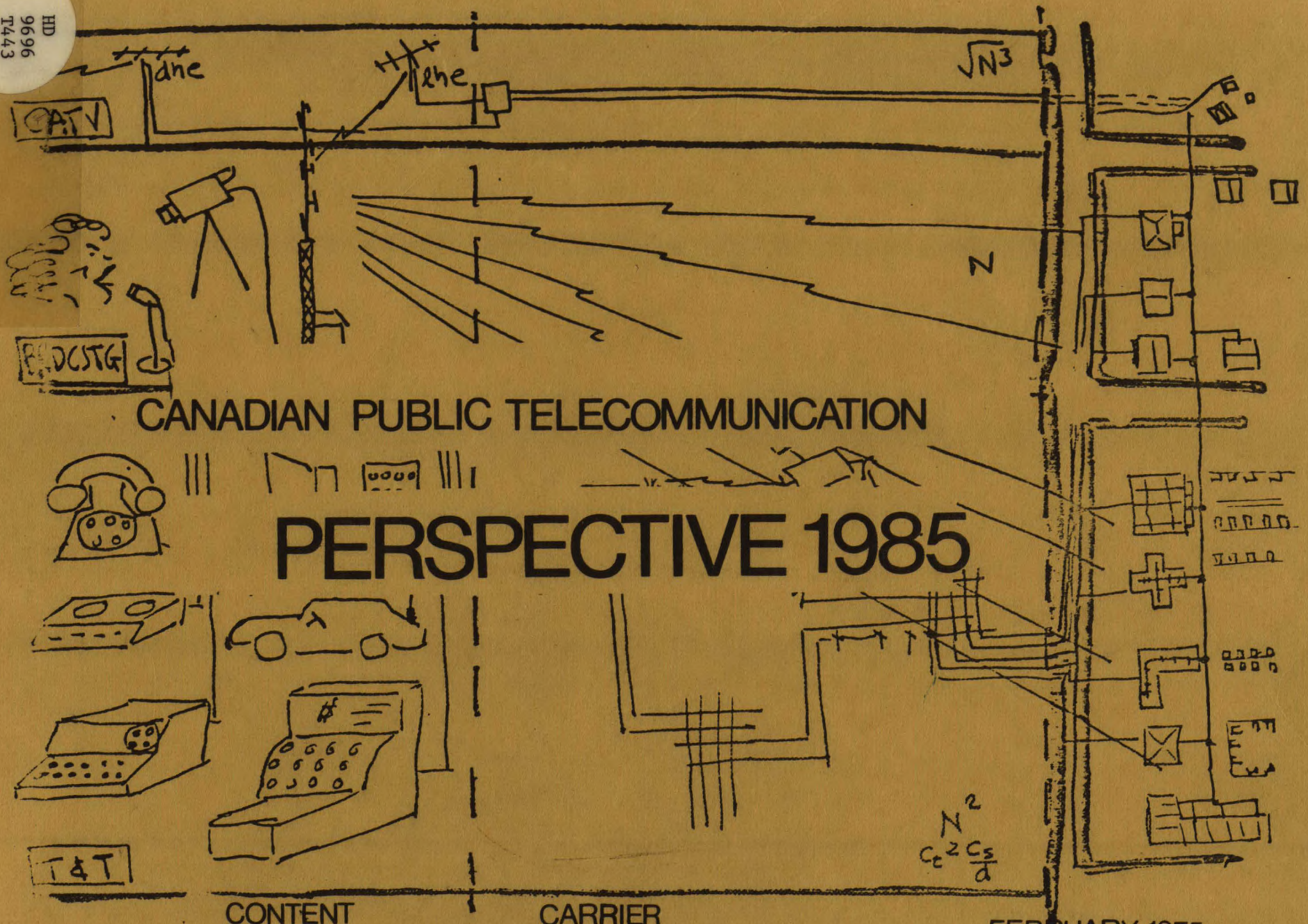


CANADIAN PUBLIC TELECOMMUNICATION

PERSPECTIVE 1985

CONTENT CARRIER

FEBRUARY 1975

NOTE OF TRANSMITTAL

The general interest in the subject of this document, and the continuing program of seminars which have been called for by the branches of the department, have made it necessary to produce and distribute a quantity of copies. This edition has not had the benefit of a review of its tabular data by our statisticians or, indeed, of any critical editorial attention from any other quarter. It is therefore not suitable for other than the intra-departmental dialogue it was designed to stimulate.

It is not the purpose of this remark to cause the document to be locked in safes but to identify it as "think and talk" material which does not articulate any already defined departmental policies.

1 March, 1975

J.W. Halina

CANADIAN PUBLIC TELECOMMUNICATIONS

PERSPECTIVE 1985

FEBRUARY 1975

CONTENTS

PREFACE

The contents of this document made up the substance of a seminar in which a large number of the department's officers participated on February 11, 1975. One of the functions fulfilled by that seminar was to determine the format in which the material might best serve the department's researchers, policy planners and, in general, those activities to whose present orientation long-range options and outcomes are more or less relevant.

It became rapidly evident that any particular directorate of the department views long-range trends in an optic which is different or very different from that of another. For the researcher and equipment developer, for whom the distance between an idea and installed hardware is five to ten years, it is essential to orient himself on an "interception course" with the future. To the individual engaged in developing regulatory guidelines, it is necessary to estimate the degree to which some current trend might diverge from national goals in a year or two, and so on.

Abstraction, condensation and elimination are mandatory in a survey which sets out to cover as much ground as does this one. What particular subject or issue ought to be amplified or eliminated will not be well understood

until a number of additional seminars have been held for special interest groups. The conclusion - in which the ADMs Space and Research, who participated in the meeting, concurred - was that the "hard copy" produced at this time should be of the character of a summary, resemble the oral version and that the tabular material be made easy to grasp in a cursory reading.

The present book is therefore of the nature of an expanded executive summary. The summaries it contains are thus abstracts of abstracts. The body of the report originally planned - together with the source detail from which approximations and generalizations were derived - will be made available during the year on a schedule determined by the needs of individual groups. These will in turn be ascertained during seminars yet to be organized.

The present condensation follows the thematic order of:

I A summary of conclusions in the introduction;

II An assessment of the resources, existing and forseen, of the nation's public telecommunications utilities in financial terms, in chapter I.

III A survey, and a projection of the communications

requirements and expectations of the public in the next decade, in chapter II.

IV Trial linear extrapolations of the evolution of existing structures into the next decade, in chapter III, and

V A listing of government preoccupations and priorities which might arise as a consequence of the "natural" evolution of things, in the last chapter.

The four chapters can be read in that sequence by the reader who has time to go through the whole document; in reverse, if he must restrict himself to a familiarity with the results of the research and may not be able to go beyond the last chapter or two.

It is necessary to reiterate that - in abstracting, condensing, distilling and summarizing - approximations and deletions are de rigueur. Subjective judgements are inevitably made in the course of eliminating or rounding off whatever seems to be of a second order of magnitude or significance. It is then quite easy to arrive at conclusions consciously or inconsciously harboured a priori. It therefore behooves the reader of abstracts to take his own precautions.

This document was produced in a relatively short time and with relatively modest resources. It will nearly certainlay contain errors - particularly in the abstraction of statistical data.

The many charts and tables in this report were designed by Miss Roy who was also responsible for its typing and reproduction.

J.W. Halina

INTRODUCTION AND SUMMARY OF CONCLUSIONS

The principle conclusions of this study are the following:

(A) The three strata of the national telecommunications complex, telegraphy, telephony, broadcasting and cable distribution - implemented at approximately 25 year intervals beginning in the last quarter of the nineteenth century and enduring as distinct institutions into our time - are in the process of infiltrating each others domains. Of the twenty or so major departmental preoccupations in the remaining seventies and the eighties, catalogued in the last chapter, about one-half implicate all four strata and another third concern more than one of them.

(B) The economic and operational imperatives of the public carriers are driving them into diverse forms of integration in the central common-conveyance sector and into separations along the message-medium (cargo-carrier, commodity-conveyance, content-container) and terminal-network boundaries

(C) The defacto but not necessarily dejure restructuring which is in process is oriented in a sense which is precisely tranverse to the historic stratification of the carriers. The scope, complexity and, at times, incomprehensibility of such a large scale transformation would make it desirable that it stretch out over a long period - much of the ten years in the optic of this research - and evolve by non-destructive trial, error, and course correction. This is the best that can be hoped for and, even so, it can not exclude some of the penalties of change - the arrival of new and undisciplined enterprise and the failure of others unabled to adapt.

The following is a sampling of some of the more probable preoccupations of governments foreseen.

- The apparent saturation of the public with the one-way communications of broadcasting. Its search for alternatives is presently focussed on content but probably destined to end up on multi-lateral communications patterns and content.

- The jurisprudential issues in the acquisition

of content produced by other enterprises and its retransmission.

- The place of social costs in assets, liabilities, and profit accounting in the light of the third or more of the nation's disposable human resources which telecommunications engage, actively, passively, or otherwise.

- Coherency, coordination and standardization on the long and serrated boundary between common carriers and conveyers, and the proliferating independant "forwarders" and terminal operators.

- The risks of carrier expansion and consolidations into institutions which become unregulatable by the public and in its interest, and the contrary "surgical" risks of fractionalization.

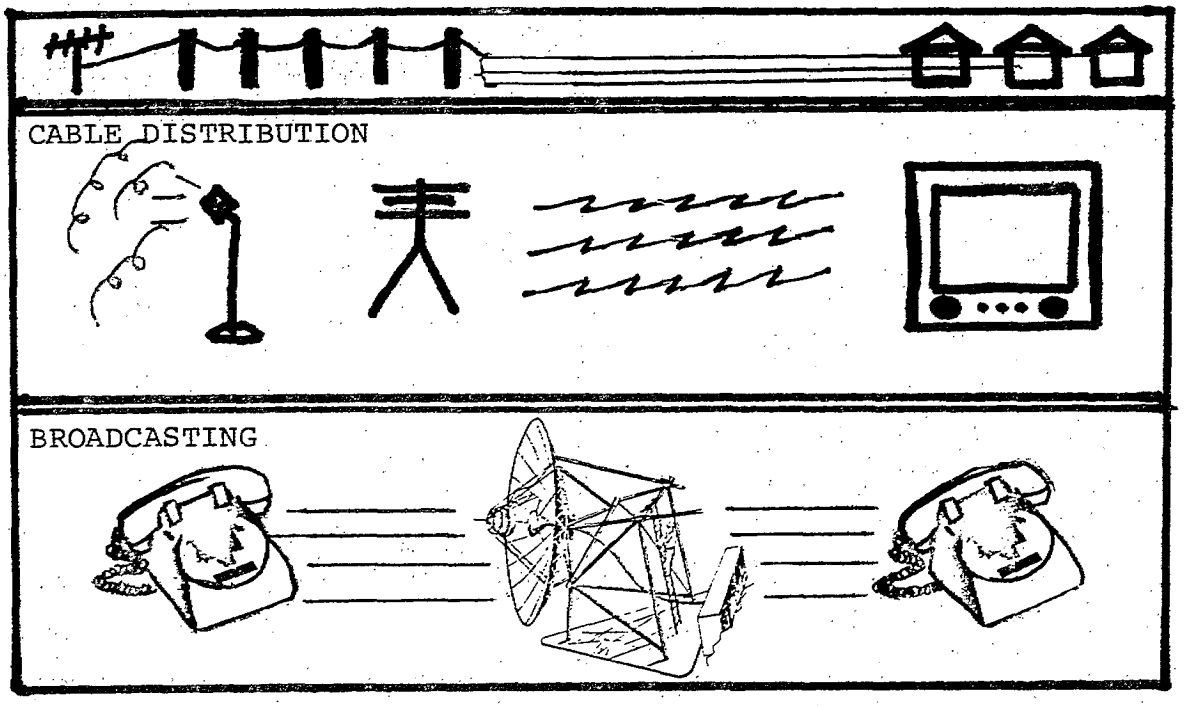
- The evolution of CBC into a principally programming institution and of private broadcasters into a principally consumer promotional industry.

- The development of new and common channelizing, signalling, supervision and control hardware and systems in integrated, multi-commodity networks.

- "Flat", "toll" and "bulk" tariff policies and mechanisms of revenue distribution between programmers, carriers, and subscribers - and a relevant but presently non-existing system of account separations required.

The essential usefulness of long-range assessments of this sort is in the extent to which they reduce some of the disorganizing stresses of change by anticipating them and by stimulating some allocation of resources in advance. That is itself a laborious and time-consuming business in the face of the multitude of priorities left over from yesterday and arising each day. If then, this document can aid the department executives in sorting out some of their priorities and in allocating them in the more or less coherent context of the departments overall priorities, it will have well served its purpose.

**The reader will observe that the exhibits bear apparently arbitrary numbers. This is a consequence of their having been culled from a larger collection of tables and figures, of which only some were required for the body of this report.



I

THE

CARRIERS

CHAPTER I: THE NATIONAL TELECOMMUNICATIONS CARRIERS

Projections Mainly Financial

The vehicles on which Canadian public telecommunications will ride into the future might include some new carrier enterprises not now on the scene. The principal ones will surely be the existing utilities, their present capital and human resources, their ability to borrow money and sell stock and to modify their vocations to needs which will be changing as rapidly and radically as economic and occupational patterns adapt to resource depletion and scarcety. The financial structures and potentials of the carriers - taken here to include the enterprises which carry messages over common facilities for aggregates of private persons, be it one way from studio to household, bilaterally between persons or otherwise - are the subject matter of this chapter.

The aggregate Canadian carrier enterprise is stratified into four principal layers, as much as a consequence of history as of present vocation:

- The telegraph carriers who came into existence in the last quarter of the nineteenth century with and alongside the railroads and

transoceanic shipping routes. Manual keys, "bugs" and sound box telegraphy evolved into telex and some of it was re-christened "data". It is still a principal business of the two Canadian Crown Carriers, CNT and COTC.

- Telephony, born with Alexander Graham Bell, grew into a major industry in the first quarter of this century. With time and blurring boundaries, telephony and telegraphy have spilled into each others "eminent domains" and share "data" as a common market. In parts of this report, the business of the eleven major telephone carriers, the two crown carriers COTC and CNT, and Telesat, will be bundled under the one title of "telephony and telegraphy" or "T&T".

- Radio broadcasting arrived at the turn of the second quarter of this century and evolved into video broadcasting at the turn of the mid-century. It splits into two corporate substrata, that of the private broadcasters and another of roughly equal dimensions, the Canadian Broadcasting Corporation.

- Cable distribution arrived at the turn of the

mid-century, more or less coincidently with television broadcasting.

In terms of numbers of enterprises, telephony and telegraphy are represented by eleven major telephone companies and three crown carriers, radio and television broadcasting by over two hundred and forty enterprises of which about sixty are television broadcasters, cable distribution by over a hundred and thirty companies of which fourteen account for over half of the industry's gross revenues.

Telegraphy, telephony, radio broadcasting, video broadcasting and cable distribution - the four principle strata of the national telecommunications mosaic which arrived at approximately quarter century intervals. We are at the beginning of the last quarter of the twentieth century and there are straws in the wind which harbinger another turning point. What that turning point might be is the subject of our curiousity.

1. Financial Accounts & Accountants

Whether it be to assess them as enterprises in their own rights, or comparatively between themselves or in the context of the national economy, the most ready and understandable language is financial - more particularly the financial language of corporate accountants, revenue departments

and annual financial statements. This is a lexicon which is highly stylized, institutionalized and, rightly or not, at the foundation of business decision making and a good deal of governmental regulation.

As its end product, corporate financial statements produce three projections of their enterprises;

- That of its assets and liabilities, which is to say the balance between what it owns and owes at one particular instant in the year. To the extent that government and corporate rules of the game permit, executives and accountants endeavour to give their companies the best look they can at that point of the year and thus, if anything, a better appearance than at other times.

- A second projection which is in a sense an arithmetic derivative of the first, to wit, that of the flow and movement of goods and services through the enterprises - in other words, its sales and procurements, its revenues and its expenditures.

- And a last one which is an accounting of

capital flows into and out of the enterprise and thus the modification of asset-liability balances between the start and end of the fiscal year.

On the whole, these financial projections produce a good static, dynamic and incremental accounting of capital processes in the enterprise - the accretion and depletion of wealth, amortization, replacement, repair, the accrual and retirement of debt, and so on. On the whole, they also tell little explicitely about human assets, internal or external to the enterprise, and what they do say is not said well. That gap or deficit in commercial financial projections needs to be born in mind and redressed if a balanced and comprehensive economic and social assessment is desired.

2. Assets and Liabilities
(exhibit 7)

The assets and liabilities of the three strata into which public communications are consolidated in exhibit 8, describe these institutions better by their differences than their similarities. The book assets of telephony and telegraphy approximate seven billion dollars, the bulk of which are in fixed telecommunications plant and equipment. Considerably less than ten percent of these belong to the

ASSETS

	T&T		BROADCASTING		CATV	TOTAL
	TCTS	CROWN	PRIV.	CBC		
EQUIPMENT	5,700	500	93	149	121	6,500
TOTAL	6,500	550	292	180	182	7,700
OR APPROXIMATELY	7,000		500		200	8,000
+ TMNL	INCLUDED		3,000			
	7,000		3,500		200	10,000
LIABILITIES						
LT DEBT	3,200		64		74	
DEBT/ASSETS RATIO %	50		23		41	

EXHIBIT 7

sector of telegraphy which had its origins in the preceeding century. Broadcasting, as it is corporatively institutionalized, is represented by a figure which is less than one tenth the size of telephony - one-half billion dollars, about equally divided between the public and the private sectors. In the broader optic of the national economist, that figure represents only a part and in fact a relatively small part, of the nationally utility. The remainder consists of the investments of some ten million private citizens in television sets and radios. If that investment is taken at about five hundred dollars per household at depreciated value, the number is of the order of three billion dollars. In turn, the global assets of the broadcasting industry can then be taken to be of the order of 3.5 billion dollars or about one half of that of the telephone and telegraph sector.

Each of the preceeding two strata are essentially self-contained in the sense that they include everything from "head-to-tail", from the source to the sink. The last and most recently arrived layer is less than one-half the size of broadcasting in its corporate financial definition. Its assets are almost microscopic relative to those of telephony and telegraphy. It is neither autonomous nor self-contained to the extent that its "head-end" is in the domain of the broadcasting industry, its "tail" in the private television set, and an important part of its core is in leased telephone

wires and cables. In view of this position astride the other two strata, one might be rash to judge cable distribution by the relative magnitude of its assets. It could well be playing the role of what chemists call a "catalyst" - that is to say an element of small relative concentration which serves to stimulate radical reactions between larger or much larger ingredients.

Two of the three strata are utilities in the sense that they are primarily engaged in effectively renting pieces or all of their fixed investments. The assets engaged are large relative to annual revenues in contrast to, say, a manufacturing enterprise which sells title to its products outrightly. This is true unconditionally for T&T and cable distribution where the content which flows through the pipelines does not figure in their assets. It is only partly true in the case of broadcasting to the extent that broadcasters are also heavily engaged in manufacturing messages or content and in retrieving their costs from all or some of their public - the CBC from all the public through general taxation, the private industry from most of the public through the prices of goods whose sales it promotes for its commercial clients.

The capital resources engaged by these three operations loom large in the national economy. The ten billion

dollars in book assets of the entire public communications sector is of the order of three percent of the nation's total material assets, as are their gross revenues as a proportion of the gross national product. The mechanisms for such large capital accretions are those of broad stock participation, borrowing and, only exceptionally, the investments of and outright ownership by very wealthy individuals. In telephony, the liability side of the balance sheet shows half of its capital coming from borrowing. Nearly the same proportion is long-term debt in cable distribution. Only in the private sector of broadcasting is reliance on debt of a secondary magnitude. (Foot note: In the broader and terminal inclusive context of broadcasting, it is not improbable that overall indebtedness of broadcast entrepreneurs and private TV set owners is in the fifty percent debt-assets bracket. The industry is so structured that the crucial element of the assets-liabilities equation, the relatively small one of studios and transmitters, is in the sector of corporate enterprise and, there, it is divided in units which are within the scope of un-indebted private ownership.)

The hybrid character of cable distribution is evident in the aggregate trial balances of the industry. It resembles broadcasting, with respect to the magnitude of assets engaged, and T&T with respect to debt.

On the basis of relative size and absolute numbers, the T&T stratum is in a category by itself insofar as its institutional dependance on debt goes and its ability, qualification and facility for sourcing capital through large scale borrowing - and then channelizing or re-channelizing the proceeds - on a scale which might implicate as much as 10% to 15% of the annual national capital formation in a given year. The over-three billion dollars of debt which T&T's fifty percent long-term debt-to-assets ratio represents, corresponds to approximately three hundred dollars for each of its 10 million subscribers. How much it is capable of aggregating per year may be judged better when its sources and applications of funds are examined in section four.

3. Revenues and Expenditures
(exhibit 8)

The assets engaged by each of the three strata of the industry in exhibit 7 were seen to be in the proportion of seven thousand, five hundred and two hundred million dollars for T&T, broadcasting and cable respectively or 90%, 7% and 3% respectively of the total assets of the industry. It might be expected that their respective revenues and expenditures would be of the same relative magnitudes. *That is in fact not the case.* They are shown in exhibit 8 to be roughly two thousand, five hundred and one hundred

	T&T		BROADCASTING		CD	TOTAL
	TCTS	CROWN	PRIV.	CBC		
REVENUES ($ MILLIONS)	1,800	200	280	230	80	2,600
EXPENSES (% OF REV.)			PROG 31	62	3	
DEPRECIATION	20	19	5(10)*	5(17)*	20	
MAINTENANCE	28	41	6	14	21	
MARKETING	6		15	3	6	
A & G	14	13	22	12	21	
INCOME TAX	9	7	9		10	
NET INCOME	12	19	10		11	
INTEREST	11	2	2	4	8	

* IF CALCULATED ON BASE OF NON-PROGRAMMING EXPENSES

EXHIBIT 8

	T&T	BROADCASTING	CD
ASSETS % OF TOTAL	90	7	3
REVENUES % OF TOTAL	77	20	3
APPROXIMATE RATIO REVENUE/ASSETS	25%	100%	50%

	TCTS	CROWN	PRIVATE	CBC	CATV
RATIO OF REVENUE (LESS PROGRAMMING EXPENSES) TO ASSETS	26	31	66	48	43

EXHIBIT 8(A)

millions respectively or in the ratio of 77%, 20% and 3%. The resulting revenue-to-assets ratios are of the order of 25%, 100% and 50% respectively. These relationships are summarized in exhibit 8(A) in rounded off numbers in the first three rows and in more precise percentages in the last row in which the revenues of CTV, CBC and CATV were adjusted to eliminate their programming expenses.

In part, these extraordinary differences are accounted for by the content production vocation of broadcasting. The differences are still very large after programming expenses are removed from the broadcasting column. These differences are plainly evident in the last row of exhibit 8(A). CBC and the CATV industry accrue annual revenues equal to about half the assets they engage; private broadcasting over two-thirds; and T&T at the bottom with about one-quarter. The remaining explanation is to be found in the expense break-downs in the lower part of exhibit 8, that is to say the account of the disposition of the revenues these industries perceive.

Three numbers stand out in the private broadcasting column, to wit, the relatively large proportion of revenues which the private broadcaster consecrates to marketing, to administration and management expenses, and to himself or his stock holders in net income. Private broadcasting

emerges as a hard selling, high management cost, high profit business by virtually any business standards. CATV distinguishes itself by its high management and administration outlays and the crown corporations by their high maintenance expenses - presumably on their old wire line plant, mechanical switches and terminal machinery. With two-thirds of its revenue dedicated to programming and, as it turns out by numerical coincidence, two-thirds of all programming outlays of the entire broadcasting industry, CBC emerges as an essentially content production enterprise.

That then is how the national public telecommunications industry accounts for what is about three percent of the gross national product - somewhat frugally in the T&T sector, rather handsomely in the private broadcasting sector, quite "culturally" in the CBC and perhaps perplexingly in CATV.

4. Sources and Applications of Funds

Exhibit 9

The wealth of the telecommunications industries changes from year to year as a consequence of the flows of capital into and out of their enterprises and to one side or the other of their trial balances. In the case of the T&T and private broadcasting sectors, over two-thirds of their funds were sourced from operations. They are both therefore, enterprises

FUNDS	T&T	PR. BROADCASTING	CATV
SOURCES			
% OF TOTAL			
OPERATIONS	62	64	42
LT DEBT	25	22	36
APPLICATIONS			
PLANT	73	21	60
INV.	1.2	21	8
WKG CAP	1.0	10	-6
DEBT	10	17	20
DIV	1.3	18	5

EXHIBIT 9

which are largely sustained by their operations. (In CBC's case, the bulk of its funds are appropriated by Parliament and can be thought of as essentially sourced from "Operations".) In CATV's case alone do operations account for less than half of funds sourced. The "pay-off" is presumably in the future.

In the applications sector, it is noted that both CATV and T&T consecrated the bulk of the funds they sourced on plant additions. They are industries dominated by their plant. Private broadcasting by contrast dedicated a modest proportion of its funds to that end, consecrating a relatively large percentage to investments and dividends and to what would appear to be essentially "rolling over" its debt. Both telephony and telegraphy and CATV were indebting themselves at a rate which was about fifteen percent greater than their rate of debt retirement. It would follow therefore that a large part of the growth of their respective plants was being paid for by borrowing.

There is thus in this exhibit a further confirmation of the financial images projected by the preceeding two views of the industry's finances. The telephone and telegraph and CATV industries need to source a large proportion of thier high capital requirements from the sale of debt. If and when the absolute numbers rise into multitudes of millions of dollars, the nation's principle capital formation reservoirs

- those of life insurance, retirement savings and general savings deposits in banks - must be tapped, and the qualifications of the borrower must then meet the conditions of these categories of institutional investors and lenders. The absolute numbers for funds acquired by telephony and CATV from long term borrowing were of the order of three hundred million dollars and twenty million dollars respectively in 1972. In the ordinary course of events that number will have risen to between three-quarters and one billion per year by the mid-1980s. If it turns out that programs involving hundreds of millions or multiples of billions of dollars are to be undertaken in the decade to come, it is likely that, by consequence of its institutional mechanisms, and ability to borrow on a large scale, the T&T sector would have to play a key part. It is a wide open question as to whether the CATV industry will be able to boot-strap itself up to that status. As for private broadcasting, it has apparently not needed to "cultivate the art of borrowing"on any large scale or to practice it.

5. The "Average" Enterprise

In seeking mechanisms for reducing complex aggregates to intellectually tractable proportions, one often resorts to averages - average company, average Canadian, average something or other. In doing so, it is first necessary to average

amongst comparables and then to keep in mind, that, even so, the resulting average may correspond to no actual company or person.

Before averaging amongst the companies in the three strata, two "garganthua" - Bell Canada in the telephone sector, and CBC in broadcasting - were eleiminated. Each of these accounts for half or more of its respective industry's business. Although disparities between companies are wide in cable distribution (-ten percent of the enterprises account for over one-half of the assets-) no similar eliminations were made. Lastly, and for relevant comparative purposes, the broadcasting averages are restricted to the TV enterprises.

The resulting "average" enterprises are represented in exhibit 10. They do serve to emphasize some essential and representative parameters of their respective industries. The following are amongst the more remarkable;

- It is noted again that the T&T enterprise is highly capital intensive with book assets of one hundred thousand dollars per employee, and about two times that number for an employee added at the present time. The number for cable distribution is one-half that size but its fixed plant and investments are rising rapidly as CATV

THE "AVERAGE" ENTERPRISE

	T&T (NON-BELL)	CATV	TV BROADCASTING PRIVATE
FIXED ASSETS - MILLIONS	300	1.3	2
REVENUES - MILLIONS (GROWTH RATE IN %)	70 (8)	.6 (25)	2.5 (5)
DEBT - MILLIONS (DEBT-ASSETS %)	150 (50)	.5 (40)	.4 (20)
GROSS RETURN ON ASSETS %	8	13	16
ASSETS/EMPLOYEE	100,000	50,000	25,000
SUBSCRIBERS (THOUSANDS)	400	12	100
FIXED PLANT/SUBS. AT COST	750	110	20
DEPREC.	550	75	10
INV./SUBSCRIBER ADDED	1,500	RISING RAPIDLY	NEGLIGIBLE TO COMPANY
REV./SUB.	175	60	25
PROGRAMMING EXP	NIL	25,000	750,000
A & G - MARKETING	1 MILLION	75,000	800,000
	(20)	(1.5)	(16)
SOURCES OF REVENUE	CALLERS AND CALLED EQUALLY	CALLED ONLY	CALLER ONLY
FROM OPERATIONS	60	40	65

EXHIBIT 10

extends to less denselly populated communities and invests in longer "drops". Telecommunications share with computers the center of the automation stage. *They are also rapidly "capitalizing" their own way out of reliance on labour.* Thus, contrary to theories held at the dawn of this post-industrial era, automation would not appear to be creating within its own domains, jobs it eliminates elsewhere.

- The investment per subscriber added in T&T is a high fifteen hundred dollars. It is relatively high and going up in CATV; and neglibibly small or nothing on the part of the broadcaster. We have noted before that high investments do exist in broadcasting but they have been institutionalized as the private burden of the "subscriber" rather than that of the metropolitan TV broadcasting corporation. On the other hand, if the one or five hundred dollar subscriber investment in television sets were added to those of CATV, the resultant figure for investment per subscriber would resemble the corresponding number for fixed plant at depreciated value in telephony. *The two "wired villages" - one for voice, the other for video*

- therefore implicate two sets of investments of comparable magnitude.

- For an industry whose stock in trade is the diversity of channels and programs it can offer the subscriber, content is only a token element of cost for the average CATV company. It is appreciated that the bulk of CATV's programs attractions come by off-air capture of US broadcasts. *However, any technical, legal or diplomatic development which disturbed that extraordinarily favourable circumstance, would plunge the cable industry into a deep and possibly insoluble financial crisis.*

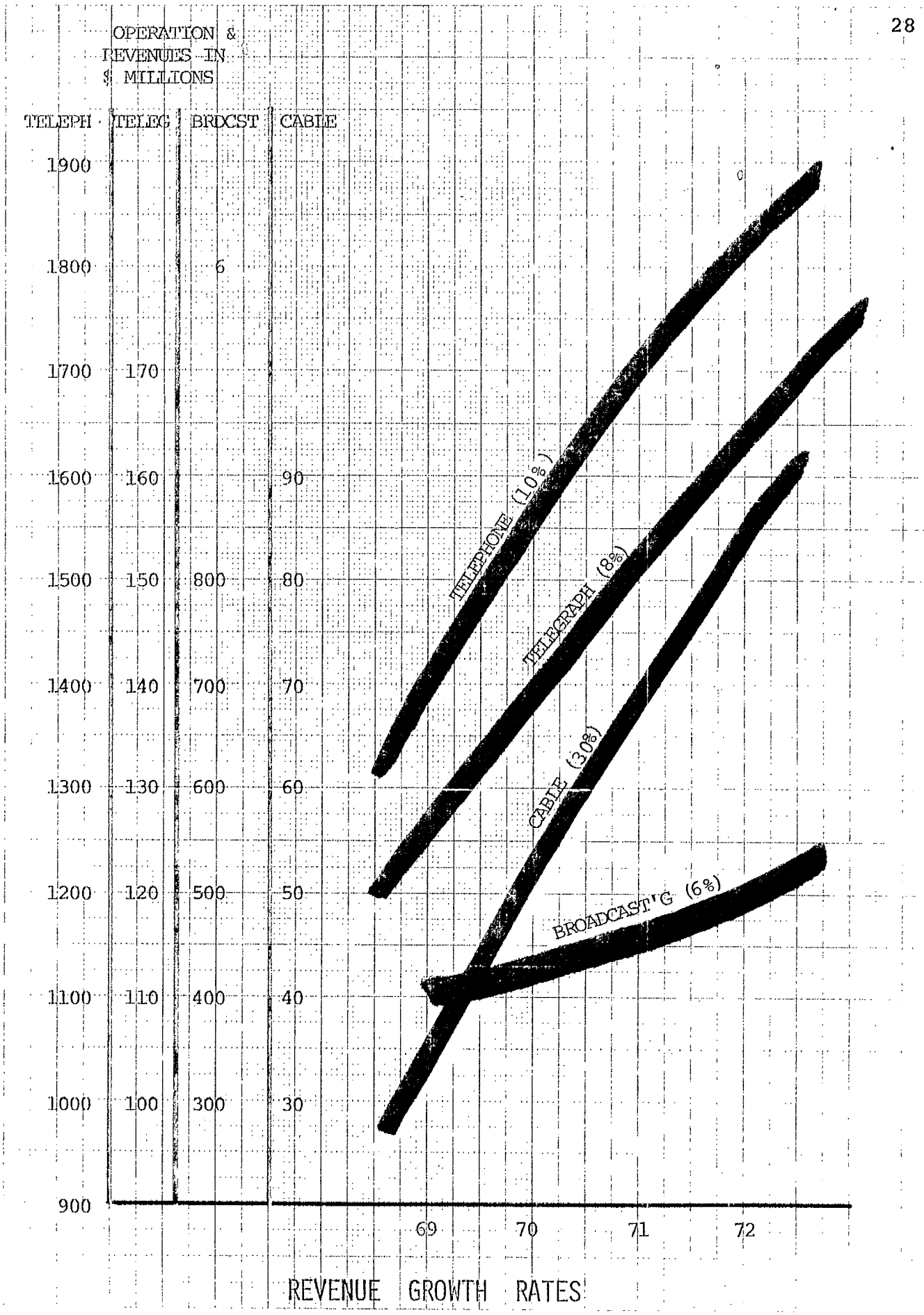
- Although administrative, management and marketing expenses in cable distribution and private broadcasting were seen to be unusually high on a total industry basis in exhibit 8, they appear here as equivalent to only one and one-half $25,000 per year executives per company in the cable sector. This is a necessary consequence of the number and size of companies. In the private TV broadcasting sector, where that number was 57 in 1972 and where the average size of a company is considerably larger, the same expense item is equivalent

to sixteen such executives. *How an average private TV broadcasting enterprise, which manages two million dollars worth of fixed assets, also manages to spend eight hundred thousand dollars in administrative and marketing outlays and what public interest it serves in doing so, are questions worthy of further research.*

6. Rates of Change

The three views which the three industry sectors provided of themselves through their 1972 statements of assets and liabilities, of revenues and expenditures and of sources and applications of funds, can now be supplemented by a few of their rate of change parameters. These might in turn indicate the directions in which the industries are heading.

The nine to ten percent growth rates in the revenues of the telephone and telegraph companies for the years 1969 to 1972 displayed in exhibit 13, were judged to be unspectacular but healthy in 1972. In an era of resource scarceties and depletion, and rates of inflation which by themselves exceed numbers like six and eight percent, these statistics more accurately represent enterprises which are keeping their heads above the inflation water level rather than expanding significantly in real terms. The six percent growth rate on the



REVENUE GROWTH RATES

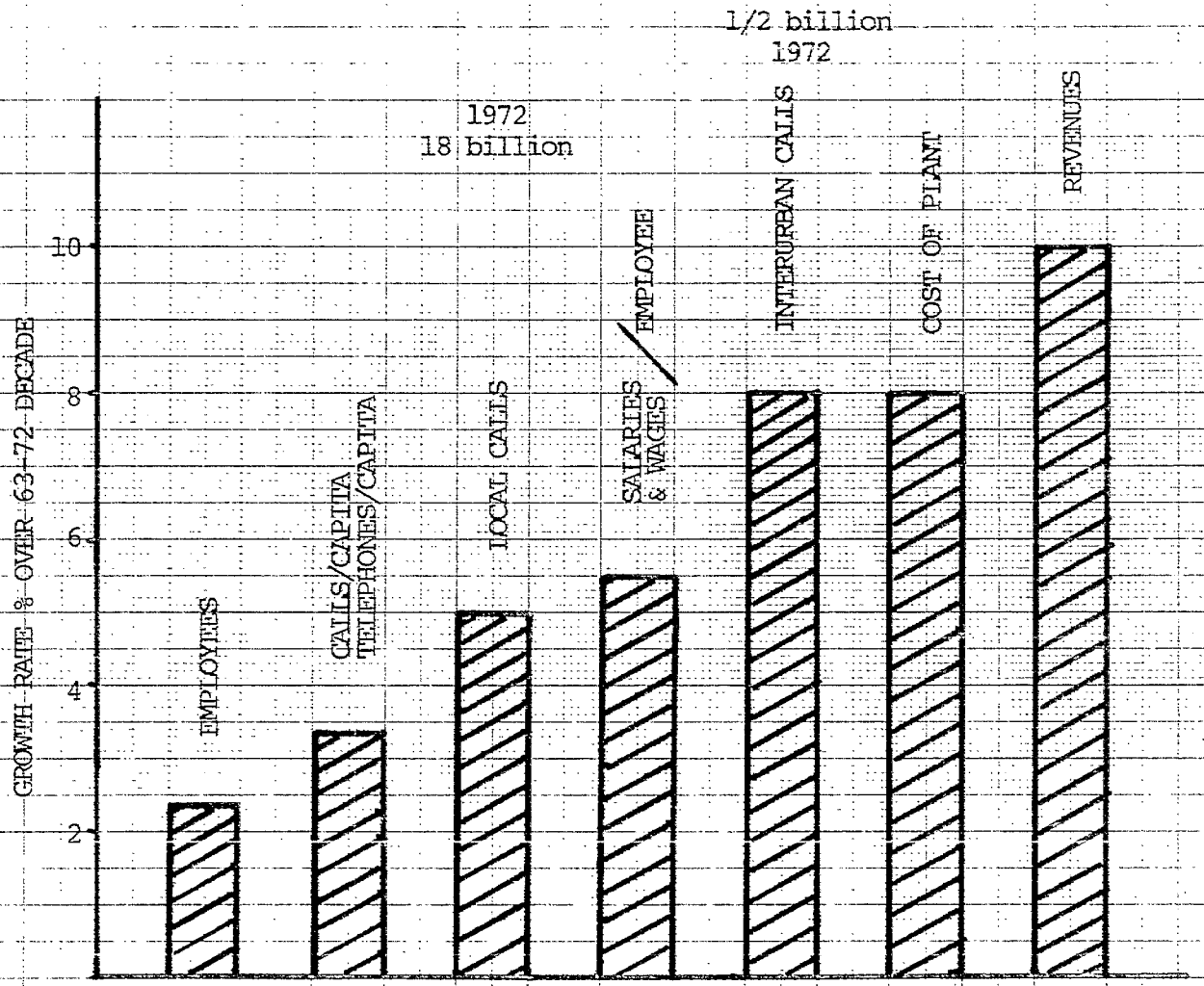
EXHIBIT 13

part of the revenues of the broadcasting industry raises questions about the possibility of market saturation and a business which, profitable as it may be, might be arriving at a levelling point in its growth curve. One datum is surely not enough for such a conclusion. However, it will be interesting to see if other evidence turns up later to corroborate or contradict that hypothesis.

The over twenty-five percent growth rate of CATV's revenues is a phenomena for which one must go far afield to find parallels - the automobile industry in the 20s, the computer industry in the decade after solid state machines were engineered. These are rates of change which have traditionally strained capacities for capital acquisition, for technical adaptation and for management. They generally characterized industries in their periods of initial market penetration, periods marked and followed by failures, acquisitions and general restructuring for the longer term.

The second exhibit (No. 12), focussed on the telephone industry alone, decomposes that industry's growth dynamic into some of its components.

The comparatively low rate of growth in employees compared to plant investment and revenues in the 63-72 decade (2.5%, 8% and 10% respectively), corroborates observations



THE DYNAMICS OF TELEPHONY

SELECTED GROWTH RATES

EXHIBIT 12

already made about capital - labour intensity in exhibit 10. At these relative rates, investment per employee will have doubled relative to present figures within 10 years - to over $200,000.

The relative growth rate of interurban and local calls indicates the changing role of telephone networks as well as the telecommunicating habits of the public. Although toll calls in the interurban communications sector are growing at a significantly faster clip than local calls, they represent only one-half billion of some eighteen billion calls overall. The fact that this small fraction of total calls - about three percent - accounted for nearly fifty percent of the revenues of the telephone industry in 1972, emphasizes the overwhelming role of interurban tolls in company financing and interfinancing and the very critical consequences of tariff policies in this quarter.

7. Summation

As a resource acquisition and deployment machine, the T&T sector emerges from these analyses and projections as one which will be more than doubling its assets in the decade. *If the industry's general management capability is only typical of most other large enterprise, it should be able to manage a two fold greater expansion - provided that that occured*

in the domain of the industry's competence. The annual numbers will thus go from seven billion in 1972 to over fifteen in 1985, and over twenty is well within the scope of the debt and equity placement capabilities of the industry's relatively large units.

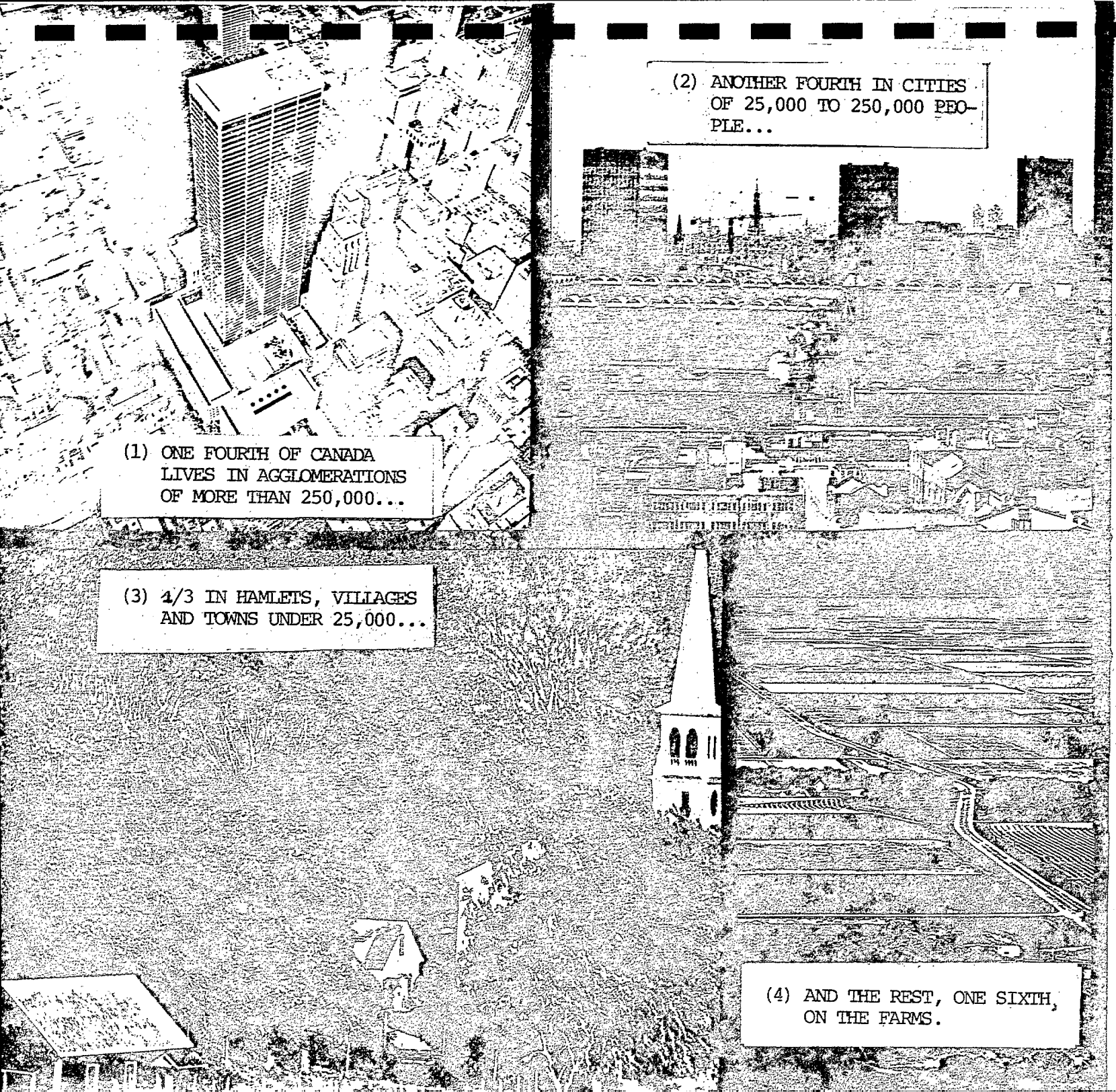
The private TV broadcasting industry emerges as a business which has been a rewarding risk for intermediate scale entrepreneurs. Although its growth prospects are not spectacular, there is nothing in the data to this point to suggest that its returns on assets engaged are likely to be less adequate in the immediate future. The essentially promotional and advertizing arm of the consumer industry that private TV broadcasting is, any moderate economic down-turn could as likely as not accentuate hard-sell consumer persuasion and the industry's advertising revenues.

It is not altogether obvious that CBC, with two-thirds of its revenues consecrated to programming, is properly classifiable as a carrier-conveyer. In 1972, about two-thirds of its fixed plant was composed of its studios and transmitters in the twenty-two major metropolitan agglomerations of Canada. The remaining sixty million was in peripheral transmitters. The accelerated coverage programs initiated in the last two years will add something of the order of twenty-five million dollars to CBC's peripheral transmission

plant and another twenty-five million to its studio investments in the metropolitan centers. In one of his periodic presentations to the government in 1975, and clearly over burdened by hardware preoccupations, CBC's crusading president virtually asked its owners and regulators to let the corporation concentrate on content rather than carriage.

Virtually every index in the financial projections of CATV raises questions about that industry's future course. Its over twenty-five percent growth rate, linearlarly projected into the future, would have the industry tripling its assets to over one-half billion in the next five years and tripling them again to an enormous 1.5 billion in the following five. (It will be seen in the third chapter that a billion is about the investment required to cable eighty-five percent of Canadian households at present prices.) On the other hand, the expendability of its services and its reliance on highly discretionary outlays of its subscribers, the size and stability of its component units, and its vulnerability to any interuption in or interference to its cost-free sourcing of its stock in trade - all these added to the rising investments required for each new subscriber accessed, are a combination of factors which ought to perplex any forecaster. *The inseparable package that they are, they spell out a list of preoccupations for government departments and regulatory agencies for most of the decade.*

A disturbing and possibly explosive phenomenum is well know to have evolved in a corner of the T&T sector of the industry. There is nothing in its financial profiles - or perhaps, more correctly, in the way these profiles are aggregated - to shed any light in that quarter. The reference here is to the terminal area where new attachements consecrated to producing and yielding new services have been proliferating at rates which equal or exceed anything encountered in the preceeding pages. An assessment of their implications for 1985 and the industry as a whole, will therefore have to be attempted by the demand projection mechanics of the next chapter.



II

THE TELECOM-MUNICATORS

CHAPTER II: THE CANADIAN TELECOMMUNICATING PUBLIC

The second half of the communications-communicator equation is the public, its economic, cultural and leasure requirements and expectations from the public telecommunications system. Public demand and public interest are a complex continuity in which economic, social and cultural factors interact. The problem becomes less a question of available information than the one of knowing what information is to be sought out. It is thus necessary to determine at the outset the parameters of the "public" which are relevant to the issues at hand and to delimit the research within some finite boundaries.

The objective of the present exploration is to discern the directions in which the national service complex will be developping structurally, institutionally and commercially within its resource and management constraints. It is therefore required to define those parameters of the carrier complex which are, in the first place, determined by its public, and in the second, determinants of the carriers structural evolution.

The key generating equations of carrier system planning and development are or will be elaborated in greater detail in the appendices and annexes. The following are four

of the more important.

I Subscriber deployment

- The distances between user terminals in their residential aggregations and in turn the distances between centers. All other things being equal, the cost of telephone communications networks is proportional to the sums of distances bridged.

II Interaction patterns

- Unilateral, multi-lateral, bilateral, mixed. All other things being equal, the relationship between a network which connects all the N subscribers of a system for simultaneous, unidirectional, uni-commodity transmission, and one which fully connects all of them for independent bilateral communications, is as N is to N^2.

III -The aggregate volume of traffic and consequently the cross-sectional dimensions of the transmission facility between pairs of points. The unit channel cost of a transmission conduit

declines almost inversely with its aggregate capacity.

IV -The number of remote information terminals to which any one subscriber may require connections and the time for which the connections may need to be maintained.

These determinants translate into the following sorts of questions about the subscribing public.

- Where do Canadians live - locations, sizes of agglomerations, distances between them?

- What are the numbers of channels, circuits, connections required by subscribers in their working and leasure time communications?

- What are the patterns and orientations of their communications, between regions, urban centers, households, and individuals?

To the extent that such questions can be answered quantitatively in the framework of the 1980s, it might be possible to calculate demand and load impacts on the carriers and then to make some judgements about the adaptations of the

one to the other.

1. Demographic Deployments

The 1971 census offers a variety of projections of the national community, two of which make for a useful introduction to Canadian demography.

- Sixty-five percent of Canadians live in metropolitan agglomerations of twenty-five thousand or more people ; the remainder in lesser cities, towns and on farms;

Alternatively,

- Seventy-five percent of Canadians live in communities and agglomerations of residential densities of one thousand or more per mile, another seven or eight percent in communities of densities in the range of one per acre to one thousand per square mile, and seventeen to eighteen percent on farms.

These statistics provide an interesting gross measure of Canada's urbanization and fix Canadan squarely in the ranks of the "developed" and urbanized world. (Although,

Aggl.	Density sq. mi.	% of population	Residence per sq.mi. *	Residence per lin.mi
>250,000	5,000	27	5,000	50-85 av. (75)
25,000 to 250,000	3,500	23	3,500	40-60 av. (50)
2,500 to 25,000	500 (1/acre)	28 35	500	15-35 av. (25)
<2,500	↑ 1/acre t&V 1-10/mi.^{2} ↓	(7) 22 (15)	500 ↑ 1-10 ↓	15-25 ↑ 1-10 ↓ av. (3)

* $\frac{\text{Pop/sq.mile}}{\text{res/sq.mile}} = \frac{\text{pop}}{\text{res}} \times \frac{\text{ttl. area}}{\text{res. area}} = \frac{1}{3 \text{ to } 4} \times \frac{3 \text{ to } 4}{1} \simeq 1$

EXHIBIT 24

definitions differ, the following United Nations data on urban percentages is of some comparative value; Belgium 86%, Sweden 81%, the UK 78% and the US 74%.)

In terms more relevant to telecommunications planning, the afore-going statistics state that more than three-quarters of Canadians live within less than two hundred and fifty feet of each other. (Wiring one to the other with three dunductor 8 gauge copper cable would cost about $1 per foot at going prices).

The breakdown of exhibit 24, which was derived from data of the 1971 census, elaborates this particular aspect in better detail. (The last column of the exhibit is the result of some additional modelling and analysis done in DOC to arrive at estimates of the line density of houses in the residential areas of each of the four categories of agglomerations.)

The implications of exhibit 24 are illustrated in exhibit 20. The hypothesis underlying this exhibit is that, if all of the residents of the entire nation are to be wired with a constant cross-section facility - say cable capable of carrying one program - the cost of such a system would be a linear function of the sum of distances between the houses wired. It is seen that, given the distribution of Canadian

- THE LINEAR ARITHMETIC OF CONSTANT CROSS-SECTION COMMUNICATIONS:

% OF SUBSCRIBERS	RELATIVE DENSITY	RELATIVE DISTRI-BUTING COST
25	75	5
25	50	7
35	25	20
15	3	68
100		100

EXHIBIT 20

households in exhibit 24, *the builder of such a system will have drawn on only 12% of his total capital after having wired the first 50% of households. He would be calling on well over the last two-thirds of his capital to wire the last 15% of households.*

While it is quite true that the cost of wiring cities and farms varies with facilities and technologies available at a particular time, it is nearly certain that whatever these might be, the wiring of the towns, villages and rural residences of Canada will be an economic challenge beyond the reach of modest outlays or conventional approaches.

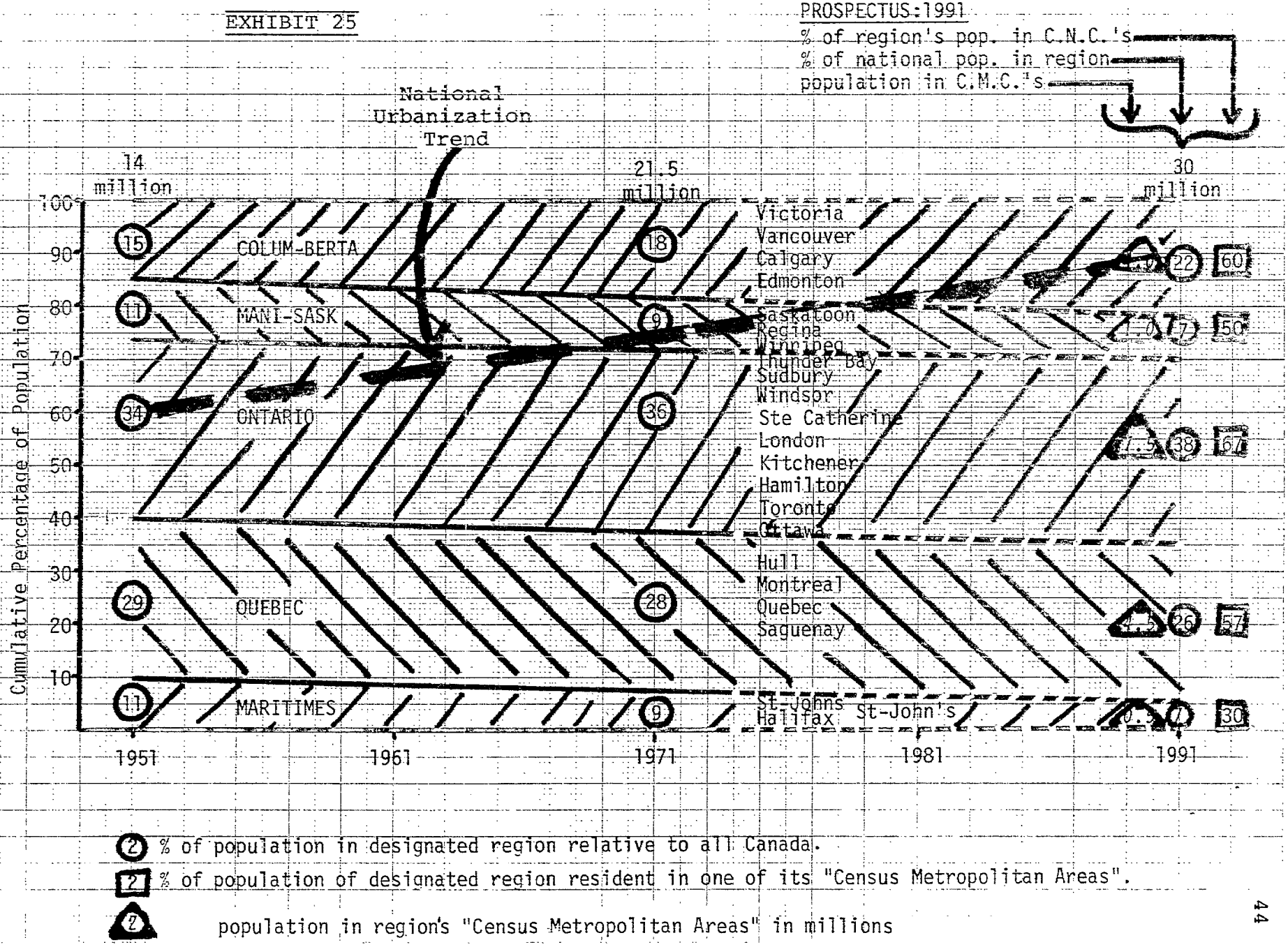
It would be useful to try to foresee demographic deployments in the next decade as between farms, villages, towns, cities and major metropolitan centers.

2. The Regionalization and Urbanization of Canada

Exhibit 25 is a straight line extrapolation to 1990 of relatively straight line trends over the past several decades. Were these trends to in fact materialize, two relatively important changes will have taken place in the national demographic landscape by the late 1980s.

- The population of western Canada will have risen

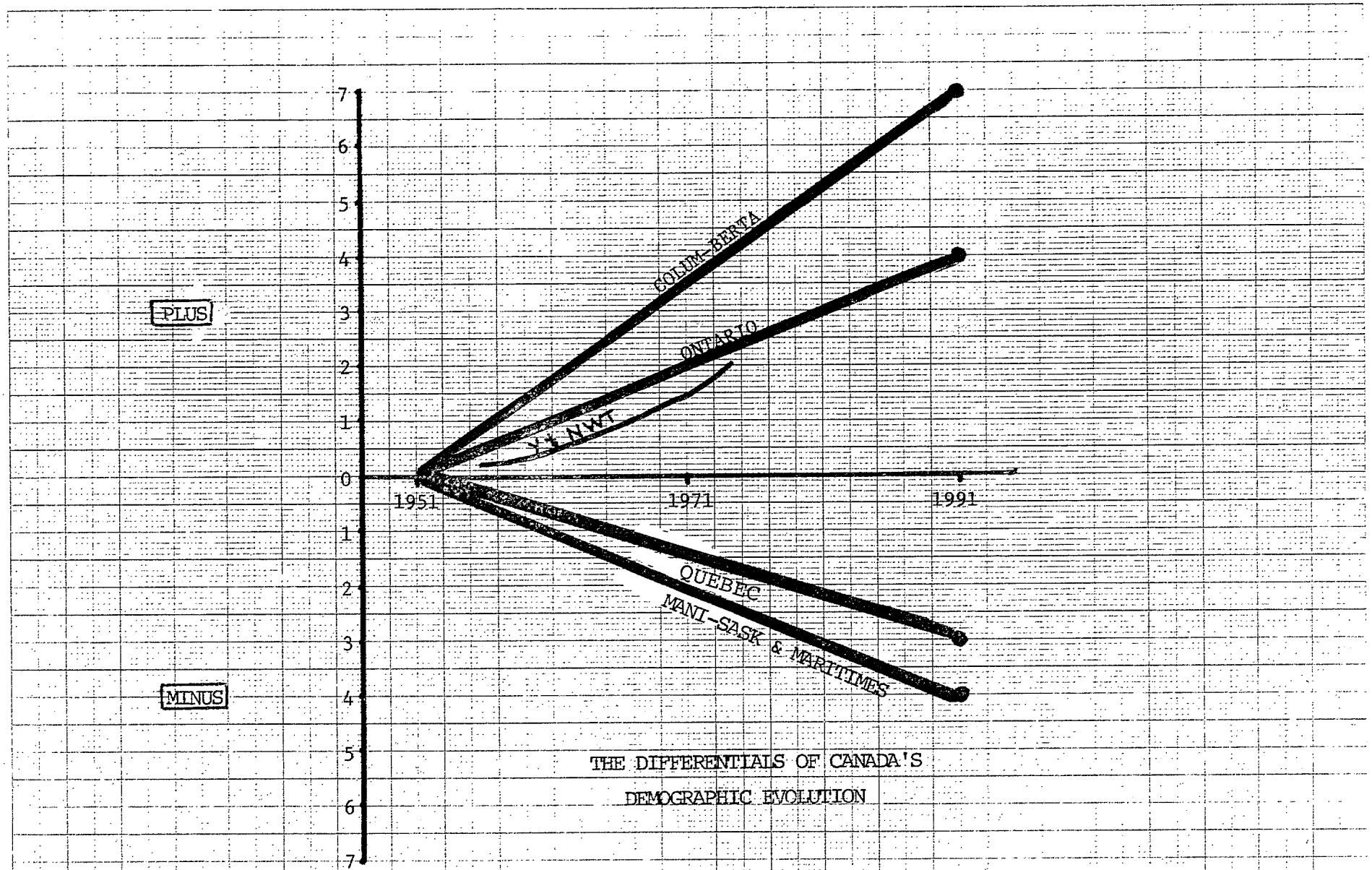
EXHIBIT 25



(2) % of population in designated region relative to all Canada.

[2] % of population of designated region resident in one of its "Census Metropolitan Areas".

<2> population in region's "Census Metropolitan Areas" in millions



THE DIFFERENTIALS OF CANADA'S DEMOGRAPHIC EVOLUTION

EXHIBIT 26

to 30 percent of that of the nation - that is to say to the neighbourhood of ten million out of thirty.

- About sixty percent of the populations of western and central Canada will have been concentrated in the seven major metropolitan centers of the one and the twelve major metropolitan centers of the other.

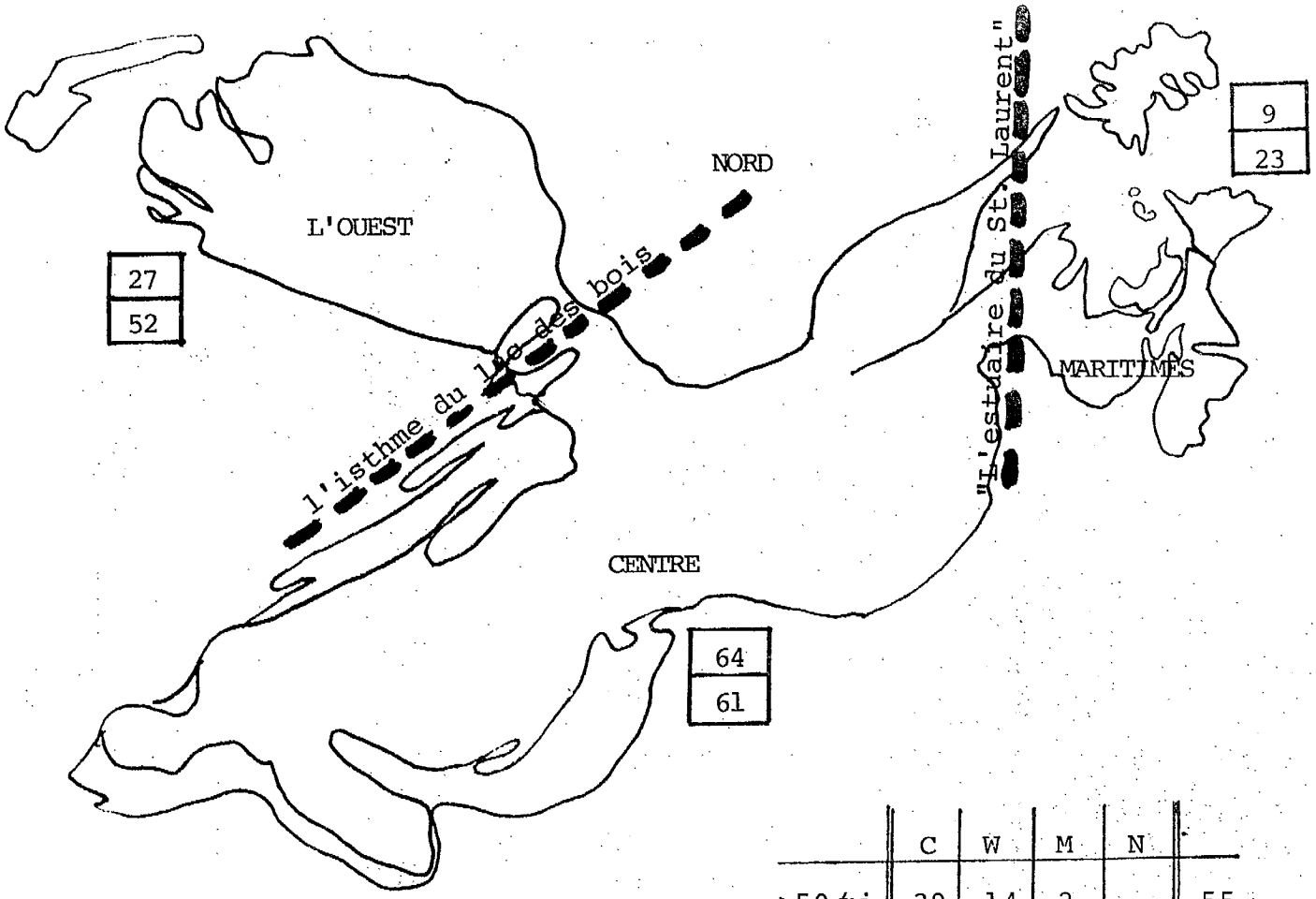
3. Solitudes and High Rise Apartments

Two general observations fall in place at this point, both of them of more than passing concern to policy planners.

The first is that the "Two Solitudes" mystique so dear to Canadian folklore appears certain to endure, albeit in a re-incarnated form. In exhibit 26, the long-term trends buried in exhibit 25 have been amplified to make Canada's demographic bi-polarization more visible. On the whole, central Canada remains demographically stable in its relation to the total population, with Ontario gaining what Quebec loses. But what Manitoba, Saskatchewan and the Maritimes lose statistically, British Columbia and Alberta gain. We are therefore witnessing a redistribution of the national population around two principal poles.

"Two Nations - Two Solitudes"

Versions 1974



	C	W	M	N	
>50/mi	39	14	2		55
<50/mi	25	13	7		45
	64	27	9		100

>50 hh/mile,

(52 X .27 + 61 X .64 + 23 X .09)

≃55%

= % de population Canadienne

= % de population régionale à densité de 50 foyer/mile ou plus

EXHIBIT 27

1980

	CANADA			THE US			THE REST OF THE WORLD		
	W	ONT	QUE/ MAR	US PAC	US SOUTH	US EAST	AUSTRAL-ASIA	EUR & AFRICA	CENTRAL & SOUTH AFRICA
WEST	6,000 / 14%	5,000 / 17%	2,000 / 17%	2,500 / 10%	800 / 17%	1,000 / 20%	250 / 25%	200 / 15%	60 / 25%
ONT	/	/	10,000 / 12%	200 / 12%	400 / 11%	6,000 / 10%	200 / very high	600 / very high	200 / very high
QUE MAR	/	/	2,500 / 12%	250 / 34%	300 / 14%	6,000 / 15%	100	600 / 19%	200 / 13%

LEGEND

xxxx / xx% — No of voice trunks / rate of growth

(xx / %) - principal growth corridors

GLOBAL	MESSAGE	OTHER
DOMESTIC	17,000	14,000
Rate of Growth	14%	14%
US	15,000	9,000
Rate of Growth	12%	7%
OVERSEAS	2,000	100
Rate of Growth	21%	16%

- CATV

EXHIBIT 28

The result is better illustrated in exhibit 27 which is a reproduction of Statistics Canada's 1975 compendium of social statistics. The frontier between the "Two Solitudes - version 1980" will have moved from the Ottawa River to a line that runs approximately vertically from James to Thunder Bay.

Whatever other implications there might be in this development - and there are doubtlessly many - the one for telecommunications is of communications traffic increasing between these two poles with the rhythm of their demographic, commercial and governmental interactions. That traffic will not only intensify rapidly across the unpopulated "Isthmus" between the two "Nations" but between them and others as the circled items of the Canadian carriers' very conservative forecasts in exhibit 28, indicate.

The second observation concerns national demographic goals, philosophies and policies. The 1971 distribution of the national population is shown in the first column of exhibit 31. Two limiting hypotheses about the 1991 distribution are displayed in the columns labelled I and III. I, is the result of accelerating the national urbanization rate of the last ten years. III, is based on a back-to-the-towns and back-to-the-farms movement. While communications may not be the determinant in the national choice between these alternatives

AGGLOMERATION	1971	HYPOTHESES 1991 I	II	III
CMA'S	55	65	60	50
ALL UP TO 100,000	28	25	30	35
RURAL S.D.	17	10	10	15

EXHIBIT 31

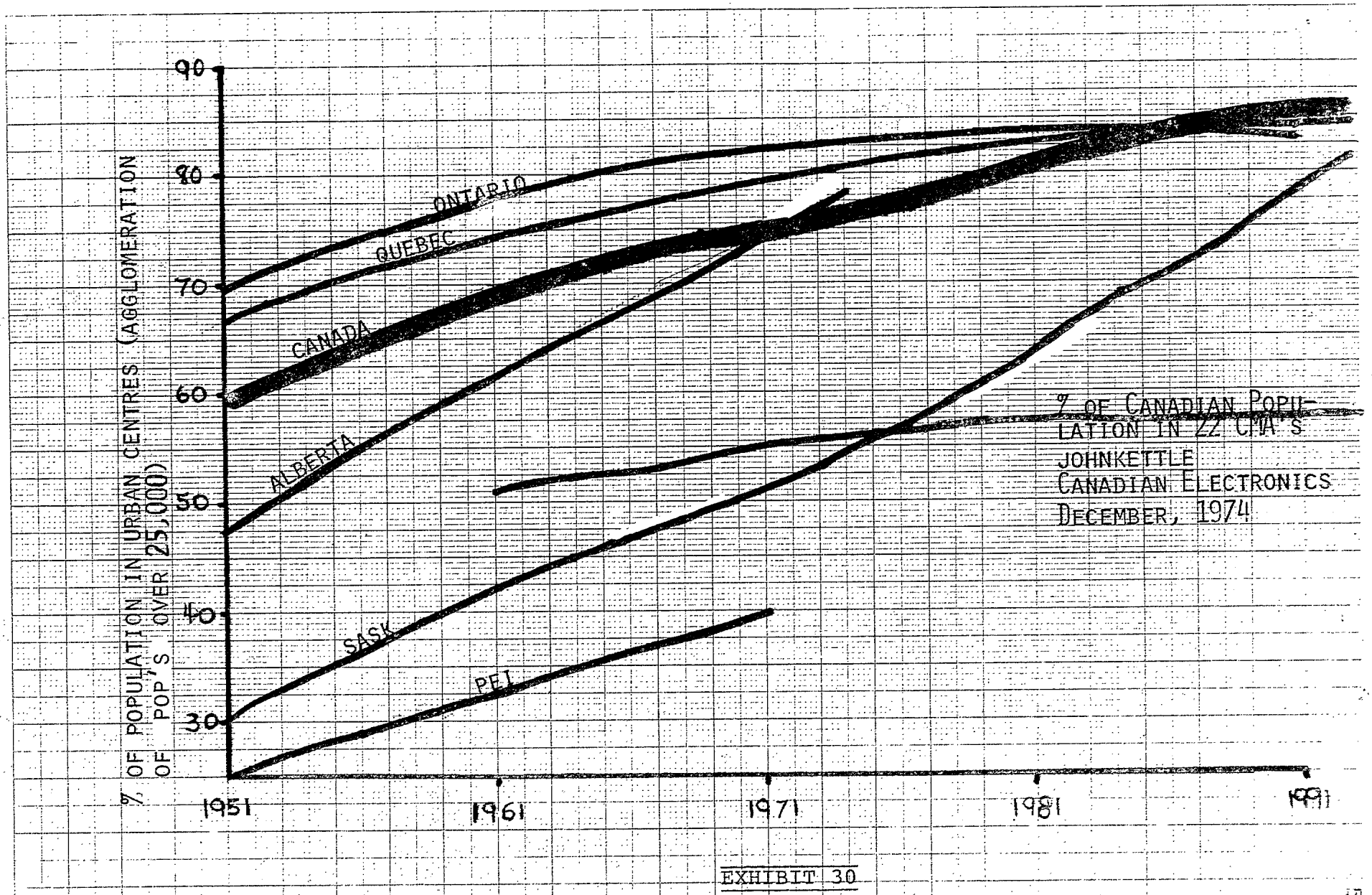

90
80
70
60
50
40
30
% OF POPULATION IN URBAN CENTRES (AGGLOMERATION OF POP'S OVER 25,000)
ONTARIO
QUEBEC
CANADA
ALBERTA
SASK
PEI
1951
1961
1971
1981
1991
% OF CANADIAN POPULATION IN 22 CMA'S
JOHNKETTLE
CANADIAN ELECTRONICS
DECEMBER, 1974

EXHIBIT 30

neither are they a purely passive and reactive factor. The cost and availability of telephone, television and all other sorts of communications services in metropolitan centers relative to those of smaller cities, towns, villages and on the farms, are an urbanization incentive. Interfinancing and tariff policies of governments are decisive in determining cost balances. The graphs and extrapolations of exhibit 30 plainly indicate that over 80 and perhaps over 85 percent of Canada's population could move into its larger towns and cities. No major nation on the planet is 90% urbanized today. But the problems of metropolitan ghettos and their energy equations are being better understood and city lights might be losing some of their charm.

4. Communications (-Cultural but not Necessarily so..)

The next six exhibits (32, 33, 35, 38, 36 and 37) relate to the nation's communicating patterns in the category of diversion, amusement, entertainment, that is to say social as contrasted from economic interactions. Large and increasing proportions of these are broad band video communications. It is therefore essential to keep in mind the many orders of magnitude which distinguish broad-band video from narrow-band voice communications in terms of transmission capacity. A television circuit is equivalent to one thousand telephone circuits. Although the network patterns of video communications

are largely those of one-way one-commodity conveyers and the number of connections provided are of the order of the *square root* of the number of telephone connections, this one-thousand-to-one ratio goes a long way to putting the total capacity of program trunks in the same cross-section category as all of the telephone, telegraph, data and tele-control systems put together. *Any multiplication in the numbers of program channels in the next decade and almost any degree of introduction of multilateral and bilateral audio-video communications, will make this category of traffic the principal determinant of the future evolution of Canadian public communications.* These two perturbations are now nearly certain to occur in the course of the decade.

5. Leisure-time Telecommunications

Exhibits 32 and 33 describe the televiewing patterns of Canadians by location of residence, occupation, education and age. Although regional differences are accentuated in exhibit 32, it is evident that virtually all Canadians in all provinces are reached by television for *some time each week* and between 83 and 88 percent of them are reached on a *daily* basis. (The corresponding *weekly* average in the United States is 97 percent.)

The time consecrated by Canadians to televiewing is,

THE "ISO-SPECTATO-GRAPHIC" TABLEAU OF CANADA

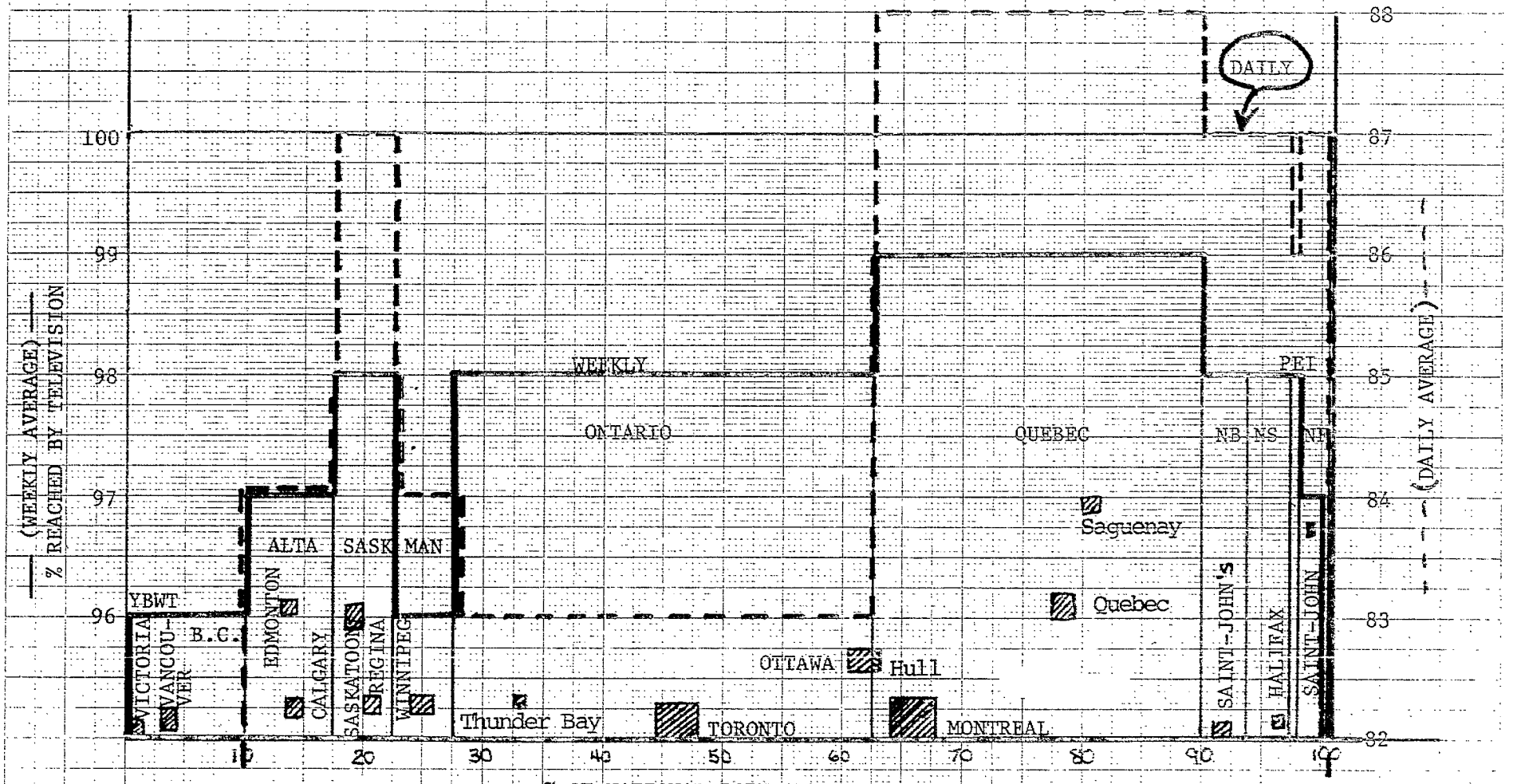


EXHIBIT 32

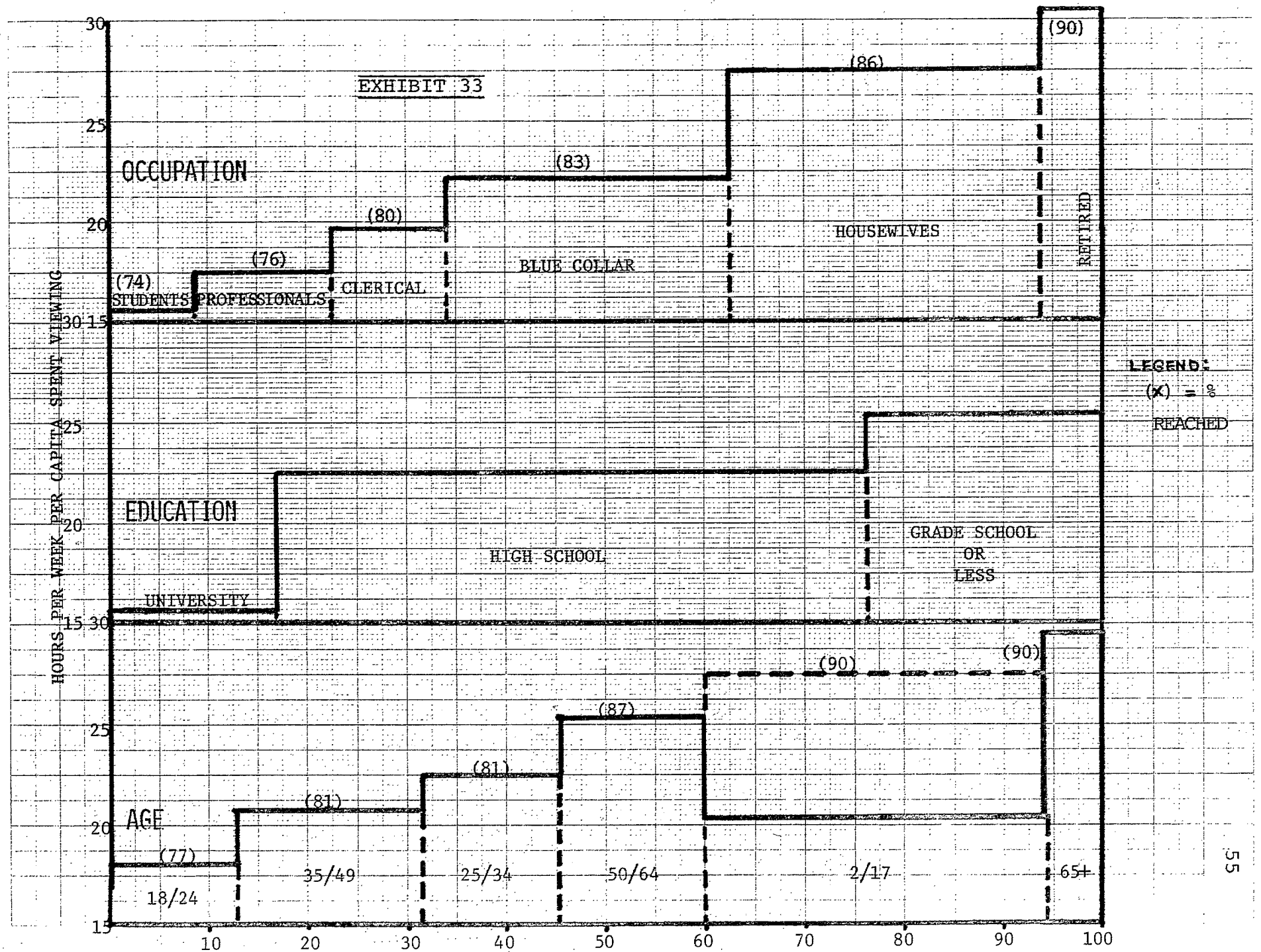


EXHIBIT 33
HOURS PER WEEK PER CAPITA SPENT VIEWING
OCCUPATION
(74)
STUDENTS
(76)
PROFESSIONALS
(80)
CLERICAL
(83)
BLUE COLLAR
(86)
HOUSEWIVES
(90)
RETIRED
EDUCATION
UNIVERSITY
HIGH SCHOOL
GRADE SCHOOL OR LESS
AGE
(77)
18/24
(81)
35/49
(81)
25/34
(87)
50/64
(90)
2/17
(90)
65+
LEGEND:
(X) = %
REACHED
30
25
20
15
10
20
30
40
50
60
70
80
90
100

at nearly four hours per day, well on the way to parity with that dedicated to the imperatives of earning a living. In the case of housewives and the retired, that average is in excess of 27 or 28 hours per week. (The corresponding US averages are 25 hours per week per average adult, 32 hours per week for the average adult female, with the average American adult appearing to be spending somewhat more time than his Canadian counterpart, reading newspapers.)

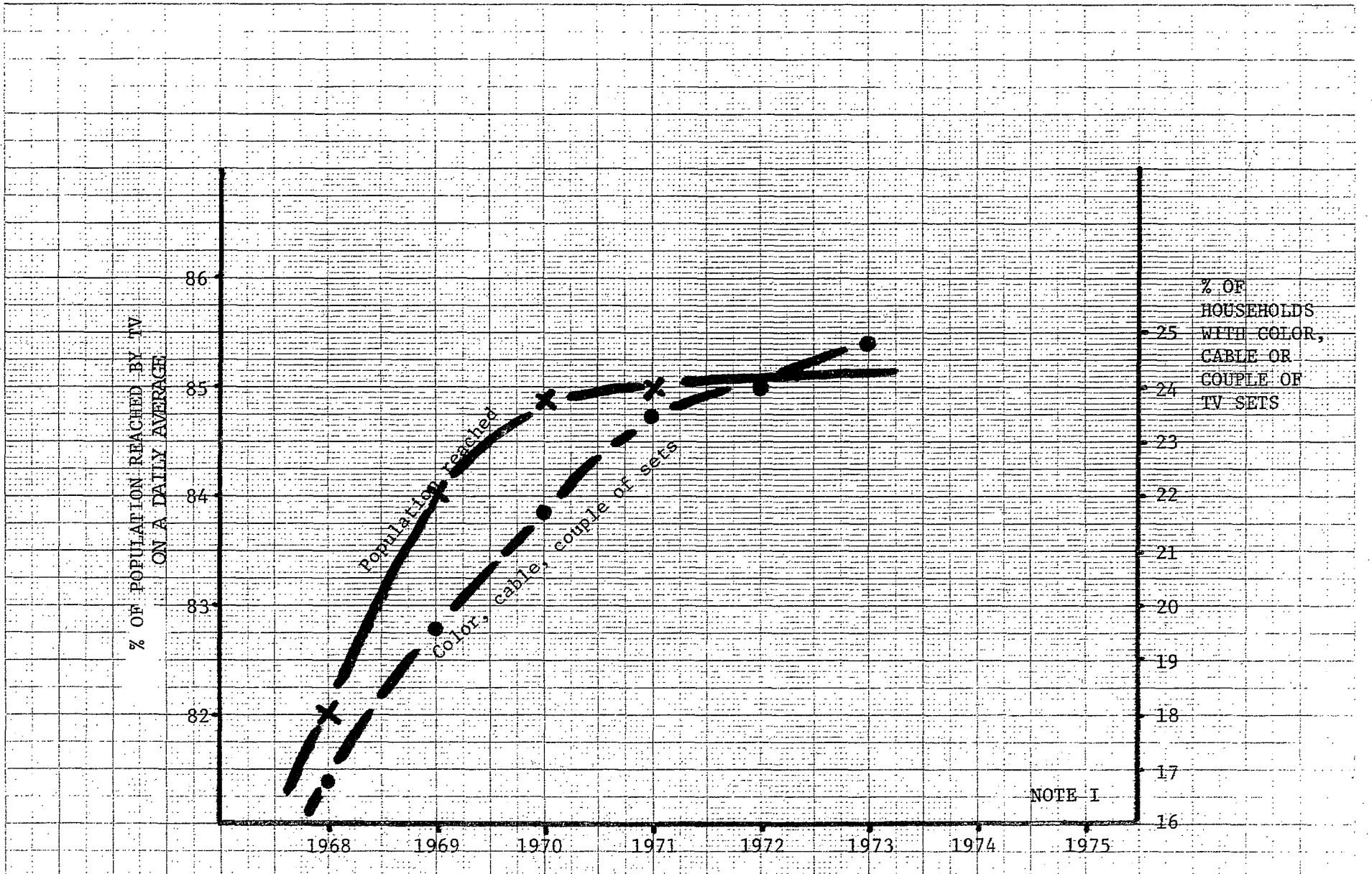
Some future shifts in the deployment of Canadians amongst the categories demarcated in exhibit 33 might be provoqued by

- more housewives moving into the white and blue collar categories.

- a reduction in the two-to-seventeen age group as a consequence of declining natality, and

- possibly, but not probably, an increase in the proportion of the population with high school and university education.

None of these can be forseen to profoundly disturb the average viewing patterns of Canadians in the 1980s. On the other hand, the continuing rise in the category of the



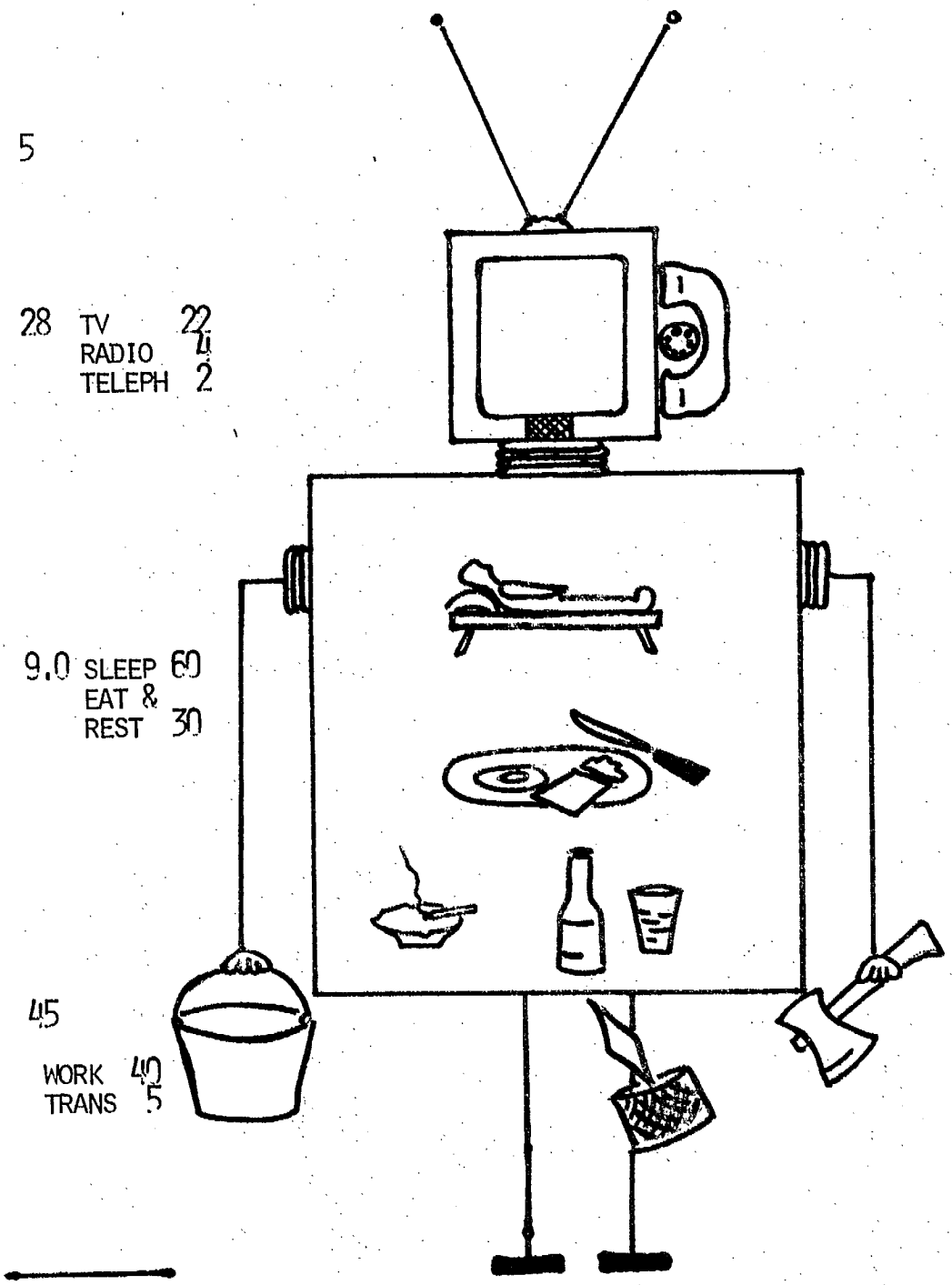
NOTE I: THE AVERAGE PER CAPITA VIEWING TIME OF THE CANADIAN PUBLIC, THROUGHOUT THE SPAN OF THIS GRAPH, WAS ESSENTIALLY STABLE AT 3 3/4 HOURS PER DAY.

retired, be it by early retirement, simple disemployment or the reduction of the work week in the blue collar occupations, cannot be equally lightly brushed off.

It is apparent from exhibit 38 that neither color TV nor cable have broken through the three and three-quarter hour per day ceiling on the average viewing time of Canadians. The judgement of CBC researchers is that this ceiling is probably inpregnable and that more channels, more programs and more stations could only have the affect of subdividing the viewing time and patronage of televiewers amongst themselves.

It is true that viewer statistics show Canadians dividing their time with little discrimination between stations available to them (CBC or CTV or US Networks). Nevertheless, such a prognostication might be minimizing one issue and going by the side of another. The first is that the viewing hours of the retired ar six to eight hours per week greater than the national average. A swelling of these ranks by early and quasi-retirement, by work week reduction and by disemployment, may swell the ranks of heavy viewers - and the side-effects of heavy viewing. (Some social workers in an institution for the retired in Montreal recently reported, with some pride, success in re-teaching some of the inmates the art of conversation!)

The other question is whether one-way communications



5			3%
28	TV	22	16%
	RADIO	4	
	TELEPH	2	
9.0	SLEEP	60	54%
	EAT & REST	30	
45			27%
	WORK	40	
	TRANS	5	
168 HOURS PER WEEK			100%

$\left(\frac{16}{46} = 30\%\right)$

EXHIBIT 36

can fulfill the wants and needs of the over 80 percent of Canadians over two, who are now reached by broadcasting - and to what effect. There is a certain amount of literature on the mutism syndrome amongst the retired and the alienation syndrome amongst the younger viewers and the relation of both to communications in which one cannot talk back to the "sound box". There are equally well, many questions as to the effectiveness of "education" without a reverse channel from the student to the teacher.

The caricature of exhibit 36 is intended to bring these and other questions into relief. If fifty percent of the lifetime of the average Canadian is appropriated under the biological imperatives of nourishment and rest, and twenty-seven percent under the economic imperatives of work and bread wining, nineteen percent remains. Sixteen of the remaining nineteen (-and thus 30 percent of the waking time and deployable energy resources of Canadians over two-) is occupied by televiewing and social telephony. It follows that three to five percent remain for alternative options of skiing, theater going, reading, bricolage, and so on.

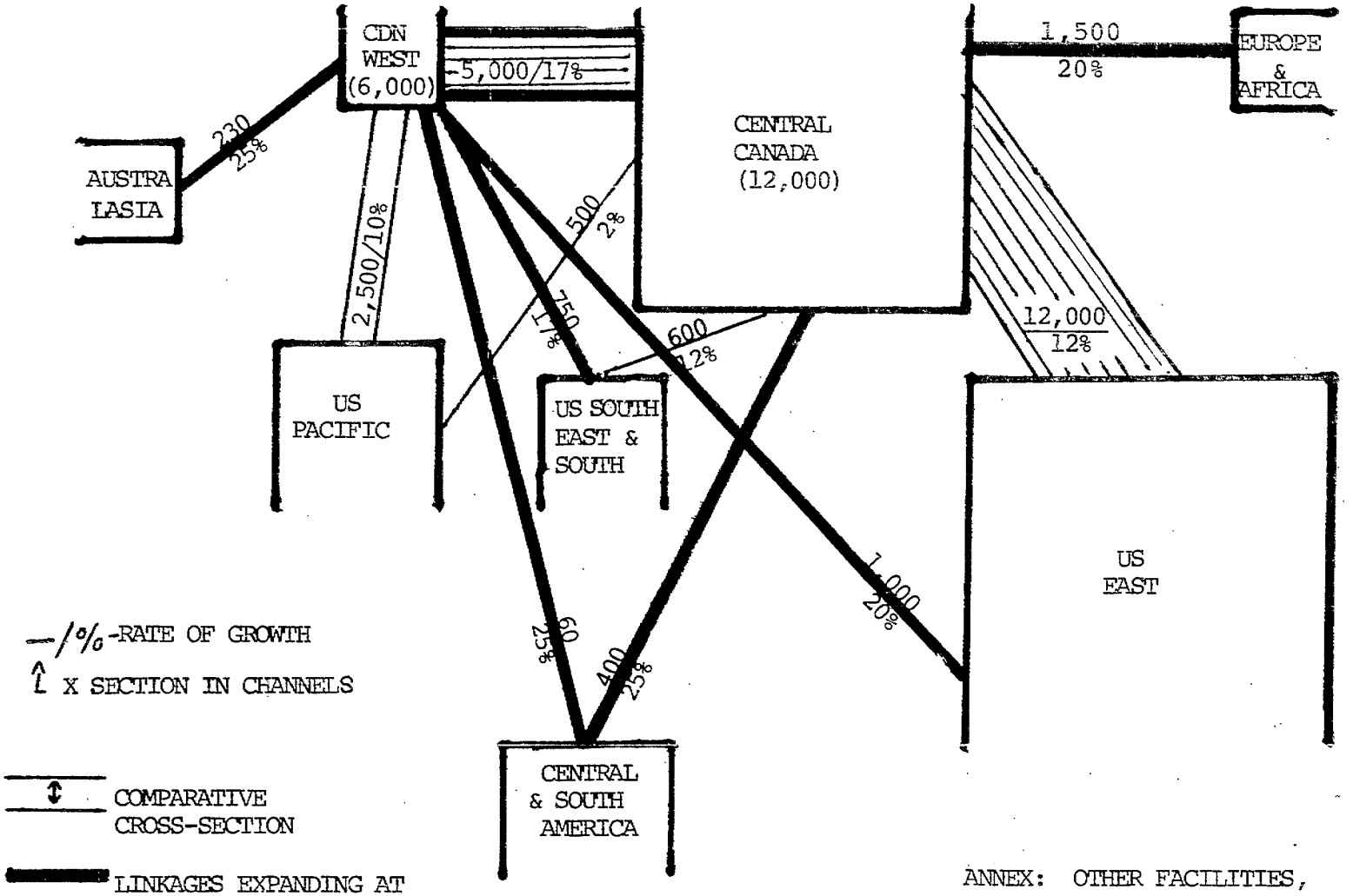
Figures like the preceeding - sixteen percent of total time, thirty percent of discretionary time, and so on - emphasize the limitations of business accounting as a principle basis of policy making. Approximately three percent

of the gross national (material) product is accounted for by telecommunications, with one-third of that by the broadcasting sector. How then are these numbers to be judged with respect to their adequacy, sufficiency or otherwise, in the context of the afore-going and much larger numbers which bear on human resources? People entertaining people is not work which figures in the gross national product or in the expense column of the profit and loss accounts of an enterprise. But, one person entertaining many does. Should then, the investments in, and the cost of facilities for serving one and the other be differently valuated?

6. Business Communications - Interurban

In the sector of communications which can be losely termed "economic" in contrast to the social communications which occupied the preceeding paragraphs, two trends are particularly remarkable. The first and less spectacular is displayed in exhibit 14 which is a graphic version of the table of exhibit 28 in section 3. It concerns the extraordinary growth rate in interurban and inter-regional traffic. In the traditional Central-Canada-Eastern-US corridor, it has been growing at a non-spectacular 12 percent per year. For a nation reliant on world trade to equilibriate its resource in balances, the threshold of remarkability in inter-regional traffic growth rates can be taken at something

MESSAGE FACILITY REQUIREMENTS - 1980



ANNEX: OTHER FACILITIES, PRINCIPALLY WIDE BAND PROGRAM ACTIVITIES - GROWTH RATE 15-25% PER ANNUM

CANADIAN TELECOMMUNICATION CARRIER

FACILITY REQUIREMENT 1980

EXHIBIT 14

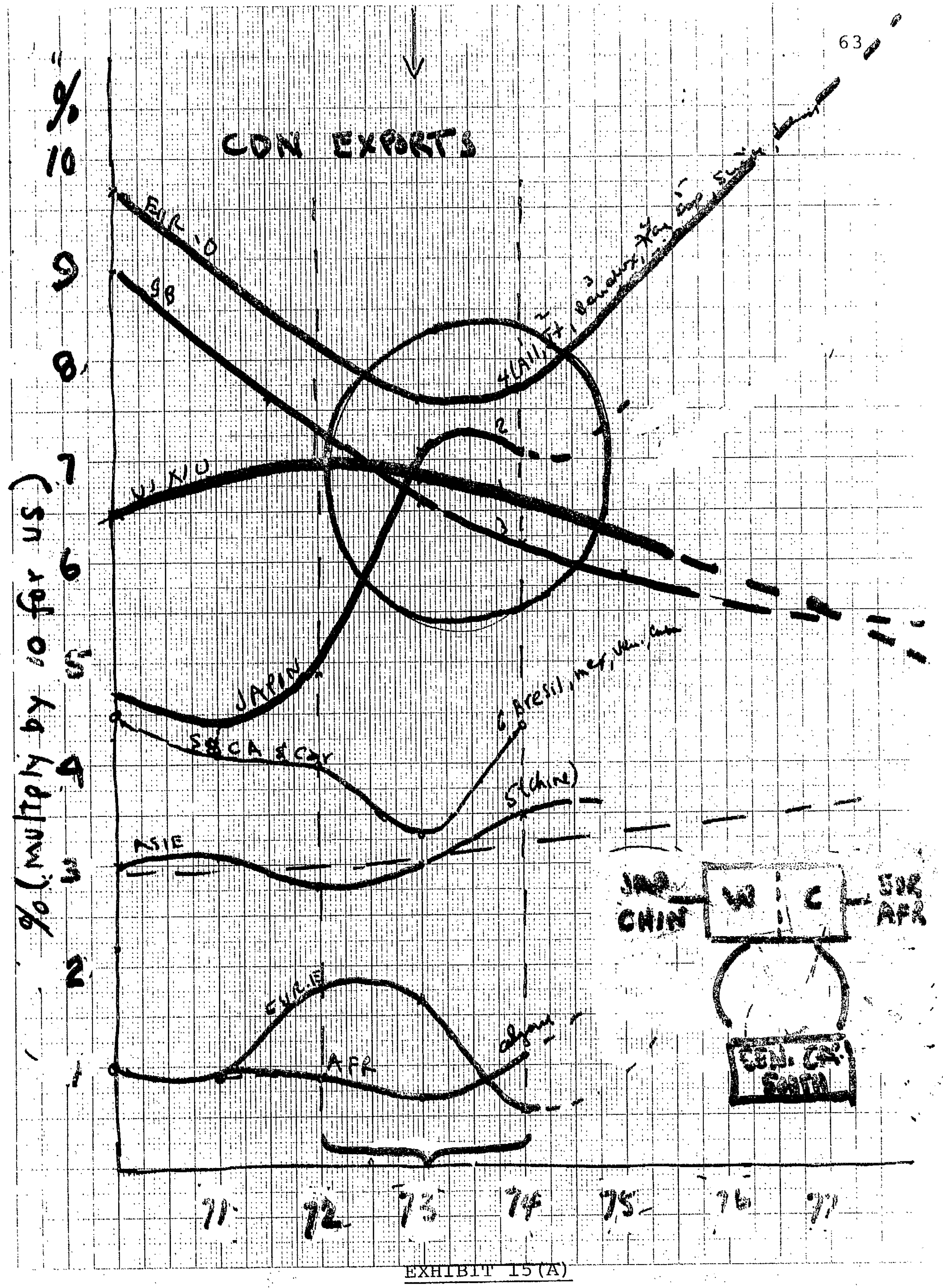


EXHIBIT 15(A)

around 15 %. The growth rate of traffic, as measured by the number of circuits occupied, between western Canada and the rest of the world have all been growing at over 25 percent, as have been those between eastern Canada, Europe and South America.

These forecasts in absolute numbers of trunks required in 1980, were simply extrapolated from past history by the carriers in 1972. Between 1972 and 1974, everyone of Canada's principal export-import interaction patterns - with which long-haul communications correlate very tightly - turned about. Some turned a squared ninety degrees as exhibit 15(A) indicates. Declining exports to Europe began rising, rising exports to the United States began declining, rapidly declining exports to the United Kingdom began declining less rapidly and the future of highly rising rates of exports to Japan was difficult to predict.

Canada's political and commercial relations with the rest of the world are in a period of general re-orientation as well as some reversals, as are those of a whole world caught up in a wave of "globalization" and re-equilibration. The quadrupling of capacities in almost any inter-regional or inter-continental artery are within the realm of reasonable planning conjecture for the 1975-85 decade. It is again recalled that the same remark would apply *a fortiori* in the

communications corridor between Canada's two emerging industrial and economic poles.

(By way of a side remark, it might be noted from exhibit 39, that there is something of the same "global" tendency in social communications as well. Although the Canadian broadcast networks have offered the public outside of Quebec a large 36 percent of their time in local programming, viewers consecrate only 24 percent. The Quebec figures are more difficult to interprete. It is possible that much of what is classified as "network" is in some sense "local".)

7. Business Communications - Terminal

While the changes described in the preceeding section have been and are occuring on a plane "far away from home", a much more spectacular phenomenum has been set in motion at the very point of origin of business communications, to wit, the terminal area.

A few of the "happenings" which escape meaningful descriptions in the language of annual percentage rates, are displayed in exhibit 40. Although clouds of legality and permissibility hang over so called "foreign attachments" - the very term connotes illegitimacy - gadgets of all sort ranging from tape recorders through call diverters

	CANADA EXCEPT...		.... QUEBEC	
	NETW	LOCAL	NETW	LOCAL
OFFERED	64	36	96	4
VIEWED	76	24	96	4

And he prorates his time between national and foreign content according to availability if he can "read" it.

EXHIBIT 39

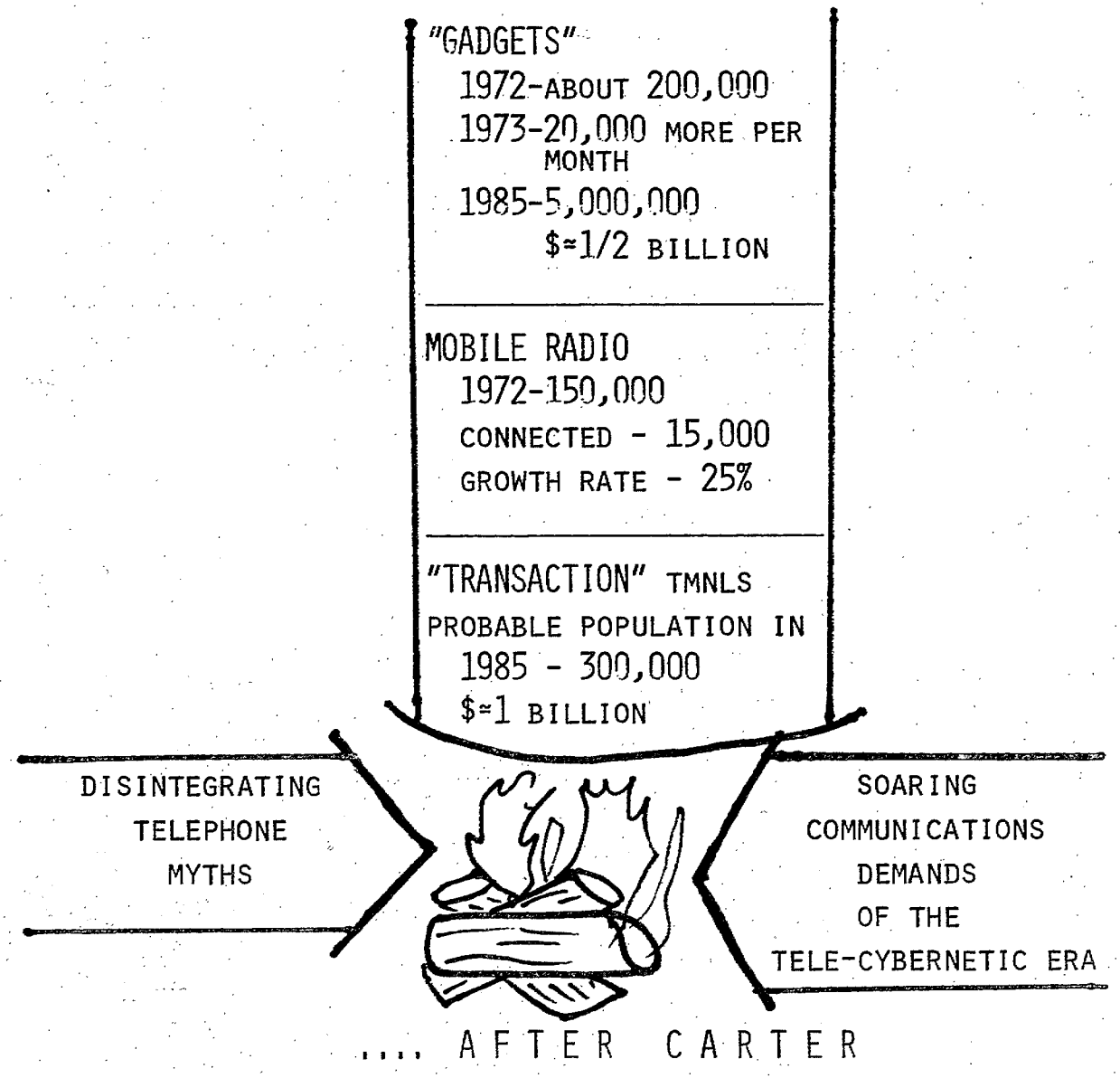

"GADGETS"
1972-ABOUT 200,000
1973-20,000 MORE PER MONTH
1985-5,000,000
$≈1/2 BILLION
MOBILE RADIO
1972-150,000
CONNECTED - 15,000
GROWTH RATE - 25%
"TRANSACTION" TMNLS
PROBABLE POPULATION IN
1985 - 300,000
$≈1 BILLION
DISINTEGRATING TELEPHONE MYTHS
SOARING COMMUNICATIONS DEMANDS OF THE TELE-CYBERNETIC ERA
.... AFTER CARTER

EXHIBIT 40

and acoustically coupled data terminals were being bought and clandestinely connected to telephone lines in 1973 at the rate of a quarter million per year. The general category of "transaction terminals" which range from cash registers through teletypewriter adaptations, various computer peripherals and computers, can be expected to add three hundred thousand new "subscribers" to the public networks in the course of the remaining seventies and early eighties. That number corresponds roughly to the number of business enterprises for whom such devices might fill an economic need.

On the whole, a wave, whose proportions and dynamics are not yet well understood, of new applications and functions for the public telecommunications utilities in industry and commerce has surged up abruptly and has not yet created. Its natural course of evolution is inhibited presently by utility resistence, regulatory silence and the inarticulateness of governments. We are still in the familiar period in which mentalities, captive of traditions, are bewildered and misgiving of a revolution obviously in process. Historically, the epoque following such an interregnum has been one of an explosive rate of installation and expansion to make up for lost time once policies, rules and regulations have been squared out. In the Canadian context, that explosion shapes up as something of the order of two billion dollars worth of diverse new terminals being joined to the national complex

between now and the mid-eighties. The institutions preparing to capitalize on these developments appear to be all non-domestic.

8. Summation

(A) The demographic deployment of Canadians today, and in the decade to come, puts 25 to 35 percent of households in the category of high wiring cost and 10 to 15 percent in the category of the prohibitively high. The wiring of the last 35 percent of the "village" will pose an extraordinary financial challenge .

(B) Canadians consecrate more time to communicating - televiewing and making telephone calls - than any nation for which relevant statistics are available, except possibly Sweden. There is some likelihood that they will consecrate even more as the decade advances and seek wider choice, greater utility and personal rewards for their pursuits. Multi-lateral and bilateral patterns of broad-band communications demand will very probably emerge and further emphasize capital constraints and the economics of plant utilization.

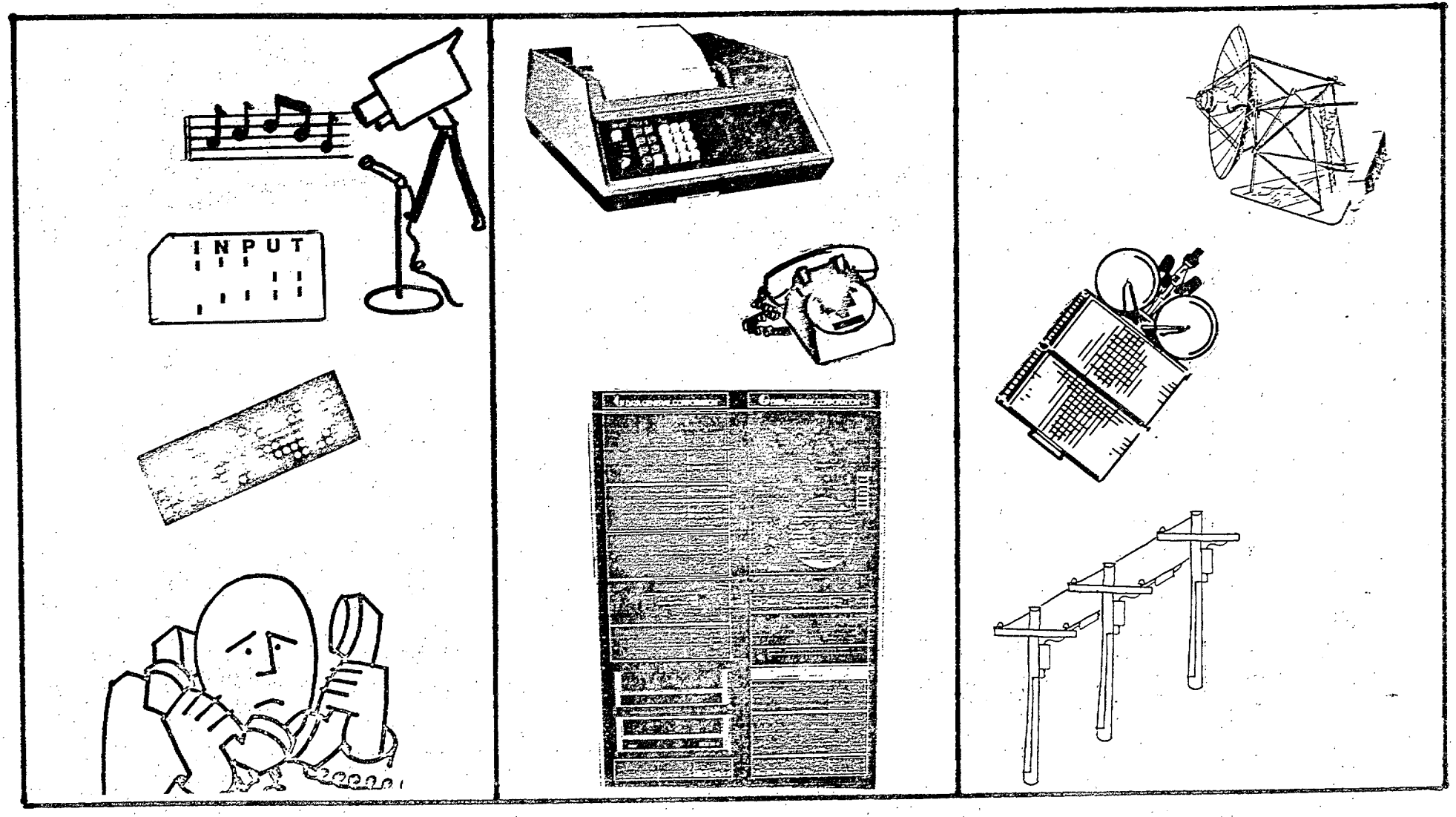
(C) A substantial growth in interurban, inter-regional

and international traffic - of both the economic and social categories - is in the process of happening and will be accentuated. It may be accentuated even more in the east-west intra-national orientation for governmental and business management reasons particular to the Canadian society, and everywhere else as the cost of transportation of goods and persons continue to mount relative to those of telecommunications.

(D) The wave of new investments in terminal equipment intended to be connected to the public networks , will continue to mount to a crest in the first half of the 1980s and call for quick institutional improvizations to forestall or roll back foreign domination.

(E) The uses, applications and patterns of public telecommunications will tend to cross and blur the traditional boundaries between the three principle strata of the national facility.

THE EXTRAPOLATIONS



THE MESSAGE

THE TERMINALS

THE MEDIA

CHAPTER III STRAIGHT LINE EXTRAPOLATIONS INTO 1985

The logic and method of the explorations to this point must now lead to some conclusions. That method has been based on the following three propositions:

I The industry under examination is large in the national economic aggregate, and dynamic. Conversely put, it does not need to be "wound up and put in motion".

II It is a self-organizing and goal-seeking organism and a considerable proportion of its goals are broadly coincident with the public interest.

III The function of government is to correct by regulation, the course of developments where they do not so coincide.

The first chapter was dedicated to an analysis and projection of the industry's resources, the applications it has made of them and its potential for resource acquisition in the coming decade. The second chapter was consecrated to the assessment of public needs, expectations and uses of telecommunications. The present task is to anticipate the courses of evolution which the industry might follow in the decade to come and the extent to which these might or might not correspond to

public demand and expectations within its economic constraints.

The line of approach will be to simply extend into the next decade, processes in motion during the last, according to the established financial rules and formulas and trends discerned earlier in the book. Judgements might then be made as to the extent to which the public needs and expectations projected in chapter II will have been fulfilled.

1. Extrapolation I: Cable Distribution

The essential data necessary to extrapolate the cable distribution enterprise into the future are the following figures;

- cost of cabling - $5,000 per mile, going on $10,000 during the decade,

- revenues required relative to assets engaged, 45 to 50 %. (At the present stage of household penetration of agglomerations where household densities are in excess of 75 per mile, this corresponds to average revenues of $5.00 per month per subscriber)

The national extrapolation is based on the demographic

model of exhibit 24 in chapter II. The result is exhibit 55. The upper half of the table displays, in the fifth column, the monthly rates which cable distribution enterprises would have to perceive from their subscribers if each enterprise - operating in anyone of the four household density sectors - were to be auto-financing. In this context, the large city dwellers, the intermediate city residents, the smaller town folk and villagers and the rural residents would each be required to pay their way. The result is the familiar $5.00 per month tariff now being paid by large metropolitan residence for their cable services (I). It rises to $7.50 for residents of cities where household densities fall to 50 per mile (II) and to 15 dollars per month for householders and villages where densities are of the order of 500 homes or one to two thousand people per square mile (III).

Average family incomes tend to decline as one descends from the density category I through II and III to IV. The average contribution per national household, directly or indirectly, to the total revenue of the public telecommunications industry in 1972 was approximately 425 dollars per year or a little under $40 per month. Of this, three hundred dollars per annum or 25 dollars per month, went to telephony and about $9 per month to broadcasting, radio, TV and cable distribution). (Footnote: It is of course recognized that the portion going to CBC and to private broadcasters takes the route of general taxation or that of the cost of advertising included in the

prices of goods). These numbers provide a measure of tolerability as rates goes and one might therefore guess that an acceptable limit on monthly tariffs for a cable distribution system would lie somewhere between 10 and 15 dollars per household per month.

If this reasoning were applied to exhibit 24, it would follow that the existing enterprise as it is structured would not "stretch" particularly gracefully to all of the 35% of households in the towns and villages of Canada, and decidedly not to any of the rural population.

The lower half of the table of exhibit 24, is derived by precisely the same generating rules as the upper half except that household rates are averaged and equalized at each stage of penetration. Under this regime, 85% of the nation's households (-that is to say all but the rural population) could be served at a nationally average rate of $10.00 and for a global outlay of approximately 1 billion dollars at today's prices.

If cable capacities were to be doubled over those generally offered by existing enterprises - that is to say expanded to 12 to 24 channels - and if a cost inflation allowance of 7 to 10 percent per year were also made, these figures would need to be approximately doubled to 20 dollars per month per household and 2 billion dollars for total investments.

A similar extrapolation for Saskatchewan in exhibit 52

RATE AVERAGED BY CONCESSION

I	25%	>250,000	1.5 mill	75	5.00	200
II	25%	25,000 to 250,000	1.5 ↓ *practical limit*	50	7.50	300
III	35%	(250)/ 25,000	2.0 ↓ *theoretical limit*	25	15.00	750
IV a	8% Riv	25/mile	.5	5	75.00	1,000
b	7%plans	1/mile	.5	1		

	% of pop.	Agglome-rations	hhlds (millions)	res/mi.	tariff $ Mth	invest millions
I	25%	>250,000	1.5	75	5.00	200
+ II	50%	> 25,000	3.0	65	6.50	500
+ III	85%	> 250	5.0 ↓ *practical limit*	50	10.00	1,000
+ IV a	92%	> 3.5	5.5 ↓ *theoretical limit*	45	15.00	2,000
b	99%	> 1	6	40		

NATIONALLY RATE AVERAGED

EXHIBIT 55

THE A-B EXTRAPOLATION TO "POPULATED" PART OF SASKATCHEWAN

	CAT	Prop of pop.	Aqql.	hhlds	hhlds / mile		investment $ millions
A	II	30%	>25,000	100,000	50	7.50	18
				practical limit A			
	III	17%	250/ 25,000	40,000	25	37.50	40
				theoretical limit A			
	IV	25%	1/sq.mi.	60,000	1	190.00	300
B	II	30%	>25,000	100,000		7.50	18
	+ III	47%	> 250	140,000		16.00	60
				practical limit B			
	+ IV(b)	72%	> 1	200,000		70.00	360
				theoretical limit B			

(Book worth of Sask. Tel 190 million, cost of teleph. added $15,000)

Saskatchewan does not have a rate-averaging base to "go it alone" under either option beyond 50% of its households.

EXHIBIT 52

indicates that no more than 47% of the provinces households could be wired within the same economic constraints, if the equalization base were confined within the boundaries of Saskatchewan.

The inferences which can be drawn at this point are the following:

I The auto-financing entrepreneurial patterns to which the existing cable distribution industry is structured, cannot be stretched to serve much more than one-half of the nation's households. That is in fact the point it will have reached in the course of the next year or two.

II A national structure, regulatory and entrepreneurial, which could accommodate itself to revenue division, interfinancing and tariff equalization on a nation-wide basis, could put the existing range of cable services withing the economic reach of all but the rural households of the country.

III Any further extension - in capacity, in patterns of transmission and to the rural sector - might not be within the nation's resources unless significant additional, operational and engineering

economies can be affected.

IV It is probable that the Canadian public will expect its governments to find ways and means for getting as far as the second stage in this sequence and probably the third.

A second issue bearing on future developments has already loomed up. It is of a jurisprudential character and it may implicate complex economic and operational modifications for its solution. The original raison-d'être of CATV in Canada was its extension of American networks to the nation's major metropolitan centers which were already being served by domestic broadcasters. (With 15 of the nation's 22 major metropolitan centers, and over 50% of the nation's population, located within 100 or so miles of the US boarder, such an extension was a technical and business "push-over".) That business is still the principal vocation of Canadian cable distribution. Program content acquired at negligible cost by means of antennas focussed on US stations is at the core of the industry's present operational and financial viability. An aspect of that process of content acquisition is presently entangled in the courts over the deletion of advertizing content . These developments have in turn triggered off counter measures on the part of US broadcasters. Some of them are in the course of modifying the radiation patterns of their stations in such a way as to deny their broadcast to electro-magnetic pick-up across the boarder. Going underground by cable is a prospective alternative or complementary measure. Other retaliations, explicit or

veiled, can be expected where property and profit rights fundamental to a society are menaced, or thought to be, by another country. The "sponging", "boot legging" and similarly described implications of the Canadian industry's mode of program acquisition is now the subject of jurisprudential as well as public debate. The two nations which share the bulk of the continent along a relatively long and open boarder have succeeded, despite similar squirmishing in the past, in finding solutions which satisfied their common criteria of commercial justice and ethical integrity. Unfortunately or otherwise, most of the technically and ethically rational solutions in view cast a cloud over the future of border "head-ends" and, further down the line, the essential vocation of the industry as it now stands.

2. Extrapolation II:

(A) Commercial TV Broadcasting

It was seen in a preceeding chapter that the "average" private broadcasting enterprise is located in one of some sixty of Canada's 180 incorporated cities and is thus generally confined to the populated agglomerates in which household densities are in excess of 50 per mile. These are the houses which

are already wired for cable or within the reach of the existing cable distribution industry, commercially and technically. The obvious question which these observations generate is, why then employ a TV transmitter of many kilowatts of power, in a priceless band of the radio spectrum, to communicate from a studio to a cable head a few hundred or thousand feet away? Some answers might be framed in the form of, "To permit the cable distributor to acquire content in a way that legally excuses him from paying for it and equally legally denies him the advertizing revenues associated therewith". Another is that that is the price which must be paid for the coexistence of two industries. Still another is that one or two or three percent of householders have the right not to subscribe to cable services.

The question and these answers figuratively "pass each other in the night" without addressing themselves to economic, technological and operational issues which sub-tend them. They are also sufficient until the day that economic imperatives begin to pinch pocket

books, private or national. The arithmetic in this book seems to suggest that that "pinch" will come well before the middle of the next decade.

In the mean time, a number of government and public initiatives appear to be adding up more or less coherently to define a specific future "living space" for the private TV broadcaster. The taxation of corporate expenses in foreign advertizing media, the deletion of advertizing from US programs which reach Canadian households by cable, the scheduled withdrawal of CBC from advertizing, and the explicit exclusion of the cable distribution enterprise from that territory, taken together, circumscribe a relatively exclusive domain for the TV broadcaster. That domain and vocation would appear to be that of the production and sale of content for promotional applications. That is then to locate the private TV broadcasting industry in the space between the national consumer goods and the cable distribution industries, perceiving its revenues from the one and buying distribution services from the

other.

By and large this is neither an unfamiliar vocation nor one which is fundamentally different from that which he practices now, nor is it one for which he is poorely equiped management-wise or financially.

Should the vocation of private TV broadcasting crystallize and re-define itself in this way, some of the metropolitan transmission hardware might conceivably migrate to the hinterlands, and a slightly different regulatory scenario would present itself. The "ex-broadcaster" would then have simply integrated himself in the competitive one-billion-a-year promotional content industry of Canada. The focus of regulators concerned with tariffs, network time allocations, commercial-to-cultural content ratios, territorial coverage and the like, would naturally shift to the distribution networks. One of the major preoccupations and frustrations of government - that of content balance - may simply regulate itself out automatically when enough channels with and without advertizing

are available and the televiewer is no longer obliged to pay for his entertainment by suffering consumer commercials - if suffer them he does.

(B) Broadcasting - CBC

In January 1971, in a presentation to a parliamentary committee, the president of CBC said, "On nous a constamment cassé la tête avec l'amélioration de la qualité des émissions de Radio-Canada. Mais chaque fois qu'il a fallu prendre une décision, les gouvernements et le CRTC on opté pour l'équippement, c'est-à-dire l'investissement dans l'ouverture de nouvelles stations et de postes de transmission un peu partout à travers le pays ... Mais quand on prend une décision comme celle-là, il faut en supporter les conséquences ... On va bâtir tellement de nouvelles stations qu'on n'aura plus l'argent pour produire les programmes pour mettre dedans ..."

On an assets base of 180 million, 150 of them in fixed equipment, CBC is in the course of

launching a two-slice 50 million dollar program to extend its coverage to the peripheral 3 to 5 % of the nation's population. These are effectively one channel extensions which exclude CTV, US networks, educational and other services. In the light of what we have been able to learn of the Canadian televiewer in chapter II, it is nearly certain that fault will be found by the beneficiary public shortly after the program has been terminated. Communications economists and engineers alike have been drawing the attention of planners for a long time to the fundamental and operational irrationality of a program of piecemeal, independant and autonomous extensions. On the other hand, it is not in CBC's terms of reference to act as a peripheral common carrier for other than its own programs.

The consequent questions concerning the peripheral extension of multi-channel facilities are in the same territory as the questions raised in the preceeding section which dealt with CATV extensions to these sectors. The same questions will be encounteredonce again under the caption of rural and "hinterland"

services in telephony. They translate into the following pair of questions for the 1985 planner: Should each of these requirements be met by autonomous and independant extensions within theirrespective industry boundaries - each of them costing hundreds of millions of dollars? Can all of them be met by an integrated network of about the same cost as any one of the three autonomous systems? The empirical equations which relate unit transmission costs to integrated capacity - equations supported by three quarters of a century of cost data - suggest that the second question can be answered in a conditional affirmative.

Were solutions to be found to the political, entrepreneurial, operational and regulatory problems which condition the immediately afore-going affirmative, it is conceivable that the implied wish of CBC's president - that of managing a national institution primarily consecrated to content and the instruments associated with its production - might be realized.

There is doubtlessly a long planning space

between the preceeding "Might" and a succeeding "Will".

3. Extrapolations III - The Telephone and Telegraph industry

Exhibit 62 summarizes the options facing the T&T industry. It will be adding something of the order of 1 billion per year to its present assets of 7 billion - the bulk of them in fixed plant - as a matter of the simple practice of its traditional vocation, that of making telephone and TWX connections and renting some capacity to the national broadcasting networks. Its single biggest economic challenge within than one billion dollars annual program is that of renewal of outdated mechanical plant in the "hinterland" and the costly upgrading of services to rural and small town dwellers.

It is already evident that cable distributers - pressed by the public and regulating agencies alike to extend their services to less densely populated communities - will be trying to get their transmission facilities where they cost least, to wit, the common carriers. The additional plant outlays which the carriers might then see themselves obliged to make in the areas where their plant is already relatively good, would fall in the billion dollar range, if 85 to 90 percent of the households of Canada are to be accessed by the mid-1980s.

T&T's

1972 BOOK ASSETS	7 BILLION
AVERAGE ANNUAL ACCRETION 1975-1985	1 BILLION
TERMINAL ASSETS (BK)	1.5 BILLION

- 5 BILLION (OR MORE)

.5 TO 1 BILLION IN TRUNK CABLE DISTRIBUTION

TMNL

"GADGETS"
$6 \times 10^6 \times 250 - 1.5 \times 10^9$

MOBILE
$10^4 \times 10^3 - .1 \times 10^9$ -

CC TMNLS
$3 \times 10^4 \times 3 \times 10^3 - 1.0 \times 10^9$

PB X CONNECTED SYSTEMS ?

COMPUTER SERVICES

EXHIBIT 62

It is conceivable that economic techniques for the extension of all sorts of facilities which carry content in common, can be most economically achieved by single integrated systems be it satellites, optical fibre cables, omnidirectional microwave stations, or other. The institutions with the necessary experience and the mechanisms for capital acquisition are in the T&T sector. That is where 85% of the national corporate public telecommunications assets are now.

Two other avenues of extension are also practically open to the T&T industry as it launches itself into the next ten years - that of engaging indirectly in information processing, and that of maintaining a dominant position in the terminal sector. In contrast to the preceeding avenue of extension in the sector of transmission, which is squarely in line with the vocations of telephone common-carriers, the latter implicate know-how, engineering, marketing investments, innovation and renewal and management competencies which would largely need to be acquired. The "natural monopoly" reasoning which rationalizes their status today, and might well continue to do so in the conveyance-transport-container sector of the future where integration is an operational and economic imperative, stretches poorely to the new ones. Moreover, the history of utilities which deversify themselves and adventured into fundamentally different activities is a relatively gray one. Neither the public nor the regulator can

quickly forget the adventure of Central PENN in real estate, or Bell Canada-Northern Electric in micro-circuit components for the general market.

The future options of the telephone and telegraph sector are thus paved in billions of dollars of new investments be it in integrated common conveyance systems, information processing, terminal devices, or the extension of toll telephone service to Saskatchewan farm houses. Perhaps the most important question for the policy planner is the regulatability of large conglomerates. The natural consequence of institutional integration - even when it is achieved in no more than a common holding context- is to blurr lines of demarcations, of cost separations and inter-financing transactions between d sperate operations - blurred for the world ouside first, and, frequently, for the inside executives and managers later.

The passive motive for the extension or maintenance of regulated common carriers in business not integral to their natural monopoly of common carriage, is the dearth of domestic enterprises and institutions capable of filling the gaps. The choice of policy planners thus falls between

- regulating unregulatably large and conglomerate enterprises, or
- cultivating new institutions

THE TELECOMMUNICATIONS CHECKER BOARD AND THE BORDER LINES OF COLLISION

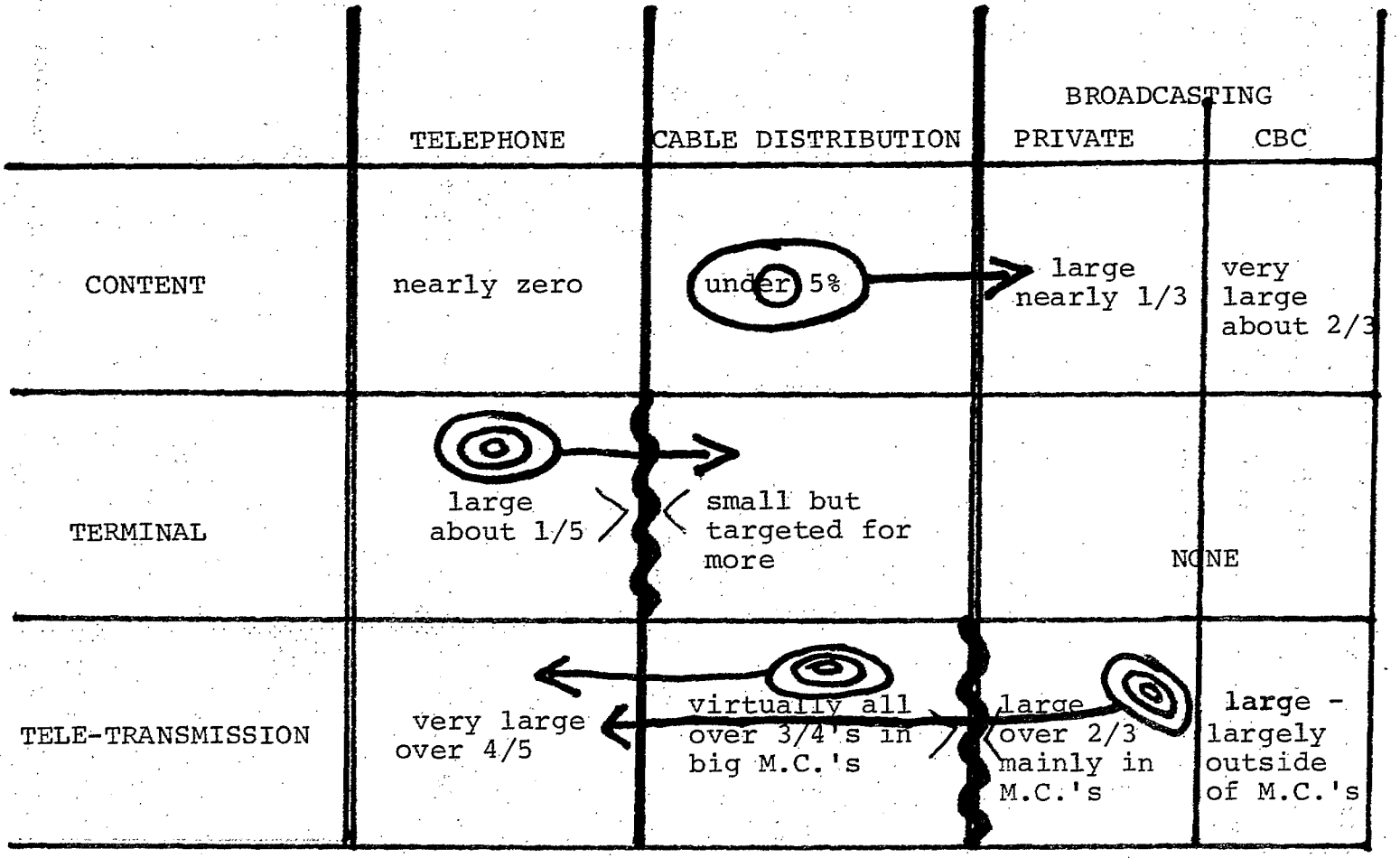


EXHIBIT 64

On the immediately visible checkerboard of this study, there is a dynamic CATV industry which operational and economic constraints may be driving out of the "common conveyance" sector during the decade to come. At the same time, most of the parameters which characterize this industry qualify it for expansion into the terminal sector. These parameters include the size of its units, their lack of tradition and therefore their innovative mentality, their territorial patterns and regulatory environment, their consumer orientation and perhaps several more.

4. Summation

The "checkerboard" figure of speech of the preceeding paragraph is carried one step further in exhibit 64 to the end of summarizing the possible outcomes of the preceeding extrapolations.

The impasses forseen through the extrapolation mechanics of this chapter carry the seeds of their own solutions - as most impasses do. The three players (telephony, cable distribution and broadcasting) are displayed in exhibit 64 with their bets, placements or "checkers" in each of three operational sectors of communications - content, terminal and tele-transmission. What these involvements are is described frugally by the words in the squares. The

public, economics, resources and governments appear to be conspiring to shift the checkers to a pattern which neatly - perhaps too neatly - consolidates the dispersed bets into only one in each row and column and to orthogonalize the matrix.

The political, institutional, regulatory and other implications of such a vast and vertical re-ordering of what is now a horizontally stratified industry, are impressive to say the least and boggling otherwise.

CHAPTER IV PREOCCUPATIONS AND PRIORITIES FOR THE 1980s - A CATALOGUE

The probable preoccupations and priorities of departments of communications - federal and provincial - have been falling out along the course of the preceeding chapters in the order imposed by the methodology of the research. It remains to summarize them here and to give them a minimum of order which corresponds to the organization of the department with a view to their serving as an agenda for the dialogue which will sort them out. They are arranged under the three principal headings of exhibits 66, 67, 68 and 69. What follows are brief elaborations of items which may have been titled too cryptically in the exhibits.

1. Socio-economic

-1. Unilateral Communications

This is a heading for anumber of questions of the following sort: To what extent might the widespread grumbling of the public about content, and its demand for more channels, in fact be a reaction to saturation by one-way communications and a gropping for patterns better fitted to the bilateral communications faculties of people? (The nation, and mankind as a whole, have probably never been so completely

inundated by "broadcast" forms of communications.) What might the consequences of uni- and bi-lateral communications be on public education, self-government, local resolutions of social problems, and a public sense of participation in the national adventure? What might the cost-benefit trade-offs be and by what mecanisms might benefits be translated into revenues required for multi-lateral system development?

-2. Operational Telecommunications

The present policies of carriers and governments are, in the balance, those of resistence to the connection of new systems and the implied new patterns of ownership, operations and services. The dominating preoccupations of both appear to relate to the coherent control of the national networks. The other side of the ledger - particularly the economic impacts of galloping diversification on the nation's business and of divestment on the carriers financial structures - are articulated relatively incoherently by pressure groups. An assessment of what the balances might be in the public interest, social and economic, is a pre-condition for the evolution of an explicit policy.

-3. Jurisprudential issues

This item is adequately elaborated in chapter III,

SOCIO-ECONOMIC

1. UNILATERAL TELECOMMUNICATIONS
2. OPERATIONAL TELECOMMUNICATIONS
3. JURISPRUDENTIAL ISSUES IN TELE-ACQUISITION OF INFORMATION
4. SOCIAL ACCOUNTING - HUMAN ASSETS IN THE TRIAL BALANCE
5. URBANIZATION
6. ALTERNATIVES TO "TELECOMMUNIZATION".

section A.

-4. Social Accounting

An elaboration is to be found in Chapter II, section 3. (A broader preoccupation under this heading is relevant to telecommunications but goes well beyond them. It concerns accounting of human assets as a purely current expense to be minimized. The "sink" into which such assets are consequently disposed is taken to be as both infinite and excluded, as well as excludable, from profit and loss balances. The "infinite sink" is "government" - unemployment insurance, public works, economic and consumer stimulation policies. The financial circuits closes back on the profit-and-loss account through taxes, insurance deductions, retirement allocations and the like. But the employment-disemployment circuit remains an open one-way conduit. The core issue in social accounting is the redefinition of human values in assets-liabilities and revenue-expenditure terms to the end that their useful employment might become a broadly decentralized concern of business enterprise and visible in its financial accounting. In the context of the telecommunications common carrier industry itself, the degree to which, say, magnetic tape machine should replace information operators - with the consequence that telephone calls might need to be taxed to support the "local initiatives" of disemployed operators -

is a social accounting issue. Figuratively speaking, if falls in the category of the delemna of choosing between plugging holes in a boat at sea or bailing water!)

-5. Urbanization

See Chapter II, section 2.

-6. "Alternatives to Telecommunications"

is intended to take note of the proposition that contemporary society suffers from an excess of communications and that some of its problems might be solved by going back to less "tele-" and more town-hall, coffee-table and over-the-back-fence communications. The proposition is profane to the ears of anyone with a vested interest in telecommunications - this researcher included. It is listed here under the obligations of "objectivity"!

2. Technical

Most technical issues are best treated in the specific lexicon of engineering, and will be in appropriate annexes. The following are elaborations in lay terms:

-1. Multiplexing and Channelization

The bulk of carrier economies in recent decades

TECHNICAL

1. MULTIPLEXING AND CHANNELIZATION
2. NON-HOMOGENEOUS TRAFFIC ENGINEERING
3. THE "DROP"
4. INTEGRATED SIGNALLING, SUPERVISION AND CONTROL
5. "COMPATIBLE RECEIVERS"

derived from the declining unit costs of conduits of increasing cross-section. That benefit is at the point of becoming invisible as unit costs decline to a point where "breaking out" a single channel becomes the dominating factor. The price of one thousand dollars per channel for multiplexing has resisted reduction for several decades. *The possibility of holding costs down, and compensating for general inflationary pressures, virtually does not now exist in telecommunications unless a new break-through can be made in channelization. Space, frequency, time division techniques and mixtures of them need to be re-examined in the light of the very wide-band media like optical fibres on the one hand, and wide-band user communications services on the other.*

-2. Common Carrier Traffic Engineering

rides on the back Erlang. The mathematics and consequent economics of mixed traffic engineering - in which the statistics of pay-TV arrival and hold times have no common denominator with those of three minute telephone calls, and those, in turn, are on another statistical planet from thirty second transaction calls - is presently in need of a neo-Erlang.

-3. The "Drop",

which is that part of the network which serves a

subscriber, and only him, to connect his terminal to the shared network, is subject to the "one conversation at a time" limitation of human subscribers. The efficiency of its utilization is an inverse function of the number of channels "dropped". The efficient exploitation of long drops and the engineering to make it efficient, is one of the two biggest cost challenges before cable distribution as well as telephony today.

-4. Signalling, Supervision and Control

It has been said that "when a telephone network has been designed to handle signalling, supervision and control, what remains to be done to carry calls is incidental"! If integrated SS&C systems do not evolve, pay-TV, information retrieval, data, voice, bank and other communications will each wind up with their own. Any integrated system would in turn affect the television set, telephone, call recorder, answer-back, indeed all terminal devices - and, in turn, directories, billing computers, central offices. Clearly this challenge does not lack for implications.

-5. "Compatible Receivers"

relates in part to the preceeding subject of SS&D and in part to the fact that the off-air receiver was not

designed to exploit the economies and signal qualities of cable networks. The Canadian CATV industry is already engaged in researches but - too small in terms of RD and E resources - it is not likely to move ahead of US industry initiatives - except possibly under the federal department's stimulation.

3. Institutional

-1. The Private TV Broadcaster

See Chapter III, section 2(A).

-2. The "Gap"

between the trunk of the common carrier and the terminal of the private subscriber in the present era of "foreign attachments", is entrepreneurial and institutional. By the consequence of the "Branch Plant" status of much of Canada's industry on one hand and, on the other, a virtually open frontier to foreign terminal equipment merchandisers who are able to exploit the currently equivocal regulatory situation with greater immunity than domestic entrepreneurs - the imminent risk is the occupancy of the terminal sector of the public communications by foreign enterprise. Of the few Canadian enterprises which might be able to fill the gap, the CATV companies are the most credible. (See Chapter III,

section 3). However this is not the direction their attention is focussed at the present time. They appear to be considerably more interested in moving in the reverse direction of common carriage.

-3. CATV mergers, prodded by narrowing margins, capital scarcity, management and operating efficiency, engineering development costs, and so on, are in the process of happening - and have been for some time. "Quasi-acquisition" relates to the effective take-over of a sector of the cable distribution business as CATV companies lease more facilities from common carriers. The departmental options are of a binary sort - to encourage or to brake the movement.

-4. CBC (See Chapter III, section 2(g).

-5. If the carriers expand in the natural direction of cable distribution and integrated common carriage - as they are in fact doing - their simultaneous expansion in the terminal and content (or "content processing") sectors might lead to or re-enforce an ultimately AT&T-like, impregnable and unregulatable wall-to-wall, source-to-sink monolith. FCC's experience - as well as that of some countries in which the State is that monolith - suggests that it is easier to keep such monopolies from evolving than to render them governable later.

INSTITUTIONAL

1. THE PRIVATE TV BROADCASTER
2. THE ENTREPRENEURIAL GAP BETWEEN TRUNK AND TERMINAL
3. CATV - MERGERS - ACQUISITION AND QUASI-ACQUISITION
4. THE CBC DICOTHEMY
5. CARRIERS, COMMON - THE CARE AND PRUNING OF
6. CARRIER COMPETITION
7. "BANKING" - COMMON BILLING COLLECTION AND REVENUE SETTLEMENT FACILITIES

TARIFFS

1. THE "FLAT" FEE
   - URBAN T&T
   - COMMUNITY FARE
   - EDUCATION
   - PUBLIC SERVICE

2. "TOLLS"
   - PROMOTIONAL
   - THE "SPECTACULARS"
   - INTER-URBAN T&T
   - BUSINESS

3. BULK PRICING
   - GOVERNMENTS
   - BANKS
   - POST OFFICE
   - UTILITIES

4. REVENUE DIVISIONS AND INTER-FINANCING
   - INTER-CARRIER
   - INTER-SECTORIAL (C,C & C)
   - AND COMPATIBLE COST SEPARATION ACCOUNTING

-6. While "carrier competition" in the intra-urban sector is a proposition which stands up poorly to the "natural monopoly" argument, the Canadian experience appears to testify to the opposite in the interurban, inter-regional and international sectors. Whether that competition should be enhanced by a consolidation and strengthening of crown carrier competition, and whether Telesat should compete in US/Canadian transmission of programs and other wide-band cargo with TCTS and the CATV industry, was a subject more thoroughly explored in another report. ("Systems engineering resources and requirements - 1 November, 1974").

-7. "Banking"

See preceeding note on signalling, supervision and control.

4. Tariffs

The four items under this heading of exhibit 70 would appear to be self explanatory for the present purposes. Section 4 of Chapter III is particularly relevant to the issue of revenue divisions and inter-financing.

5. Concluding Note

In exhibit 71, the 21 preoccupations-priorities

THE SCORE BOARD

	T&T	CATV	BROADCASTING
SOCIO-ECONOMIC			
1. UNI-BI-LATERAL C'S		✓	✓
2. OPERATIONAL PATTERNS	✓		
3. JURISPRUDENTIAL		✓	
4. SOCIAL ACCOUNTING	✓	✓	✓
5. URBANIZATION	✓	✓	✓
TECHNICAL			
1. CHANNELLING	✓	✓	✓
2. TARIFF ENGINEERING	✓	✓	
3. THE DROP	✓	✓	
4. S, S & C	✓	✓	✓
5. RECEIVER	✓	✓	✓
INSTITUTIONAL			
1. PRIVATE BROADCASTER			✓
2. T - T GAP	✓	✓	
3. ACQUISITON	✓	✓	
4. CBC		✓	✓
5. CARRIER SPRAWL	✓		
6. COMPETITION	✓		✓
7. B - C - R	✓	✓	✓
TARIFFS			
1. FLAT	✓	✓	✓
2. TOLL	✓	✓	✓
3. BULK PRICING	✓	✓	✓
4. INTER-FINANCING	✓	✓	✓
	17	17	14

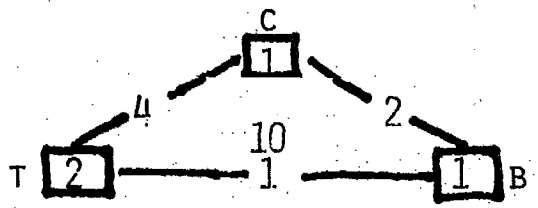


EXHIBIT 71

catelogued in this chapter are arranged to display their relation to the three strata of the industry. It is noted in the sub-totals that ten of the twenty-one relate to all three sectors, 17 to two or more, and only four are restricted to any one of the three industries. This very crude tally serves to emphasize the overwhelming degree to which the concerns and the priorities of the department relate to all three strata interactively and integrally. One is led to conclude that it might not be possible to evolve a coherent and comprehensive communications policy in the context of any one stratum alone or each of them separately.

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