MONTREAL

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RAPPORTS
TECHNIQUES

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Case 7

INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

LES CLIENTELES SCOLAIRES

Les quelques notes qui suivent ont pour but d'indiquer comment établir les clientèles scolaires.

Lorsqu'on a la population totale d'un territoire et la population par groupe d'age, il est facile d'établir alors la clientèle scolaire à chacun des niveaux d'enseignement en utilisant les formules qui suivent:

Maternelle (1 an)

$$Pm = +.0336\ N_1 \quad +.2272\ N_2 \quad -.0752\ N_3 \quad +.0144\ N_4$$

Élémentaire (6 ans)

$$Pe = -.0480\ N_1 \quad +.8720\ N_2 \quad +.4480\ N_3 \quad -.0800\ N_4 \quad +.0080\ N_5$$

Secondaire (5 ans)

$$Ps = .0144\ N_1 \quad -.1216\ N_2 \quad +.7584\ N_3 \quad +.3904\ N_4 \quad -.0416\ N_5$$

Institut (2 ans)

$$Pi = +.0080\ N_2 \quad -.0560\ N_3 \quad +.4480\ N_4$$

Pm = Population ayant atteint l'âge requis pour fréquenter la maternelle.

Pe = Population ayant atteint l'âge requis pour fréquenter l'école élémentaire.

Ps = Population ayant atteint l'âge requis pour fréquenter l'école secondaire.

Pi = Population ayant atteint l'âge requis pour fréquenter l'institut.

N_1 = Population de 0 à 4 ans

N_2 = Population de 5 à 9 ans

N_3 = Population de 10 à 14 ans

N_4 = Population de 15 à 19 ans

N_5 = Population de 20 à 24 ans

Lorsqu'on a que la population totale, il est possible d'arriver à des résultats valables rapidement en utilisant les chiffres qui suivent:

maternelle: 20 élèves par 1,000 habitants
élémentaire: 130 élèves par 1,000 habitants
secondaire: 85 élèves par 1,000 habitants
institut: population ayant l'âge de fréquenter l'institut, 30 élèves par 1,000 habitants.

Ces quelques chiffres permettent d'obtenir rapidement une idée de la taille des clientèles scolaires mais ils négligent les facteurs qui font varier les pyramides d'âges.

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En général on peut dire que:

a) une population protestante contiendra un pourcentage plus faible d'enfants d'âge scolaire;

b) une population entièrement catholique aura un nombre légèrement supérieur d'enfants d'âge scolaire;

c) les territoires situés près du centre-ville auront une proportion plus faible d'enfants susceptibles de fréquenter l'école élémentaire;

d) les nouvelles subdivisions de maisons unifamiliales auront un plus fort pourcentage d'enfants susceptibles de fréquenter l'école élémentaire et un plus faible pourcentage susceptible de fréquenter le secondaire et l'institutionnel.

Les deux graphiques qui suivent illustrent d'ailleurs assez bien la variabilité des populations d'âge scolaire d'un secteur à un autre sur l'Ile de Montréal.

RÉGION DE MONTRÉAL

RÉPARTITION DES POPULATIONS D'AGE SCOLAIRE

PAR 1,000 HABITANTS

				Prévisions du Service			
	1951	1956	1961	1966	1971	1976	1981
Maternelle	21	22	22	23	24	23	23
Élémentaire	102	117	122	125	131	130	128
Secondaire	69	76	87	88	91	96	96
Institut	29	26	30	33	33	34	36

Le tableau montrant la répartition des population d'âge scolaire par 1,000 habitants a été construit à l'aide des données du recensement et des prévisions telles qu'établies par Hermann Welp. Il est fort probable que les prévisions du service seront révisées puisque le comportement récent de la population semble indiquer un affaissement des taux de natalité. Il résultera de ceci des taux de participation plus faibles aux différents niveaux scolaires dans l'avenir.

PL/ajr
12-5-66

Paul Laliberté

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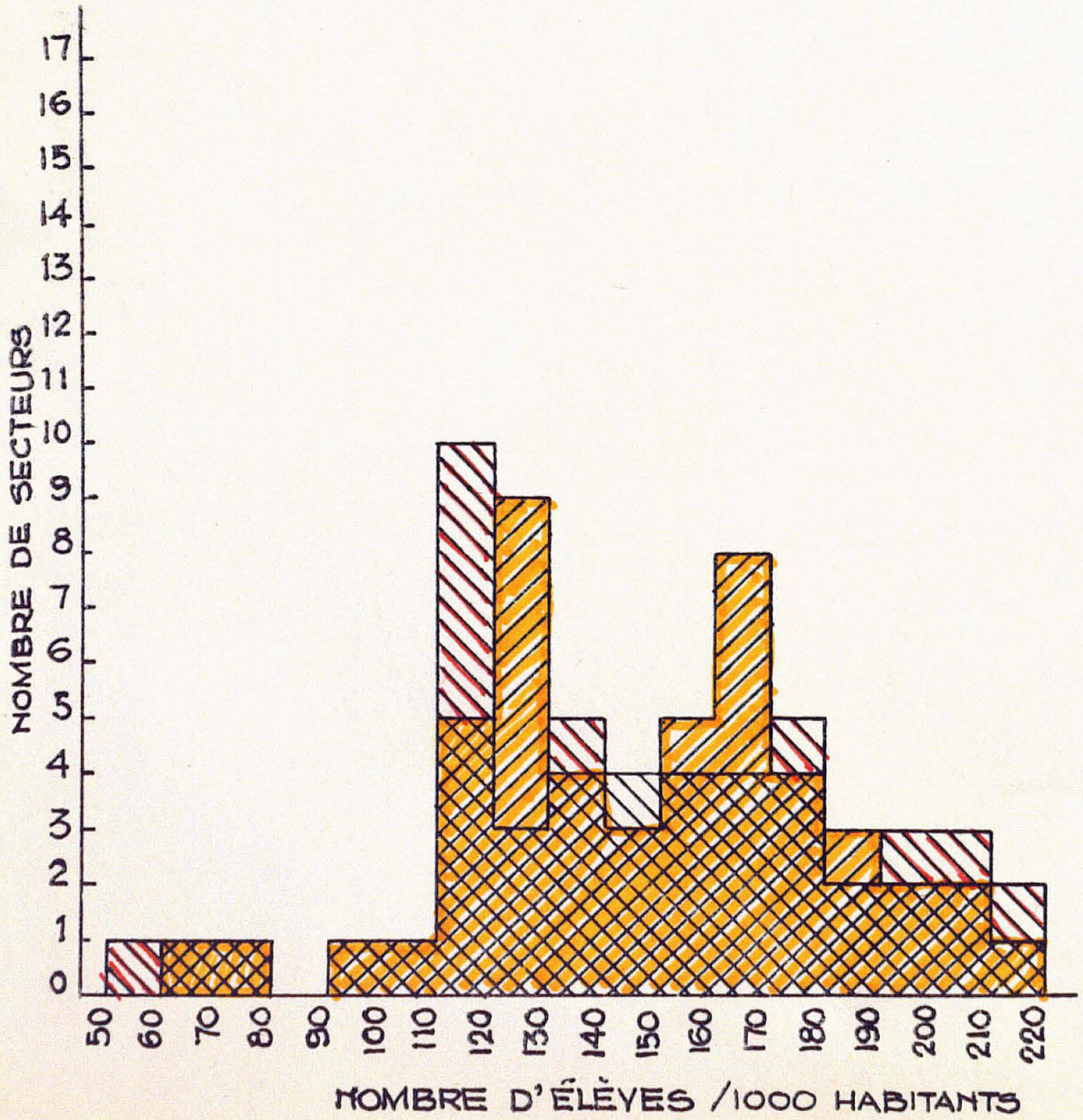
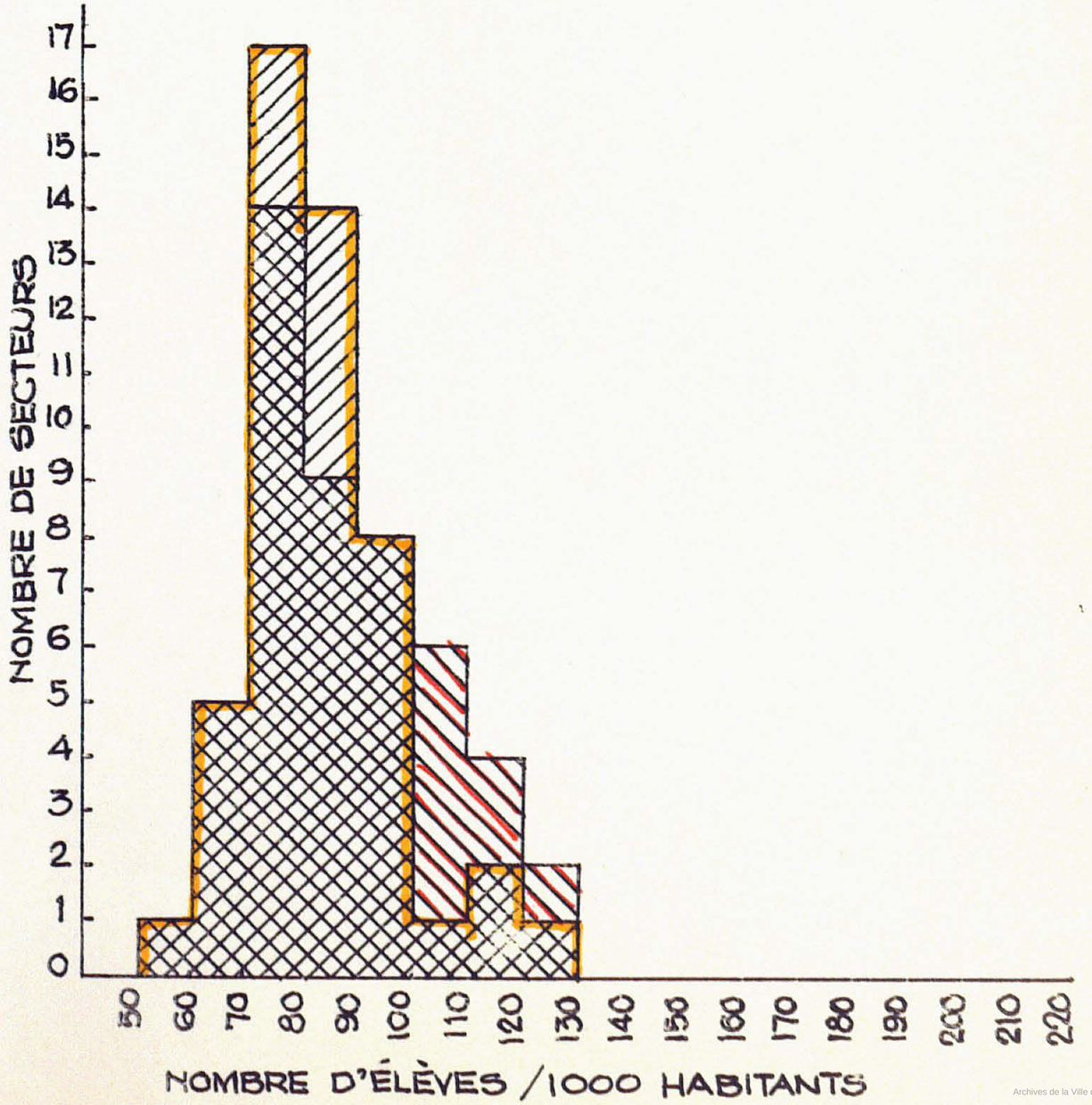
RÉPARTITION DES POPULATIONS D'ÂGE SCOLAIRE POUR LES 50 SECTEURS DE L'ÎLE DE MONTRÉAL

NIVEAU ÉLÉMENTAIRE



NIVEAU SECONDAIRE



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U73-16-12
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INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

NOTES - INSTITUTIONS D'ENSEIGNEMENT SUPÉRIEUR (Universités, etc.)

Organisation universitaire

Nous prenons pour acquis que les recommandations du Rapport Parent touchant ces institutions seront appliquées par le Ministère de l'Éducation. Cette hypothèse est valable puisque, à date, les documents de cette commission ont servi de base à l'élaboration des politiques du Ministère.

Le Rapport Parent recommande que, dorénavant, les universités ne pratiquent que de l'enseignement authentiquement supérieur, ce qui veut dire que les élèves qui fréquenteront les universités à l'avenir auront préalablement complété les cours donnés au "niveau institut". Ainsi, la première et la deuxième année "collège" ne seront plus prodiguées à l'université.

Les universités existantes continueront à fonctionner, toutefois, elles devront elles-mêmes, avec l'approbation du Ministère de l'Éducation, établir un palier à leur croissance. L'Université de Montréal a déjà indiqué le désir de limiter sa population étudiante future à 25,000.

L'on peut ainsi prévoir l'implantation de nouvelles institutions universitaires.

- Le Rapport Parent recommande l'implantation de centres d'études universitaires dans les endroits où on pourra assurer une clientèle adéquate pour permettre le bon fonctionnement de l'institution. Ces centres sont des "filiales" d'université à charte complète. Ils prodigueront l'enseignement des deux premières années de l'université et devront compter un minimum de 1,200 étudiants et de 100 professeurs.
- Le Rapport Parent prévoit l'établissement d'universités à chartes limitées, c'est-à-dire les institutions qui n'offrent pas d'éventail complet de formation adéquate et professionnelle que l'on retrouve dans les universités existantes. Les universités à chartes limitées devront être assurées d'une clientèle d'au moins 2,000 étudiants.

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- Le Rapport Parent prévoit la création d'instituts supérieurs de technologie. Ces instituts de technologie prodigueront un enseignement d'un niveau comparable à celui de l'université; toutefois, leur orientation académique est différente. L'institut de technologie supérieure vise à former des cadres intermédiaires dont la responsabilité est d'assurer un lien entre le professionnel et le contremaître.

- Le Rapport Parent recommande que l'École des Beaux Arts et le Conservatoire soient restructurés de façon telle que ces institutions deviennent d'authentiques maisons d'enseignement au niveau supérieur.

- Le Rapport Parent recommande la création immédiate d'une nouvelle université de langue française à Montréal et d'une université de langue anglaise qui pourrait prendre le Collège Loyola comme point de départ.

<u>Les taux de scolarisation au niveau supérieur d'enseignement</u>

Le Rapport Parent établit à 17% de la population du groupe d'âge de 19 à 27 ans la participation de la population aux études supérieures. Ce chiffre s'appuie sur l'hypothèse que 20% de la population d'une génération "entrera" à l'université et que les 3/4 des étudiants compléteront leurs études. Le taux de scolarisation théorique de 13.6% applicable au groupe d'âge 20-24 ans résulte de ce taux de participation.

- Le Rapport Parent n'a pas établi le taux de scolarisation au niveau des études post-graduées. Nous nous aventurons à établir le chiffre de 2.0% applicable au groupe d'âge 20-24, nous appuyant sur les hypothèses suivantes:

a) en 1981, le tiers des étudiants diplômés poursuivra ses études pour l'obtention de la maîtrise;

b) le tiers des diplômés détenant une maîtrise poursuivra des études de doctorat.

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- Le Rapport Parent considère que l'enseignement prodigué par les instituts supérieurs de technologie, l'École des Beaux Arts et le Conservatoire sont de niveau "Supérieur" et se situe au même palier que celui que prodigue l'université. En l'absence de taux de scolarisation établi par la Commission, nous formulons l'hypothèse que le quart des diplômés des instituts qui ne vont pas à l'université s'orienteront vers ces institutions supérieures pour y poursuive en moyenne deux années d'étude. (Taux de scolarisation théorique applicable au groupe 20-24 ans = 2.0%).

Les clientèles au niveau scolaire supérieur dans la région de Montréal

Si nous acceptons les taux de scolarisation établis plus haut et les prévisions de population élaborées par Herman Welp, nous en arrivons aux clientèles portées au tableau qui suit.

Il faut noter que nous formulons l'hypothèse qu'a cause du caractère de ses institutions et de sa position géographique, la région réussira à attirer les 2/3 des clientèles du reste de la province, se destinant aux études post-universitaires et aux instituts supérieurs et le 1/6 des clientèles du niveau universitaire.

Niveau	Originaire de la région	de l'extérieur	Total
Post-universitaire	8,000	4,800	12,800
Universitaire	54,700	8,000	62,700
Instituts spéciaux	8,000	5,000	13,000
	70,700	17,800	88,800

La répartition géographique des institutions

Les institutions d'enseignement supérieur constituent un des éléments qui peuvent nous permettre de réaliser des centres régionaux:

a) ces institutions emploient une personne pour 4 ou 5 étudiants;

b) leur implantation identifie le centre;

c) elles sont génératrices d'activités;

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d) leur implantation est une décision du secteur public.

Les quelques mots qui suivent tendent à définir les bassins de desserte de ces institutions en s'appuyant sur deux hypothèses:

a) les tailles d'institutions minimum établies par la Commission Parent;

b) les étudiants "étrangers" logés près de l'institution sont ignorés pour les calculs.

Les bassins de desserte - Centres d'études universitaires

Clientèle minimum de 1,200 étudiants.

Pour assurer à l'institution la fréquentation minimum, il faut une aire de desserte contenant un minimum de 320,000 habitants si le taux de scolarisation est de 13.6% puisque ces institutions ne pourront probablement attirer que le tiers de la clientèle au niveau supérieur résidant dans leur bassin de desserte. Nous avons établi le tiers en formulant les hypothèses suivantes:

a) la durée de la majorité des cours prodigués dans ces institutions ne sera que 50% de leur durée normale;

b) l'éventail des cours offerts ne sera suffisant que pour attirer les 2/3 des étudiants des deux premières années d'université.

Les bassins de desserte - L'université à charte limitée

L'aire de desserte requise pour assurer l'existence d'une université à charte limitée ayant 2,000 étudiants est de 540,000 habitants si nous utilisons un taux de scolarisation de 17.6% de la population du groupe de 20-24 ans.

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Il y a lieu d'utiliser les chiffres ci-haut mentionnés avec beaucoup de circonspection puisqu'ils sont basés sur l'hypothèse que l'institution peut attirer le tiers de la clientèle qui se destine aux études supérieures. Ce pourcentage a été choisi de façon empirique, puisque pour l'établir d'une façon sérieuse, il faudrait connaître l'éventail des cours offerts par l'institution et l'étudier au regard de l'éventail des cours offerts dans l'ensemble des institutions de haut savoir.

Institutions d'enseignement supérieur et terrain

L'état de la Californie, dans son plan d'aménagement de l'éducation a établi les normes suivantes pour ses institutions:

	Taille	Superficie	Acres/1,000
Université	25,000 étudiants	1,000 acres	40
State Colleges	10,000 étudiants	250 acres	25
State Colleges (50% residence)	5,000 étudiants	150 acres	30

Il m'apparaît que ces normes ne tiennent pas compte de la relation qui doit exister entre l'intensité d'utilisation du sol institutionnel et la densité d'occupation des terrains environnants.

Quelques chiffres suffisent à montrer la variation des densités d'utilisation prévues par certaines universités:

Washington (Seattle)	37.6 acres/1000 E
Berkeley	21
Penn. (Philadelphia)	18.5
Sir George Williams	7.7

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Tout et aussi longtemps que des études plus précises n'auront pas été réalisées dans ce domaine, nous suggérons les "normes temporaires" suivantes:

Au centre-ville	10 acres/1000 E
milieu urbain	20 acres/1000 E
milieu sub-urbain	30 acres/1000 E

Adéquation

Le plan prévoira assez de places dans les universités et autres institutions d'enseignement supérieur pour recevoir toute la population qui désirera les fréquenter. (Voir textes, clientèles)

Le plan prévoira une réserve d'un nombre suffisant d'acres de terrain pour satisfaire les besoins des institutions d'enseignement supérieur. (Voir normes suggérées).

Accessibilité

La localisation des institutions d'enseignement supérieur sera telle que la majorité des étudiants puisse s'y rendre en 30 minutes.

Les institutions d'enseignement supérieur seront localisées de façon à ce que le transport en commun puisse les desservir.

Variété

Le plan prévoira un sain mélange d'université de tailles variées, de centres d'études universitaires, d'universités à chartes limitées et d'institutions spéciales.

Le plan prévoira des institutions d'enseignement supérieur des deux langues.

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Perceptibilité

Les institutions d'enseignement supérieur constituent des éléments susceptibles de favoriser la réalisation de cet objectif; à ce titre, elles doivent être distribuées d'une façon qui favorise la perception de la forme de développement choisie.

Particularité

Montréal est une métropole bilingue; partant, il s'est avéré désirable d'y favoriser l'implantation de maisons d'enseignement supérieur authentiquement bilingues.

Animation

A cause de l'animation qu'elles peuvent générer, les institutions d'enseignement supérieur devraient être intégrées aux centres régionaux que nous désirons édifier.

Résilience

Dans la répartition du terrain pour fins "Institutions d'enseignement supérieur", il faut penser à la permanence de ces établissements et allouer du terrain non seulement pour satisfaire les besoins d'un site en 1981 mais aussi les besoins ultimes de ce site.

PL/ajr
26-7-66

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UNIVERSITÉ DE MONTRÉAL

25

LISTE DESCRIPTIVE DES PROGRAMMES POUR ORDINATEUR PRÉPARÉS AU SERVICE D'URBANISME

Note d'introduction

Les programmes décrits ici sont, à quelques exceptions près, rédigés en langage FORTRAN IV et destinés à l'ordinateur CDC-3400.

Les références aux entrées et sorties (v.g. U-5116) indiquent le numéro de classification des bandes magnétiques.

Les références aux tableaux avec numéro entre parenthèses sont aux tableaux de sortie du programme en question. On doit mentionner le numéro du tableau avec chaque demande pour copie des résultats, qui sera fournie sous forme de photocopie.

Les intéressés peuvent aussi se procurer une copie de n'importe lequel de ces programmes en référant à son sigle et numéro (v.g. No 8, INPOP). Pour quelques programmes qui portent un numéro de la série "P", (v.g. P-1060) on dispose d'une description plus complète du programme.

Harry N. Lash

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NO	PROGRAMME	DESCRIPTION
3	TAPLOG	Transformation de la bande magnétique (U-3017) des données de population, ménages, familles et habitations par secteur de recensement, contenues dans 5 records de 1440 caractères en BCD, en 1 record de 907 mots binaires (point flottant) par secteur de recensement et éditées sur bande magnétique U-5174, (HY), 1° filière. -Mode: Buffer in (UL,1) (X,X(907))
4	SYMAP	FORTRAN CDC-3400 - "Version française".
5	CONS	Préparation des données d'entrée pour programme GRAPH (51). Corrélation entre indicateurs de zones défavorisées -Entrée: U-6000, (HY), 1° filière.
7	GDENS	Préparation des données d'entrée pour programme GRAPH (51) Corrélation entre la densité et le type de résidence par secteur de recensement, 1964. -Entrée: U-5116, (HY), 2° filière.
8	INPOP	Préparation des paramètres (mortalité, fertilité, immigration) pour les 24 hypothèses d'entrée du programme pour les projections de population de la région, 1981, "POPULAT".
9	ILOTD	Distribution de la population des secteurs de recensement (1964) par îlot selon la structure résidentielle de l'îlot et calcul de la densité nette par îlot. -Tableaux (2 copies) pour les îlots de la Zone Métropolitaine. -Voir IMP (56) pour réimpression partielle -Entrée: U-5116, (HY) 2° filière U-2013, (HY) 1° filière -Sortie: U-3008, (HY) 1° filière, "D-I"
11	EMPLOI	Distribution des données des commerces de gros, de détail et de service par secteur de recensement -Tableaux (67) Sortie: U-5116, (HY), 1° filière.

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NO	PROGRAMME	DESCRIPTION
10	EMPLOZ	Impression, calcul du rapport population/emploi par zone d'analyse (août 1966) selon les données de la distribution de l'emploi des commerces par secteur de recensement, 1961. -Tableaux (66).
12	SOMME	Sommation des données du commerce et de l'emploi par zone d'analyse et distribution procentuelles -Tableaux (68).
13	TAUX	Projection des taux de participation à la main-d'oeuvre - (Zone Métropolitaine, 1951-61) et application de ce taux aux projections de population par groupe d'âge de la région. (Revisé, octobre 1966) -Tableaux (69).
17	DATACHECK I & II	Programmes pour vérifier la consistance des données de l'occupation du sol, 1964, par îlot avant la mise sur bande magnétique et application d'un facteur de correction pour ajuster la superficie.
18	DENS	Pour calcul et impression des densités nettes urbaines et nettes résidentielles par secteur de recensement, 1961. -Tableaux (34) -Entrée: U-5116, (HY), 3° filière.
19	ZONELU	Sommation de données de l'occupation du sol -1964, par zone d'analyse (août 1966) -Tableaux (63) -Entrée: U-5116, (HY), 3° filière.
20	CONVERSUM FOLIO	Sommation et tabulation des données de l'occupation du sol 1964, par secteur de recensement. -Tableaux (polycopiés).
21	COOR	Pour transformer un système de coordonnées quelconque en un système compatible au système utilisé par le programme CARTO 953) -Pour plus de détails: CARTO, P-1060 (programmathèque): COOR, P-1030.

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NO	PROGRAMME	DESCRIPTION
27	DENSITE	Programme qui illustre visuellement la relation entre la densité et le type de résidence en fonction de 5 grands districts de la zone métropolitaine -Entrée: U-5116, (HY), 2° filière. -Tableaux (44)
28	BINTAPE	Édition d'une nouvelle bande magnétique des données de l'occupation du sol - 1964, par îlot, tel que défini sur U-2013 - (en caractère BCD) et redéfinies sur U-5343, (HY), 1° filière. -Mode de transmission: Point-flottant binaire -BUFFER IN (UL,1) (X,X(39)).
29	MTAPE	Pour la mise en une seule bande magnétique des données de l'occupation du sol par îlot, 1964. -Entrée: U-5174 (ces bandes sont réaffectées U-5175 à de nouvelles utilisations) U-5343 U-1017 U-2017 -Sortie: U-2013, (HY), 1° filière. -Mode de transmission: 39 mots de 8 BCD. -BUFFER IN (UL,0) (N,N (39))
30	ZONE	Sommation des données de l'occupation du sol par zone d'analyse (août 1966). -Entrée: U-5176, (HY), 1° filière. -Sortie: AR-5 (non disponible). -Tableaux (63).
31	METRO	Tabulation et distribution procentuelle par catégorie des données de l'occupation du sol par zone d'analyse (août 1966). -Entrée: AR-5 (non disponible). -Tableaux.

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NO	PROGRAMME	DESCRIPTION
33	TDENS	Préparation des données d'entrée du programme DENSITÉ - (27) par secteur de recensement: (2) - Assignation d'un des 5 districts (3) - Assignation de zone d'analyse (4) - Distance (5) - Augmentation de population (6) - (10) pourcentage des types de résidence (11)- Population (12)- Acres résidentielles (13)- Densité -Sortie: U-5116, (HY), 2° filière -Mode: 13 mots binaires (point flottant) -BUFFER IN (UL,1) (X,X (13)) -Tableaux (58) -Entrée: U-3011, (HY), 1° filière U-5116, (HY), 3° filière
35	PORAY	Calcul de la population dans un rayon de X milles d'un point (XX, YY) selon le système de coordonnées ETEN, pour les secteurs de recensement. -Entrée: sur cartes perforées, les centroïdes et population par secteur de recensement 51-64 (Université de Montréal).
40	VACANT	Assignation programmée du terrain vacant par îlot. -Résultat insatisfaisant, à être repris. -Entrée: U-5343, (HY), 1° filière.
42	DEUXGR	Préparation des données d'entrée pour programme GRAPH-(51)- Corrélation simple entre certaines caractéristiques du logement (2ième partie). -Voir séries de diagrammes et de courbes de régression entre caractéristiques du logement (60).
50	LOG	Sommation par zone d'analyse (septembre 1966) des données de l'habitation selon le type (BFS-61) et districution procentuelle. -Entrée: U-3011, (HI), 1° filière -Tableaux (70)

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NO	PROGRAMME	DESCRIPTION
51	GRAPH	Analyse de la corrélation simple entre deux variables. Produit un diagramme "nuage de points", un graphique de la ligne de régression (3ième degré), calcul des coefficients de corrélation liniaire et non-linéaire. Format d'entrée: 3 mots binaires par observation - 1. Référence 2. Variable en X 3. Variable en Y -Impression "off-line" optionnel. -Voir "GRAPH, P-1010" pour détails et instruction (programmathèque).
53	CARTO	Mise en mémoire de 3 cartes superposées pour fin de comparaison, de construction, d'illustration, etc. Une carte est une matrice de 256 par 180 éléments où chaque élément peut représenter une fonction urbaine, une localisation quelconque. -Voir "CARTO, P-1060" pour détails et instruction. (programmathèque).
54	LOGMAT	Revision des projections des logements à partir des projections revisées de population - (POPULAT).
55	SECTAD	Pour définir en terme d'adresses civiques une liste de secteurs de recensement. -Entrée: U-4018 (HI), 1° filière "Blocking Factor" = 10 -Sortie: description par ordre alphabétique des municipalités et des noms de rues des secteurs de recensement demandés.
56	IMP	Pour impression de la densité de population par îlot, 1964. Pour un intervalle de secteurs de recensement sur CDC-3100 -FORTRAN-3200 -Entrée: U-3008, (HY), 1° filière Voir: ILOTD (9).

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NO	PROGRAMME	DESCRIPTION
61	YVAN	Pour tabulation des données de l'occupation du sol, 1964, par secteur de recensement (superficie) TOTALE brute, vacant, S.N.B. S.N.B. industriel, résidentiel, vacant -Tableaux: (62) -Entrée: U-5116, (HY), 3° filière.
64	MICHELE	Calcul de l'accroissement annuel moyen et tabulation des populations 1951, 56, 61, 64 par secteur de recensement. -Tableaux: (65) -Entrée: cartes perforées des population par secteur de recensement.

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U73-16-14
Case 234

LES INSTITUTS

Organisation

Les instituts, tels que décrits par le Rapport sont des institutions d'enseignement prodiguant des cours nettement distincts à la fois du cours secondaire et de l'enseignement supérieur.

Au sortir du secondaire, l'élève s'y oriente pour se mieux préparer aux études universitaires ou pour y suivre un cours de formation professionnelle terminal. La durée du séjour est de deux ou trois ans, dépendant de l'orientation de l'élève.

L'institut doit, de plus, prodiguer un enseignement approprié aux besoins d'éducation permanente du milieu où il s'imbrique.

La taille minimum d'un institut est de 1,500 élèves; toutefois, où les densités de population le permettent, l'on devrait viser à l'implantation d'instituts de 5,000 élèves.

Le taux de scolarisation

Le Rapport Parent recommande que les taux de scolarisation à l'institut soient les suivants:

	% de la génération	Durée des études	Taux de scolarisation
Pré-universitaire	17.5%	2 ans	20.1%
Professionnel	28.0%	3 ans	48.3%
	45.5%		68.4%

Le taux de scolarisation de 68.4%, applicable à une génération de deux ans, tient compte de la durée des études et du pourcentage (15%) des doubleurs.

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Il me semble nécessaire de souligner que ce taux est faible. En 1966, l'on observe qu'en Californie au-delà de 50% de la population poursuit des études après le High School, comparativement au taux de participation de 45.5% utilisé ici.

Les clientèles au niveau institut dans la région de Montréal

Utilisant les prévisions démographiques existantes pour la région en 1981 et le taux de scolarisation ci-haut mentionné, nous obtenons une clientèle de 109,000 élèves au niveau institut. Ceci représente une clientèle de 22.6 élèves par 1,000 habitants.

L'implantation des instituts étant réalisée dans le reste de la province, il est douteux que la région attire un nombre considérable d'élèves à ce niveau.

La répartition géographique des instituts

La répartition géographique des instituts est liée, d'une part, à la population requise pour assurer l'existence d'un institut de taille minimum (75,000 habitants) ou d'un institut de taille optimum (220,000 habitants) et, d'autre part, à la répartition de la population dans la région.

Comme la variété de l'enseignement prodigué dans un institut est directement reliée à la taille de l'institution et que l'éventail des connaissances humaines va en s'élargissant, il me semble que, dans un territoire densément peuplé comme la région, l'on doit favoriser l'implantation d'institutions de taille optimum. Toutefois, il sera nécessaire de penser à l'évolution de l'urbanisation et d'équilibrer l'avantage pédagogique de la grande institution et l'avantage structural de la petite institution en période de transition.

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Il faut se rappeler que ces instituts constituent un des éléments susceptibles de noyauter et de structurer le territoire régional:

a) les instituts emploient 60 personnes par 1,000 étudiants;

b) ils assurent aux autres entreprises une source de cadres intermédiaires requis pour leur exploitation;

c) leur implantation peut favoriser l'identification des noyaux urbains.

Instituts et terrains

Je crois que, au départ, nous pouvons formuler l'hypothèse que les instituts de petite taille seront à une étape intermédiaire de développement en 1981 et que tous les instituts auront un jour une population de 5,000 élèves.

Sauf dans les cas particuliers, la superficie des sites devrait être de 125 acres. Ce chiffre est majoré lorsqu'on observe un fort pourcentage d'étudiants en résidence et diminué lorsqu'on fait l'utilisation d'un équipement sportif et communautaire déjà existant.

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U 73-16-15
Case 16 -

INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

Population Projections for the Montreal Region, 1981

Assumptions, Methods, and Results

by

Herman H. Welp, Ph.D.

and Jean-Pierre Gohier, B.Sc.

City Planning Department

City of Montreal

March 1964

Archives de la Ville de Montréal

Population Projections for the

Montreal Region, 1981

The basis of all plans for the physical facilities of an area is a reasonably accurate projection of population. In making such a projection for Montreal the date chosen was 1981, and the area which it covers is the Montreal Region as defined by the City Planning Department in previous studies.*

Projections can be made by different methods. To arrive at a first approximation of the population to be expected in 1981 a short-cut method was used, viz. crude mathematical projections:

Arithmetic projection

An arithmetic projection assumes the continuation of the amount of population change observed in what is defined as the base period, the period from which the projection is started, through successive equal intervals of time.

Geometric projection

A geometric projection looks at population changes in terms of rate of change rather than numerical changes, with results that vary according to the base period chosen.

The range of regional populations projected by these mathematical projections in 1981 is as follows:

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* See Les Cahiers d'Urbanisme: Métropole, No 1, January 1963: The Inner Region.

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TABLE I

Arithmetic & Geometric Projections by Base Periods

	Base period		
	1941/1961	1951/1961	1956/1961
Arithmetic projection			
Yearly population increase	53,460	73,120	83,480
1981 population	3,555,000	3,950,000	4,155,000
Geometric projection	in 20 years:	each 10 years:	each 5 years:
Percentage increase	75.45%	41.66%	20.18%
1981 population	4,360,000	4,990,000	5,185,000

Forecasts based on national projections

Another approach is to examine projections for future population of the country and the province, such as those prepared by the Royal Commission on Canada's Economic Prospects, and to assigne a proportionate population for the region. The first step in this method is to project the percentage of the population of Quebec and Canada that will reside in the Montreal Region. Since 1911 the following changes were found:

TABLE II

Montreal Region Population as a Percent of Quebec and Canada

	1911	1921	1931	1941	1951	1956	1961
% of Quebec	38.59	40.70	43.94	42.53	43.27	44.70	47.27
% of Canada	10.39	10.61	11.85	11.99	12.53	12.86	13.63

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Using the rate of increase of different base periods alternative percentage shares for 1981 were arrived at. Applying these forecast percentages to the projected Canadian and Quebec populations gives the following set of possible future populations:

TABLE III

Regional Population Projections Based on Share of Provincial & National Projections

	Base period		
	1941/1961	1951/1961	1956/1961
Region in 1981 as a -			
1) Share of Quebec population	4,300,000	4,585,000	4,840,000
2) " " Canadian "	4,215,000	4,390,000	4,680,000

Having established through these crude short-cut methods the brackets within which the region's population can be expected to range in 1981 we then come to analytical approaches which base future population estimates on an analysis of the major components of population change.

Analytic projection procedure

The emphasis of the procedure is on the assumptions made and on the factors which make these assumptions reasonable.

There are three major components of population change: deaths, births, and net migration, each of which will be considered.

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Deaths

The mortality rates expressed as the number of deaths in a calendar year per 1000 persons by five-year age group and sex are displayed in Table IV, which appears on page 4.

Our basic assumption on mortality is that the region will have the same mortality trend as Canada, based, among other considerations, on income level and quality of health services.

The estimates of future mortality rates by the Royal Commission on Canada's Economic Prospects provide the best starting point for forecasting the survival rates in the region. Mortality rates in most age groups of each sex have shown a tolerably constant relative rate of decline, as Table IV shows. It may further be noticed that the actual 1955/57 and 1960/62 mortality rates, broadly speaking, are close to the Royal Commission's forecasts for this period. This induced us to adopt their projected death rates, which they had prepared by plotting the mortality rates on semi-logarithmic paper to fit free-handedly a straight line giving particular weight to the post-depression data and projecting these lines through the forecast period. Their resulting projections are given in Table IV.

Births

As in the case of the mortality rates, it is assumed that the region's birth rates will follow the national trends. Our hypothesis is that although the birth rates of urban population are generally lower than

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those of rural population, this will be counterbalanced by the high birth rates of the population which migrates into the region. In this case also, the Royal Commission's projections were adopted (TABLE XIV). The implication of the forecast of age-specific fertility rates is that the crude birth rate will vary between 24.2 and 25.6 over the period of the forecast, which seems acceptable in view of the past figures set out in the following table:

TABLE V

Birth Rates

	Province of Quebec	Montreal Region	Rest of Quebec
1951	29.8	26.0	32.3
1956	29.4	26.5	31.7
1961	26.1	24.3	27.7

Determination of future in-migration

Migration of people from other areas has played a major part in the population growth of the Montreal region. The future composition of the region's population will be affected substantially by both the volume and character of the net migration. It is for this reason that we will have a closer look at the net migration figures of the region.

The census figures (General Review - Growth of Population in Canada, D.B.S, 99-511) reveal that the net migration into the region between 1941 and 1951 was 109,074, and between 1951 and 1961, 344,390:

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- more than three times the amount of the former decade. The latter decade, further broken down, shows a net migration of 141,790 in the 1951-56 period and of 202,600 in the 1956-61 period, an increase in the second quinquennium over the first one of 43%.

According to the census (Citizenship and Immigration, D.B.S. 92-548), the foreign immigrant population of the region in 1961 by period of immigration was 1941-51: 37,302; 1951-56: 78,340; 1956-61 (5 years 5 months: 109,209): 100,800. This immigrant population of the region represented nearly 90% of the total immigrant population of Quebec.

To complete this part of the record it may be noted that according to the 1961 census (Place of Birth, D.B.S. 92-547), 223,183 Canadian-other-than-Quebec-born persons are residing in Quebec and about the same number of Quebec-born persons (268,445) are residing in the other provinces. On a total Quebec population of 5½ million the difference is of negligible influence with regard to net migration.

Some rough approximations can now be made of the composition of the net immigration of the region. In both foreign immigration and net migration into the region from the rest of Quebec an increasing number of persons is settling in the region, as the following table shows:

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TABLE VI

Yearly Net Migration into the Region

	Period		
	1941/1951	1951/1956	1956/1961
From the rest of Quebec	7,177	12,690	20,380
Foreign immigration	3,730	15,668	20,160
Total	10,907	28,358	40,440

The question to be answered is, what will be the future net migration into the region? As shown above there are two main sources: foreign, and from the rest of Quebec.

The bulk of the net migration into the region from the rest of Quebec must have occurred at the expense of agricultural areas, which have usually been areas of out-migration. Therefore, a more detailed examination was made of the rural population of Quebec.

Migration from the Rest of Quebec

The rural population* of Quebec minus the region (the rest of Quebec), as a percentage of the total Quebec population, declined from 25.54% in 1956 to 21.86% in 1961. The rate of decrease between these years was applied to obtain the corresponding percentages for 1966-71-76-81:

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* Rural population as defined in the census statistics of "rural and urban distribution" based on the 1956 definitions.

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TABLE VII

Estimated Rural Population of the Rest of Quebec

as a Percentage of Total Quebec Population

	1956	1961	1966	1971	1976	1981
% rural	25.54	21.86	18.71	16.01	13.01	11.73

To project the rural population of the rest of Quebec, the rate of decrease between 1956 and 1961 was applied to the actual 1961 figure, giving the following results:

TABLE VIII

Estimated Rural Population of the Rest of Quebec

	1956	1961	1966	1971	1976	1981
Rural population	1,182,047	1,149,872	1,118,572	1,088,124	1,058,505	1,029,692

The yearly natural increase per 1000 population in the province of Quebec was 22.0 from 1951-56 and 21.3 from 1956-61. The rate of decrease between these two figures was applied to obtain the projections of the rate of natural increase, with the following results:

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TABLE IX

Estimated Rate of Natural Increase, Quebec

	1951-56	1956-61	1961-66	1966-71	1971-76	1976-81
Yearly natural increase per 1000	22.0	21.3	20.6	19.9	19.2	18.5

When the natural increase shown in Table IX is applied to the 1956 rural population it is found that the calculated 1961 population is 163,538 more than the actual rural population in 1961. This means a yearly net rural population loss of 32,700 for the period 1956-61. In the same way, calculations were made for future years, and these show a yearly loss of rural population as follows:

TABLE X

Estimated Annual Population Loss, Rural Population of the Rest of Quebec

	1956-61	1961-66	1966-71	1971-76	1976-81
Annual loss	32,700	30,900	29,200	27,600	26,100

We have already shown that the yearly average in-migration to the region from the rest of the province during the period 1956/61 was about 20,400 (Table VI). To find out where the 20,400 comes from, we checked the migration figures for the urban population of the rest of Quebec, and found that this urban population receives a net gain over the natural increase. This means that the net in-migration to the region in effect comes from the rural population, whose annual future losses we have just estimated (Table X).

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We then assume that the amount of rural migration into the region will decline along with the decline in the loss of rural population. The ratio between annual migration from the rest of Quebec into the region and the annual total loss in rural population for 1956-61 is 20,400 : 32,700. Applying this ratio to the projected total losses in rural population shown in Table X gives the following rounded figures:

TABLE XI

Estimated Annual Migration to the Region from the Rest of Quebec

1961-66	1966-71	1971-76	1976-81
19,000	18,000	17,000	16,000

This established the rest-of-Quebec component of the in-migration to the region.

Foreign Immigration to the Region

Foreign immigration depends first of all on government policy both in Canada and abroad, the degree of international tension and the economic and social conditions in Canada relative to those in other countries.

The expectations of the Department of Citizenship and Immigration are that due to the easing of standards of immigration, by which a wider area of the world's prospective immigrant potential will be covered, the yearly immigration into Canada will be around 100,000. Of this total,

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considering the recent more positive approach of the Quebec Government, about 33% should settle in Quebec. Of this amount, about 90% will come into the region, as past figures show.

Total Net In-Migration to the Region

In the light of these considerations the net migration into the region is estimated to be 48,000 yearly in the first 1961-1966 period and slightly decreasing in the following 5-year periods: 47,000 from 1966 to 1971, 46,000 from 1971 to 1976 and 45,000 yearly from 1976 to 1981.

Age-Sex Structure of the In-Migrant Population

Before the future population can be estimated by calculating the survivors of each generation, and adding births and the net in-migration, it is necessary to estimate the age-sex structure of the in-migrant population, since this will affect the numbers of children born during any five-year period.

It has been assumed that the age-sex structure of the annual net inflow of migrants will be the same as the average age-sex structure of the net migration into the region of the 1951-1961 period.

It is also assumed that 51.6% of the immigrants will be male: this was the 1951/56 distribution.

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TABLE XII

Standardized Age-Sex Structure of Migrants into the Region

Age	Percentage	
	Male	Female
0-4	11.6	12.0
5-9	15.3	14.6
10-14	7.2	7.4
15-19	7.2	10.2
20-24	13.2	20.7
25-29	16.3	13.3
30-34	12.5	10.0
35-39	7.9	6.0
40-44	4.6	3.3
45-49	2.7	0.7
50-54	1.5	1.8
	100.0	100.0

We arrived at the age-sex structure shown in Table XII by making the following calculations on the population by 5-year age-groups and sex for the periods 1951-1956 and 1956-1961.

The number of deaths in each age group were found by applying the probability of dying within the age interval according to the Canadian Life Tables (D.B.S. 84-510) to the number of persons at the beginning of the period. The survivors were deducted from the actual

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number of persons counted by the census at the end of the period. In this manner the net migration was found for the age-sex groups 5-9.....80-84. To establish the 0-4 year net migration the fertility rates of 1956 and 1961 were applied to the net immigration of women from 15-49 (assumptions: the net migration of the five-year period to be in equal yearly numbers and that in the year of migration half of these babies were not born in the region) and corrections made with the death rates.

As a result of these calculations it was found that the net migration into the region was 158,996 from 1951 to 1956 and 217,827 from 1956 to 1961, a total of 376,823 for the decade 1951-1961. This is close to the figures of the census (General Review - Growth of Population in Canada, D.B.S. 99-511) revealing a net migration into the region of 141,790 from 1951 to 1956 and 202,600 from 1956 to 1961, decade 1951-1961: 344,390.

Projection of the Region's Population by Age-Sex Groups

The assumptions so far presented made it possible to project the region's future population on a five-year cohort basis by five-year steps.

The procedure applied was broadly the same as that used by the Royal Commission on Canada's Economic Prospects. The number of persons (expressed in thousands) in a given age class was multiplied by the fifth power of one minus the estimated mortality rate for persons in that age class, to yield the survivors of those persons in the next highest

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age bracket five years later. The mortality rates were assumed to be constant within each quinquennium, and so were the fertility rates which were used to calculate natural additions to the population. The survival rates and fertility rates are given in Tables XIII and XIV, pages 16 and 17.

In each year of a given quinquennium, the number of live births was taken to be the sum of the products of the number of women (expressed in thousands) in each fertile age group at the beginning of that quinquennium and the estimated fertility rate pertaining to that age group. The number of children age 0-4 surviving at the end of a quinquennium was calculated by reckoning separately the survivors of each annual crop of babies at the end of the period.

At the end of each period the estimated in-migrants are added to the calculated numbers of persons in each age-sex group. It will be noted that we ignored any deaths of in-migrants or births within the group during the quinquennium of their arrival in the region.

In Table XV the resulting estimates of the population of the Montreal region are presented by age and sex for the years 1966, 1971, 1976 and 1981.

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Pages Manquantes

16 et 17

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TABLE XV

Estimated Future Population of the Montreal Region

(in thousands)

	1966		1971		1976		1981	
Age	M	F	M	F	M	F	M	F
0-4	190.8	182.1	220.9	210.3	254.9	242.5	291.9	277.4
5-9	169.1	160.8	208.9	198.3	238.7	226.2	272.3	258.1
10-14	142.3	136.0	177.4	169.1	217.0	206.3	246.6	234.1
15-19	126.3	125.2	150.8	147.5	185.6	180.2	225.0	217.2
20-24	111.8	119.2	141.6	148.5	165.7	170.2	200.2	202.4
25-29	103.3	106.6	130.9	134.1	160.3	162.0	185.9	184.5
30-34	108.1	105.7	117.8	117.8	144.9	145.0	173.9	172.7
35-39	106.8	105.6	117.0	112.2	126.5	124.2	153.4	151.3
40-44	96.4	98.9	111.4	108.8	121.5	115.5	130.9	127.4
45-49	79.9	82.2	98.1	98.8	113.0	108.8	123.0	115.5
50-54	70.2	74.0	79.4	82.9	97.2	99.5	111.7	109.4
55-59	58.1	61.9	66.9	72.1	75.8	80.8	92.8	97.3
60-64	44.9	48.7	53.8	59.5	62.0	69.5	70.2	78.1
65-69	33.0	38.3	39.7	45.6	46.6	55.9	54.9	65.6
70-74	23.4	28.3	27.9	34.4	33.7	41.3	39.6	51.0
75-79	15.3	20.6	18.1	23.5	21.8	28.8	26.5	34.9
80-84	7.8	11.2	10.4	15.0	12.5	17.3	15.3	21.7
85-89	3.0	4.6	4.1	6.3	5.6	8.6	6.9	10.1
90-94	0.7	1.3	1.0	1.8	1.4	2.5	1.9	3.4
95+	0.1	0.2	0.1	0.3	0.2	0.5	0.3	0.7
	1,491.2	1,511.4	1,776.2	1,786.8	2,084.9	2,085.6	2,421.2	2,412.8
Total	3,002.7		3,563.0		4,170.5		4,834.0	

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REVISION DES PROJECTIONS DE POPULATION

Région de Montréal

1966 - 1981

Service d'Urbanisme
Division des études d'ensemble
Novembre 1966

Rolland Lamothe
Hermann Welp
Jean-Pierre Gohier

Archives de la Ville de Montréal

U 73-16-23
(case C-

REPARTITION SECTORIELLE DE LA POPULATION DE LA REGION, 1951, 1961, 1981

	1951		1961		Augmentation 1951-1961 %	1981		Augmentation 1961-1981 %
Population totale de la région	1,756,000		2,488,000		42	4,200,000		69
Population rurale agricole	92,000		74,000		(20)	41,000		(45)
Population non-agricole de la région	1,664,000		2,414,000		45	4,159,000		72
Population non-agricole de la "Couronne"	145,000		203,000		40	352,000		73
% de la région	8%		8%			8%		
Les quatre centres urbains secondaires		90,000		117,000	30		195,000	67
% de la "Couronne"		62%		58%			55%	
Autres villes et villages de la "Couronne"		27,000		41,000	52		72,000	76
% de la "Couronne"		19%		20%			21%	
Population rurale non-agricole de la "Couronne"		28,000		45,000	61		85,000 (1)	89
% de la "Couronne"		19%		22%			24%	
Population urbaine de la métropole	1,519,000		2,211,000		46	3,807,000		72
% de la région	87%		89%			91%		

1) De la population rurale non-agricole future, environ 20,000 seraient groupés autour de trois des quatre centres urbains secondaires.

YF/cl
Le 17 janvier 1967.

En octobre 1966, le Bureau Fédéral de la Statistique établissait à 2,843,871, dans un rapport préliminaire, la population de la région de Montréal en juin 1966.

La comparaison de ces données avec les projections du Service d'Urbanisme telles que publiées dans le papier Population Projections for the Montréal Region, 1981 -- Assumptions, Methods, and Results, March 1964, nous a amené à reviser les hypothèses de base sur les trois déterminants démographiques.

Tableau des hypothèses

Mortalité	Fertilité	Migration nette (1)
1. Commission Gordon	1. Hypothèse faible	1. 36,000/an
2. Commission Deutch	2. Hypothèse moyenne	2. 40,500/an
	3. Hypothèse forte	3. 44,600/an
		4. 46,600/an

Les résultats des 24 combinaisons possibles d'hypothèses appliquées aux données régionales de 1961 ont été comparés avec le dénombrement fédéral de 1961. La combinaison qui donne le meilleur résultat en regard du dénombrement 1966 a été retenue. Ces trois déterminants démographiques sont:

a) mortalité: taux de la Commission Gordon

b) fertilité: hypothèse moyenne

c) migration nette: moyenne annuelle de 40,500 pour 1976-1981.

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1) Pour la période 1976-1981, à titre de comparaison.

Archives de la Ville de Montréal

U 73-16-17
Case 24

INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

Projection of the Number and Size of Families and Households, 1966, 1971, 1976, 1981

Assumptions, Methods and Results

Herman H. Welp, Ph. D.

and

Jean-Pierre Gohier, B. Sc.

City of Montréal

City Planning Department

April 1965.

Archives de la Ville de Montréal

Projection of the Number and Size of Families

The object of this study was to make a projection, for the Montréal Region, of the number and size of families for the years 1966, 1971, 1976 and 1981. The work was undertaken following the completion of projections of population by age and sex, and this study is based in part on the results of the preceding work, which has already been described in another paper. To facilitate cross-reference, the tables in this and the preceding paper are arranged so as to form one series numbered consecutively.

Factors Influencing Trends in Family Formation

Statistics indicate that prosperity and the prospect of prosperity encourage marriage. In the last two decades, not only did the proportion of married persons increase but both men and women were marrying at a considerably younger age than formely.

Table XVI

Average Age at Marriage of Single Persons Never Previously Married

Canada and Quebec

		1940/44	1945/49	1950/54	1955/59	1960	1961
Brides:	Canada	24.4	24.0	23.7	23.3	23.0	22.9
	Québec	25.1	24.6	24.3	23.9	23.6	23.7
Bridegrooms:	Canada	27.6	27.0	26.5	26.1	25.8	25.8
	Québec	27.7	27.1	26.6	26.3	26.1	26.1

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For both sexes, the average age at marriage in Quebec is higher than in Canada as a whole. We do not know what causes this difference, but we suspect that among the possible factors may be mentioned two which exert an influence: Quebec's educational system keeps young people at school longer, and the economy is less highly developed, resulting in a lower proportion of jobs with an economic return permitting marriage. The lesser mechanization of farming would be an example. Future changes in these factors, it has been assumed, will result in a lowering of the average age at marriage in Quebec to a level closer to the Canadian Average.

Whatever the reasons, in Quebec a higher proportion of the urban population was married in 1961 than in 1941. Table XVII reveals that, excepting only females of 65 and over, in all age groups and both sexes an increasing percentage of persons were married. The heaviest percentage increases occurred in the 15 to 35 age groups. The largest increase took place during the decade 1941-1951, and in large measure reflects the "boom" in marriages that followed the postponements of the depression and war years. Our projections, however, are based on later trends, the 1951-61 period, and thus avoid the influence of these unusual conditions.

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Table XVII

Quebec Urban

Percentage of Married Persons by Age Group and Sex

Age Group	Males				% Increase 1941/61		Females			
	1941	1951	1956	1961	M	F	1941	1951	1956	1961
15-19	.26	.53	.64	.72	177	70	3.07	4.54	5.19	5.21
20-24	14.18	22.67	25.14	26.43	86	74	27.75	39.93	44.76	48.21
25-34	57.84	71.04	72.61	75.40	30	33	60.08	72.68	76.58	79.72
35-44	79.27	84.97	85.64	86.92	10	15	71.59	76.38	79.45	82.50
45-54	81.88	85.04	85.57	87.43	7	7	70.19	71.89	73.14	75.26
55-64	78.66	81.57	81.85	83.18	6	2	61.43	61.32	61.85	62.42
65+	63.11	64.05	64.95	67.47	7	-	36.14	35.75	35.57	36.11

General Assumptions

Within the framework of this paper no social, religious or other speculations will be introduced with regard to human behavior connected with marriage.

The main assumptions made are that prosperity encourages marriage, that economic prospects will continue to improve, and that none of the business recessions of the next two decades will match in severity the depression of the '30's.

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We assumed that factors which worked together in the recent past are reflected in the trends in marital status and that these trends will continue to occur in future as a result of improving economic prospects and increasing longevity or other factors. The trends in Québec are similar to those for the rest of Canada and those in the U.S.A. However, in these other places the age at marriage is already much lower, and the proportion of the population married is much higher than in Québec. This means that in Québec there is much room for considerable further change in the future, and for this reason we have pursued as much as possible the local differences and trends.

Comparable data are not always available for the region, but we have attempted to keep as close as possible to the structure of the Region, and to use regional figures whenever possible.

Projections Based on Number of Families per Adult Member of the Population

The relationship between the number of families and the total adult population provides one means of projecting the number of families. This is a rough projection which gives an idea of the range within which figures for our final projection should fall.

The number of families per adult (population aged 15 years and over) has changed over the years as shown in Table XVIII.

Table XVIII

Montréal Region: Number of Families per Adult

1941	1951	1956	1961
0.30	0.32	0.33	0.34

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From Table XVIII, and using the rate of increase between different base periods, various ratios for 1981 were arrived at. Applying these ratios to the region's estimated population aged 15 years and over, the following figures as to the possible future number of families result:

Table XIX

Montréal Region: Number of Families Based on Ratio of Families to Adult Population

Base period	1966	1971	1976	1981
1) 1956/1961	681,100	804,100	944,900	1,108,000
2) 1951/1961	690,000	825,000	981,700	1,165,200
3) 1941/1961	697,000	843,600	1,014,300	1,216,000

Forecast Based on Trends in Types of Families

A more detailed projection was made by type of family: viz. families with husband and wife at home, with or without children; and families made up of widowed, divorced and separated persons with children.

At a given point in time, the size of a family, as defined by the Census, is generally a function of the type of family (husband-wife or other type) and the number of children of the head who are present. Husband-wife families always include at least two adults, whereas other families often include only one; however, at least 35% of these other families in the Montréal Metropolitan area have an adult son or daughter over 25 years of age and never married, living with a parent. In contrast, only a relatively small percentage of the husband-wife families include adults other than the head and his wife among their members. This is explained partly by the fact that the heads of husband-wife families are younger on the average and their children are less likely to have left home.

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Husband and Wife Families

The census statistics of families by marital status, sex and age of head reveal that the percentage of married people of which both husband and wife are at home increased in each age group of the population 15 years and over. Table XX shows for Canada and Québec in 1951 and 1961, and for the latter date, the Montréal Metropolitan area, the percentage of the male population in each age group who are heads of families with husband and wife at home.

Table XX

Heads of Families, Husband and Wife at Home,

as a Percentage of the Male Population by Age Group

Age Group	1951		1961		% Increase 1951-1961		1961 Metropolitan Montréal
	Québec	Canada	Québec	Canada	Québec	Canada	
15 - 19	0.42	0.99	0.62	1.26	47.6	27.3	0.85
20 - 24	20.30	25.50	23.77	30.42	17.1	19.3	27.83
25 - 34	69.48	71.95	71.41	73.18	2.8	1.7	72.62
35 - 44	82.02	80.89	82.80	83.05	0.1	2.7	82.97
45 - 54	80.94	78.80	82.70	82.66	2.2	4.9	82.10
55 - 64	76.90	75.30	77.91	77.15	1.3	2.5	76.81
65 +	60.08	60.31	61.83	62.02	2.9	2.8	59.86

The marital status of the population is primarily a function of vital events: viz., births, deaths and marriages. In addition, immigration and emigration play a part in determining the marital status of the population.

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Our population projections provide figures as to age and sex; the estimated age structure is based on fertility and mortality rates as well as expected net immigration. The purpose of this section is to establish the marital status of the projected population.

Social and economic factors, by their effects on vital events and migration, influence the marital status of the population. This is shown without doubt in the figures given in Table XX. It can be seen that in each age group an overall increase in the percentage married occurred in Québec as well as in Canada. The percentage increase in those married was highest in the under 35 age-group; furthermore it was in general higher in Québec than in Canada. The increase in the over 35 age groups was higher in Canada than in Québec, but there is hardly any difference between Canada and Québec in the percentages married in these age groups.

There are no figures for Metropolitan Montréal for 1951; trends are therefore impossible to determine. However, for 1961, the percentages married in Metropolitan Montréal lie between those of Québec and Canada for the ages up to 35 years. The age-group 35 to 45 years is similar for all three and over 45 there is a gradual reduction in Metro compared with the other two. The composition of the Metropolitan area population is different from Québec as a whole partly because of in-migration as previously shown. (1)

The marriage rates are reflected in Table XX. In our projections, in view of the foregoing, we assumed that the trends of Canada applied to the 1961 Metropolitan figures for percentages married by age group would give the most reasonable results. This would also accomodate the changing age composition shown in the population estimates. The resulting estimate of the number of husband-wife families is shown in the following Table.

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(1) Bulletin Technique no. 2, February 1964, Families and Households.

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Table XXI

Montréal Region: Estimated Number of Families with Husband and Wife at Home

1961	1966	1971	1976	1981
517,440	613,868	727,820	858,051	1,007,920

Families of Widowed, Divorced and Separated Persons

The next element to be estimated is the number of non husband-wife families.

In this case we calculated, for each type of family, the parents or heads of the family as a percentage of the adult population, "adult" being defined as before to mean persons aged 15 years and over.

In the case of the widowed-with-children category the parents decreased from 2.69% of the adult population in 1951 to 2.04% in 1961 (Metropolitan area figures). With greater longevity, there are fewer widowed-with-children persons in the population. We expect this trend to continue.

In the category of divorced persons with children the parents increased from 0.06% in 1956 to 0.08% in 1961. In the category of separated persons with children the corresponding increase was from 0.83% to 0.93%. No data are available concerning the backgrounds of these latter separations, but the Québec marriage legislation most probably has a bearing on this relatively high percentage, compared with the low divorce percentage.

Taking the last three categories of families together, the parents showed a decrease of 0.63 percentage points during the last decade; we assume that this trend will also continue.

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On the above mentioned assumption, the rate of decrease in the parents of widowed, divorced and separated persons families in the Metropolitan area was applied to obtain the corresponding percentages for 1966-71-76-81. These percentages were then applied to the estimated future adult population of the region, with the following results.

Table XXII

Montréal Region: Estimated Number of Families of Widowed, Divorced and Separated Persons

1961	1966	1971	1976	1981
51,700	56,400	59,900	62,900	64,400

Projection of Size of Family

To project the average size of family the projections of number of families by type shown in Table XXI and XXII were used.

The number of husband-wife families multiplied by two gives one element of the number of parents in families. To this a number equal to the number of other types of families was added, completing the total of parents in families.

The number of children in families was calculated from past trends and the population projection by age and sex. For the age group of children under 15 years of age, past figures showed that in 1951 and 1961, 98% of the group lived at home. This ratio was adopted for future years. The group of children 15 to 24 years of age living at home has been more variable. For the urban population of the Province, the census of 1941 showed 74.3% at home, but only 67.5% at home in 1961. The only figure available for the region is the 1961 metropolitan area figure, which showed 64% of this age group at home. It was decided to adopt the figure of 65% for forecast purposes.

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Sons and daughters never married and living at home and who are older than 24 years are considered by the census as members of the family, although the census does not count them as children. This group represents a small and decreasing proportion of family members. Expressed as a percentage of the population aged 25 years and over the figures show this decreasing trend: 1951, 7.51%; 1956, 5.32%; 1961, 4.77%. We believe that this decreasing trend is accounted for by the general improvement in economic conditions and by the increase in the proportion of married persons at all ages. Accordingly, we expect that the trend will continue, and our projected percentage for this group, based on 1956-61 trends, are as follows: 1966, 4.23%; 1971, 3.69%; 1976, 3.15% and 1981, 2.61%.

The average family size and average number of children per family resulting from these assumptions is shown in Table XXIII. It will be noted that both figures at first increase during the forecast period, representing a continuation of present trends, and then level off and decrease slightly in the latter part of the forecast period. The last mentioned trend appears to be unexpected, but is not really so taking into account the existing and recent high birth rates and the resulting rapid rate of family formation, giving an increasing proportion of small families during the forecast period.

Table XXIII

Montréal Region: Estimated Average Size of Family and Average Number of Children per Family

	1951	1961	1966	1971	1976	1981
Average size of family (1)	3.68	3.80	3.92	3.97	3.97	3.96
Average number of children per family (2)	1.63	1.76	1.90	1.96	1.97	1.96

(1) Adult children over 25 at home included.

(2) Adult children over 25 not included.

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Projections of the Number of Households

Following the completion of population estimates and the projections of the number and average size of families, we can now study the future number of households by size, based in part on the obtained results, in order to estimate housing requirements for the Montréal Region for the years 1966-71-76 and 1981.

Thus far, the number of children and the number of adult members in the family besides the head and wife have been projected. In the present section, these components will be treated in combination with the head, in order to arrive at projections of family households by size.

The family generally passes from an early stage, when the husband and wife are the only members, through a developmental stage when the family is expanding, to maturing stage when the family is contracting, ending in a later period when the couple is living alone once more.

Between 1951 and 1961 significant changes occurred in the proportions of families without, with only a few, or with a larger number of children in the earlier and later phases of the family life cycle. This can be seen in tables XXIV and XXV which give for Canada, Québec and Metropolitan Montréal the percentage distribution, by age group of the head of family, of the number of children at home. These percentages are shown for two types of families: husband and wife at home (Table XXIV) and other families which are composed of widowed, divorced and separated heads of family (Table XXV).

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Table XXIV

Percentage Distribution by Age Group of Head of Family,

of Number of Children at Home

Husband and Wife at Home

Number of Children	0		1		2		3 - 4		5+	
Year	1951	1961	1951	1961	1951	1961	1951	1961	1951	1961
Age Group	QUEBEC									
Under 35	24.86	20.00	27.99	26.59	22.69	25.02	18.96	22.24	5.50	6.16
35 - 44	13.12	9.16	16.47	13.17	20.41	21.00	26.93	32.51	23.08	24.16
45 - 54	19.28	16.53	17.74	17.16	16.22	19.05	21.15	24.54	25.60	22.72
[illegible] - 64	41.65	45.32	20.30	21.47	12.97	12.95	14.68	12.57	10.41	7.69
65 +	77.40	82.85	12.81	10.17	4.96	3.71	3.50	2.36	1.33	0.91
	CANADA									
Under 35	25.52	19.82	30.12	25.31	25.17	26.58	15.96	23.03	3.23	5.25
35 - 44	13.59	9.56	19.47	14.03	26.35	25.74	26.76	34.03	13.83	16.65
45 - 54	23.50	20.21	22.29	21.01	20.01	22.65	20.03	22.92	14.16	13.21
55 - 64	51.65	53.67	21.62	21.68	11.56	11.54	9.95	8.88	5.22	4.23
65 +	82.59	86.88	10.54	8.21	3.72	2.71	2.33	1.62	0.83	0.57
	METROPOLITAN MONTREAL									
Under 35	31.36	23.52	31.55	28.54	22.44	25.74	12.82	18.82	1.82	3.38
35 - 44	18.55	12.52	12.69	16.86	26.22	26.66	24.57	32.13	8.96	11.83
45 - 54	26.89	21.94	23.18	21.63	20.06	23.66	19.22	23.05	10.65	9.71
[illegible] - 64	53.00	55.27	21.96	22.84	11.49	11.77	9.63	7.58	3.93	2.53
65 +	82.89	87.64	11.02	8.25	3.50	2.63	2.06	1.20	0.53	0.28

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Table XXV

Percentage Distribution by Age Group of Head of Family, of Number of Children at Home

Widowed, Divorced, Separated

Number of Children	0		1		2		3 - 4		5+	
Year	1951	1961	1951	1961	1951	1961	1951	1961	1951	1961
Age Group	QUEBEC									
Under 35	0.46	0.47	45.74	40.91	28.23	27.92	19.60	23.24	5.98	7.47
35 - 44	0.51	0.39	33.76	30.58	23.61	24.31	24.44	27.13	17.69	17.59
45 - 54	7.85	5.91	32.12	34.61	21.15	23.86	22.48	22.50	16.40	13.12
[illegible] - 64	33.14	33.96	33.84	36.57	15.99	15.66	13.15	10.83	3.88	2.98
65 +	83.70	86.53	12.06	10.49	2.79	2.00	1.22	0.80	0.22	0.18
	CANADA									
Under 35	0.18	0.45	47.88	39.22	28.80	29.46	18.86	23.96	4.28	6.91
35 - 44	0.39	0.36	36.16	32.43	27.32	27.32	24.41	27.12	11.72	12.77
45 - 54	8.13	6.21	40.32	42.28	23.18	24.92	19.18	18.66	9.19	7.93
55 - 64	35.96	35.06	38.55	40.89	14.26	14.01	8.96	8.07	2.27	1.97
65 +	84.64	85.96	11.79	10.82	2.33	2.07	1.01	0.91	0.22	0.24
	METROPOLITAN MONTREAL									
Under 35	0.55	0.55	55.04	46.53	28.39	28.57	13.73	20.26	2.29	4.09
35 - 44	0.61	0.43	43.39	38.32	26.17	27.67	21.50	24.41	8.33	9.17
45 - 54	10.59	7.62	39.87	41.92	22.93	26.18	18.31	18.23	8.33	6.05
[illegible] - 64	40.96	40.76	35.41	38.39	13.61	12.94	8.52	6.72	1.50	1.20
65 +	87.40	88.59	9.99	9.43	1.78	1.45	0.74	0.48	0.09	0.06

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An analysis of husband-wife families by age of the head shows that changes in the percentage of the number of children follows the same pattern for Canada and Québec as well as for Metropolitan Montréal between the years 1951 and 1961.

An examination of Table XXIV demonstrates that in families where the head is under 45 years there has been a heavy percentage decrease in childless and 1 child families, and complementary to this, a marked increase in percentage of families with more numerous children, especially in the three and four children group.

Further, it can be seen that a percentage decrease starts in the group where the family head is between 45 and 54 years old with five or more children at home, and continues in the 55 + group through the other family sizes. Meanwhile the childless families are increasing as children grow up and leave home.

In conclusion, it appears that people are having their children at a younger age than they did in 1951, that parents are less old when the children become adults, and consequently the contraction of family size occurs at a less advanced age of the head than previously.

It is assumed that these trends will continue until 1971 and then stabilize. The Canadian ratios were used rather than those of Québec or Montréal Metropolitan because it was considered that these would give a more reliable result in view of the growing urbanization and consequent concentration of the population in Metropolitan areas. There was also noticeable in-migration from abroad and the rural parts of the Province. It was thought that these migrants probably have social characteristics more similar to Canada as a whole than to either the provincial or metro groups.

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On this basis, then, projections were made for the year 1971 for husband-wife families, of the number of families by number of children, for each age-group of the head of family. After making these projections, it was found that minor corrections were necessary to arrive at a total of 100% for each age group. These were made according to the deviation in the cohorts between 1951 and 1961.

In the same manner the various families by number of children were calculated for the other (non husband-wife) families for 1971

The result of these calculations gave a number of children in families in 1971 2% lower than the number of children projected according to future average family size. Supposing the latter to be the closer estimate of children living in families, corrections were made of the number of the 0 and 5+ children families to match this total. A good reason to do so is found in the fact that the metropolitan percentages of the 5+ children families in all the age groups of heads were very low compared with Québec and Canada.

By these methods the projections for the size of families with children under 25 years old living at home were made. However, census defined families consist of the above mentioned persons plus children over 25 never married and still at home. Analysis revealed that in the Montréal metropolitan area in 1961 30% of these persons were living with one parent against 25% in 1951. This percentage also increased in the husband-wife family without children and the one parent with one child under 25 from 32% in 1951 to 35% in 1961. In all the larger size families a percentage decrease took place. We assumed that these trends will continue and corresponding calculations were made to arrive at the future number of families by size given in Table XXVI and the percentage distribution in Table XXVII.

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Table XXVI

Montréal Region: Projected Number of Families by Size

	2	3	4	5	6	7 +
1951	128,589	101,251	81,337	46,069	24,200	30,439
1956	148,344	112,032	99,350	58,280	31,000	34,368
1961	161,226	128,101	120,792	75,848	40,818	43,336
1966	162,443	146,470	146,424	107,837	57,976	49,122
1971	196,406	154,652	172,819	127,483	69,797	66,595
1976	230,446	177,590	199,729	150,403	84,058	78,765
1981	280,218	202,716	229,748	176,704	101,008	81,902

Table XXVII

Montréal Region: Percentage Distribution of Families by Size

	2	3	4	5	6	7 +
1951	31.2	24.6	19.7	11.2	5.9	7.4
1956	30.7	23.2	20.6	12.0	6.4	7.1
1961	28.2	22.4	21.2	13.3	7.2	7.7
1966	24.2	21.9	21.8	16.1	8.7	7.3
1971	24.9	19.6	21.9	16.2	8.9	8.5
1976	25.0	19.3	21.7	16.3	9.1	8.6
1981	26.1	18.9	21.4	16.4	9.4	7.7

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Having projected the number of families by size, we then proceeded to determine the number of households by size. Here there are two major categories, non-family households, consisting of single persons or groups of mainly unrelated persons, and family households, consisting of a family with or without additional persons.

Before assigning other persons than parents and children to the family households it is necessary to look into the group of persons who are not part of a family. These non-family persons live either 1) in family-households as additional persons; 2) in "collective" households which include hotels, large lodging houses, institutions of all types, military camps and other establishments of a similar nature, or 3) in their own non-family households.

The non-family component of the population for 1966-1971-1976 and 1981 is derived from the existing estimates of the number of families and average size of families for those years. The difference between total population and population living in families, which makes up the number of non-family persons is given for the last decade and the projection period in Table XXVIII.

Table XXVIII

Montréal Region: Number and Percentage of Non-Family Persons

Year	1951	1961	1966	1971	1976	1981
Number	239,463	320,136	378,389	437,964	511,905	593,289
% of total population	13.6	12.9	12.6	12.3	12.3	12.3

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Estimated Non-Family Households

In the 1951-1961 period, non-family persons maintaining their own households showed a larger increase in the one-person households that in the two-or-more-person non-family households. Of all non-family persons, 8.5% in 1951 lived in one-person households against 16.9% in 1961. The corresponding percentages for the 2+ non-family households were 23.3% in 1951 and 25.1% in 1961. This increase of persons living in non-family households occurred at the cost of the category of persons lodging in family households or large lodging houses. We assume that with increasing prosperity this trend will continue. Therefore the rates of increase between 1951 and 1961 were applied to obtain the corresponding percentages of persons living in one-and two-or-more person non-family households for 1966-71-76-81. These percentages were applied to the estimated number of non-family persons given in Table XXVI with the following results:

Table XXIX

Montréal Region: Persons Living in Non-Family Households

Year	1951	1961	1966	1971	1976	1981
1 person households	20,430	54,028	79,840	108,275	151,012	199,938
2+ person households	53,318	80,307	100,273	122,192	149,989	182,137

Having estimated the number of non-family persons who will have their own household we now have to predict the number by size. The one-person household is of course no problem. The problem arises with the 2+ non-family households. Apart from average size, which was 2.8 in 1951 and 2.5 in 1961, no data are available with regard to the composition of the non-family households by size; these could theoretically range from two persons upwards.

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In practice however it is safe to assume that they will consist of 2, 3 or 4 persons. Households above this size will usually contain a family, and is then classified as a family household with additional persons. Further it was assumed that the greatest number of 2+ non-family households will consist of 2 persons, that there will be less in those consisting of 3 persons, only a few in those consisting of 4, and that the ratio of these last two will be 4 to 1. Further it was assumed that there will be no change in the present existing average of 2.5 persons during the forecast period.

Given these four assumptions the following equations were formulated to represent the situation:

$$2A + 3B + 4C = P$$

$$A + B + C = H$$

$$2.5H = P$$

$$\frac{B}{C} = \frac{4}{1}$$

Where

A = 2 person non-family households

B = 3 " " " "

C = 4 " " " "

P = population in 2+ non-family households

H = total 2+ non-family households

Applying these equations to the estimated number of persons in 2+ non-family households given in Table XXIX, the following sizes of non-family households were calculated.

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Table XXX

Montréal Region: Estimated Non-Family Households by Size

Year	1961	1966	1971	1976	1981
Size 1	54,028	79,840	108,275	151,012	199,938
2	18,740	23,396	28,512	34,996	42,502
3	10,710	13,371	16,292	19,999	24,286
4	2,680	3,343	4,073	5,000	6,071

Additional Persons in Family Households

So far we have estimated an increase of the population in non-family households which will occur at the cost of the population in collective type of households and of non-family persons in family households. With respect to the collective type of households, no exact figures are available about the percentage of the population living in them, nor about the distribution of these people in religious orders, prisons, army camps, hospitals for the chronically sick, on the one hand, and persons in lodging houses, on the other. In the first category, it is felt that there is not too much elasticity and that it will virtually grow in proportion to the total population.

Calculations were made to give an approximation of the percentage of persons living in collective type of households. The result for 1961 was a percentage between 3.1% and 3.5%. On this basis, it was assumed that for the projection period 3% of the projected population will live in collective households. Having thus estimated the number of persons in non-family households and in collective households, the number of additional persons in family households is found by substracting from the total number of non-family persons. The results are shown in Table XXXI.

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Table XXXI

Montréal Region: Estimated Additional Persons in Family Households

	1951	1961	1966	1971	1976	1981
Number	106,480	98,790	108,189	100,004	85,787	66,185
Percentage of population	6.0%	4.0%	3.6%	2.8%	2.1%	1.4%

The next problem is to distribute these additional non-family persons among the families by size.

Non-family persons living with families are almost all found in the single family households: see Census Bulletin 93-511, table 7, which shows for Canada approximately 520,000 households of this type, containing non-family persons, compared with a total of about 168,000 family households which might contain additional non-family persons. The distribution of these households by size class is the only indicator we have of the possible distribution of this group of non-family persons into households of different sizes. We used this slender thread as a guide to future distribution. 15.3% of the single family households in the Montréal Metropolitan area had additional persons in 1961. We assumed that this percentage would remain stable as well as the distribution of the sizes of this type of family. To each of this family was given one person and the remaining persons were added to the 4, 5 and 6 persons households in the proportion that such households exist. This assumes that there is a tendency for additional persons to be concentrated in the smaller families.

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2 + Family Households

The last problem to be solved is the projection of households in which there is more than one family.

Two-or-more family households decreased in the past decade in the region from 11% in 1951 to 7.2% in 1956 and to 4.7% of all families in 1961.

A projection of these trends would suggest that the doubling-up of families in one household will disappear, but we concluded that this is unlikely to happen. Since we assume an increasing standard of living and since we feel that doubling-up is related to this standard, we studied present day levels of doubling-up in census tracts composed largely of middle and upper income groups to serve as a guide to the extent of doubling-up in the type of economic prosperity we expect by 1981. It was found that 2% is the absolute minimum that we can expect in 1981 which on a straight-line trend gives 3.3% in 1966, 2.6% in 1971 and 2.2% in 1976. It was assumed that doubled-up families would be those which had no additional non-family persons living with them. It was also assumed that the future distribution of the doubled-up family households into each size class would be the same as the distribution in 1961 of households of 4 persons and over into size classes. These assumptions made it possible to calculate the number of 2, 3, 4 and 5 person family who would be living in some combinations together. The rule adopted for making these combinations was an arbitrary one, as follows:

4 person	households	consist	of	2 - 2 person families.	
5	"	"	"	"	50% 2 person and 50% 3 person
6	"	"	"	"	25% 2 person, 50% 3 person and 25% 4 person.
7	"	"	"	"	25% 2 person, 25% 3 person, 25% 4 person and 25% 5 person.

Having combined these families, the appropriate numbers were substracted from the single-family totals.

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Households by size

In the preceding pages we considered all the possible events which influence household size. The results of these considerations are given in Table XXXII showing the estimated number of households by size for 1966, 1971, 1976 and 1981.

Table XXXII

Montréal Region: Estimated Number of Households by Size

	Total	1	2	3	4	5	6	7 +
1951	418,175	20,430	83,540	87,825	81,766	59,094	35,330	50,190
1956	511,722	29,473	110,893	106,796	100,902	69,826	41,439	52,393
1961	634,451	54,028	139,541	124,599	121,875	85,236	50,813	58,359
1966	768,103	79,840	131,966	148,421	155,610	123,739	68,044	60,483
1971	924,422	108,275	175,935	160,244	182,958	139,061	79,929	78,020
1976	1,111,736	151,012	220,281	187,003	210,497	160,773	93,147	89,023
1981	1,323,647	199,938	280,829	215,798	241,505	185,733	108,955	90,889

Table XXXIII

Montréal Region: Percentage Distribution of Households by Size

	1	2	3	4	5	6	7 +
1951	4.9%	20.0%	21.0%	19.6%	14.1%	8.4%	12.0%
1956	5.8	21.7	20.9	19.7	13.6	8.1	10.2
1961	8.5	22.0	19.7	19.2	13.4	8.0	9.2
1966	10.4	17.2	19.3	20.3	16.1	8.8	7.9
1971	11.7	19.0	17.3	19.8	15.1	8.7	8.4
1976	13.6	19.8	16.8	18.9	14.5	8.4	8.0
1981	15.1	21.2	16.4	18.2	14.0	8.2	6.9

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HOUSING THE PROJECTED HOUSEHOLDS

1966, 1971, 1976, 1981

Estimated Net Requirement for Dwellings by Number of Rooms

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City Planning Department

Montreal

August 1965

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Housing The Projected Households.

This is the third and last of a series of technical papers giving the results of population studies made for the regional master plan. The first paper gave the results of population projections, based on such factors as birth, death, and fertility rates and migration, and produced total population forecasts by five-year age groups and sex for the four forecast years of the master plan, 1966, 1971, 1976, and 1981. The second paper then examined what would be the resulting number of families and households by size and type, for the same years.

The problem to be discussed in this paper is the estimation of the housing required for the projected number of households.

It would be no problem at all if we only needed to know the number of dwellings required, because by definition a household is a person or a group of persons, related or unrelated, occupying a dwelling, and the number of households equals the number of occupied dwellings.

However, for planning purposes, we would like to know much more than the total number of dwellings --

- We would like to know not just the total number at the end of the planning period, but the addition to the existing stock of dwellings, and not just the net addition but the gross figures; the required housing starts and their counterparts, losses from the existing housing stock on account of fire, change of use, expropriation, and other causes.

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- We would like to know the requirements for dwellings by type of building: single, detached, duplex, row housing, apartment houses, etc., and by price or rental category.

- We would like to know what the requirements are for dwellings of different sizes, from one-room apartments to large dwelling containing 10 or more rooms.

For reasons which will become clear later in this paper, this study has not attempted to provide estimates of the first two kinds mentioned above, but is limited to providing the last, an approximation of net housing changes required, by size of dwelling (measured in terms of number of rooms).

Postulates and Policies

In making these estimates, we encounter for the first time the possibility, and indeed the need, of adopting policies designed to bring about a desired end result, as opposed to judging trends. We have postulated that population growth will continue to occur in the Montréal Region and that the magnitude of this growth is hardly susceptible to influence by the regional plan. The projections of population, families, and households are based on such postulates. But the future housing stock, in contrast, can be influenced by policies adopted as part of the regional plan, just as the composition of the present housing stock has been influenced by provincial and federal policies in the housing field.

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This is one of the reasons why we have not carried our estimates as far as we earlier indicated would be desirable: before this is done, certain policy decisions need to be taken. We will return to this point later on in the paper.

The Concepts of Crowding

Throughout this paper we will make constant reference to the idea of crowding in housing. We are concerned to judge the adequacy of the existing housing stock and that of the future stock, as well as to suggest policies necessary to improve crowded conditions.

Before we can determine what is crowded, we have to define the standards by which it is to be judged. We know of two standards which might be adopted:

1) According to the Census, a crowded household is one which has more than one person per room. This definition has the advantage of being simple, but it appears to us to be too severe, and unrealistic in the light of ordinary behavior, when it is used to judge the accommodation of large families and households. For example, it seems to us evident that a family of eight can be quite comfortable in a house with less than eight rooms.

We have therefore termed "nominal crowding" any situation which is only one step within what the Census calls crowding, but we have added the term "serious crowding" to indicate worse conditions in accordance with the following rule of thumb.

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"Serious Crowding"

Three or more persons in one room.
Four or more persons in two rooms or less.
Five or more persons in three rooms or less.
Six or more persons in four rooms or less.
Seven or more persons in four rooms or less.
Eight or more persons in five rooms or less.
Nine or more persons in six rooms or less.
Ten or more persons in six rooms or less.

2) The CMHC relocation standards for public housing projects. (See Appendix I). These standards are on the whole less stringent than the Census definition, but have the disadvantage of being complex, it being necessary to know the age and sex of children for their exact application. This is more a standard of comfort than of crowding, and falls between "nominal" and "serious" crowding as described above.

Availability of Data

Another limitation on the study has been the lack of data. There is no data concerning demolitions, conversions, fire losses, etc. Although there is data about the number of housing starts and completions, this is broken down in limited degree only, as to type, (e. g. single, detached, flats, apartments) and not at all as to size by number of rooms. But we are much concerned to know not only the number of rooms, but also the way in which households of different sizes occupy dwellings of a given size, for it is this that determines the degree of overcrowding and is a major factor in determing the adequacy of the housing stock. In effect, we have had to rely on one type of table published by the Census for each census year: the tables that show size of households cross-classified by the size of dwelling they occupy.

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Relationship Between Household Size and Dwelling Size

The occupancy of dwellings by households of different sizes ranges from extreme underoccupancy to extreme overcrowding. At one end of the scale, are households consisting of only one person occupying dwellings of ten or more rooms, and at the other extreme, we have households of ten or more persons crowded into a dwelling of only one room. In between, we have every possible combination of household size and dwelling size.

There is a complex of factors which affects the relationship between household size and dwelling size.

First of all, the size of the household may change while the household remains in the same dwelling. The size of a household changes, for example, when children are born in a family, or when these same children grow up and leave the household.

Another factor is the income of the household and the proportion of this income which it chooses to spend for shelter.

A third factor is the supply of housing of different sizes in relation to the size of household. Generally speaking, the distribution of household sizes changes much more rapidly than the distribution of dwelling sizes, because the size of a dwelling is usually the same throughout the life of the building, but the size of household changes in each generation. Thus, it happens that the distribution of dwelling sizes, which may have been adequate a generation or two previously, may no longer be adequate.

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The distribution of dwelling sizes is also affected by government policies which may favor one kind of dwelling over another, and by the availability of mortgages, which may be more favorable to one type of housing than another.

The housing market has a very slow and imperfect response to demand, and this results in an oversupply of some kinds of housing and an undersupply of others. Also, to some extent, we are still correcting for the housing shortage of the war years.

The relationship between housing size and household size has been changing in a manner which we will describe later. What we wish to point out here is that it is the above factors and the interplay between them which produces the observed changes in the relationship. The only thing which we can study with any precision is the result. The interplay of factors is too complex for us to determine, for example, what part of the change may be attributed to government policies, and we do not know whether the continuation of government policies of the past ten years will produce changes in the observed trends, or keep them at the same level.

For this reason, our estimates for future years are based on a mathematical projection of the trends of past years, without too much examination of the causes of these trends.

General Outline of Method

Before going into details of the estimates, it would probably be useful to review the general method used in making the estimates:

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1- The basic data used is, for the reasons given above, the 1961 and 1951 tables showing the size of household by size of dwelling. The tables are a matrix of 100 units, the combination of ten dwelling sizes with ten household sizes.* These tables are not directly available for the Montréal region, and we have had to make estimates for the region based on the available statistics for the metropolitan area and for Québec urban areas.

2- Using these tables, we made mathematical projections to obtain estimates of the dwelling-household size relationship for each of the four forecast years.

3- Next, we made a correction to allow for the effect of increased income, as suggested by the report of the Canada Economic Council.

4- The result of the previous steps was examined in terms of crowding according to different measures of crowding.

5- Based on the elimination of crowding, as defined by CMHC for public housing projects, we arrived at an estimate of the additional investment required to eliminate overcrowding by the final year of the plan. Note, however that it was assumed throughout that nothing comparable could be done to eliminate underoccupancy and thus made more rational use of the available housing stock.

6- The paper concludes with a section dealing with the other matters that must be studied before one could arrive at gross totals of required new housing.

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* It has not been possible to use the whole matrix at all times. For example, our estimates of households by size have only seven instead of ten classes.

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It should also be noted that our estimates, as shown in the tables, have not been rounded. We do not pretend to be able to estimate future requirements to such a degree of accuracy, and before they are published, the figures should be rounded at least to the nearest thousand. We have used unrounded figures in this paper because it is easier to check the calculations when unrounded figures are used.

The 1961 Distribution of Households by Size of Dwelling

As already stated, households choose their dwellings for many different reasons and within a series of constraints imposed by the housing market, government policy, etc. The existing "choice" is expressed by the distribution of households by size into dwellings by size. This distribution is given by the 1961 census for the Montréal Metropolitan Area, but not for the Region. To arrive at the distribution for the region in 1961, estimates were made, the results of which are shown in Table XXXIV.

Table XXXIV

Montréal Region: Occupied Dwellings by Number of Rooms and Size of Household, 1961

Rooms	Persons	1	2	3	4	5	6	7+
1		9,602	2,519	244	56	-	(34	212
2		9,273	6,645	1,969	655	182	(	
3		14,168	35,515	16,257	7,325	2,474	943	251
4		9,771	40,831	39,548	32,141	16,878	7,697	6,266
5		5,551	28,178	34,483	39,095	29,747	17,227	16,902
6		3,204	16,013	19,577	25,301	19,111	12,336	13,901
7		1,337	5,467	6,955	9,492	8,546	5,954	8,932
8		588	2,625	3,252	4,798	4,828	3,246	6,028
9		267	765	1,068	1,650	1,977	1,683	2,427
10+		267	983	1,246	1,362	1,493	1,693	3,440

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The method used to estimate the regional distribution was the following: From the 1961 census, the number of dwellings by size for the extra-Metropolitan parts of the Region were extracted. To each dwelling size, the corresponding Québec urban occupancy by size of household was applied, and this was added to the Metropolitan distribution. The result showed minor differences from the total number of households by size for the Region. These differences were corrected according to the Metropolitan Montréal distribution of size of household by size of dwelling.

It will be observed that there is considerable overcrowding as well as underoccupancy, and the question immediately arises, what are the trends?

Trends in Househols Size / Dwellings Size Distribution, 1951 - 1961

The 1961 regional housing picture given in Table XXXIV is the result, as stated earlier, of the combined influence of many factors. Consumers express their preferences through the actual choices they make, based on economic and social criteria, and their preferences, reflected in housing demand, differ according to family composition, income, and personal needs and desires. However, choice is circumscribed by the variety, quality, and price or rent of dwellings actually available. Consequently, the entire housing picture as it has taken shape is the result of building practices, construction costs and financing, public policies, the efficiency of real estate operators, and other forces.

To study trends in the housing picture, we have used Québec Urban data rather than data for the region. This was done because, although we were successful in estimating the regional picture for 1961, a similar attempt for 1951, which had to be based on less data than that for 1961, would have resulted in too many discrepancies. It was, therefore, judged more desirable to use the

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trends as shown by the Québec Urban data.

The Québec Urban trends are given in Tables XXXV and XXXVI.

Table XXXV

Québec Urban: Net Change from 1951 to 1961: Occupied Dwellings by Number of Rooms and Size of Household

Rooms	Persons 1	2	3	4	5	6	7+
1	6,669	668	-199	-145	-106)	-507	-489
2	7,914	2,270	-634	-1,146	-528)		
3	12,711	22,333	6,432	717	-1,160	-744	-1,747
4	7,303	22,533	20,248	15,542	6,897	2,528	-994
5	4,580	16,477	19,998	27,194	22,974	13,681	12,252
6	2,749	8,832	6,442	11,202	8,879	6,733	5,898
7	1,148	2,903	2,140	3,417	3,134	2,566	4,659
8	513	1,471	1,384	2,047	2,482	1,724	2,564
9	183	316	419	593	979	784	460
10+	107	359	220	335	531	592	1,053

Table XXXVI

Québec Urban: Net Percentage Change from 1951 to 1961: Occupied Dwellings by Number of Rooms and Size of Household

Rooms	Persons 1	2	3	4	5	6	7+	Total
1	15.2	.8	-.4	-.2	-.2)	-1.9	-2.1	2.0
2	18.0	2.9	-1.1	-1.9	-1.2)			2.1
3	29.0	28.6	11.4	1.2	2.6	-2.7	-7.4	11.6
4	16.7	28.8	35.9	26.0	15.7	9.2	4.2	22.2
5	10.4	21.1	35.4	45.5	52.1	50.0	51.8	35.1
6	6.3	11.3	11.4	18.7	20.1	24.6	24.9	15.2
7	2.6	3.7	3.8	5.7	7.1	9.4	19.7	6.0
8	1.2	1.9	2.5	3.4	5.6	6.3	10.8	3.7
9	.4	.4	.7	1.0	2.2	2.9	2.0	1.1
10+	.2	.5	.4	.6	1.2	2.2	4.5	1.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Generally speaking, we can observe an improvement in housing conditions in the decade 1951 - 1961, because occupied dwellings increased by 51.7%, but population only increased by 41.7%. To what extent this represents an improvement will become more clear as we examine what happened in each size of dwelling category. This we do in the following paragraphs.

One-Room Dwellings

Of the 1951-61 increase of one-room dwellings, 91% were taken up by one-person households. The remainder, 9%, were taken up by two-person households, which is only "nominal" overcrowding in the case of a modern bachelor apartment with all facilities and occupied by two friends or a young married couple. The seriously crowded accommodation of three and more persons in a one-room dwelling decreased between 1951 and 1961 so that in 1961 less than 2½% of the one-room dwellings were occupied by three- or more-person households.

Two-Room Dwellings

Between 1951 and 1961, the additional two-room dwellings were all occupied by one-person and two-person households. There was a notable decrease in the number of households of three persons and more living in two rooms. At the end of the period, 84% of these dwellings were uncrowded, but there still remained 10% (three-person households) nominally crowded, and 6% (four- or more-person households) in a seriously crowded condition.

Three-Room Dwellings

Of the increase of three-room dwellings in the 1951-61 decade, more than 98% accommodated 1-, 2-, and 3-person households. The rest were occupied

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by 4 persons, not necessarily crowded accommodation for a young family of this size. There was a noticeable decrease in the number of 5 and more persons living in 3-room dwellings. As a result of this improvement, by the end of the period 85.7% of these households had one or more rooms per person at their disposal. 9.5% of these dwellings were occupied by 4-person households, which is nominally crowded, and an additional 5%, occupied by larger households, were seriously crowded.

Four-Room Dwellings

Between 1951 and 1961 there was an improvement in this category, but a proportion of the increase in this category was used to house households at least nominally too large for the four rooms. 87% of the increase represented satisfactory occupancy, but the other 13% represented at least nominally unsatisfactory occupancy. The result was that in 1961 about 80% of the four-room dwellings were not crowded; 11% were nominally crowded with 5-person households, and the others were clearly unsatisfactory: 6-person households in 5% and 7 or more persons in the remaining 4%.

Five-Room Dwellings

We established that not all of the additional 4-room dwellings during the 1951-61 period showed improved condition of occupancy, and the same can be observed regarding the 5-room dwellings. Nearly 4% of the increase was occupied by 8 or more persons, considered an insufficient accommodation. Only nominally crowded was the 6.5% of the addition which accommodated 7 persons and the 11.7% giving accommodation to 6-person households. However, the rate at which the 5-room dwelling increment was occupied by 6- and

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7-person households was higher than its 1961 occupancy which amounts to 10% 6-person and 5% 7-person households. 8- or more-person households accounted for 4.2% against less than 4% of the increment. At the end of the period, 80% of these dwellings were satisfactorily occupied, but the other 20% are nominally or seriously crowded.

Six-Room Dwellings

The way in which the additional six-room dwellings were occupied represented an improvement over previous conditions, but in 1961 an appreciable percentage remained overcrowded, when 3.2% of these dwellings were occupied by households of 9 persons or more, and 9.5% were occupied by 7- and 8-person households.

Seven-and-more-Room Dwellings

Insufficiency of statistics prevents us from judging the seriousness of overcrowding in some of these households. In 1961, we know that at least 77.5% were not crowded because they were occupied by households of six persons or less. The other 22.5% were occupied by seven persons or more, of which a small portion at least represents serious overcrowding. The 1961 picture in this category remained practically unchanged from that of 10 years earlier.

Summary of 1951 - 1961 Trends

The general picture we have from studying these trends is one showing an increase in almost all categories of underoccupancy, or perhaps we

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had better say an increase in the level of comfort enjoyed by most households. Where there had previously been nominal or serious crowding, improvement was most marked for the smaller sized households and dwellings, but there was little real improvement for the larger families and households. Even though the percentage changes seemed favorable, the number of crowded households actually increased because of the great absolute increase in the number of households.

Estimating the "Natural" Increase in Housing Stock, 1961 - 1981

Our first estimates of the future housing stock were made by assuming that the trend observed between 1951 and 1961 will continue. As previously noted, it is not possible to state what have been the causes of the observed trend, but our mathematical projection certainly assumes that all of the factors noted earlier will continue to operate.

Our starting point for these estimates was the projected number of households by size for the region; this was the conclusion of the second paper in this series. To this projected increase of households by size, we applied the Québec Urban net percentage change 1951 - 1961 (Table XXXVI).

The next step was to apply a specific correction for increasing income. Although the first step already makes some allowance for increasing incomes in the future, because this was a factor influencing the trends of 1951 - 1961, we made an additional specific allowance for this factor based on studies by the Economic Council of Canada.

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The Council"s staff study No 4, "Housing Demand to 1970" states as follows:

> "An explicit allowance for some higher standards was made by assuming that the average size of a single detached dwelling would increase by about 100 square feet (1.250 to 1.350 sq. ft.). This implies increases of about 1 per cent each year in the unit value per dwelling from 1961 to 1970. Similarly, an allowance was made for an annual increase of about 1 per cent in the unit value per multiple dwelling".

We adopted this assumption of a 1% yearly increase of floor space in the dwellings to be constructed, and we also assumed that this would affect the number of rooms in dwellings occupied by the larger size households, say 5 and up, in so far as less than one room per person is available in them.

This increase of 1% in floor space is not, of course, to be thought of as an average applying to all new dwellings. We have translated it to mean that a proportion of the new dwellings will have one room more than they would otherwise have had.

For the first five-year period, we calculated the increase in the number of dwellings in each seriously "crowded" category. We then "move up" one-half of this increase to the next number-of-rooms category. We then repeated the process for the succeeding five-year periods.

The results of these calculations are given in detail in Table XXXVII. Tables XXXVIII and XXXIX summarize this information, giving the totals and percentage distribution of dwellings of each size for the four forecast years of the plan, together with the figures for 1951 and 1961 which are included for purposes of comparison.

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TABLE XXXVII

MONTREAL REGION: ESTIMATED OCCUPIED DWELLINGS BY

NUMBER OF ROOMS AND SIZE OF HOUSEHOLD

ROOMS	YEAR	PERSONS: 1	2	3	4	5	6	7+
1	1966	13525	2455	161				
	1971	17847	2829	169				
	1976	24343	3206	25				
	1981	31780	3721					
2	1966	13929	6425	1702				
	1971	19059	7700	1569				
	1976	26769	8986	1269				
	1981	35595	10742	870				
3	1966	21648	33350	18970	7712	1089	189	262
	1971	29888	45916	20317	7449	465		
	1976	42273	58590	23365	7184			
	1981	56452	75895	26645	6887			
4	1966	14069	38646	48093	40915	19890	8493	6177
	1971	18803	51327	52334	48028	24101	9484	4045
	1976	25919	64116	61932	55191	26580	10039	2543
	1981	34065	81578	72261	63256	29216	10658	2289
5	1966	8246	26580	42923	54448	52826	22332	17452
	1971	11215	35853	47112	66894	58999	29365	22543
	1976	15677	45206	56593	79427	70815	35703	29933
	1981	20785	57976	66795	93539	84078	43080	33265
6	1966	4820	15157	22295	31626	26866	20885	14716
	1971	6600	20125	23644	36754	29952	22474	21158
	1976	9275	25136	26697	41918	34325	26059	23024
	1981	12338	31978	29983	47732	39352	30598	22262
7	1966	2011	5186	7858	11422	11283	7570	9406
	1971	2753	6817	8306	12986	12372	8685	13263
	1976	3868	8462	9320	14561	13916	9925	15259
	1981	5145	10708	10411	16335	15691	11408	15389
8	1966	890	2483	3836	5952	6996	4332	6352
	1971	1223	3310	4126	6887	7859	5081	8936
	1976	1723	4144	4782	7829	9081	5914	9840
	1981	2295	5282	5487	8889	10486	6910	9637
9	1966	373	735	1244	1984	2832	2178	2583
	1971	490	911	1332	2255	3172	2519	3758
	1976	665	1088	1530	2528	3654	2898	3617
	1981	866	1330	1743	2835	4208	3352	3158
10	1966	329	949	1339	1551	1957	2065	3535
	1971	397	1147	1385	1704	2141	2322	4315
	1976	500	1347	1489	1858	2402	2608	4805
	1981	617	1619	1601	2032	2702	2949	4888

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TABLE XXXVIII, MONTREAL REGION: ACTUAL AND ESTIMATED NUMBER OF OCCUPIED DWELLINGS BY NUMBER OF ROOMS, 1951-1981

ROOMS	1951	1961	1966	1971	1976	1981
1	6,262	12,351	16,141	20,795	27,574	35,501
2	12,215	18,691	22,056	28,328	37,024	47,207
3	45,019	76,809	83,220	104,035	131,412	165,879
4	103,282	153,277	176,283	208,122	246,320	293,323
5	94,810	171,436	224,807	271,981	333,354	399,518
6	78,719	109,557	136,365	160,707	186,434	214,243
7	36,679	46,661	54,736	65,182	75,311	85,087
8	19,222	25,329	30,841	37,422	43,313	48,986
9	8,419	9,822	11,929	14,437	15,980	17,492
10	8,815	10,438	11,725	13,411	15,009	16,408

TABLE XXXIX, MONTREAL REGION: ACTUAL AND ESTIMATED PERCENTAGE DISTRIBUTION, OCCUPIED DWELLINGS BY NUMBER OF ROOMS, 1951-1981

ROOMS	1951	1961	1966	1971	1976	1981
1	1.52	1.95	2.10	2.25	2.48	2.68
2	2.95	2.95	2.87	3.07	3.33	3.57
3	10.89	12.11	10.83	11.25	11.82	12.53
4	24.98	24.16	22.95	22.51	22.16	22.16
5	22.93	27.02	29.27	29.42	29.98	30.18
6	19.04	17.27	17.75	17.39	16.77	16.19
7	8.87	7.36	7.12	7.05	6.77	6.43
8	4.65	3.99	4.02	4.05	3.90	3.70
9	2.04	1.55	1.55	1.56	1.44	1.32
10	2.13	1.64	1.53	1.45	1.35	1.24

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It is difficult to judge how reliable these estimates might be, and we do not know whether they should be regarded as optimistic, average, or pessimistic. As previously stated, the data used to prepare the estimates do not permit us to extract the influence of one factor from the complex.

It is recognized that lack of housing of a certain size or the oversupply of other sizes might have influenced the actual choices of households in finding satisfactory accommodation, to which can be added economic considerations which prevented households from obtaining proper housing. However, data were not readily available, which would have enabled us to correct the applied trends. Besides, past trends do not count changes which can be expected from such things as new government housing legislation[1].

Thus, although some improvement over the conditions we have estimated might occur of themselves, we believe that it would be advisable to regard such improvements as matters subject to the determination of policy. In other words, it is better to seek improvements by deliberately planning for them than to hope that trends will continue to improve. If this point of view is accepted, the next step in the study is to examine the preceding "natural" estimates of future housing in the light of the plan's objectives of adequacy and comfort, etc.

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1. See Appendice II

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Adequacy of the "Natural" Future Housing Stock

To judge the adequacy of the future housing, we used the CMHC standards previously described (see page 4 and Appendix I). However, some simplifications were necessary because we do not know the age and sex of children in the future households as strict application of these standards would require. In effect, we assumed that where one room less than normal would be needed by a household, (on account of the particular ages and sex of the children), those cases would be balanced by others where the household would require one room more (2-family households and boarders, etc., not accounted for in CMHC standards).

We have at this time made our judgment only for the twenty-year period 1961 - 1981. This could of course later be broken down into the five-year periods of the plan, but we believe the policy should be decided upon before doing so.

Table XL shows the detailed results of applying these standards. It is easily read in relation to Table XXXVII. For example, the latter table shows 870 crowded three-person households housed in 2-room dwellings in 1981. These should be "moved up". Therefore, 870 two-room are subtracted from the "natural" estimate and 870 three-room dwellings are added, as shown in Table XL.

The effect of these changes on the "natural" estimates is shown in Table XLI. It will be noted that although the total number of dwellings remains the same, there would be a considerable decrease in the number and proportion of 3-room dwellings built, a considerable increase in 6-room dwellings, and lesser changes in other categories. The effect is to make the distribution curve more symmetrical, although the peak remains with the five-room dwelling.

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Table XL

Montréal Region 1981: estimated occupied dwellings (Table XXXVII) affected by application of standards to avoid overcrowding.

Rooms	Persons	1	2	3	4	5	6	7+
1		-	-					
2		-	-	-870				
3		-	-	-26,645	-6,887			
4		-	-	+27,515	+6,887	-29,216	-10,658	-2,289
5		-	-	-	-	+29,216	+10,658	-33,265
6		-	-	-	-	-	-	+27,265
7		-	-	-	-	-	-	+6,000
8		-	-	-	-	-	-	-
9		-	-	-	-	-	-	-
10+		-	-	-	-	-	-	-

Table XLI

Montréal Region: 1961 - 1981 estimated net increase of occupied dwellings, providing for satisfactory accommodation.

Rooms	Estimated net increase before applying minimum standards.	Change	Net increase providing for satisfactory accommodation	
			Number	Percentage distribution
1	23,150	-	23,150	3.4
2	28,516	-870	27,646	4.0
3	89,070	-33,532	55,538	8.1
4	140,046	-7,761	132,285	19.2
5	228,082	+6,609	234,691	34.0
6	104,686	+29,554	134,240	19.5
7	38,426	+6,000	44,426	6.4
8	23,657	-	23,657	3.4
9	7,670	-	7,670	1.1
10+	5,970	-	5,970	.9
Total:	689,273	0	689,273	100.0

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Although the total number of dwellings remains the same, the total number of rooms does not. We have used this fact to estimate the extra cost of achieving this standard of adequacy. There are 118,989 additional rooms: assuming an average floor space of 120 square feet per extra room at an average cost of $10. per square foot, this means an annual investment of some $7 million dollars. This would appear to amount to about 2% of the annual investment in all residential construction.

This sum of money would be an investment of public funds, and it would be in addition to other public funds already accounted for in the "natural" trends projection.

The sum as estimated may well be too low because the investment would likely have to take the form of building of whole dwelling units, rather than just "additional" rooms at minimum expense.

It should now be decided whether the master plan should adopt as a policy the achievement of this level of improvement in housing conditions by 1981.

Additional Policy Matters to be Studied

A policy sufficient to achieve adequate conditions of housing from the point of view of crowding does not exhaust the issue:

1) Housing stock does not only consist of occupied dwellings. To allow for a satisfactory mobility of households, a certain vacancy rate has to be applied. Family allowance data indicate that, on average, Canadian families change residence once every four years. Vacancies were estimated to have risen from 3.5 per cent of the housing stock in 1961 to

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3.9 per cent in 1963. The assumed vacancy rate of the Economic Council of Canada underlying their estimate for 1970 is 4.0 per cent of the total housing stock. This is a rough allowance for the long-term or "frictional" vacancy rate associated with future mobility of households. There might be some doubt as to the adequacy of this 4% assumption in the face of the 6% comparable vacancies in the present and proposed composition of the United States housing stock.

2) In this paper, no attention was paid to the quality of the housing stock, replacement of substandard units, and depreciation of the housing stock. If we define housing need as the sum of correcting present deficiences and meeting future requirements, this should be considered. However, it was felt that the paper as far as it has gone should be presented for approval by the Policy Committee, which should also decide whether to pursue the necessary studies in the Comprehensive Research Division or the Urban Renewal Division.

3) Similar considerations apply to loss of satisfactory units either by fire, private demolition, or by implementing projects called for in the master plan. (expressways, etc.)

4) Our population forecasts have been converted into <u>net</u> housing forecasts, that is, net additions of dwelling units, but only the determination of 1, 2, and 3 above will tell us the gross changes required. Once this has been done, we need to study the actual amount of land to be allocated to housing. This will, of course, depend on the sites selected and the assumptions or policies made regarding the percentages of single family units, duplexes, row houses, and high-rise apartments to be built.

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APPENDIX I

C M H C Standards for Adequacy of Dwelling Size.

In order to avoid overcrowding of the applicant's family, the under-mentioned rules should generally govern the allocation of living-units:

A) For Houses

(i) Two bedroom houses are to be allocated to families with two dependents of the same sex, any age, or two dependents of opposite sex under six years of age.

(ii) Three or more bedroom houses are to be allocated according to the size of the family with due regard to the age and sex of its members, but should not normally be allocated to applicants qualifying under (i) above.

B) For Apartments

(i) Bachelor apartments (no separate bedroom) are to be allocated only to childless couples.

(ii) Apartments with one bedroom are to be allocated in the following priority (other things being equal):

a) To parents with one dependent less than 4 years of age.

b) To couples expecting their first child.

c) To childless couples.

(iii) Two bedroom apartments are to be allocated to families with two dependents of the same sex, any age, or two dependents of opposite sex under six years of age.

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APPENDIX II

Recent Changes in the National Housing Set.[1]

"The federal government will pay one half of the cost of preparatory urban renewal studies, and also one half of the capital cost of the actual works, including land acquisition and clearance and the installation of all services. The federal government is now also prepared to loan up to two-thirds of the expenses incurred by the provincial and municipal governments.

The federal-provincial partnership arrangements were extended to permit the purchase or lease of existing properties, as well as the construction of new housing, for families and individuals in need. Self-contained hostel or dormitory projects may also be built under these new arrangements. Furthermore, a new and alternative approach to public housing is now open to provinces and municipalities, under which the federal government will advance 90 per cent of the cost of construction or acquisition of public housing, including hostel and dormitory accommodation.

The operating subsidies, amounting to 50 per cent of cost, and previously applicable only to newly constructed low-rental projects, have now been extended to cover other low-rental units as well.

For future low-rental needs, the establishment of "land-banks" by municipalities may be financed, up to 90 per cent, by federal loans.

1. This Summary of the 1964 Amendments is cited from Staff Study No 4, Housing Demand to 1970, of the Economic Council of Canada, December, 1964, p. 31. The 1965 amendments made no important policy changes of interest in this context.

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Limited dividend organizations now have access to low-interest federal loans for up to 90 per cent of the cost of building or acquiring low-rental projects, hostels or dormitories for older people.

The National Housing Act was amended to permit insurance of mortgage on existing properties in urban areas designated for urban renewal, in the hope that this measure may encourage rehabilitation and conservation of existing properties."

Le 25 août 1965
ajr

Archives de la Ville de Montréal

((13-16-19
Case 4

NOMBRE DE LOGEMENTS SELON LE NOMBRE

DE PIECES ET LA TAILLE DES MÉNAGES - 1961

P E R S O N N E S

Nombre de pièces	1	2	3	4	5	6	7	TOTAL
1	9,602	2,519	244	56	-	34	212	31,391
2	9,273	6,645	1,969	655	182			
3	14,168	35,515	16,257	7,325	2,474	943	251	76,933
4	9,771	40,831	39,548	32,141	16,878	7,697	6,266	153,132
5	5,551	28,178	34,483	39,095	29,747	17,227	16,902	171,183
6	3,204	16,013	19,577	25,301	19,111	12,336	13,901	109,443
7	1,337	5,467	6,955	9,492	8,546	5,954	8,932	46,683
8	588	2,625	3,252	4,798	4,828	3,246	6,028	25,365
9	267	765	1,068	1,650	1,977	1,683	2,427	9,837
10	267	983	1,246	1,362	1,493	1,693	3,440	10,484
	54,028	139,541	124,599	121,875	85,236	50,813	58,359	634,451

Tableau A

NOMBRE ESTIMÉ DE LOGEMENTS SELON LE NOMBRE DE PIECES ET LA TAILLE DES MÉNAGES - 1966

Nombre de pièces	PERSONNES 1	2	3	4	5	6	7	TOTAL
1	13,301	2,570	146	2	0	0	0	16,019
2	13,653	6,830	1,700	142	0	0	121	22,445
3	21,225	37 ,336	19,049	7,649	1,511	475	0	87,246
4	13,835	42,664	48,341	39,167	21,371	8,700	6,013	180,093
5	8,082	29,521	43,154	51,391	44,656	22,681	19,151	218,636
[illegible]	4,737	16,732	22,369	30,354	24,863	15,019	14,982	129,057
7	1,970	5,703	7,886	11,032	10,578	6,979	9,787	53,935
8	880	2,746	3,864	5,717	6,430	3.933	6,497	30,068
9	364	790	1,239	1,920	2,607	1,999	2,514	11,434
10	316	1,015	1,344	1,524	1,836	1,933	3,635	11,603
	78,364	145,907	149,093	148,899	113,852	61,720	62,701	760,536

Tableau B

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NOMBRE ESTIMÉ DE LOGEMENTS SELON LE NOMBRE DE PIECES ET LA TAILLE DES MÉNAGES - 1971

Nombre de pièces	PERSONNES 1	2	3	4	5	6	7	TOTAL
1	17,253	2,925	75	0	0	0	0	20,253
2	18,333	8,115	1,505	0	0	0	81	28,034
3	28,765	50,012	21,067	7,614	884	162	0	108,503
4	18,177	55,429	54,694	44,329	23,832	9,328	5,795	211,584
5	10,786	38,873	49,418	60,424	52,825	26,090	20,128	285,544
6	6,375	21,741	24,387	34,067	28,014	16,696	15,452	146,732
7	2,646	7,342	8,558	12,164	11,691	7,620	10,159	60,180
8	1,192	3,588	4,307	6,392	7,309	4,363	6,701	33,850
9	468	968	1,363	2,119	2,952	2,197	2,552	12,618
10	368	1,236	1,415	1,643	2,025	2,083	3,720	12,490
	104,362	190,229	166,789	168,752	129,532	68,538	64,586	892,788

Tableau C

Archives de la Ville de Montréal

NOMBRE ESTIMÉ DE LOGEMENTS SELON LE NOMBRE DE PIECES ET LA TAILLE DES MÉNAGES - 1976

Nombre de pièces	PERSONNES 1	2	3	4	5	6	7	TOTAL
1	23,323	3,319	0	0	0	0	0	26,642
[illegible]	25,521	9,546	1,165	0	0	0	45	36,278
3	40,346	64,122	24,220	7,392	352	0	0	136,432
4	24,846	69,638	64,625	50,745	25,922	9,668	5,596	251,039
5	14,939	49,283	59,210	71,652	59,758	28,032	21,014	303,888
6	8,891	27,316	27,540	38,681	30,689	17,652	15,878	166,647
7	3,684	9,168	9,609	13,571	12,636	7,985	10,496	67,149
8	1,671	4,525	4,998	7,231	8,054	4,607	6,885	37,972
9	628	1,165	1,557	2,366	3,244	2,310	2,586	13,855
10	448	1,483	1,525	1,791	2,184	2,168	3,797	13,397
	144,297	239,566	194,450	193,428	142,839	72,422	66,297	1,053,299

Tableau D

Archives de la Ville de Montréal

NOMBRE ESTIMÉ DE LOGEMENTS SELON LE NOMBRE DE PIECES ET LA TAILLE DES MÉNAGES - 1981

Nombre de pièces	PERSONNES 1	2	3	4	5	6	7	TOTAL
1	28,942	3,753	0	0	0	0	0	32,696
2	32,176	11,119	776	0	0	0	0	44,071
3	51,068	79,636	27,177	7,135	0	0	0	165,015
4	31,020	85,261	73,935	58,177	28,203	9,981	5,030	291,607
5	18,784	60,729	68,391	84,659	68,348	31,429	23,325	355,665
6	11,220	33,446	30,497	44,027	34,003	19,323	16,989	189,504
7	4,645	11,175	10,595	15,200	13,806	8,624	11,375	75,420
8	2,115	5,556	5,647	8,203	8,977	5,035	7,367	42,900
9	776	1,382	1,739	2,651	3,607	2,507	2,675	15,337
10	521	1,754	1,629	1,963	2,382	2,318	3,998	14,566
	181,268	293,811	220,385	222,015	159,326	79,217	70,759	1,226,781

Tableau E

Archives de la Ville de Montréal

Tableau F

RÉGION DE MONTRÉAL

NOMBRE ESTIMÉ DE FAMILLES SELON LA TAILLE

	TOTAL	PERSONNES 2	3	4	5	6	7
1951	411,885	128,589	101,251	81,337	46,069	24,200	30,439
1956	483,374	148,344	112,032	99,350	58,280	31,000	34,368
1961	570,121	161,226	128,101	120,792	75,848	40,818	43,336
1966	651,552	179,603	141,419	141,643	94,947	51,818	42,122
1971	748,405	214,902	152,871	162,281	118,746	55,884	43,721
1976	861,862	256,368	177,547	186,430	133,453	61,102	46,962
1981	990,702	299,535	202,644	213,601	151,390	70,239	53,293

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Tableau G

RÉGION DE MONTRÉAL

NOMBRE ESTIMÉ DE MÉNAGES SELON LA TAILLE

	TOTAL	1	2	3	4	5	6	7+
1961	634,451	54,028	139,541	124,599	121,875	85,236	50,813	58,359
1966	751,762	78,364	145,817	149,093	148,899	113,852	61,720	54,017
1971	844,014	104,362	190,139	166,789	168,752	129,532	68,538	55,902
1976	1,044,525	144,297	239,476	194,450	193,428	142,839	72,422	57,613
1981	1,218,007	181,268	293,721	220,385	222,015	159,326	79,217	62,075

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U 13-16-20
Case 14

INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

MINIMUM DE LOGEMENTS UNIFAMILIAUX DETACHES, 1971-1981

Les tendances passées

Dans la zone métropolitaine, les tendances récentes des logements commencés démontrent une diminution réelle et relative des logements unifamiliaux détachés (U.D.)

	Logements U.D.	%	Total Z.M.
1962	8,289	32.3	25,610
1963	7,216	27.1	26,616
1964	6,723	24.8	27,035
1965	6,371	21.8	29,182

On remarque une tendance similaire dans les logements en construction:

	Logements U.D.	%	Total Z.M.
31 décembre 1964	3,840	25.4	15,107
31 décembre 1965	3,345	19.9	16,765

Les données pour la région, selon le recensement, sembleraient indiquer une tendance opposée.

	Logements U.D.	%	Total Région
1951	84,262	20.38	413,442
1961	156,580	24.68	639,371

Cette tendance pourrait s'expliquer comme suit. Au début de l'urbanisation d'un territoire, le pourcentage de logements unifamiliaux est plus élevé, mais à mesure que l'urbanisation se poursuit et même avant que le terrain soit complètement utilisé, le pourcentage de logements unifamiliaux détachés diminue. Dans la région nous sommes au début de l'urbanisation (surtout dans la couronne régionale); en 1971 nous serons encore au même stage, mais en 1981 nous entrerons dans le deuxième stage d'urbanisation et le pourcentage de logements U.D. sera ramené au

Archives de la Ville de Montréal

taux de 1951. Ceci sera d'autant plus réel si les objectifs de densité des planificateurs sont réalisés

Hypothèse

On a donc pris comme hypothèse que le recul des limites de la zone métropolitaine ne dépasserait pas le rayon de 25 milles et à mesure que l'urbanisation s'étendrait, la proportion de logements unifamiliaux détachés diminuerait.

Tendance future

Nous indiquons dans le tableau ci-dessous nos projections de la proportion de logements unifamiliaux détachés et leur équivalent en nombre en se basant sur les projections de logements de H. Welp, et ceci pour la région.

	Pourcentage de logement U.D.		
	Minimum	Moyen	Maximum
1951		20.38	
1961		24.68	
1971	24.0	26.0	28.0
1981	20.0	26.0	32.0

	Logements			
	Total	Unifamiliaux détachés		
		Minimum	Moyen	Maximum
1951	413,442		84,262	
1961	634,371		156,580	
1971	924,422	221,800	240,300	258,800
1981	1,323,647	264,700	344,100	423,500

Accroissement de logements

	Total Logement	Logements Unifamiliaux Détachés		
		Minimum	Moyen	Maximum
1961-1971	290,051	65,220	83,720	102,220
1971-1981	399,225	42,900	103,800	164,700

Comme nous avons déjà dit dans des conditions idéales le minimum pourrait être réalisé.

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La densité

Selon les observations de la S.C.H.L. (données non disponibles au public), il y aurait 75% des logements unifamiliaux détachés (en construction) qui seraient construits sur des lots de 6,000 à 6,500 pieds carrés, un peu plus de 5% sur des lots de moins de 6,000 p.c. et le reste sur des lots de 7,000 à 8,000 p.c.

Si le pourcentage des terrains déjà subdivisés en lots de moins de 6,000 p.c. baisse prochainement à une proportion insignifiante, nous pouvons croire que le pourcentage des lots de 7,000 à 8,000 p.c. n'augmentera pas proportionnellement mais plutôt décroîtra probablement à 10% ou moins dans le futur, même si pendant les dernières années cette proportion est demeurée assez stable.

Du point de vue stock de logements pour la période de 1961 à 1981, on peut s'attendre à obtenir un stock de 90% de logements U.D. sur des lots de 6,000 à 6,500 p.c. Ceci nous donnerait les résultats suivants au point de vue de leur densité résidentielle nette:

	Basse densité (6,300 p.c.)	Très basse densité (7,500 p.c.)
Logement/acre	6.9	5.8
Personne/acre	27.6	23.2

Du point de vue de terrain résidentiel net occupé dans la région par ces deux types, on aurait les résultats suivants (minimum de logements):

Terrain résidentiel net en acre - Logements U.D.

	Lot 6,300 p.c.	Lot 7,500 p.c.	Total
1971	28,930	3,824	32,754
1981	34,526	4,564	39,090
1961-1971	8,507	1,555	10,062
1971-1981	5,596	740	6,336

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Densité de voisinage

Nous avons considéré que l'unité de voisinage serait définie comme suit: une agglomération résidentielle de logements unifamiliaux détachés accompagnée des services suivants:

Rues	23%	de la superficie brute
Parc	2.5	acres par 1,000 h.
Ecole élémentaire	3.5	acres par 1,000 h.
Eglise	0.15	acre par 1,000 h.

Ceci donne un total de 7.15 acres par 1,000 h. et 23% pour les rues.

A partir du tableau précédent, on obtiendrait les densités de voisinage suivantes pour la région.

	Lot 6,300 p.c.	Lot 7,500 p.c.	Total
Logement/acre	4.4	3.8	
Personne/acre	17.7	15.3	
Terrain en 1971 (acres)	45,368	5,837	51,205
Terrain en 1981 (acres)	54,143	6,966	61,109
Terrain 1961-1971 (acres)	13,340	2,278	15,618
Terrain 1971-1981 (acres)	8,775	1,129	9,904

Conclusion

Nous n'avons pas tenu compte dans nos calculs des grands domaines et nous n'avons pas considéré séparément le phénomène de la construction isolée de de logements en zone hautement urbanisée (filling up). Ces types particuliers de logements seront analysés dans un rapport subséquent.

R. Cousineau

/cl

Le 26 août 1966.

Archives de la Ville de Montréal

U 13-16-22
Case 9

REGION DE MONTREAL - RECENSEMENT 1961.

Ménages familiaux selon l'importance du revenu total de la famille.

Automobiles et nombre de personnes par pièce.

Groupe de revenu	Total	Nombre de personnes par pièce		Automobiles	
		Moins d'une %	Une ou plus %	Aucune	Une ou plus
Moins de $1,000.	14,856	65.85	34.15	66.13	33.87
$ 1,000 - $ 1,999	27,754	63.00	37.00	70.79	29.21
$ 2,000 - $ 2,999	48,502	56.51	43.49	59.90	40.10
$ 3,000 - $ 3,999	89,160	54.40	45.60	51.00	49.00
$ 4,000 - $ 4,999	92,678	55.00	45.00	41.99	58.01
$ 5,000 - $ 5,999	73,701	59.22	40.78	34.22	65.78
$ 6,000 - $ 6,999	50,091	66.43	33.57	25.60	74.40
$ 7,000 - $ 7,999	36,099	69.08	30.92	26.34	73.66
$ 8,000 - $ 9,999	43,757	70.64	29.36	23.95	76.05
$10,000 - $14,999	37,226	74.16	25.84	18.65	81.35
$15,000 +	20,376	85.79	14.21	9.38	90.62
Total:	534,230	62.15	37.85	39.78	60.22

Moyenne de revenu	$ 6,016.
Aucune automobile	4,594.
1 "	6,524.
2+ "	15,215.

WH/ajr
October 31, 1966.

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U73-16-24
Case 5

MONTREAL REGION

PROJECTION OF FARM POPULATION 1971, 1981

	1951	1961	1971	1981
I Population on Farms	97,468	75,440	56,300	43,200
II Farm Operators	17,593	13,826	10,500	8,200
III Farm Labour Force	28,875	22,031	16,100	12,200
IV Average Farm Household size (I divided by II)	5.54	5.46	5.38	5.30
V Farm Labour Force ratio to Operators (III divided by II)	1.64	1.59	1.54	1.49

According to the employment projections of the Montreal Region by economic activity 16,000 persons in 1971 and 12,200 in 1981, are estimated to be employed in farming (Line III). There was a slight decrease in the ratio of the farm labour force to the farm operators from 1951 to 1961. We assumed that this trend will continue and projected the ratio for 1971 and 1981 (Line V). Dividing the projected farm employment by this ratio we find the number of farm operators (Line II).

A similar projection was made of the average farm household size which also follows a slightly decreasing trend (Line IV). Multiplying the number of farm operators by the average household size gives a projected farm population of 56,300 in 1971 and 43,200 in 1981 (Line I).

January 16, 1967
HW/dg

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U73-16-25
Case 306

DIVISION DE LA RÉNOVATION URBAINE

ÉTUDE DES BESOINS FUTURS EN LOGEMENTS

Pierre-Paul Lett

17 mai 1967.

Archives de la Ville de Montréal

Introduction

La présente étude s'ajoute à celle qui a déjà été exécutée par la division des études d'ensemble.

L'objectif de cette première étude était de faire un estimé du nombre de logements occupés d'ici 1981, à partir de la population de 1961, des tendances démographiques et des tendances actuelles dans l'occupation des logements. Les résultats de cette étude sont fournis sous forme de tableaux intitulés: "Nombre estimé de logements selon le nombre de pièces et la taille des ménages".

L'objectif de la présente étude est d'évaluer, à partir de ces données, le nombre de logements à construire durant la même période, compte tenu du nombre existant et des besoins créés par l'accroissement de la population et la démolition d'un certain nombre de logements. L'étude ainsi conçue se limite à la prévision des logements à construire et aux notes explicatives sur la méthode employée. L'analyse des résultats doit se faire dans une étude subséquente.

Dans la première partie du travail nous nous attarderons au problème de la densité d'occupation des logements afin de découvrir s'il existe un problème grave de surpeuplement qui justifie une intervention directe dans la construction de logements de taille déterminée; dans la deuxième partie nous considérerons les problèmes des logements démolis par suite de projets publics, d'incendies, etc.

I- Densité d'occupation des logements

La densité idéale d'occupation des logements n'a jamais été définie d'une façon précise et pratique.

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A Montréal, nous nous trouvons devant deux façons d'envisager cette question de la densité:

1- Selon le recensement du Canada:
"un logement est considéré comme surpeuplé lorsque le nombre de personnes surpasse le nombre de pièces";

2- Selon le Code du Logement:
actuellement en vigueur à Montréal, on exige comme normes minima d'habitabilité d'un logement: deux pièces communes et pas plus de deux personnes par chambre à coucher.*

A- Calcul par la méthode du recensement du Canada.

La définition du recensement du logement surpeuplé et par opposition celle du logement sous-peuplé semble quelque peu restrictive. Nous avons préféré établir cinq classes de densité:

1- moins de 0.5 personne par pièce;
2- de 0.5 à 0.9 personne par pièce;
3- 1.0 personne par pièce;
4- de 1.1 à 1.5 personnes par pièce;
5- plus de 1.5 personnes par pièce.

- -

* Ces normes sont à peu de chose près, celles des habitations à loyers subventionnés. Le Code du Logement précise en outre pour les pièces communes, les dimensions minima qui varient selon le nombre de chambres à coucher.

Ledit Code du Logement tolère qu'un salon ou vivoir d'au moins 150 pieds carrés puisse tenir lieu aussi de chambre à coucher, ce qui ramènera le nombre de pièces à deux. (Bachelor) Ces logements ne sont pas considérés dans cette étude.

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Les chiffres de ces tableaux sont aussi calculés à partir des tableaux fournis par ETEN.

Quelle que soit la façon de calculer la densité d'occupation des logements, le problème du surpeuplement ne semble pas très critique et tout indique qu'il ne le deviendra pas.

En effet, la première méthode de calcul de la densité d'occupation (1 personne par pièce), le nombre de logements surpeuplés croît légèrement en chiffre absolu et décroît en pourcentage, tandis que celui des logements sous-peuplés croît en nombre absolu et en pourcentage. Remarquons ici que le nombre de logements sous-peuplés est de beaucoup supérieur à celui des logements surpeuplés (proportion de 12 à 1).

Cependant, dans la deuxième méthode de calcul, le nombre de logements surpeuplés est supérieur à celui trouvé plus haut et le nombre de logements sous-peuplés en est inférieur. Le nombre de logements surpeuplés croît en chiffre absolu et décroît en pourcentage tandis que celui des logements sous-peuplés croît en chiffre absolu et demeure stable en pourcentage.

Il en résulte que le nombre de logements surpeuplés est supérieur à la première façon de calculer, et reste inférieur au nombre de logements sous-peuplés.

Si la courbe décroissante des pourcentages des logements surpeuplés se poursuit, leur nombre absolu ira lui aussi en décroissant après avoir passé par un sommet. Dans un tel cas, les pourvoirs publics n'au-

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raient pas à intervenir mais il faudrait que la tendance actuelle dans la façon de se loger, elle aussi se maintienne.

Cependant nous nous sommes interrogés quant à la possibilité d'une intervention publique sous une forme quelconque, afin de hâter l'élimination des logements surpeuplés. A cette fin, nous avons examiné la qualité des logements sous-peuplés et la situation des ménages qui les occupent.

A première vue, il semble y avoir une corrélation très forte entre le nombre de logements sous-peuplés, l'état des bâtiments, le nombre de propriétaires et les classes de revenus. Cette corrélation* s'établirait dans ce sens: les bons logements sous-peuplés sont occupés par leurs propriétaires qui ont un revenu au-dessus de la moyenne et qui par conséquent peuvent se payer un logement spacieux; les mauvais logements sous-peuplés sont occupés au contraire par des locataires qui ont un revenu égal ou inférieur à la moyenne.

Il ressort donc de tout ceci que l'intervention d'une autorité compétente en la matière n'est pas totalement impossible. Cette intervention pourrait se faire à l'occasion de la rénovation urbaine, lors des projets de restauration ou de démolition-reconstruction, en veillant à ce que les logements restaurés ou reconstruits soient occupés plus adéquatement.

- -

* Le coefficient de cette corrélation doit éventuellement être fourni par ETEN.

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II- LOGEMENTS A CONSTRUIRE

Les besoins en matière de logements se traduisent en termes de logements à construire (d'ici 1981). Parmi ceux-ci, nous pouvons distinguer les logements requis:

1- pour l'accroissement de population;
2- pour assurer une certaine mobilité résidentielle;
3- pour remplacer ceux qui sont démolis par suite d'incendies, pour fins de projets publics, etc.;
4- pour remplacer ceux qui sont démolis dans le cadre de projets de rénovation urbaine.

A- Logements requis pour l'accroissement de population

Le nombre de logements à construire pour l'accroissement de population (tableau no 3), représente la différence entre le nombre de logements prévu (selon leur taille) pour une période, et celui qui est prévu pour la période précédente, ou plus simplement, c'est la différence dans le nombre de logements prévu pour deux périodes successives.

B- Logements requis pour assurer une mobilité résidentielle

On considère comme normal qu'il existe un certain taux de logements vacants qui assure à la population une mobilité résidentielle. Ce taux que l'on considère comme normal - et il est accepté par la S.C.H.L. - est d'environ 5%. D'après le recensement de 1961, le taux de vacances pour la région métropolitaine était de 5.2%.

Pour la construction du tableau no 4, nous avons admis 5% comme taux normal. Nous avons appliqué ce taux au nombre de logements existant

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en 1961, ce qui nous a permis d'obtenir le nombre de logements vacants existant à cette date. Par la suite nous avons appliqué ce même taux au nombre de logements à construire à chacune des périodes et nous avons ainsi obtenu le nombre de logements à construire pour assurer le surplus nécessaire de logements.

C- Logements requis pour remplacer ceux qui sont démolis

Le nombre de logements démolis à Montréal - excluant les projets de rénovation urbaine - durant les sept dernières années représente en moyenne 0.456% par année. Les chiffres obtenus de la S.C.H.L., pour la zone métropolitaine en 1961, représentent 0.4% du total des logements de cette zone.

Nous n'avons malheureusement pu obtenir le nombre de logements détruits par des incendies au cours d'une année. Cependant, à titre de renseignement supplémentaire, le nombre de logements où un incendie à été rapporté au Bureau des Incendies de la Province, pour l'Ile de Montréal et l'Ile Jésus, pour l'année 1965, représente 0.444% des logements.

Pour nos besoins, nous admettons le taux de 0.4% des logements qui seront démolis par suite d'incendies, de projets publics, etc.**

Ce taux, pour la construction du tableau no 5, est appliqué anhuellement au nombre moyen de logements (habités et vacants) pour chacune des périodes.

- -

* Ce taux tient compte de tous les incendies, même mineurs.

** Non compris les démolitions pour les projets de rénovation urbaine.

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D- Logements requis par suite de projets de rénovation urbaine

La vie utile d'un bâtiment résidentiel ordinaire dont la charpente et les murs extérieurs sont constitués de bois avec revêtement extérieur de brique ou de pierre est établie à 55 ans au maximum.* D'autre part, notre expérience en rénovation urbaine à Montréal démontre que la grande majorité des bâtiments qui ont plus de 60 ans d'âge sont à démolir, que ceux qui ont plus de 25 ans et moins de 60 sont à restaurer et ceux qui ont moins de 25 ans sont à conserver.

De ce qui précède nous pouvons dire à priori et d'une façon générale que d'ici 1981, la grande majorité des bâtiments construits avant 1920 sont à démolir, ceux construits entre 1920 et 1959** sont à restaurer et ceux construits après 1959 sont à conserver.

Selon les chiffres du recensement de 1961 et en y ajoutant le nombre de logements qui seront construits d'ici 1981, nous pouvons établir ce qui suit:

	Nombre	%
logements à remplacer	180,149	13.99
logements à restaurer	455,686	35.37
logements à conserver	652,285	50.64
total	1,288,120	100.00

- -

* Manuel des Estimations des Biens-Fonds, Ville de Montréal, 3e édition, 1954.

** Pour respecter les classes d'âges du recensement nous devons fixer la limite de cette classe à 1959 au lieu de 1956.

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Toutefois une légère correction s'impose car parmi les bâtiments à remplacer, un certain nombre de ceux-ci le seront par suite d'incendies, de projets publics, etc. Il faut donc déduire ce nombre des deux premiers groupes (à démolir et à restaurer) et l'ajouter au dernier (à conserver); ce qui donne le tableau suivant:

logements à remplacer	166,647	12.94%
logements à restaurer	421,536	32.72%
logements à conserver	699,937	54.34%
total	1,288,120	100.00%

Le tableau no 6 montre la répartition de ces logements selon leur taille.

E) Nombre total de logements à construire

Nous avons fait le total du nombre de logements à construire (d'ici 1981) dans le dernier tableau. Le nombre de logements affecté par la rénovation urbaine y a été réparti entre les quatre périodes y compris 1961-66. Ceux-ci devront donc être répartis sur les trois groupes suivants ou reportés à la fin de la dernière période, car il est fort possible qu'en appliquant un programme de restauration et de conservation la vie utile des bâtiments en soit prolongée d'autant. Le nombre de logements à démolir pour fins de rénovation urbaine durant les quelques années qui suivront 1981, sera peut-être minime.

17-5-67

PPL:ca.

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Tableau 1

DENSITE D'OCCUPATION DES LOGEMENTS

(Méthode du recensement)

Année	Nombre de personnes par pièce: Moins de 0.5 — Nombre de logements	Moins de 0.5 — %	0.5 à 0.9 — Nombre de logements	0.5 à 0.9 — %	1.0 — Nombre de logements	1.0 — %	1.1 à 1.5 — Nombre de logements	1.1 à 1.5 — %	Plus de 1.5 — Nombre de logements	Plus de 1.5 — %	Total
1961	104,717	16.50	313,922	49.48	113,247	17.85	77,630	12.24	24,935	3.93	634,451
1966	125,693	16.53	375,122	49.32	145,118	19.08	91,221	12.00	23,377	3.07	760,531
1971	161,930	18.14	441,941	49.50	167,760	18.79	98,763	11.06	22,398	2.51	892,792
1976	210,239	19.96	524,534	49.80	193,165	18.34	103,795	9.85	21,565	2.05	1,053,298
1981	258,415	21.06	612,765	49.95	221,738	18.07	111,952	9.13	21,911	1.79	1,226,781

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Tableau 2

DENSITE D'OCCUPATION DES LOGEMENTS

(Méthode du Code du Logement)

Année	Logements de moins de 3 pièces		Logements ayant plus de 2 pièces excédentaires		Logements ayant 1 ou 2 pièces excédentaires		Logements n'ayant aucune pièce excédentaire		Logements n'ayant pas le nombre de pièces requises		Total
	Nombre	%	Nombre	%	Nombre	%	Nombre	%	Nombre	%	
1961	31,391	4.95	81,438	12.84	261,852	41.27	180,838	28.50	78,932	12.44	634,451
1966	38,465	5.06	93,962	12.35	313,057	41.16	226,933	29.84	88,114	11.59	760,537
1971	48,287	5.41	110,448	12.37	370,540	41.50	270,844	30.34	92,673	10.38	892.792
1976	62,919	5.97	130,034	12.34	440,471	41.82	322,376	30.61	97,498	9.26	1,053,298
1981	76,766	6.26	151,207	12.33	516,214	42.08	378,515	30.85	104,079	8.48	1,226,781

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TABLEAU NO 3

Logements requis pour l'accroissement de population

Nombre de pièces par logement	Nombre de logements existants en 1961	Groupes d'années 1961-66	1966-71	1971-76	1976-81	TOTAL
1	12,421	3,598	4,234	6,389	6,053	20,274
2	18,970	3,476	5,588	8,243	7,794	25,101
3	76,933	10,312	21,259	27,928	28,584	88,083
4	153,132	26,959	31,493	39,456	40,567	138,475
5	171,183	47,453	39,908	45,344	51,777	184,482
6	109,443	19,613	17,676	19,915	22,858	80,062
7	46,683	7,252	6,245	6,969	8,271	28,737
8	25,365	4,702	3,785	4,119	4,929	17,535
9	9,837	1,596	1,186	1,237	1,481	5,500
10+	10,484	1,119	887	906	1,169	4,081
TOTAL	634,451	126,080	132,261	160,506	173,483	592,330

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TABLEAU NO 4

Logements requis pour une mobilité résidentielle

Nombre de pièces par logement	Nombre de logements existants en 1961	Groupes d'années 1961-66	1966-71	1971-76	1976-81	TOTAL
1	621	180	212	319	303	1,014
2	949	174	279	412	390	1,255
3	3,847	516	1,063	1,396	1,429	4,404
4	7,657	1,347	1,575	1,973	2,028	6,923
5	8,559	2,373	1,996	2,267	2,589	9,225
6	5,472	981	884	996	1,143	4,004
7	2,334	362	312	349	414	1,437
8	1,268	235	189	206	246	876
9	492	80	59	62	74	275
10+	524	56	44	45	58	203
TOTAL	31,723	6,304	6,613	8,025	8,674	29,616

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TABLEAU NO 5

Logements requis pour remplacer ceux qui sont démolis

Nombre de pièces par logement	Groupes d'années				TOTAL
	1961-66	1966-71	1971-76	1976-81	
1	292	368	476	600	1,736
2	424	508	652	812	2,396
3	1,684	1,972	2,472	3,044	9,172
4	3,424	3,944	4,660	5,468	17,496
5	4,008	4,816	5,668	6,644	21,136
6	2,452	2,776	3,152	3,584	11,964
7	1,032	1,148	1,280	1,432	4,892
8	568	644	724	812	2,748
9	220	244	264	292	1,020
10+	228	244	260	280	1,012
TOTAL	14,332	16,664	19,608	22,968	73,572

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TABLEAU NO 6

Logements requis dans le cadre de projets de rénovation urbaine

Nombre de logements à construire

Nombre de pièces par logement	Total	Par période de 5 ans
1	3,263	816
2	4,983	1,246
3	20,207	5,052
4	40,222	10,055
5	44,963	11,241
6	28,747	7,187
7	12,262	3,065
8	6,662	1,666
9	2,584	646
10+	2,754	688
TOTAL	166,647	41,662

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TABLEAU NO 7

Nombre total de logements à construire

Nombre de pièces par logement	Groupes d'années 1961-66	1966-71	1971-76	1976-81	TOTAL
1	4,886	5,630	8,000	7,772	26,288
2	5,320	7,621	10,553	10,242	33,736
3	17,564	29,346	36,848	38,109	121,867
4	41,785	47,067	56,144	58,118	203,114
5	65,075	57,961	64,520	72,251	259,807
6	30,233	28,523	31,250	34,772	124,778
7	11,711	10,770	11,663	13,182	47,326
8	7,171	6,284	6,715	7,653	27,823
9	2,542	2,135	2,209	2,493	9,379
10+	2,091	1,863	1,899	2,195	8,048
TOTAL	188,378	197,200	229,801	246,787	862,166

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Case 19

INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

THE HARBOUR OF MONTREAL

It was the harbour of Montréal that has made the city a centre of transportation and finance and also the biggest industrial and commercial centre of the region.

At the beginning of the last century, Montréal with its 9,000 inhabitants was an inland commercial centre only with minor maritime interest. The river was important, however, as an inland highway to the hinterland but not as a direct access to the sea. Navigation on the river between Québec and Montréal proved to be extremely difficult at the time. In later years, however, officially disciplined navigation, channel marking by means of lights and buoys, straightening and deepening of the channel and improvements of the harbour works in Montréal laid the foundation of a busy seaport demanded by the fast growing trading interests and transformed the inland river town into our present day metropolis.

In 1816, John Molson built the first private wharf. Another small wharf existed at the foot of McGill Street while Berthelette's wharf was a little further, opposite Youville Square. Ships generally cast anchor by the shore and unloaded their goods on the bank. In 1830 an act was passed "... to provide for the improvement and enlargement of the harbour of Montréal". By 1833, many improvements had been made, wharves and jetties built.

In 1850, under John Young, as chairman of the Harbour Commissioners, the real work was begun and it produced excellent results: new wharves were built, the river was dug to a depth of 30 feet. The channel from Québec became well marked with buoys, lighthouses and beacons and as a result, the number of ships arriving in the harbour increased considerably.

1832	117 ships, with a tonnage of	28,000
1850	222 " " "	47,000
1862	571 " " "	265,000

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At the end of the first half of the 19th century, there were almost 200 factories established in Montréal, such as tanneries, foundries, breweries, flour-mills, rolling mills, machine factories, etc. A great number of them found the best location at the locks of the Lachine Canal forming a solid nucleus of industries. Some of the biggest establishments could have not functioned without the help of the harbour because their activities were based on raw materials, such as wood, iron, agricultural products which came from the hinterlands. Factories engaged in extensive operation at the time were a steam machine factory with 257 employees, 3 ship building factories, one of which gave work to 100 men, 3 manufacturing firms with 65, a foundry with 60 employees. Furthermore, the city could not absorb alone all of its product any more but began to export in increasing quantities outside its limits.

Since both import and export affected the harbour considerably, it had to become the object of betterments, especially through lengthening the wharves and deepening the water for the ships which constantly grew in size. By the turn of the century, the harbour was almost completely rebuilt with new wharves, storehouses. The first elevator came into operation in 1904, the second one in 1914 followed by a third one in 1916 with 4 million bushel capacity. Rail lines tied the facilities of the harbour into a well functioning system.

Total length of the wharves increased considerably:

1877	total length		22,000 feet
1914	"	"	39,000 "
1940	"	"	55,300 "

Because of better facilities of the harbour, navigation took remarkable proportions. Tonnage of sea-going vessels having visited the harbour grew 10 times in less than 50 years. It was 555,000 tons in 1882 but reached the 5,500,000 ton mark in 1928. If the size of the ships was growing rapidly also

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their number increased a great deal:

1907	=	740	ships
1925	=	1,255	"
1939	=	1,000	"

Tonnage handled in the harbour passed 9 millions by 1928, qualifying Montréal as one of the busiest portson the american continent. Large quantities of grain from the Great Lakes were transshipped in Montréal and exported by sea-going vessels beside other agricultural and industrial products:

Canadian grain	95,000,000	bushels
American "	76,000,000	"
Flour	323,000	tons
Meat & lard	114,000	"
Fruits	56,000	"
Cheese	52,000	"
Automobile parts	177,000	"
Paper	66,000	"
Wood & pulp	29,000	"
Copper	27,000	"
Cement	29,000	"
Rubber	30,000	"
Agricultural machine	12,000	"

Compared to 6,800,000 tons of export handled in the harbour import was not as impressive yet. It consisted of mainly primary industrial material such as petrol, coal, mineral products, raw sugar, etc.: 2,550,000 tons in all.

By the end of the 1930's two major developments took place in connection with the harbour. Montréal declined as leading grain port of the world. While in 1928 there were 171 million bushels leaving the port (76 million american) this figure dropped to 64 millions (only 9 million bushels american) by 1939. Vancouver took a significant portion of the products from the Prairies and also the harbours of the Hudson and of New-England increased their facilities for grain

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shipping. At the same time elevators were built in Sorel and Trois-Rivières with a capacity of handling 31 million and 21 million bushels respectively.

Total volume of export of the Montréal harbour shrank from 6,800,000 tons in 1928 to 3,000,000 tons by 1939. Flour shipments decreased by 51,000 tons, meat and lard by 6,000 tons, auto-parts by 106,000 tons, to mention only a few among the many commodities exported then in smaller quantities.

That decade witnessed Montréal to have become an "importateur". The volume of import greatly increased and offset the loss of the port occurring from handling less export goods. From 1928 to 1939 tons of imported goods swelled from 2,550,000 to an impressive 5,100,000 tons. Montréal and its Region consumed more than 80% of all the import goods arriving at the harbour while its share was a bare 10% in export leaving the port.

Industrial establishments mushroomed in and around Montréal expressing an increasing demand for imported goods mostly for primary materials. Crude oil made up almost half of the total import ranking first by a large margin:

Crude oil	2,335,000 tons
Charcoal	1,399,000 "
Sugar	276,000 "
Molasses	60,000 "
Iron	54,000 "
Sulphur	46,000 "

An important result emerges from the above statistics: it was the industrial complex of Montréal which supported the harbour. The principal activities of the port were oriented towards supplying material for industrial production.

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A direct link by water between the sea and the Great Lakes had been a topic of conversation for some time and after the Second World War it appeared again. There was an unhappy feeling in Montréal about it considering the effect a seaway would have on the vigorous activities of the harbour from the moment that the head of navigation moved west to Duluth. It was thought that by providing a direct access for the ocean vessels to Chicago, the necessity of transshipment of cargos at Montréal would disappear.

The transshipment function of the harbour of Montréal, however, is by no means as great as is popularly thought. The best customers of the port are still the industries of the Montréal Region. Average cargo tonnage percentages prior to the opening of the Seaway show that total local and regional traffic accounted for 67.3% of the harbour and thus the Seaway could only affect one third of its trade. The following table supports two conclusions emerging from our statistics:

1) Traffic of the harbour has been still increasing in recent years.

2) This traffic is far from being adversely affected by the Seaway.

	Number of Vessels	Net Registered Tonnage (in Millions of Tons)	Total Cargo Tonnage Handled by the Harbour of Montréal (in Millions of Tons)
1954	N.A.	N.A.	16.2
1955	N.A.	N.A.	15.8
1956	5,622	10.1	18.4
1957	5,339	9.7	15.9
1958	5,943	11.0	17.6
1959*	6,406	15.4	17.7
1960	5,713	16.7	18.3
1961	6,092	18.4	22.9
1962	5,913	N.A.	22.0

* Seaway opened.

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A larger number of vessels of greater net registered tonnage takes advantage of the harbour than in the pre-Seaway era. Also the volume of cargo handled by the port has grown considerably.

The 65 commodities listed in the Annual Reports of the National Harbour Board are grouped into 5 major groups: grain, coal, iron, petroleum and petroleum products, and general cargo. Since the opening of the Seaway in 1959, there have been more tonnage handled in each of the five groups with the exception of grain.

Cargo Averages for the Harbour of Montréal 1956-1961
(in millions of tons)

Average	Grain	Coal	Petroleum	Iron Ore	General Cargo
1956-58	5.7	1.6	5.1	.1	4.8
1959-61	5.4	1.9	6.6	.6	5.0

Grain is the most important cargo handled in the port, although it does not contribute significantly to employment. Revenues from the grain elevators accounted for $3,2 millions of the total $9.3 million revenues of the harbour in 1961.

The decline of grain tonnages passing through the port of Montréal is due to many factors. One is the lowering of ocean freight rates with the result that ports on the Pacific coast could divert part of the grain formerly exported from Montréal. The second factor is the significant reduction of import to United Kingdom. Since Montréal handled the largest proportion of the grain the decline in shipments has been most seriously felt here.

Competition must be mentioned as the third factor from other harbours on the lower St. Lawrence River with new elevators being put into operation at Sorel, Trois-Rivières, Québec and Baie Comeau. The final factor is

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directly related to the port itself. Grain handling facilities prove to be in need of modernization and also the water-level has always fallen considerably during late summer months when grain shipping season is at its peak.

Should ocean freight rates for grain shipments increase in the future, Montréal will regain its position as the cheapest outlet for grain from the Prairies. Also better handling and storage capacity of the harbour can improve the position of Montréal as a transshipment port.

Petroleum and products - The refineries of Montréal East represent 30% of Canada's refinery capacity handling 300,000 barrels per day. It is not surprising, therefore, that imports of foreign crude oil of 3 million tons in 1961 constituted the largest item of Montréal's petroleum trade which has been steadily rising from 4.6 million tons in 1956 to 7.6 million tons in 1961. The amount of petroleum products shipped from the harbour was also extensive, that is 3.3 million tons in 1961, due mainly to the fact that local refineries in Ontario could not meet the entire demand of their market.

Since refineries on the east-end of the Island are blocked for expansion by residential and industrial buildings, it is expected that growth in the demand for petroleum in the Montréal Region will absorb an increasing percentage of the output of the refineries while reducing shipments through the port to other areas of Canada.

COAL

Coal handled by the port of Montréal (in thousand tons)

1956-1958 (average)	1959-1961 (average)	1962
1.6	1.9	2.0

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Despite increasing shipments of coal through the harbour since the opening of the Seaway, there has been a decline in the demand for coal in the Montréal Region. Coal consumption in Montréal stood at the 2.1 million ton mark in 1956 but abruptly dropped to 1.5 million tons by 1961. This decline was due partly to competition from other fuels, partly to changeover to diesel locomotives on the railways and to natural gas home-heating.

Higher Federal subventions on coal from the Maritimes, however, and pressing demand for coal in Ontario increased the volume of coal handled by the harbour of Montréal. Most of the commodity was transshipped to lake vessels and delivered to Canadian Great Lakes ports. Thus, extended voyage for ocean-vessels up the Seaway with less than full load could be avoided.

IRON ORE

Ore Shipments
(in Thousand Tons)

1957	1958	1959	1960	1961
45	67	477	396	762

The sharp rise can be entirely attributed to the extension of the harbour's limits to include the iron ore dock at Contrecoeur. The figures above, however, represent receipts of foreign iron ore because transshipments of domestic ore at Montréal have completely disappeared since the completion of the Seaway. Iron ore can be carried now from Seven Islands to Great Lakes ports directly in large lake vessels. Iron ore arriving at Montréal harbour is mostly from Brazil, Chile and Liberia. It has not been able to offset the loss of transshipments in domestic ore.

The recent growth of the transshipments of foreign ores at Montréal is likely to be maintained because U.S. industries are seeking higher grade ores such as the Venezuelan and other Foreign ores. (Iron content over 60%.) Canadian ore from Ungava, however, will continue to form the largest percentage of the iron ore moving up the Seaway.

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General Cargo - It is an important commodity for the Montréal harbour since the handling of a ton of general cargo results in the expenditure of six or seven times as much in a port as does the handling of a ton of bulk cargo. Considering the repercussions from handling general cargo one may say that the industrial and commercial growth of the city is connected even with this harbour activity: "... one ton of general cargo adds $60 to a port city's economy, directly or indirectly. Bulk cargo adds from $6 to $12 per ton to the economy."*

Montréal is an established port of call for some 60 shipping companies. Through long experience in the general cargo trade, Montréal has installed excellent facilities for handling this type of cargo and also built up a highly complex relationship with service industries such as banks, insurance companies, freight forwarders and custom brokers. These factors should make Montréal harbour superior to ports of the Great Lakes for some more time to come. There is also another factor in favor of the harbour. The best market for cargo arriving at the port is Montréal itself with its high industrialization and commercial activities.

Considering future aspects, it is expected, that the growth of population and of the manufacturing industries of Montréal will ensure the expansion of imports and exports of general cargo through the harbour. It is important, however, that the efficiency of the handling facilities of the port should be maintained.

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* J.H. McCann: "Ship-Shore News". Dec. 1962, p. 1.

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Notice should be taken of Montréal as Canada's most important harbour for foreign passengers and the largest passenger port after Vancouver.

Number of Foreign Passengers at Montréal's Harbour

1959	1961
173,000	122,000

The decline reflects a world-wide trend due to increased air-traffic.

The St. Lawrence Seaway extended the trading links of Montréal's port. With the exception of grain and iron ore all other commodities registered a gain in recent years because they are related to the growth of industrial production and consumption of the Montréal Region itself.

This now concludes a short historical review of Montréal's harbour. If it is required then further studies could be made regarding:

a) extension of present study to more recent years;

b) facilities in the harbour;

c) land use survey of the port area.

Yvan Feherdy

February 23, 1966.

YF/cl

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INSTITUT D'URBANISME
UNIVERSITÉ DE MONTRÉAL

THE EVOLUTION OF MANUFACTURING ACTIVITIES IN MONTREAL

For nearly 300 years after Jacques Cartier first sailed up the St. Lawrence River, life in Montréal was the same as in other river towns of the continent. The town rested primarily on the craftsmen. Manufacturing was a small scale activity carried out in shops or households to meet only local needs. The first watermill and a brewery were built around the middle of the 17th century.

According to the records of the city archives for June 23, 1672, the principal representatives of Montréal met on that day and decided to build a large brewery. There was another one already in existence but it proved to be too small for the needs of the growing community. The Gentlemen of the Seminary, the only bankers of the time, lent the money for this apparently municipal venture.

Increasing domestic consumption called for an early shart also in the clothing industry. The growth of the town, occasional fires and indian wars started activities in the construction industry. The first brick-field appeared in 1688.

One sees no trace, however, of manufacturing activities conducted on the large scale. The flourishing small establishments and workshops supplied only the domestic market. During that time, the biggest obstacle to the extension of manufacturing activities happened to be the mother country where industrial interest keenly protected its monopolistic position against potential competition in the colonies. It was only towards the end of the 18th century that Montréal showed signs of becoming the present day regional centre of industrial production and consumption.

The early tanneries, breweries, distilleries were very small and simple since modern manufacturing technique was still a long way to come. A brewery of the time worked with less than 10 employees.

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As trade began to grow, however, Montréal became a centre of a number of industrial activities. By the turn of the 19th century, the traiding area of the city outstretched into the present day metropolitan region. Flour-milling was one of the first industries to benefit from large scale production.

Population of Montréal increased at a rapid rate from 5,000 inhabitants to 25,000 in 60 years. The records from these days mention only 6 flour-mills, 1 oil-mill, 4 foundries, 2 distilleries and 42 other factories so insignificant that they never emerged from anonymity. The foundry named Eagle was established in 1819, the Dominion Metal Work started operation in 1828. These establishments, however small in number, still mark a cautious awakening of manufacturing activities. This trend becomes more evident on the basis of information from the year 1844. Beside the intensive activity of households supplying articles for the clothing trade, there were 150 small establishments engaged in manufacturing a variety of products. In addition to the type of firms mentionned above, a wire-work shop started operation in 1830, a paint manufacturing firm in 1842, a number of food and wooden fabric factory between 1840 and 1850.

Primary industrial activities of Montréal had to rely on imported raw materials such as wood, iron, agricultural products from the hinterland. Thus, one can immediately notice the connection between manufacturing activities in the city and the progress made in navigation from 1830 to 1850. In its infancy, industry has already become the daughter of the harbour.

Navigation, which brought the merchandise to and from the city, similarly furnished the motive power through the locks of the new Lachine-Canal by releasing large quantities of water. At each lock, the factories rapidly multiplied: at lock No. 2: three flour-mills, two rolling-mills, a machine factory, a saw-mill; at St. Gabriel lock: foundries, a rubber factory, an agricultural machine-shop,

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saw-mills, a furniture factory, 21 establishments in all; another ten at Côte St. Paul's lock. It happened in the period from 1850 to 1860 that the banks of the Lachine-Canal became the solid nucleus of Montréal's industries and stayed that way for a long time.

The census of 1851 was the first to give data on some big factories which had to heavily rely on the support of the harbour: a steam-machine factory employing 257 workers, 3 ship building factories, one of which gave work to 100 men, 3 tool manufacturing firms with 65 employees, a foundry with 60 workers. The above source furnished information also on industrial activities which had no connection with navigation but were important features of the growing industrial complex of Montréal: two hat-makers with 77 workers, seven small tobacco factories, and it also gave a list of craftsmen headed by 406 cobblers and 195 tailors.

In 1854, the Canada Sugar Refinery was established by John Redpath.

During the period from 1850 to 1860, the railway appeared on the scene as the new transportation medium exerting influence on the economic development of the city. It brought in primary goods and also carried the manufacturing products of Montréal into the exterior.

The census of 1861 bore further evidence of the expanding industrial pattern. There were 141 manufacturing establishments listed within the city limits and another 20 located in the near outskirts. This was the first census which gave the number of employees by certain industries. Several factories in the garment industry took the place of the old household-type workshops by giving employment to 1,658 shoe-makers, 1,333 tailors and 425 dress-makers. The abundance of man-power seems to be the third major component besides the port and the railway in forming a solid base for the intensified manufacturing activities in the city during the second half of the 19th century.

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The Civil War in our southern neighbour contributed in a large extent to the economic growth and the diversification of industries in the Montréal Region. The war took millions of men from the ordinary activities of the country to the battlefields, thus stimulating the canadian economy to supply the demand. Industrial activity in Montréal extended then to include the following factories: lead, copper and bronze-works, elevators, orthopedic-instruments, biscuits, chocolate, cork, varnishing, tents and sails, printing. It also employed new methods in the tobacco and shoe-manufacturing. Montréal was fast becoming a centre of heavy industry and also a stronghold of consumer food production. In the decade between 1860 and 1870, the investment in the Montréal industries increased from $800,000. to $11,000,000. !

The Census of 1871 brings forward definite evidence for this industrial growth. Montréal had at the time 22,784 persons engaged in manufacturing activities, that is one from every 6 inhabitants. The largest number of people found jobs in the leather industry where shoe-manufacturing gave employment to 5,267 people, tanneries to 365, 117 were working in saddleries and also a few making small travelling bags and soldier's kitbags, a quarter of the total labor force in all. Total production came to 1,000-1,500 pair of shoes per day.

The garment industry spread out in 191 establishments and employed 3,425 persons. The third largest number of people, that is 1,110, was engaged in the manufacturing of tobacco products, followed by the printing industry with 1,023 employees. These labor oriented industries claimed half of Montréal's labor force in 1871. The rest was scattered in other firms such as metal factories, wood-manufacturing, foundries, food-processing, glass-ware. There was also a rubber manufacturing firm with 370 workers. The cotton industry originated in the old Hudon Mill at Hochelaga, which started operation in 1874. At the time of its foundation, the mill employed 300 people.

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Around the mid-70's recession set in due to a number of reasons. The war was over in the States and resumed production caused an inevitable slow-down in Canadian outputs. Montréal's manufacturing industries suffered a great deal being so closed to the United-States. Almost all lines of goods could be producted at a lower cost in the United States because of her great population and natural resources developed more efficiently. The border was closed to our goods by high tariffs while the home market left open to American factories. Furthermore, a general stress was noticeable on the Canadian business and economy as a result of great financial losses caused by the wars both in the North American Continent and in Europe.

The recession, however, happened to be short. In 1879, the "National Policy" made business booming again. American and English capital began coming in, new factories opened mostly along the Lachine-Canal. Names appear from this period such as Ingersoll, Dominion Wire, Dominion Bridge. Among the 178,000 inhabitants of Montréal, as many as 35,675 were engaged in manufacturing activities, that is, one from every 5 Montrealers. The industries of the 1880's mobilised for their service almost half of the active population of Montréal.

At the end of the 19th century, the Hochelaga Cotton Plant, Montréal Rolling Mill, Dominion Car Works joined the rank of factories employing large number of people and turning out significant volume of output. Also Angus shop of C.P.R. started operation with 7,000 persons. New items were added to the enlarging variety of manufacturing products: tubes, horse-shoes, steel-wheels, nails, stoves, boilers, pumps, saws, sewing-machines, wires, springs, etc. Foundries, sugar-refineries and tobacco-work shops remained in the forefront of manufacturing activities. Labor force in 1901 reached the 52,000 mark, raising value of production to $80,000,000.

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In spite of the fact that new factories were constantly opening, their total number decreased because of concentration and absorption. In 1881, there were 1,561 establishments operating in Montréal. This number dropped to 966 by 1901.

During the first decade of the 20th century, labor force grew from 52,000 to 78,000, that is by 50%, while the value of production increased from $80 million to $200 million. Population of Montréal increased by 55% in the same time.

The railroad did not stop with the development of its main lines. Spurs were built and rail facilities thus became available to most of the larger plants which had previously no direct access to the main lines. This spread of railroad spurs in the Montréal Region influenced the location of plants in a great extent. Waterside locations ceased to be the compelling places for plants and they could now spread out into the suburbs. The Lachine-Canal's area, however, kept its first place until the First World War housing most of the establishments.

The distribution of the labor force by districts at the end of the first decade of the 20th century was the following: Ste. Anne: 19,000 employees (24% of the total labor force) in factories like metal, electric , tobacco, paper, rubber, located mainly along the river bank; Maisonneuve: 15,000 employees; St. Antoine: 11,000, in mainly shoe manufacturing firms; St. Henry: 10,500; St. Jacques: 3,400 employees.

In the years immediately preceding the First World War, clothing manufacturing was the most important industry in the city. Nearly 10% of the factory workers were engaged in this trade producing 2/3 of the annual Canadian output. The principle single industry was tobacco, while boots and shoes came next in importance. Among the food products slaughtering and meat packing ranked with flour. The largest flour-mill in the British Empire was operating in Montréal.

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Manufacturing activity in the city became immensely diversified. Prior to 1880 there were no metal bridges manufactured and practically no structural steel work for buildings. Since that year, however, bridge and structural steel making progressed steadily. The combined output of Dominion Bridge Co. in Lachine, of the National Bridge Co. Ltd., and of the Phoenix Bridge and Iron Work was between 75,000 and 80,000 tons of bridge and building work in 1912, totalling $4.5 million in value. The great car and repair shops of the two chief railways were also in Montréal: shops of the Canadian Pacific Railway and the Grand Trunk Railway System. Manufacturing in and around the city developed to such an extent that per capita valuation of the products reached $360 million annually.

Montréal also served as centre of several industries which were not actually located in the city but only managed from there. The pulp industry in the Montréal Region without a single pulp-mill in the city is an example. The development of important hydro-electric properties greatly reduced industrial costs in the Region. Several factories took advantage of the inexpensive operation of securing power such as pulp and paper industries, lumber and textile mills, rubber factories. The Montréal Light, Heat and Power Company Ltd. supplied power in Montréal acting as distributing agent for the Shawinigan Water and Power Company.

The following table from 1912 compares the major industries of Montréal in terms of number of establishements, employees and value of production

	Establishments	Employees	Value of Production (in Millions)
Books and Shoes	39	5,700	$11.5
Boilers and Engines	8	1,350	3.3
Cars and Car Works	4	3,500	7.7
Clothing	200	11,000	18.5
Cotton	6	3,500	6.5
Electrical Appliances	13	2,200	6.8
Slaughtering and Meat Packing	12	750	6.1
Tobacco	35	4,000	13.9
Leather Goods	13	500	2.4
Total for the City of Montréal	1,093	67,000	164.7

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Two important developments after the First World War freed the factories from their downtown-bound location. Residential areas began to spread into the outskirts and the truck appeared on the road as the new mean of transport. Thus, labor force remained close to the new industrial sites while trucking provided flexibility for moving goods by reducing the disadvantage of settling away from railroad lines and harbor piers.

During the 20's, labor force climbed to 106,000. Its ratio to total population changed to one employee from every 8 inhabitants. This was not a sign of slow-down in manufacturing activities but of progress in mechanization. Manufacturing, by that time, established itself as the most significant component of the Montréal economy. By 1931, manufacturing labor force accounted for 131,400 from the total active population of 336,000, that is 39.1%. No other activity has even got close to this percentage.

It is interesting to know that in 1881 the clothing industry was on the top by giving work to 25% of the labor force. In 1931, it was still 20% but lost its first place to the metal factories which rised from 15.2% in 1881 to 3[illegible].3% in 1931. Population in the same period increased from 178,000 to 973,000.

During the Second World War, manufacturing activities became greatly intensified accompanied by an unprecedented increase in the labor force. Metal industry was booming in factories like Canadian Car in St. Lawrence with 1,500 workers; Dominion Bridge with 1,600 and Dominion Wire with 1,800 employees. Other activities in the field of heavy industry involved over 20,000 persons in the Canadian Pacific workshops and 2,500 employees with Canadian Car in Ville St. Pierre.

Firms making electrical appliances employed 12,700 workers, Canadian Air in St. Lawrence 7,500, food manufacturing 18,500, including Molson brewery with 3,000, a distillery in La Salle with 650.

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Among the industries, one should also mention leather with 10,200 employees, textile, 8,900; tobacco, 7,450 (the largest firm, Imperial Tobacco in St. Henri); printing, 6,750; chemicals, 6,770; paper, 3,000; petrol, 1,960; glasswear, 1,950; rubber, 2,100 (British Tire in Lachine with 860 workers).

The attached table shows the distribution of manufacturing establishments in the Montréal Region in 1960.

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INSTITUT D'URBANISME
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DESCRIPTION OF THE MANUFACTURING SECTOR IN MONTRÉAL METROPOLITAN AREA

It is difficult to give a fully sufficient yet condense description of the manufacturing industries of the Québec economy because their evolution and diversification have been so rapid. The southern part of the Province of Québec is one of the most industrialized regions in Canada and it has become so only after the Second World War in a comparatively short time.

The density of population in the Montréal metropolitan area has made that section of the Province the main center of economic development. There live more than 2 million people who represent 10 per cent of the Canadian population and 40 per cent of Québec's population. This economic sector accounts for one eighth of the Canadian gross production and its manufacturing shipments amount to more than $5 billion annually. Metropolitan Montréal produces 60 per cent of the gross value of manufacturing industries in the Province. This is expected since manufacturing establishments tend to assemble around centers with large populations creating a more than proportionate per capida volume of production.

The City of Montréal, with its harbour and rail connections, is the magnet attracting population and industry for the present rapid economic development. The city is still growing but not as fast as its metropolitan area. It is expected that the metropolitan area of Montréal will witness a much more rapid growth than the city itself. Land in the city proper has approached saturation and factories are now forced to look for space in the suburbs.

Manufacturing is closely connected with all phases of economic activity in the metropolitan area. It is the most important industry, employs about 35 per cent of the labor force, that is more people than any other industry, and in general sets the standard of living of the residents. Indeed, the level of manufacturing production has always been a good indication of the vitality of economic activity in an area.

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A survey of the metropolitan area's manufacturing activity engenders a strong impression of diversification. Montréal is not identified with the production of just a few commodities, as Detroit is identified with automobiles or Pittsburgh with steel. Some of the cities in the Province of Québec, however, are still characterized, at least in the public mind, by their leading industries. For example, Sorel is noted for its shipbuilding and ilmenite smelting, St. Hyacinthe for textiles, Joliette for tobacco, St. Laurent for aircraft, Valleyfield for cottons, Trois-Rivières for newsprint, and so on. Montréal signifies the current industrial revolution in Québec. The area, in fact, produces at least a little of almost everything that is turned out in the nation. With the development of the mineral ores of the north of the Province, heavier industries are moving into the Montréal Area. These include shipbuilding, oil refineries, copper smelter, cement plants and steel mills. On the basis of a census classification of establishments which distinguishes about 20 manufacturing industries, we find that the Montréal metropolitan area has some employments in all.

We get a different impression, however, when we look at the number of workers employed in different industries of the metropolitan area as compared to the nation. For example, food, clothing, metal and transportation equipment industries together account for 55 per cent of the total metropolitan manufacturing labor force only 10 per cent of all workers in the four industries on the national level. The metropolitan area's share of the nation's employment in three industries is 25 per cent or more: tobacco 52 per cent; clothing 39; leather 29; while in another three industries it comes to 10 per cent or less: rubber 10 per cent; paper 9; wood and furniture 8. The 239,000 people in the area's manufacturing industries make up 18 per cent of the total manufacturing employment in Canada.

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Food and Beverage Industries:

The food and beverage industries constitute one of the most important industrial groups in the Province of Québec. The components of this industrial group are:

bread and biscuits

dairy products

meat products

canning and processing

grain and milk products

confectionary manufacturers

breweries

distilled liquors

carbonated beverages

Eight of the 40 leading industries come from this group which is concentrated in the southern part of the Province, especially in the Montréal area. This industry has become more integrated during the past decade as it is shown by the decrease of the number of total establishments. The average size of firm, in terms of employees, has grown by 18 per cent.

In 1961, this group of industries employed 28,000 persons, slightly over 12 per cent of the manufacturing labor force in the Montréal metropolitan area and 14 per cent of the total for Canada employed in this industry. The gross selling value of products was 18 per cent of the selling value of all manufacturers in the area. The industry is characterized by a small average size of firm and many firms in the industry. Montréal metropolitan area has 450 establishments, that is 5 per cent of the Canadian total. Labor force and value of production, however, come to 14 per cent and 16 per cent respectively of the national totals, since some of the biggest factories of the industry are located in the Montréal area. The nine biggest establishments operate with more than 500 persons.

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They are the bakeries and the great variety of biscuits making firms in the Montréal area that employ the largest number of people in the food and beverage industry. Technology is changing in both production and marketing. Montréal has rapidly taken advantage of the improvements and this resulted in removing much of the baking from the small bakery to larger firms. This tendency of transformation to larger plants was especially pronounced at the beginning of the fifties. Nevertheless, the number of neighborhood bakers in the area is still large.

Some of the largest bakeries have several firms from coast to coast. George Weston Ltd., with its executive offices in Toronto, has 14 factories in Canada, one in Longueuil. Canada Bread has also one bakery in Montréal, Le Pain Moderne Canadien, and 7 in Ontario. Consolidated Bakeries of Canada has its headquarters and a bakery in Montréal and 12 bakeries in other parts of the Provinces of Québec and of Ontario. Most of the bakeries are small, employ less than 50 people. There are only 13 establishments in the Montréal metropolitan area with more than 50 persons, of which 3 have over 500. All in all Montréal has 4,200 persons employed in bakeries. Biscuit manufacturing, on the contrary, is more concentrated. In this group of the food and beverage manufacturing industry, nine factories have been established in the Montréal metropolitan area, of which 4 employ more than 200 persons. They are David & Frère; Viau; Lido; and Weston. Employment in this group accounted for 20 per cent of the total labor force in the industry, while the selling value of these products was less than 10 per cent of the total for the industry.

The milk and other dairy product manufacturing firms compose the second group in the industry. Ontario and Québec together have 69 per cent of the labor force in this group because these provinces have most of the consumers and also their agriculture is oriented towards milk production. Butter and cheese factories, ice cream and milk condensing plants and other firms turning out dairy products account for almost 20 per cent of the total output in the food and beverage manufacturing industry in the Province of Québec. Dairy factories in the Province

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now produce about 150 million pounds of butter and cheese, some of which enter Canada's export markets. The Province accounts for over 40 per cent of the total Canadian production of creamery, butter and about 26 per cent of the production of cheddar cheese. Montréal occupies central position in the group. Three big plants are in the area with more than 500 employees. These are: Joubert, which is the subsidiary company of Borden Co. in New York city, Mount-Royal Dairies, and Dominion Dairies controlled by National Dairy Products also in New York. In addition, there are 29 smaller establishments in the metropolitan area.

Meat manufacturers form the third group in the industry with their slaughtering and meat packing plants, animal oil and fat plants, sausage and sausage casing factories. There are 53 establishments in the metropolitan area, 44 in Montréal, producing the highest value among all the groups in the industry. Small plants are relatively rare. Employment only in each of the two biggest establishments rises over 500 persons. Middle-size firms dominate the field with 150-200 employees. The three biggest enterprises, Canada Packers, Swift Canadian, and Burns & Co., all have a plant in Montréal while operating also from coast to coast with branches in many cities. Wilsil, a subsidiary of Canada Packers, is also in Montréal engaged in slaughtering and meat packing.

Fruit and vegetable canners, preservers and fish product industry ranks now fourth for its man-power, and fifth for its value of production after a very modest beginning at the turn of the century. Canadian labor force is 30,000 in this group, of which the Province of Québec is housing only 13 per cent. This group provides an annual outlet for agricultural products. The principal fruits canned are apples, strawberries, blueberries, raspberries and plums. There are four establishments in Canada employing more than 500 people each, but none is located in the Province of Québec. The Montréal metropolitan area, however, has 33 smaller plants. One third is scattered through the municipalities around the city.

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Breweries, distilled liquors and carbonated beverage manufacturers are the components of the next group in the industry. Each of these sub-groups ranks among the 40 leading industries in the Province. This mainly accounts for the fact that this industry is an important source of revenue for the Provincial Government. This group takes advantage in a large extent of Québec's raw materials. It is an important customer of the glass industry since most bottles are bought locally; and also for the paper product industry for its cartons and labels. This group occupies the fifth place in the food and beverage industry in term of labor force. Since factories in this group are heavily consumer oriented, manufacturing activities are concentrated in Ontario and Québec, the two most populous provinces, taking 39 and 38 per cent of the total labor force respectively.

The most important breweries are in the Province of Québec, four in Montréal, one in Québec City. Molson's Brewery is producing almost 4 million barrels of beer annually. One third of the 30 million gallons produced annually in the Canadian distilleries comes from the Province of Québec, where the executive offices and one of the plants of Distillers Corp. - Seagrams, the largest company of its kind in the world, are located in Montréal. The 25 soft-drink manufacturing firms in the metropolitan area make the most significant contribution to the annual production in the Province which is more than half of the Canadian total.

Grain mills in Montréal occupy a relatively modest place in term of their labor force but rank rather high for their value of production. Flour milling has existed in the Province since the early days of settlement , but it is only within recent times that its progress has become significant. Robin Hood Floor Mills and Oglivie Flour Mills Co. are the most important among Montréal's eight feed and flour manufacturing establishments.

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The rest of the food and beverage industry includes confectionery manufacturers, sugar refineries and miscellaneous food manufacturers. The confectionery manufacturers are primarily engaged in manufacturing chewing gum, cocoa butter, chocolate, caramels, popcorn, peanuts, etc. Laura Secord and Lowney are the biggest firms in Montréal with another 30 in the metropolitan area. Among the sugar refineries there are two large establishments: St. Lawrence Sugar and Canada and Dominion Sugar. A small sugar-beet factory is in operation in St. Hilaire: Raffinerie de Sucre du Québec. Miscellaneous food manufacturing includes a great variety of products like macaroni, noodles, rice, coffee, tea and spices. At least 70 factories of different size are operating in the Montréal Region. Establishments in Montréal with larger than average size are: Salada Foods, Canada Malting, the Great A & P Tea, Brooke Bond Canada, General Food, Mount-Royal Rice, Boudrias Frères, and Fred A. Lallemand in Laprairie.

TOBACCO PRODUCTS INDUSTRIES

The forty establishments in the tobacco industry employ the smallest labor force among the Canadian industries and gives one of the lowest value of production, that is, $340 millions. The small firms are almost negligible because five big companies employ more than half of the total labor force and make 48 per cent of the total production, while the middle size factories engage 40 per cent of the labor force and turn out half of the total production.

The tobacco industry in Canada can be divided into two quite separate operations: the processing and packing of raw leaf tobacco and the manufacturing of smoking and chewing tobacco, snuff, cigars and cigarettes. Tobacco processing plays a relatively small part in the manufacturing industries of Québec. It is carried out almost entirely in the famous tobacco growing region north of Lake Erie in Ontario. This Province harvests 200 million pounds of tobacco compared with 14 million in the Province of Québec.

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By far, the largest of the two operations in Québec is the manufacture of tobacco products. The ancient history of Québec tobacco manufacturing can help to explain the fact that this Province turns out a value of $182 millions while Ontario makes only $34 millions. The qualified and abundant labor force in Québec has been the main factor in attracting the necessary capital for the development of this industry. The production of cigars and cigarettes occupies more than 94 per cent of all employees in the tobacco and tobacco products manufacturing in the province, accounts for 97 per cent of all wages and salaries, and for over 97 per cent of the selling value of factory shipments.

Montréal is considered to be the center of the canadian tobacco manufacturing industry because there are 25 per cent of all the canadian factories in the metropolitan area producing 41 per cent of the total national output and employing 52 per cent of the labor force. Among Montréal's nine tobacco factories, there are three big establishments: Imperial Tobacco with two plants and MacDonald Tobacco, each working with more than 500 persons. The trend of employment and concentration of production in the tobacco product industry shows the effect of increased demand and improved technology.

RUBBER INDUSTRIES

Canada is among the leading countries of the world in manufacturing rubber goods. The industry is thus important to the economic life of the country, for besides supplying the domestic market, it contributes materially to the export trade. In 1961, there were 92 establishments in the industry, 36 of which were in the Province of Québec. Ontario and Québec together accounted for about 98 per cent of all factory shipments. This industry, similarly to tobacco product manufacturing, is relatively a capital intensive enterprise with large average size of firms. Fifteen big factories employ 3/4 of the total labor force and produce more than 80 per cent of the national output.

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The concentration of the automobile industry in Ontario makes this Province the first in rubber manufacturing while Québec takes second place with rubber footwear and waterproof clothing.

There are seventeen factories in the Montréal metropolitan area. Each of the two largest companies, Dominion Rubber and British Rubber, employs more than 500 persons. Dominion Rubber is primarily engaged in manufacturing rubberized rainwear and waterproofed fabrics, rubber hoses and tapes, rubber sheets and miscellaneous rubber products. The British Rubber Company in Lachine manufactures bicycle tires, overshoes and goloshes, bathing shoes and rubber supplies such as washers, gaskets, valves, plugs, etc. Dominion Rubber also has a plant in St. Jérôme. There are two more medium size firms in the Region, one in St. Jean and another in Ste. Thérèse-de-Blainville, these are: Tillotson Rubber Co. Ltd. and Precision Rubber Products Ltd. respectively.

LEATHER INDUSTRIES

The manufacture of leather products in Canada provided employment for 30,000 persons in 1961, of which 2/3 worked in the medium size factories. (50-500 workers). Metropolitan Montréal had 28 per cent of the establishments, employed 29 per cent of the labor force and produced 27 per cent of the total output.

There are two sections of this industry, the primary which consists of the tanning of leather, and the secondary, those industries that produce consumer goods from tanned leather. The latter section includes belting, boot and shoe findings, footwear, gloves and miscellaneous leather products.

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The tanneries are mainly located in Ontario while the second sector has long been one of Québec's leading industries. The leather footwear sector is by far the largest in Montréal's leather industry - 74 of the 168 establishments belong to this group. The principal firms are the following: Slater Shoe, Tétrault, Daoust-Lalonde, MacFarlane-Lefaivre and Dependable Shoe. These are engaged in manufacturing boots and shoes, slippers and moccasins and athletic footwear. The Montréal firms lead the industry in the Province in manufacturing over 20 million boots and shoes with leather or fabric uppers, 2 million pairs of slippers and 3 million pairs of moccasins annually. The Québec firms also exported some 2 million worth of leather footwear principally to the United States, Trinidad, Tobago and the Barbados.

The leather glove and mitten industry, running second to the leather footwear industry, is also predominantly located in the Province of Québec. There are 12 establishements in the Montréal metropolitan area primarily engaged in manufacturing these products. Consumers Glove Co. Ltd. and Gold Gloves Ltd. in Montréal turn out the greatest variety of goods. Of some 70 establishments in Canada, as many as 40 are in the Province of Québec. About $75,000 worth of gloves and mittens were exported in 1961 primarily to the United Kingdom, Sweden and the United States.

TEXTILE INDUSTRIES

Québec is the leading Canadian source of cotton yarn and cloth, and of synthetic textiles and silks. These are two of the major industries in the textiles group. Other industries are wollen goods, automobile accessories, tents and sails, linoleum and coated fabric. Of all Canadian textile workers, 60 per cent are in Québec, 20 per cent in Montréal. The industry is characterized by the medium size of firm where almost half of the labor force is employed. Two-third

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of the rest works in the big factories, each operating with more than 500 persons. Six of these are established within the Montréal metropolitan area. The importance of the textile industry here is clearly demonstrated with the impressive number of firms which comes close to 250. Since the majority of all Canadian workers in the textile industry are in the Province of Québec and this labor force is not as concentrated in its workplace location as some other, it is not surprising to find textile producing manufacturers in many towns of the Montréal Region within a 30 miles radius from the center.

Cotton yarn and cloth mills occupy the first place in the textile group with 72 per cent of the factories in the Province of Québec. Two big companies with many firms have commanding position in the industry: Dominion Textile and Wabasso Cotton. Of these two establishments, the former has three factories in Montréal, two in Magog, one in Sherbrooke and Drummondville and a subsidiary, Montréal Cottons in Valleyfield and the latter has also three factories in the Province and two in Ontario. Goodyear Cotton in St. Hyacinthe employs more than 500 persons and is considered to be the leading factory in the locality's eight textile manufacturers.

The other important group in the industry is synthetic textile with almost as many employees as the cotton yarn and cloth mills and with a value of production exceeding that of the former. More than half of the labor force is concentrated in nine big factories. The most important ones in the Montréal Region are Canadian Celanese and Domil Ltd. in Montréal, Bruck Mills and Doric Textile Mills Ltd. in St. Jean and Consolidated Textiles in St. Hyacinthe. These companies also have factories in Cowansville, Sherbrooke, Plessiville, Sorel and Joliette. Domestic mills supply some 85 per cent of total consumption.

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The third textile group, wool yarn and cloth mills, is engaged in manufacturing woven apparel fabrics, blankets, yarn etc. Canadian production is only a fraction of domestic consumption and since imports have been rising the volume of production in the domestic factories slowly further diminishing. Ayers in Lachute and Penmans in St. Hyacinthe are the largest mills in the Region.

The rest of the textile industry is composed of several sub-groups: fibre preparing mills, thread mills, carpet, rag and mat manufacturing firms, textile dyeing, and linoleum and canvas products. There are two factories employing more than 500 persons: F. & P. Coats Ltd. in Montréal making a variety of threads and Dominion Oilcloth and Linoleum Co. specializing in the production of linoleum and coated fabrics.

KNITTING MILLS AND CLOTHING INDUSTRIES

The knitting goods and clothing industry concentrates heavily in Montréal. Of the 2,700 establishments in Canada in 1961, the 1,240 in the Montréal metropolitan area employed 39 per cent of the people engaged in the industry and sent out 46 per cent of the total shipments. The medium size firm, employing 50 to 500 persons, is characteristic for the industry taking 63 per cent of the labor force. Thirty-two per cent work in the small firms and only five per cent in big factories with more than 500 persons.

Establishments primarily engaged in manufacturing men's, women's and children's products are the backbone of the knitted goods and clothing industry bringing about 2/3 of the total value of production. The extent of concentration in this group is shown by the fact that 816 establishments were located in Montréal in 1961 employing 35,600 persons who manufactured $360 million worth of goods thus leaving Toronto, the other center in the group, at second place with 320 establishments, 13,000 workers and $108 million in value of production. Hydre Park Clothes and Freedman Co. in Montréal and Scott Clothing in Longueuil are the largest

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factories within the metropolitan area besides another eight firms with employment ranging from 200 to 500 people.

Canadian factory shipments made by the second group, that is the combined hosiery and knitted goods industries, had a value of some $200 million in 1961, of which almost 50 per cent came from the Province of Québec. Establishments are highly concentrated again in the Montréal area where the City of Montréal alone is housing 108 firms of different size. Several smaller establishments are operating in other cities and towns of the Region. Some of the largest knitting mills have found suitable location in the vicinity of the Metropolis such as Penmans in St. Hyacinthe and Regent Knitting in St. Jérôme.

Finally, there are firms manufacturing goods like fur, hat, cap and foundation garment. The total labor force in this group comes close to 14,000, of which 2/3 is employed again in the Province of Québec and similarly to the previous two groups in the industry, most of the firms are located close to Montréal.

WOOD AND FURNITURE INDUSTRIES

Wood and furniture manufacturing give employment to the largest number of persons after the food, and metal industries. This labor force of 120,000 produces a value of $1,500 million. Most of the factories are small or medium size establishments working with less than 500 persons. Large companies are relatively rare and occupy only 7 per cent of the labor force producing less than 10 per cent of the total output.

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Metropolitan Montréal accommodates only 4 per cent of the 9,000 establishments, 8 per cent of the labor force and turns out 7 per cent of all goods produced in the industry. Factories engaged in the preparation of wood like saw mills and veneer and plywood mills are located mainly in the wooded areas of British Columbia, Ontario and Québec in this order. Their number is insignificant in the Montréal metropolitan area. There is one saw mill in St. Jérôme also in Sainte Thérèse-de-Blainville, in Jacques-Cartier and in L'Épiphanie.

Sash and door and planing mills manufacture doors, frames, mouldings and planed lumber. The largest plants are in operation on the West Coat. However, a number of small firms are also located in the Montréal Region but only three establishments are significant enough to be mentioned: Canada Flushwood Door in Terrebonne, Commonwealth Plywood in Ste. Thérèse and Dominion Ayers in Lachute. In the group of "other wood products" Canada Flooring Company in Montréal is engaged in hardwood flooring, Bathurst Containers Ltd. in wooden boxes. Canada Creosoting Co. has its head-office and main factory in Delson (wood preservation).

The furniture industry is one of the rapidly growing trades in Québec. As in the case of some other manufacturing activities, there is a noticeable concentration of furniture making in the Montréal Region. The 300 firms in the area employ 5,000 persons and contribute $50 million to the selling value of factory shipments. Kilgour in Beauharnois, Krochler, Atlas, Simmons, Progress-Dodds and Ideal Upholstering Co. all in Montréal are only a few among the many companies.

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PAPER AND ALLIED INDUSTRIES

Since paper production belongs to the capital intensive industries with a large average size of firm, more than half of the labor force is employed in the biggest factories while medium size firms take another 40-45 per cent. Of the 567 establishments in the Canadian paper industry in 1961, 97 firms in the Montréal area employed 9 per cent of the total labor force.

The Québec pulp and paper industry occupied a key position in the economy of the Province and of the country as a whole. It ranks first among the manufacturing industries of Québec. There are some 60 pulp and paper mills in the Province of Québec. They produce an output worth about $650 million and pay out $140 million in wages to 28,000 employees. Furthermore, the mills create employment for an additional 60,000 men in their wood operations.

The location of the factories shows a concentrated pattern. The head offices of the biggest companies operate in Monthéal while the firms are set up close to the forests or along the rivers. Consolidated Paper Co. is one of the largest of its kind with head office in Montréal and factories operating in Trois-Rivières, Cap-de-la-Madeleine,Shawinigan, Grand-Mère and in Port-Alfred. The Canadian International Paper Co. conducts operation also from Montréal with factories in other parts of the Province. Dominion Tar and Chemicals in Montréal controls seven factories in the Province and eight in Ontario. One of the firms is in Beauharnois. The last of these big companies with head offices in Montréal is Cie de Papier Rolland with a factory in St. Jérôme and another in Mont-Rolland. Building Products Ltd. in Lasalle, classified as medium size factory, is primarily engaged in manufacturing wrapping paper, building paper and paper boards. It also has a firm in Pont-Rouge.

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The pulp and paper mills are the most important in the paper manufacturing industries giving employment to 70,000 people and producing a value of $1.5 million. Investments are very large in the industry. Development in recent years shows increasing Canadian interest in the industry after a start with foreign capital completely.

Other types of activity in the industry look only minor beside pulp and paper. There are 25,000 people, however, engaged in a number of factories that contribute $500,000 to value of production in the entire industry.

One of the main subdivisions is the paper box and bag manufacturers. A few big companies dominate the field in Québec, some with head offices in Montréal. Thus Bathurst Containers Ltd. is located in St. Laurent while its seven factories stretch out from New Brunswick to Manitoba. Continental Can Co. of Canada, Hinde & Dauch Ltd.; and Dominion Containers Ltd., all have two factories in the Montréal metropolitan area. While these factories are rather important in manufacturing corrugated boxes, there are some smaller firms, primarily engaged in folding box and set-up box making, like American Paper Box Co. and Lawson Lithography & Folding Box Co. in Montréal, Boîtes Diana Enrg. in St. Janvier, Marieville Paper Box Ltd. in Marieville and General Paper Box Mfg. Co. in St. Hyacinthe. In paper bag manufacturing, there are eleven small factories in Montréal and some other in Outremont, St. Michel, Montréal-Nord, Ste. Thérèse. The largest company, that is St. Regis Consolidated Packaging, owns a factory in St. Lambert and another in St. Laurent.

In asphalt roofing manufacturing, three companies share half of the Montréal market: Barrett Co. Ltd., Building Products Ltd. in Lasalle and Murray-Brantford in Lachine. Among the 44 paper converters in the Region, Kimberly-Clark in St. Hyacinthe and Appleford Paper Products Ltd. in Montréal are the two largest factories turning out a variety of products like waxed paper, paper-napkins and towels, typewriter paper, etc.

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PRINTING, PUBLISHING AND ALLIED INDUSTRIES

The above trade includes several closely related industries: printing and publishing; printing and bookbinding; lithographing; engraving; stereotyping and electrotyping; and trade composition. Altogether 3,200 establishments were classed in the printing trade in 1961, of which 539 were in the Montréal metropolitan area, that is 17 per cent. Total labor force amounted to 74,000 persons, of which more than 15,000 (20%) were engaged in the metropolitan area. Most of the employees worked in the medium size factories (50-500 persons).

The largest group in the industry with over 350 establishments in the metropolitan area is commercial printing. This profession includes printing, bookbinding and lithography. The largest commercial printers are Ronalds Federated, Montréal Lithographing and Office Affiliated Services, Southam Printing in Montréal and Harpell's in Ste. Anne-de-Bellevue.

The second largest group in the industry is printing and publishing. There are 15 important companies in the country, of which 10 have more than 500 persons. These are the printers and publishers of newspapers and periodicals. Montréal has three: La Presse, Gazette Printing, Montréal Star. There are 20 more in the metropolitan area which are less significant and much smaller establishments than the ones above.

Some 100 companies of varying size are engaged in publishing only. The Bell Telephone Co. of Canada is the biggest by far.

One has to finally mention the workshops on the field of electrotyping, stereotyping, engraving and photo-engraving. There are 50 in Montréal, of which the biggest ones are: Rapid Grip & Batten Ltd. and Bomac Montréal Ltd.

Printing, publishing and allied industries in Montréal metropolitan area rank fourth among the industrial groups with 24 per cent of the national output.

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METAL INDUSTRIES

One of the important changes made during the past few years in the method of collecting and compiling the returns of the annual survey of manufactures was the adoption of the Revised Standard Industrial Classification in setting up the manufacturing statistics for 1960. The iron and steel products and non-ferrous metal products were rearranged into three groups as follows:

a) primary metal industries;

b) metal fabricating (excluding machinery and transportation equipment)

c) machinery industries (excluding electrical machinery)

Statistics of the metal industries for the Montréal metropolitan area were compiled according to the old classification, and information for Canada according to the new. Therefore, the metal industry, as a whole, had to be reviewed without the subdivisions suggested in the Standard Industrial Classification.

The combined metal industry ranks first in both value of production and number of people engaged in its manufacturing activities. Province of Québec takes 27 per cent of both the total labor force in the industry and value of production while the Montréal metropolitan area shares these national figures in 15 per cent.

Primary metal industry includes iron and steel mills, iron foundries, smelting and refinery, and metal rolling. Thirty-two factories in a total of 418 employ 3/4 of the labor force and produce 80 per cent of the total output. Ontario has been the stronghold of the primary metal industry, employing 60 per cent of the labor force. Québec is on the move with 24 per cent of the labor force increasing steadily. The biggest company has been the Steel Company of Canada with its head office and plants in Hamilton and a factory in Montréal. The Dominion Steel and Coal Corporation (member of the English Hawker Siddeley group) also has a shop in Montréal with a capacity of 140,000 tons.

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There are several big companies employing electric furnaces in their method of production. On this field, Montréal and Sorel prevail over Hamilton, Welland and Windsor. The four big factories in Montréal have a total capacity of 330,000 tons. Canadian Steel Wheel and Canadian Steel Foundries are the most important. Both of them belong to the Hawker Siddeley group. There are three more steelworks in the vicinity of Montréal, two in Beauharnois and one in St. Hyacinthe. Until recently, Québec appeared to be situated disadvantageously for iron and steel production. The sources of iron ore and of coal were too far removed from the Province. Discoveries of iron ore in the fifties in the northern part of the Province have removed the first difficulty. The lack of coal may be solved by new processes.

Among the non-ferrous metal products, aluminium stands out as one of Canada's major metallurgical industries. Canada's aluminium reduction industry, second only to that of the U.S.A., is producing some 20 per cent of the world's total. The great bulk of its output, about 85 per cent, is exported. Aluminium Company of Canada (ALCAN) has its head office in Montréal and a number of plants outside the metropolitan area. There is a plant in Beauharnois with a capacity of 38,000 tons and others in Shipshaw, in Kitimat and in Shawinigan.

Noranda Mines, with head office in Toronto, is one of the leading companies engaged mainly in the manufacture of commodities from nickel and copper. Some of the factories are located in the Province of Québec, one of them in Montréal East.

The white metal alloy industry includes firms which manufacture babbitt, solders, type and type-metal. It also includes firms which refine scrap to recover white metals, i.e. lead, tin, and zinc. The most significant is Canada Metal Company in Montréal.

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In the metal fabricating industry, also the small firms can operate because of their ability to manufacture specific custom-built items at competitive prices. The Montréal area is the center for manufacturing containers for many kinds of liquid and powdered products, kitchen pots and pans, equipment for homes and for food processing establishments and also doors, windows, sidings and many other products for the construction industry. There are 7 of the large factories in the metropolitan area, each employing more than 500 persons, and 58 of the medium size establishments employing less. The largest factories are the following: American Can Company of Canada, Continental Can of Canada Ltd., General Steel Wares Ltd., Dominion Bridge Co., Warden King, Weir, F. & R. Ltd., Crane Canada Ltd. One should mention some of the factories in the second category: Robert Mitchell Company Ltd., Accessories Manufacturers Ltd., Dominion Steel and Coal Corporation, Steel Company of Canada, Westeel Products, Alsco, all in Montréal.

The metropolitan area has also become the center of manufacturing heavy industrial machinery. Factories in that area produce the major part of the total output of compressors, water wheels and turbines, pulp and paper machinery, diesel engines and power showels. Firms in the Province of Québec have naturally specialized in serving the basic industries such as mining, pulp and paper and power. Two factories in the area have more than 500 employees, 15 are of medium size and 35 factories employ less than 50 persons. Dominion Engineering, Canadian Allis-Chalmers Ltd. and Royal Typewriter contribute in large extent to the total output in the industry.

The rate at which firms enter an industry is generally governed by the profits of the firms already in the industry. It appears that iron and steel products manufacturers have enjoyed higher profits than other industrial groups. The metal industries in the Province of Québec did, in fact, experience a boom in the fifties and still show an expanding tendency mainly because new sources of raw material have been found within the province.

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TRANSPORTATION EQUIPMENT INDUSTRIES

The major industries in this category are: aircraft and parts, automobiles and other vehicles, railway rolling stock and shipbuilding. Transportation equipment manufacturing provides employment for 110,000 persons in Canada, of which 29 per cent is in the Province of Québec and as much as 24 per cent is in the Montréal area. Among the 687 transportation equipment factories from coast to coast, there are 39 of the largest type which give employment to 73 per cent of the industry's labor force and produce 80 per cent of the total output. Sixteen have even more than 1,500 employees on their payrolls. Montréal metropolitan area is housing 9 of the largest factories.

The Province of Québec has within its border firms of almost every kind of activity necessary to produce aircrafts and missile systems or their components. There is also real estate which is extremely valuable from the point of view of both defence and commercial air transport. This strategic position has brought to Québec and particularly to Montréal, factories engaged in the service, maintenance, repair and overhaul of many of the most advanced aircrafts and engines employed on the international air routes.

Canadair and Noorduyn in St. Laurent employ over 11,000 people. Canadair is a subsidiary of General Dynamics (U.S). Canadian Pratt and Whitney has its plant in Longueuil, Bristol Aero Engines in Montréal Nord. World famous names in the aviation industry with subsidiaries in Montréal include Rolls-Royce, Bristol Aircraft, United Aircraft, and in the related electronic field Bendix, Sperry, R.C.A., Marconi, all from U.S. or England.

A number of Canadian-owned companies in Montréal have also capitalized on the progress of the aviation industry. A Montréal manufacturer contributes hydraulic Canding gears to aircrafts. Another all-Canadian company in the electronic field, Canadian Aviation Electronics produces flight stimulators for fighter and commercial aircrafts.

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As the Province of Québec and especially Montréal has monopolized manufacturing in the aviation industry, Ontario has taken exclusively the automobile industry. It is only since 1961 that automobile manufacturing has expanded outside Ontario to Halifax (Volvo), Ste. Thérèse (General Motors), St. Bruno (Renault).

The railway rolling stock industry includes all firms that are making railway cars and locomotives. The biggest three shops in Montréal belong to the CNR and CPR networks.

Shipbuilding is represented by Canadian Vickers Limited in the Montréal metropolitan area. The factory is engaged in making commercial and naval vessels.

ELECTRICAL PRODUCT INDUSTRIES

This industrial group includes most of the concerns in Canada which manufacture equipment for use in the generation, transmission and utilization of electricity. It includes firms which manufacture batteries, rifrigerators, electrical appliances, heavy electrical machinery, and telecommunication equipment.

Canadian labor force totals 78,000 in 540 establishments. In the Province of Québec, 24,000 (31%) from the total labor force are employed, of which 18,000 (75%) work within the Montréal metropolitan area producing $236 million or 20 per cent of the total Canadian value of production. Bulk of the output of the electrical product industries come from factories giving employment to 50 or more persons. There are 6 factories in the metropolitan area classified within the largest establishments and 20 smaller medium size firms.

Telecommunication equipment is the largest industry in the group. Principal manufacturers in Montréal are Northern Electric and R.C.A. Victor. Alpha Electronic specializes in electronic products, Canadian Aviation Electronics in airborne navigational instruments, and military and commercial radar equipments.

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In the group of small electrical appliances, Electrolux is the most important, in Montréal, manufacturing domestic electric vacuum cleaners and floor polishers. In the group of manufacturers of major appliances, General Electric and Singer Manufacturing are the largest in Montréal and in St. Jean respectively. Main products are electric cooking stoves, dryers, household refrigerators, washing machines. Singer Manufacturing Company specializes for electric sewing machines. Marconi is the leading company in the metropolitan area for making household radio and television receivers. Three-fourth of the output of this group, however, is manufactured in Ontario.

The second largest group in the electrical product industries is composed of firms making electrical industrial equipments, motors, generators, meters and the like. Ontario is housing most of the large factories, Montréal has only one, that is Tamper Ltd. in Lachine. Among the firms manufacturing electric wires and cables, the market is equally divided between Ontario and Québec. The largest firms in Montréal are Northern Electric, Phillips, Universal Wire & Cable, and Pirelli Cables in St. Jean.

Finally, there is a great variety of products in the group named miscellaneous electrical products. A couple of factories have appeared above the average establishments in Montréal such as General Electric and Electrolier making commercial and industrial lighting equipments, lamps and signalling systems. There are 16 of these firms in Montréal City proper. Their increase in number and size has been significant in the last 10 years.

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NON-METALLIC MINERAL PRODUCT INDUSTRIES

The non-metallic mineral product industries include all the firms that turn cement, clay, gypsum, glass, lime, stone, asbestos and abrasives into manufactured products. More than half of the labor force is employed in the medium size firms, that is firms working with 50 to 500 people. There are 29 per cent of the total labor force in the industry employed in the Province, while 18 per cent have found jobs in the Montréal metropolitan area.

The cement manufacturers form the most significant group employing 16,300 persons and producing a value of $305 million annually. The biggest entreprise is Canada Cement, the owner of nine factories, of which the largest is in Montréal, is the third in the overall Canadian ranking with 4 million barrel.

Glass and glass-product manufacturing is the second in importance. It employs 9,000 persons of which 30 per cent is in the Province of Québec. In Montréal, there are three of the largest factories of the kind: Dominion Glass, Consumer Glass, and Canadian Pittsburgh Industries. The industry can satisfy only 2/3 of the demand. Canada has to import glass-products for $60 million.

Clay manufacturing employs 6,400 persons of which 1/4 works in the Province. The important plants in Montréal and in the Region are Cooksville-Laprairie Brick in Laprairie and Canadian Potteries in St. Jean. The abrasive manufacturers are mainly in Ontario.

From the point of view of Montréal, the asbestos product industry has an above-average place among the non-metallic mineral product manufacturers. Factories in the Province employ 1,300 workers of the total 2,000 in Canada. The Canadian Johns-Manville Co. in Ontario is the only asbestos mine which manufactures part of the products (located at Asbestos). Majority of the asbestos manufacturing firms are in the Montréal area, such firms as Atlas Asbestos in the city, Asbestonos Corp. in St. Lambert, Asten-Hill Ltd. in Valleyfield.

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Gypsum product manufacturers make up the smallest group in the industry (1,600 persons). Montréal has only some of the factories: Gypsum Lime and Alabastine Ltd., Canadian Gypsum, Atlantic Gypsum.

Stone and lime manufacturers engage 4,000 persons in Canada mostly in their medium size factories. Production in the metropolitan area is not significant.

PETROLEUM AND COAL PRODUCT INDUSTRIES

The petroleum and coal products industries occupy only 14,500 persons, however, the value of production reaches $1,200 million annually. This is the industry where employees enjoy receiving the highest average salary ($6,000) because almost half of the labor force is in the administrative group.

Montréal, as the largest oil refining center in Canada, accounts for 1/3 of total Canadian capacity. Six companies operate refineries in the Montréal area: B.P., B.A., Petrofina, Imperial Oil, Shell, Texaco. Their combined input capacity is now 100 million barrels of crude oil and the value of their refined products is almost $400 million annually. This is as much as 32 per cent of the total Canadian value of production. There are other establishments in the petroleum and coal industries primarily engaged in manufacturing asphalt and other products. The main enterprise is Flintkote Company in Ville St. Pierre.

CHEMICAL AND CHEMICAL PRODUCTS INDUSTRIES

These industries occupy 54,000 persons in Canada and produce a value over $1,250 million. Most of the plants are in Ontario with 52 per cent of the labor force furnishing 58 per cent of the total production value. Québec has only 37 per cent and 30 per cent respectively. Almost half of the labor force works

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in medium size firms. One-fourth of the total number of establishments and of the labor force are in the Montréal metropolitan area. Each of two big factories gives employment to more than 500 persons. There is also a large number of medium size firms in the area: 45 in Montréal, 2 in McMasterville, 2 in Valleyfield, 1 in St. Jean and also in Beauharnois.

One-third of the labor force is employed in the most important chemical industrial group, that is the manufacturers of industrial chemicals. These establishments are primarily engaged in manufacturing basic industrial organic or inorganic chemicals such as acids, alkalis, salts, and other compounds. Ontario leads the Provinces in number of factories. Québec ranks second with several firms like Shawinigan Chemicals in Varennes, L'Air Liquide and Liquid Carbonic Canadian Corporation in Montréal.

In the second group, there are those firms which manufacture mostly drugs and medicines. The number of establishments and the labor force are rather evenly divided between the provinces of Québec and Ontario. In the Montréal area, there are Averst McKenna in St. Laurent, Frost Charles Co. in Westmount, Merck Co., and Poulenc Ltd. in Montréal.

Among firms manufacturing paints, varnishes, lacquers, and shellac, Montréal and Toronto together are housing 85 per cent of the establishments. Brandram-Henderson, C.I.L., Canadian Pittsburgh Industries and Sherwin-Williams are in the Montréal area. Six out of twelve Canadian explosive and ammunition manufacturers are in the Montréal region, thus giving the Province of Québec the first place in this group. Canadian Arsenals Ltd. has plants at Nitro in the county of Beauharnois and in St. Paul-l'Ermite. Also C.I.L. has two factories in the area, one is in McMasterville and the other in Montréal. A third factory is owned by C.I.L. outside the Montréal region at Brownsburg in the county of Argenteuil.

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It is the metropolitan area again which has most of the establishments in the next industry. This is composed of all the firms that are engaged in manufacturing syntétic resins in such forms as powders, granules, liquids or single sheets: Monsanto in Lasalle, Reichold Chemicals in Ste. Thérèse and Union Carbide Canada Ltd. in Montréal-East. The majority of soap and cleaning compound manufacturers are in Ontario. Montréal's share is insignificant since the few firms in the area work with less than 100 persons.

Fertilizer manufacturing is rapidly loosing importance. The C.I.L. plant at McMasterville and Canada Packers in Montréal are the biggest in the Province. In the group of "other chemical industries", Dominion Tar & Chemical in Montréal ranks first.

MISCELLANEOUS MANUFACTURING INDUSTRIES

This group is made up of a number of relatively small and unrelated industries. Twenty per cent of the 2,400 establishments and 10,000 persons from the 48,000 strong labor force are in the Montréal metropolitan area.

The most important companies are Sperry Gyroscope in St. Laurent engaged in manufacturing aircraft engine and flight instruments, Cyanamid of Canada in St. Jean making plastic fabrications. Montréal has some of the well known jewellery and silverware manufacturers like Birks, Henry & Sons Ltd. St. Hyacinthe and Ste. Thérèse are famous for Casavant Frères organs and Willis' pianos respectively.

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Montréal metropolitan area has experienced in the last 20 years an industrial expansion unprecedented in the city's urban history. Industrial development is accepted and even encouraged by the municipalities for the sake of their economy. Since Montréal city's proper has become very congested, industries tend to find location for their plants in suburban municipalities in the central west portion and the east end sector of the Island and in the satellite areas, e.g. Ste. Thérèse, Dorion, Valleyfield, St. Bruno, St. Jean.

In the east there is the city of Anjou taking an active part in setting up three industrial parks; on the west and in Ste. Anne land has been set aside for R.C.A. Victor and Shawinigan Chemicals; the research laboratories of Domtar and of Smith-Klein & French have already been in operation in Senneville for some time; Northern Electric plans to build a new factory in Vaudreuil; General Motors' plant in Ste. Thérèse is now completed; St. Bruno has been accepted for the new Renault-Peugeot factory. Heavy industries that require water transportation for their operation find the South Shore, along the St. Lawrence River, the most convenient place for establishing new factories. That area is ideally situated "down-wind, down-stream" from Montréal and provides easy access to the Metropolis.

The evolution of planned industrial districts as recent phenomenon of suburban development brings forth further decentralization of industrial location at the regional level. Some of the industrial parks are described in the following section*.

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* Extracts are from the Montréal Real Estate and Business Review, published in 1965 by the Montréal Real Estate Board.

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Parkway Industrial Park (Anjou)

Year started: 1963

Size: 150 acres

Major industries: John M. Brocklesby Transport Ltd.

Canadian Salt Co.

St. Louis Bedding

Consolidated Carpet Mfg. Co.

Grenache Dairies Inc.

This development at the juncture of the Trans-Canada Highway and Montréal's Metropolitan Boulevard caters mainly to light manufacturing as well as service and primary industry. Labour is drawn from the neighbouring communities of Rosemount, Montréal-North, St. Michel, Montréal-East, as well as Anjou.

Pointe-Claire Industrial Park

Year started: 1956

Size: 1,400 acres

Major industries: Proctor & Gamble

Avon Products

General Motors

Chrysler Corporation

Electrolux (Canada) Ltd.

This development caters to light, clean industry and warehousing. A research area is growing within the park. The 80 acre Fairview Shopping Center is located within the park area.

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Dorval (Trans-Canada Highway)

Year started: 1964

Size: 2,000 acres

Major industries: CIBA Co. Ltd.

Sandos (Canada) Ltd.

Kingsway Transport

Altas Corporation

Chrysler Corporation

Dorval has a number of industrial areas which are well developed, but the main new area lies in the southeast quadrant of Sources Road and the Trnas-Canada Highway.

Chomedey Industrial Park

Year started: 1962

Size: 1,000 acres

Major industries: Marshal Steel

Perkins Paper Products

Puretest Dairy Ltd.

Ontario Building Materials

Caristrap Corporation

There are 31 industries presently located in Chomedey with approximately $6,000,000 invested in buildings and employing some 1,000 persons. Most of the industries are engaged in some form of manufacturing.

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Jacques Cartier Industrial Park

Year started: 1964

Size: 60 acres (initial development)

Major industries: Kimberly-Clark of Canada Ltd.

St. Lawrence Cement Ltd.

Spancrete Ltd.

Sico Paint Ltd.

Ferro Metal Ltd.

Candiac Industrial Park

Year started: 1958

Size: 500 acres

Major industries: Iroquois Glass Ltd.

Houghco Products (Div. International Harvester)

Fiberglass of Canada Ltd.

Bristol Laboratories of Canada Ltd.

Southam Printing Co. Ltd.

Contrecoeur (Industrial Port)

Industrial development was started by the building of an iron ore wharf in 1950 by the Iron Ore Company of Canada Ltd. Since that date, over 2,000 acres of land have been sold for the development of a major steel complex by the following companies:

Steel Company of Canada Ltd.

Dominion Steel & Coal Corporation

Dominion Tar & Chemical Co.

Canadian Liquid Air Ltd.

An industrial park of some 2,000 acres has been set aside for secondary industries by private developers.

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Varennes (Industrial Port)

Industrial development was started in 1950 with the building of several chemical plants, and the area is now developing into a petro-chemical complex. Principal industries to date are:

British American Oil Company

Shawinigan Chemicals Ltd.

St. Maurice Chemicals

Electric Reduction Company of Canada

Canadian Titanium Pigments Ltd.

Canadian Hoechst Ltd.

Plans are under way for the building of extensive docks in the area to handle oil and raw material in bulk.

Beauharnois

5,000,000 square feet industrial park, fed by Hydro's 2,200,000 h.p. generating plant, houses

Aluminium Company of Canada

Howard Smith Paper Mills Ltd.

Union Carbide Canada Ltd.

Standard Chemical Ltd., among others.

Since the Province's recent recognition of the importance of industry, it is expected that industrial growth will be maintained and assisted in the metropolitan area.

(Table on next page shows manufacturing establishments in the metropolitan area in relation to Canadian total).

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