

*Resources for Tomorrow*. Queen's Printer, Ottawa, 1961, 1,061 pp., 2 vols. (Also edited in French.)

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Volume 6, numéro 12, 1962

Mélanges géographiques canadiens offerts à Raoul Blanchard

URI : <https://id.erudit.org/iderudit/020392ar>

DOI : <https://doi.org/10.7202/020392ar>

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Éditeur(s)

Département de géographie de l'Université Laval

ISSN

0007-9766 (imprimé)

1708-8968 (numérique)

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Citer ce compte rendu

Innis, D. Q. (1962). Compte rendu de [*Resources for Tomorrow*. Queen's Printer, Ottawa, 1961, 1,061 pp., 2 vols. (Also edited in French.)]. *Cahiers de géographie du Québec*, 6(12), 279–283. <https://doi.org/10.7202/020392ar>

will have to be divided into at least three types according to whether the adjacent dry land is (1) used for dry farming, (2) used only for grazing, or (3) not integrated with the irrigated agriculture on the floodplain. Also there are probably important contrasts within the wide floodplain occupance type. For example, can the occupance types on the Stillaguamish River in Washington, in the Brownsville area of Texas, and in the Yazoo Basin really be considered members of the same category? A sub-humid plains type may even be identified. Nevertheless, here is a base — a starting point — for a further understanding of the agricultural use of floodplains. The thoughtful reader cannot leave the chapter without feeling that he has been instructed.

Each of the case studies is a geographical analysis of exceptional quality. Each presents not only an analysis of one or more real farms but usually also information on land use in the surrounding area, historical changes, flood occurrences, and any flood-control schemes which have affected the area. The two-color maps are well-drawn, clear, pertinent, and generally excellent. Here is a collection of case studies relating to one of America's most valuable types of agricultural land. It will be very useful to the geographer, whether interested specifically in floodplains or not, who undertakes the study of agriculture by a consideration of the *unit* of agriculture, which is the individual farm. I heartily congratulate the author on this valuable contribution to our literature of agricultural geography.

John M. CROWLEY

### LES RESSOURCES ET LE DÉVELOPPEMENT DU CANADA

**Resources for Tomorrow.** Queen's Printer, Ottawa, 1961, 1,061 pp., 2 vols. (Also edited in French.)\*

These masterly volumes constitute one of the most important recent publications in Canada. One thousand double columned pages contain maps, photographs, tables, graphs and invaluable textual material.

The eighty papers in these two volumes were published as background material for the Montreal Resources for Tomorrow conference in October 1961. There is far more here than just a study of resources. Each article is written by an authority in his field. These authoritative syntheses are invaluable contributions in dozens of fields of study which interest geographers, economists, lawyers, social scientists, conservationists and the general reader. The eleven government departments which organized the conference and this publication have done a wonderful job.

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Perhaps this review can serve as a guide. The subjects covered include agriculture, water and regional development in Volume I; forestry, wildlife, recreation and fisheries in Volume II. The Steering Committee and the writers have wisely approached these subjects from the widest possible viewpoint. The studies not only range far around the resources theme but examine activities in other countries, showing the kind of competition which Canadian resource industries must now try to meet.

For each topic listed above, except regional development, there is a basic series of studies and several special studies. The standard studies for each subject include past and current resource use, probable future demand, amount of the resource available, rates of renewal, foreign competition, legislation affecting the resource, administration, research, responsibility for research and extension work. Basic information has been assembled here which was previously almost inaccessible. These basic articles comprise about half of the papers presented.

The background articles show several trends which are common to all these resources. In the first place, all the resource industries suffer from jurisdictional complications. In many cases it is hard to know whether the federal or provincial, local or metropolitan government is

\* Voir sur la conférence elle-même: Fernand GRENIER, *Le Canada s'interroge sur ses ressources et sur son avenir*, dans *Cahiers de géographie de Québec*, n° 11, octobre 1961 — mars 1962, pp. 113-117.

responsible. For this reason alone, no action is taken on all sorts of crucial problems which continue getting worse from day to day. Many suggestions are made here for achieving co-operation and coordination. Some of these blueprints for action are clear-cut, while others suggest that more research is needed.

A second factor generally mentioned is lack of public interest in and knowledge about resources. Public apathy, or confusion (not surprising in view of the legal complexities) means lack of electoral and financial support for vital projects, which ought to be undertaken now so that Canada can compete in the future. These two volumes clearly set out the main problems and propose action. The public is strongly advised to read them. The last paper of all is a plea for communication. More educated, popular writer-scientists are needed.

A third general complaint is that trained personnel are not available even when there is money to hire them. The writers of these volumes point out that educated intelligent men and women are lacking in large numbers from the fields of research, administration, business, extension work and communication with the general public.

Fourthly, Canada is in for some very stiff international competition. Canadians have built up high-cost resource industries with high wages, high profits and little thought for future production. Now that the post-war boom is over, many countries are contriving to avoid buying high-cost Canadian raw materials and semi-manufactured goods. Other countries do more research and apply their research quickly. Their products tend to be freer of disease, of higher quality, or are cheaper than our products. Canadians must now realize that abundant natural resources have ceased to provide easily available low-cost, high quality products which can undersell the products of all other countries. Canadians must do more research and apply it, if they are to keep up with countries which have already been doing this for some time.

A fifth generalization on the basic series of articles is that small scale resource users are being forced out of business, or are being forced to suffer by more mechanized large-scale operators. From an economic point of view, the small operator should be moved into some other line of work, in order to get rid of these low-efficiency, high-cost producers. From the human point of view, something should be done for the small farmer, the lone fisherman, the Indian trapper and the workers and operators of small lumber mill.

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The remaining articles deal with the special problems and characteristics of each resource.

Agriculture is treated first. There is no clear accounting here of Canada's soil resources, nor of their rate of renewal. About one quarter of the arable land has suffered some erosion, most of it has suffered some depletion, but there are probably 40 or 50 million acres of land yet untouched. Canada can certainly supply herself with food for many years to come. Exports of food should rise if world population increases, but this trend may be counteracted by the tendency for more countries to become self-sufficient. The acreage of cultivated land is actually decreasing in Canada as fertilizers and mechanization make more intensive cultivation possible. Many farms in eastern Canada have been abandoned.

An article by N. R. Richards discusses soil fertility and the effects of various kinds of fertilizer in different areas. C. F. Bentley proves the bad effects of monoculture on prairie soils. Fewer than half of the grain farmers use fertilizer, even now.

In an especially valuable article J. C. Gilson says that 38% of Canadian farms produced less than \$1,200 worth of produce each in 1950. Many small inefficient farms still need to be abandoned. Do government subsidies encourage farmers to go on struggling with undersized farms? Perhaps farmers are deriving most of their income from off-farm jobs. And the problem of re-financing highly mechanized farms every 21 years for the next generation has not been solved. Children's education and family living standards are often sacrificed for the sake of more machinery. Gilson writes « A farm business that is kept solvent by an erosion of human resources is, in fact, bankrupt. This is a problem that deserves serious study. »

G. Fortin has written a most interesting article on the social effects of changing agricultural techniques. He suggests that rural stagnation and misery should be alleviated by sub-

sities so that farmers will not move to cities, and will be available later if demand for agricultural products increases.

The above remarks give only a few glimpses into a fascinating series of articles, dealing with the main problems of Canadian agriculture.

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The general flavour of the « water » articles indicates varying degrees of pollution. Canada has a tremendous amount of unused good water, but it is not near big cities. Pollution problems turn out to be most complicated. It is hard to affix blame in some cases so that purification could be enforced. For example, several factories on a river may have caused pollution which is not lethal to fish ; one more factory raises the pollution too high. Who is to blame?

The ownership of water rights is another complicated problem ; navigable waters are federal, while other waters are under provincial jurisdiction. Who is responsible when dams upstream lower the minimum flow so as to prevent lumber rafting of fish breeding? Or, sewage may react with oxygen in the water and cause fish to suffocate. The lack of administration and legal institutions for solving these problems is distressing.

There is not much information on how much water is available ; too few streams have flow gauges, nor is the data which exists easily available. Kristjanson and Sewell point out that rivers must be developed on a multiple purpose basis. The best interests of hydro-power, flood control, navigation, fisheries, irrigation, sewage disposal, log driving, recreation, domestic and industrial water supply must be considered. Bora Laskin has written a most interesting article on the development of laws pertaining to water rights. In Québec, for example, industries which float logs have precedence over the power industry.

Fox and Craine have cooperated to point out that multi-purpose government development is more efficient than single or dual-purpose development. Large projects are more efficient than small ones ; water storage capacity behind a small dam may cost \$1,000 per acre-foot, compared to \$20 when a large dam is built. The advantages of TVA are carefully examined in this article. R. A. Spargo discusses accounting procedures. He asks if recreational and æsthetic values are sometimes ignored because accountants cannot assign monetary values to them? The choice of an interest rate for the capital involved may make or break a project. A  $\pm \frac{1}{2}$  percent error in the interest rate equals an  $\pm 8\frac{1}{2}$  percent error in estimating original costs.

The St. John, Fraser and Nelson rivers each have excellent chapters devoted to them. Because rapids in a river are places where oxygen is mixed with water, a dam which floods out rapids can deprive fish of oxygen and perhaps also of breeding grounds. Lumbering can increase hillside erosion, or stir up river mud and cover fish-nesting areas with silt. Hydro-power is so valuable compared to other uses of a river that it will predominate in all river basins as need for power grows. J. R. Menzies' article discusses the extent of the pollution problem in each of Canada's drainage basins.

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The third and last section of Volume One consists of a series of regional studies.

Land near cities is a non-renewable resource which is being overwhelmed by suburban sprawl. Certler writes, « In an atmosphere of uncertainty the land around our cities becomes a happy hunting ground in which everyone believes he has a chance to make a killing. » Gertler believes that planning would prevent speculators from developing suburbs along undesirable lines. Another problem is the scorched-earth policy. The builders own a five year supply of land for expansion, while speculators hold reserves for another 10 or 20 years.

David Slater has written an article on industrial location. N. H. Richardson contrasts the successful growth of Kitimat with the relative failure of the Prince Rupert plan. Kitimat is an interesting new sort of « company town » where private home ownership and rival manufacturing plants are encouraged. There is an article on the Edmonton resource area, and a paper by E. G. Pleva on the current status of the Upper Thames River development plan. Pierre Camu and Fernand Grenier describe the development, current status and problems of the Lake St.

John — Saguenay region. The Niagara peninsula, the Peace River Region, Prairie agriculture, the Avalon peninsula, the Maritimes and the North each have a chapter. J. R. K. Main has written a valuable article on comparative transportation costs into and within the Arctic.

The last two articles deal with problems in the Canadian north — especially the Eskimo.

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D. V. Love's *Potentialities of the Forest Resource Base* is a masterly discussion of the national and international problems of lumber and paper industries. It is incisively thought out and clearly written ; it points out the Canadian problem and tells how it developed. The problem in a nutshell is that Canadians still believe in inexhaustible forests, but do not realize that the road to the lumbering areas is now a long one. High wages, profits and transportation costs have raised the cost of Canadian lumber in Europe above that produced from carefully planted and tended Swedish forests. Since Swedish and other European forests produce high quality lumber on a permanent yield basis, Canada is going to have a difficult time in the future. Clear-cutting of the most desirable species has changed Canada's most accessible forests into « sylvan junk ».

Another threatening development in the lumber and paper industries is competition from the Soviet Union. Soviet competition has already taken most of the British lumber market away from Canada. Soviet industries can perhaps be regarded as the *reductio ad absurdum* of vertical integration. The Soviets have not only eliminated the middlemen, they have practically eliminated profits altogether. According to Mr. Love this gives the Soviet Union such a cost advantage that Canada may lose much of her lumber and paper markets in the years to come. The increase in production rates for forest products is already somewhat less for Canada than for the world as a whole. Industry and provincial governments must do better than apply « a thin veneer of forest management. »

Generally speaking, Canadian forests could produce, on a permanent basis, about four times as much wood as they do now. Inaccessibility and lack of care are making Canada less competitive on the world market.

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Fish which are in plentiful supply are low in value : fish which are high in value are limited in amount. Economic laws are working as they should : the fishing industry is generally depressed.

The role of the fisheries in the Canadian economy has been declining for some time, but the situation would be much worse if some highly successful conservation schemes had not been carried out. Self-restraint in the halibut, salmon and lobster fisheries has produced much larger annual catches than those of the old free-for-all days. Limiting the catch to the rate of natural increase of the resource means, however, that little expansion of the industry is possible. Cod and herring are in ample supply on the east coast, but since the war they are being caught increasingly by boats from the consuming nations. This has limited the growth of the Canadian fishing industry.

W. E. Ricker shows how quickly fish can be expected to grow under different conditions and what the optimum rates of catching are. P. A. Larkin discusses the effects of man-made changes on the environment of fisheries. His discussion ranges from accidental pollution to purposeful poisoning of undesirable species. Dams, fish hatcheries, lumbering, power plants and irrigation are also discussed.

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Canadian wildlife provides fur, recreational hunting and non-destructive enjoyment. As in the case of fishing, overhunting decreases the animal and bird population, while under-killing seems to produce disease and undernourishment. Birds may be more sensible than other animals, — in poor years they raise fewer young ones.

The wild fur industry is depressed by a generally declining demand for furs and because hunters must sell at a trading post which has an effective local monopoly. Cooperative fur selling

and outfitting in Saskatchewan seems quite successful in giving hunters a living wage. Fur auctions also promise greater returns to the hunter. A. G. Loughrey also discusses the ranch fur industry. Scandinavian mink are being produced in large quantities under a brand name which guarantees quality. Canadian fur producers and manufacturers are too disorganized at the moment to meet this competition very effectively.

Recreation is neglected in a money economy because its money value is hard to assess.

The most civilized recreation article is written by Claude Robillard, of the Montréal City Planning Dep't. He points with pride to the achievement in Montréal of widely varied cultural activities. Sport is fine, he says, but not all people want to engage in team games all the time. In Montréal parks there are puppeteers, actors, singers, painters, wood-workers, movie viewers and movie-makers. Many thousand children and adults have taken part in these and other activities. People like to learn and participate. M. Robillard says : « People who are only looking for amusement cannot be entertained indefinitely . . . »

N. L. Crombie points out that tourism is an important Canadian industry. Canadians should look after their parks, but should not make them too much like American parks. In Canada, only one tourist in seven is an American, the rest are Canadians. J. A. Boan makes a good case for remembering the importance of recreation when reservoirs are being built. Norah Johnson and Joyce Tyrell have made a most interesting study of the problems of access to water and to crown land or park land. The water belongs to all people, but shorelines are often privately owned to such an extent that the public has little or no access to the water.

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In the space available only some of the immense quantity of excellent material in these volumes can be mentioned.

Donald Q. INNIS

### VILLES PIONNIÈRES INDUSTRIELLES DU CANADA

ROBINSON, Ira M. **New Industrial Towns on Canada's Resource Frontier.** Program of Education and Research in Planning, Research Paper No. 4. Department of Geography, Research Paper No. 73. The University of Chicago, 1962. IX+190 pages, ill.

Le Canada, plus peut-être que n'importe quel autre pays, est la terre des villes nouvelles. Ces villes, situées au-delà des zones de peuplement continu du Canada méridional, sont habituellement des agglomérations spécialisées dans une seule fonction. Elles naissent autour d'une entreprise unique, publique ou privée, engagée dans l'exploitation de ressources naturelles. On compte environ 145 de ces villes au Canada, groupant quelque 165,000 habitants. De ce nombre 46 ont été créées de 1945 à 1957 ; ceci s'explique non seulement par l'exploitation accélérée des ressources minérales, forestières et hydroélectriques au Canada depuis la guerre, mais surtout par le fait que l'on exploite de plus en plus les ressources très importantes qui sont situées au-delà de la limite du peuplement continu.

L'auteur de cette étude tente de nous faire comprendre ce nouveau type de ville par l'analyse de quatre d'entre elles, choisies afin de nous en présenter un échantillonnage judicieux. En effet, non seulement elles sont situées dans des régions différentes, mais chacune d'entre elles s'explique par une activité économique différente : Kitimat, dans les cordillères de la Colombie Britannique (production d'aluminium) ; Drayton Valley dans la prairie de l'Alberta (exploitation du pétrole) ; Elliot Lake, dans la partie ontarienne du Bouclier canadien (mines d'uranium) ; et Schefferville, également dans le Bouclier mais à la frontière du Québec et de Terre-Neuve (mines de fer). Parmi les caractéristiques d'ensemble de ces quatre villes pionnières, il faut d'abord signaler que chacune d'entre elles doit sa création à l'initiative d'une ou de quelques entreprises privées : l'Alcan pour Kitimat ; plusieurs compagnies de pétrole ou d'uranium pour Elliot Lake et Drayton Valley ; et l'Iron Ore Co. pour Schefferville. Il est aussi à remarquer que chacune de ces quatre villes est une ville « planifiée ».