ses attitudes et son comportement.

Voici quelques suggestions pour combattre la pollution:

- a L'algue se nourrit de phosphates et lorsqu'elle cesse de croître, elle absorbe l'oxygène dont les poissons ont besoin pour vivre.  
*Employez des détersifs sans phosphate ou à faible teneur en phosphate.*
- b Cinquante et un pour cent (51%) de la pollution de l'air, dans la plupart des grandes villes, est causé par l'échappement des voitures.  
*N'utilisez pas votre voiture pour de courts voyages. La marche est bonne pour la santé. Ne laissez pas votre voiture en marche à moins que ce ne soit absolument nécessaire. Utilisez les moyens de transports publics aussi souvent que possible. Fixez un mécanisme anti-pollution au tuyau d'échappement de votre voiture. Assurez-vous du bon fonctionnement de votre moteur afin d'éviter un excès d'échappement.*
- c Le niveau dangereux de pollution a été atteint plusieurs fois à Toronto. La même chose peut se produire partout si nous ne sommes pas prudents.  
*Utilisez une tondeuse à gazon mécanique ou électrique au lieu d'une tondeuse à combustion. Ne brûlez jamais de déchets—déposez-les aux endroits désignés pour le ramassage. Faites vérifier votre fournaise pour qu'il n'y ait pas de fumée ou de particules excessives qui s'en échappent.*
- d Plusieurs communautés s'aperçoivent que les carrières et les fosses qui existent présentement ne pourront pas toujours suffire aux déchets qui augmentent rapidement.  
*Achetez vos boissons dans des récipients réutilisables. Brisez ou écrasez tout récipient usagé afin de réduire le volume de déchets. Conservez les journaux et donnez-les aux organismes de bienfaisance. Ne soyez pas un individu qui salit la voie publique en y jetant des déchets et DONNEZ l'exemple à vos enfants.*
- e Commencez dès aujourd'hui.

# BOOKS

## **Pollution Probe,**

Donald A. Chant, ed., (Toronto: 1970);  
New Press; 209 pages \$2.50

Donald A. Chant, the editor of this book, is the Chairman of the Department of Zoology at the University of Toronto and one of the founders of "Pollution Probe." This organization was the first, and most successful, to develop community action against pollution. Written by members of the organization, the book is a handbook on pollution and pollution abatement in Canada today.

The articles cover the course of pollution in a logical way, beginning with the effects of waste on the ecosystem, through the various types of pollution, to solutions by means of social action—their "Do It" kit. The authors are self-styled experts in the field both of pollution and social action although at no point do they enlighten their readers as to the basis for this claim, other than their membership in "Pollution Probe."

In the first chapters we are told of the ecological dangers to air, water, and soil, the use of pesticides, radiation and noise pollution in a well-informed and convincing, if somewhat fatalistic way. Fortunately, however, just as the reader is becoming completely despondent, a skit "MacBarf" is inserted to revive our flagging spirits and sense of humor. This skit, marks a change of pace in the book.

The ten chapters that come after it set out what, we, the public, can do as concerned citizens and cites "Pollution Probe's" experiences in corporate confrontation and community action. It is in this section that a rising note of hysteria, subdued in the first section, comes to the surface as chapters conclude with dismal references to "death" and "graveyards." A touch of overkill perhaps?

Passing this off as a journalistic device for reader retention, there remain three major problems which recur throughout the book and detract from its credibility. The first is a complete lack of footnotes and references, a particularly disconcerting omission when cost figures, such as those for sewage treatment abatement or studies on incidences of pollution, are being discussed. If we're to be told, as we are in Chapter Two, that eleven kinds of pollution will probably kill us by 1980 and if we

happen to escape that, krypton will "get" us by 1990, we should be jolly well told who said so, and why.

Secondly, and particularly in the latter part of the book, full rein is given to lambasting the "buck passing" bureaucracy. Closer questioning of the Federal government officials involved might have shown that the situation is not quite that critical. For example, many of the changes called for in the Chapter "Northern Pressures" are allowed for under the recently enacted Northern Inland Waters legislation and, contrary to the assertions made, governmental co-ordination is also working effectively at both Federal-provincial and inter-departmental levels. They might also have mentioned in passing: the joint Federal-provincial comprehensive planning studies underway in at least three provinces, the Federal and Ontario contingency plans for materials spills, and the recent meetings held with the United States to discuss the IJC recommendations for cleaning up the Great Lakes. All this information is public knowledge, of which the authors no doubt are aware and, in all fairness, it should have been mentioned. Furthermore, some of the most comprehensive literature on pollution in Canada omitted from the "Selected Reading" list are the Government sponsored CCRM publications of the "Pollution and Our Environment" and "Resources for Tomorrow" Background Papers and Proceedings and the numerous IJC Studies and Reports.

The omission of these governmental activities casts doubt on the objectivity of the book. Such imbalance is further accentuated by the authors' tendency to oversimplify by failing to point out many of the economic and administrative constraints inherent in their proposed solutions. The answer to the problem of phosphates is not simply to return to using ordinary soap, unless everyone is to sell their automatic washers. Instead, the best solution will be a complex combination of substitution, reduction in use of phosphates in all sectors, recycling and better sewage treatment facilities.

In the same way the figure of \$25 - \$90 per capita (a rather broad range), which the authors have estimated as the cost of installing secondary sewage treatment facilities, will not necessarily be made available by restructuring government priorities away from "less important" items such as roads and industrial incentives. Rather it would

seem that industrial incentives have been one of the alternatives available for implementing the abatement programmes that are being advocated. It is easy to say "government should control" or "industry must be forced" but, in the long run, regulatory programmes may prove to be more expensive and less effective than an initial incentive to industry to change its production process or location. For while there is little disagreement that pollution costs should be considered as costs of production, the quantifying of social costs is not a simple task and the distribution of these costs on an equitable basis is an even more formidable problem. To sum up, a fear is expressed that the public will "be led down the garden path by the practical types" yet, in the longrun, surely feasibility is the final test of any policy alternative.

These shortcomings are largely made up for, however, by the final articles on communication, action programmes and the "Do It" kit. They set out the types of soul-searching questions each of us must ask ourselves if we are to solve the environmental crisis which is approaching "What do we need?", "What must we give up?" "How much are we willing to pay?". The "Do It" kit is something everyone should read and follow.

The self-confessed purpose of the "Probers" is to stimulate the public by both intellectual and emotional means. The authors say the purpose of this book was to give an informative, educated base for teachers, politicians, industrialists or the concerned public to give substance to the sensation-alism of the press. In this it has only partially succeeded. Nevertheless Professor Donald Chant and his colleagues have forcefully set out not only many of the issues involved, but they have successfully emphasized their growing concern that for the most part "we are confronted with an ecological crisis, which must be dealt with."

by Barbara Carroll



Central Mortgage and Housing Corporation  
Ottawa  
The Honourable Robert Andras  
Minister Responsible for Housing

Société centrale d'hypothèques et de logement  
Canada  
L'honorable Robert Andras,  
ministre chargé du logement