REVIEW ARTICLE

ONE CANADIAN PERSPECTIVE: *CLEAR ACROSS AUSTRALIA**

Dallas W. Smythe

* Review article of **Clear Across Australia: A History of Telecommunications** *by Ann Moyal* (Thomas Nelson, Melbourne, 1984) pp. xvi + 437, $25, ISBN 0 17 006266X.

The role of postal and telecommunications policy in Australia has been central to that country's development towards relative autonomy. Geoffrey Blainey's work, *The Tyranny of Distance,* is the frame for analysis of the role of that policy. Australia has both vast international 'distances' and internal distances. By contrast, Canada's development has been a race between trying to overcome its internal distances, and trying to cope with its *lack* of distance from its big neighbour to the south. Its internal distances were conquered but at a severe cost in lack of success in coping with the latter aspect. This reader compliments all concerned with the Moyal study. Canada has no comparable book. Telecom Australia should be thanked for commissioning the book, giving the author apparently unlimited access to its files and employees, and for finding distinguished scholars who served as an editorial board. None can question the arm's length relation between this sponsor and this independent scholarly writing. Ann Moyal deserves plaudits on many scores. She researched the history and marshalled her facts well. She avoided the possibility of writing a management-type history of Telecom by extensive interviews with middle-level workers as well as senior executives and trade union officers, and by a strenuous effort to elicit the feelings and views of linemen, telegraphers, telephonists, and construction crews in the variegated geography of her country. She presented hundreds of photographs, which together with handsome typography, paper, cover and dust jacket, provide a frame in which her felicitous writing is well integrated. The 17 chapters begin with the early decades of the postal service, following which she deals with the innovation and policies for the use of wire-telegraphy, wire-telephony, radio telegraphy and radio telephony, computers, and satellites. It comes complete with appendices, notes, bibliography and index. Altogether a book which should ornament Australian bookshelves.

In this paper, I will deal first with some theoretical issues, and then with analysis of how Australia has used its 'productive forces' (or

resources) and how its relations of production bear on its telecommunications.

THEORETICAL AND METHODOLOGICAL ISSUES

The first critical issue is the book's theory of how change takes place in the real world. Linearly, or dialectically? The author doesn't tell us. Implicitly, the book follows the linear path, despite its internal evidence of episodes in which additive change gives way to qualitative; e.g., conspicuously in the struggle over satellite policy, 1972-83. She refers to "gusting winds of change" (p.355) — a nice poetic touch but it obscures the real offensive by market forces powered by transnational corporations to gut the public telecommunications institution in the 1970s and 1980s. What is her theory of how change took place? She doesn't say.

The second critical issue: what does the book mean by the term 'technology'? Does it come endogenously or exogenously? Is it ever economically, politically or ideologically neutral? If it comes from outer space then it may be beyond human control. If its origins are endogenous, then humans, through their social and political institutions, can determine the kind of tools and techniques they will use. The Greeks referred to the 'industrial arts' which were no myth; 'technology' is a myth. But it has very material constituents. One part is pyramidal bureaucracy which follows orders in both the private and public sectors. A second part is science, which has been taken over increasingly by the third part, capital. Another part is tools and machines created by engineers. The fifth part is ideology, which provides the images with which the sixth part, propaganda, seeks to mould public opinion to accept the myth. In reality, 'technology' is just a cover story for modern industrialism in motion. Most authors (including Ann Moyal) who use the term don't pause to define it.[1]

Indeed, she is explicitly a technological determinist. It is ". . . a prime agent of change today" (p.xi), ". . . some technological developments followed an imperative of their own" (p.92). This blind spot clouds her analysis, as I will point out below. As the following analysis shows, one can analyse reality without ever using the term 'technology'.

The third conceptual inadequacy is her lack of sensitivity to what is meant by 'information'. *What* is it? The Shannon and Weaver 'information theory' is obviously not a general theory of information. Is information all that passes between humans and their environment (Norbert Wiener)? Without much further development, that is too general to be useful. I do not suggest that Ann Moyal should have produced a viable theory of what information is and does, but perhaps as a minimum she might have observed that as yet there is no such theory.

Some of us suspect that information consists of that relatively small part of a contradictory relation which at a given time and place makes a big or 'fast' difference in the relations of opposition within that contradiction and precipitates a qualitative transformation (e.g., the attack by a small number of people which captures an airfield or radio station and is the critical stage in a *coup d'etat*). It may be argued, as Bill Livant suggests, that information and communication are two aspects of one ontological object; that information concerns the structure (parts) of a thing, and communications, its movement. If these hunches are pursued, we may face formidable questions about matter and energy. Running parallel are the material, dialectical relationships with their 'fast'-acting information elements, and the signs (words, visual elements, and bits) describing these material relationships. The signs are so processed, integrated and institutionalised that the dialectical relations between information as signs and information as things which are represented by the signs become conceptually difficult. Failure to deal seriously with this interface between the world of signs and that of the referents of the signs follows from the idealistic nature of our current emphasis on information as 'bits' and whatever goes through the communication system. Gerald Long, former executive director of Reuters, emphasises the danger of looking at communications as making the world more integrated:

> In my opinion that is not what they are doing. They are creating a small, thin world which forms a tiny fragile crust above the worlds in which people actually live. That overlay creates a wholly false impression of unity and communication . . . I believe that modern communications technology has produced the society of spectacle, the society of the voyeur.[2]

As the preceding comments suggest, information is closely related to power. It is axiomatic in communications literature that the power to control information flows (or communications) is the basis of political power and an attribute of sovereignty. But Ann Moyal neither grasps this axiom nor uses it consciously to analyse the struggles between the rich and the poor as they involve communications.

My fourth critical issue concerns what might be termed the world context in which Australia's people and their telecommunications system exists. How has Australian telecommunications been related to capitalism (the word isn't in the book) domestically and internationally? How has the Australian people's drive for national identity and autonomy been affected by its own intelligence agencies, and the CIA's and NASA's actions? How meaningful is an analysis of the buildup of telecommunications services in and to the outback in

the Northern Territory and Northern Western Australia in the period since 1945 which totally ignores the Cold War, and that, as D. Ball demonstrates,[3] Australia's independence has been put in jeopardy by the US military and intelligence establishments on its land? Ann Moyal does notice that NASA has a base there, but only to admire the technical virtuosity of its space flights. It is also noticeable that she deals skimpily with Pacific rim geopolitical strategies; e.g., Tribolet's study of them in the late 19th and early 20th century.[4] There is more than a trace of the myth of technology in her circular answer to the question, why Australia did not innovate its indigenously invented telephone system: Australia had ". . . a contemporary tendency to ignore indigenous inventiveness. . ." and ". . . to turn to technology sources overseas" (p.78). *Per contra,* Ann Moyal is very perceptive of the bias imparted to Telecom by its overcentralised administrative organisation, dominated by its engineers in the 60s and 70s. But overall, the book suffers from a blindspot regarding the politico-economic nitty gritty in the international scene.

DEVELOPMENT OF THE FORCES OF PRODUCTION AND TELECOMMUNICATIONS

By productive forces I mean the historically created relations of the individuals in Australia to nature and to one another. They are in dialectical interaction with the relations of production which focus on the struggle between the advantaged and the disadvantaged. I will try to identify the major features of both in the Australian context. The forces of production include skills, science, tools, equipment, human capacities of all kinds, money, public sector institutions (family, educational institutions, arts and government), the modes of production or co-operation. They also include the features of the environment which people used (fertile land in some parts, natural harbours, gold and other minerals). The capitalist mode of production which the colonists brought with them easily and substantially destroyed the aborigines and their communal mode of production. It also brought with it the basis of a class struggle in which pro-democratic forces innovated many advanced features of democracy (in North America the secret ballot is still called the 'Australian ballot'), contending against strong pro-authoritarian forces. Transplanted from a very dense institutional matrix such as England was in the 19th century, the class struggle has been played out more visibly and crisply than in the home country — insulated by the vast intercontinental distances, and well endowed with familiar physical resources.

News from England, correspondence, and exchange of business, political and scientific information undoubtedly was the life blood for

the distant colony, but sailing ship mail took from 18 to 24 months for a round trip. Self-reliance was necessary. Not until 20 years after the first settlement did the first post office begin in Sydney, replacing the *ad hoc* and disorderly practice of ships' captains handling the mail in the early years. The gold rushes of the 1850s stimulated postal traffic in Victoria and New South Wales. Given the volatility of gold markets at any time, that experience dramatises the effects of time lag in communications on decision-making of traders, investors and entrepreneurs. The innovation of telegraphy in Victoria in 1854 set a policy precedent in three respects: it was the first electronic equipment imported from the United States; this and other telegraph services were placed under state ownership in all the colonies (except Western Australia, which had a subsidised private company until 1873 when the state took it over); and the man who brought the equipment from Professor Morse, hoping to start an American-type private enterprise, became general superintendent of the Victoria State system.

The spread of the telegraph system was rapid, both within and between the Australian colonies. Between 1870 and 1872, the coast to coast line from the south (Adelaide) to the north was completed in the face of unique climatic and geographic obstacles. They dealt with the aborigines as hostiles and built through their tribal lands and near their vital water holes. "Technologically, it was the 'greatest engineering feat' carried out in the 19th century Australia" (p.42). The east-west transcontinental line was carried west, 1500 miles from Adelaide to the Indian Ocean, between 1875 and 1877. The submarine cable link from Post Darwin to Java connected with London, via India in 1871. Telegraph development ". . . generally preceded the railroads in forging extra-local and interregional links between merchants. . ." (p.32).

The innovation of the telegraph had profound effects on the other forces of production of Australia. Even before the telegraph assumed continental and intercontinental size, in the 1850s it

> . . . immediately fed into the mixed strands of Victoria's burgeoning commerce, linking trade and transport, dispensing news from Melbourne to Murray, connecting investors with markets, gold diggers with buyers. . . (p.19)

At that time its largest consumers were government, business and the press (p.30). "Business was the stick which prodded the telegraph out and across increasingly difficult landscapes." Gold and tin discoveries in Tasmania in 1870 and 1871 ". . . forced extensions while the opening of other fields in the island's mountainous west speeded telegraphic construction. . ." (p.32).

Some of the advantages flowing from its geographic isolation were lost with the opening of the cable to London in the early 1870s.

> Initially, distance favoured local ownership of mining in the Colonies. By the mid-1880s Australians owned almost all the mines in their own continent. . . The overseas telegraph evolved as the medium of speculative foreign investment in the Colonies. . . Before the cable era, many South Australian copper mines, acting on postal reports from London, vigorously produced copper only to find from later intelligence that the metal's price was so unfavourable their mine was working at a loss. With instant cable connection, Australian gold and base metals became increasingly attractive to British speculators. While Victoria, the richest gold Colony in the British empire, could raise its capital readily on the local stock exchanges, Colonies such as Queensland began to turn to British speculators. . . By 1886 British money buttressed Queensland's golden city of Charters Towers. . . By the early 1890s. . . London replaced Melbourne as the greatest investing centre for the Colonies. (p.62)

Some of this British investment was in the public sector.

> Colonial Government as well as mining promoters also sought British investment by cable. . . Funding from British merchant bankers flowed into 'go-ahead' Colonial programmes that pushed roads, railways and the telegraph lines themselves outward; built harbours and bridges, and nourished the spread of ancillary activities in the Colonies. (p.62)

With a flood of investment, production and foreign trade flourished. The cable, however, was a two-edged sword. British manufacturers could bid competitively with Australians.

> As a result swift competition from British firms pierced the isolation that in one sense had succoured local manufacturers and meant that Australian business lost the lead time of several weeks [we are now in the age of steamships] gained by sea communication for preparing plant and training workers for effective tendering. (p.64)

Overall, the telegraph meant for Australia a long step towards integration in the international division of labour.

Moyal is insensitive to the effect of the telegraph on competition within markets. Did it confer equal benefits on small and larger businesses? Did it equally benefit enterprises in small cities and towns, as well as those in major metropolitan centres? We can't know the answers to these questions from her book. There is reason to believe that, regardless of the rosy expectation that the telegraph would tend towards perfectly competitive markets, the reality in Australia may have had similar effects to those in North America. Richard B. Du Boff has found that in the US initially and superficially, the telegraph did lower regional price differentials, save time, reduce need for large inventories, reduce short-term financing requirements and assist in eliminating middlemen and wholesalers, as well as creating access to commodity and financial markets for merchants throughout the

country. But it simultaneously and more lastingly favoured oligopolies as against small business by giving some enterprises greater power than others over pricing, investment, choices, product and process innovation, labour utilisation and management efficiency. It did so through effects on economies of scale, control effects, intelligence effects and concentration of information sources. For some firms, the telegraph created national and regional markets and their competitors who couldn't match them in market power went under. As scale increased, the telegraph invited larger firms to internalise chains of orders, trans-shipments, and stages of production which had previously been subject to market mediation and positive transaction costs.

> After 1870 vertical integration not only undercut the function of middlemen but helped producers to achieve a regulated uninterrupted flow of materials all the way to their retail outlets. Horizontal mergers too appeared on a national scale 'only as the railroad and telegraph went into full operation in the 1870s and 1880s.'[5]

The control effects stemmed from the premium which any successful intelligence operation places on speed and secrecy. He argues that the telegraph improved the efficiency between command centres within business firms and ". . . promoted large-scale bureaucratic organisation at least as much as it promoted better functioning of markets. . ." Concentration geographically in major cities was another type of effect. Firms located in them had preferred access to long distance service on telegraph wires, while those in smaller towns (including those between major cities) had delayed and interrupted service. Press use of telegraph was a conspicuous example of this concentration effect. In sum, Du Boff concludes that

> By providing differential and asymmetric access to information for business firms within the system, telegraphy greatly strengthened the normal tendency of competition to produce concentrations of economic power.[6]

And he suggests that, subject to the moderating differences between public and private ownership of telegraph (as in Europe), this centralising effect was universal.

With the innovation of duplex and later quadraplex simultaneous use of a single wire in 1898 and automatic reperforator message switching in 1909, the development of telegraphy in Australia reached a plateau, awaiting its integration with telephony and computers 50 years later. By 1900, Moyal tells us, Australia was "one of the largest national users of telegraph" (p.33).

The telephone, by contrast with the telegraph, was innovated in Melbourne in 1880 with American equipment and operated by

Americans as a private enterprise (although it was taken over by the Post Office in 1887). The first exchanges were manual and the service by 1900 was to 24,700 subscribers over about 1,000 miles of wire linking the larger cities and their suburban exchanges. Businesses and "well-heeled burghers" were the bulk of the customers along with railroads in the 1890s. Like the manual telegraph, the manual exchange telephone depended on a growing force of cheap labour: women in the case of telephonists.

The development of the national system of communication was slow and painful because each colony had developed its unique system for postal, telegraph and telephone service (and for railroads, even the gauges of which differed). "Disjointed and unco-ordinated", they would begin to be rationalised on a national scale as part of the process of Australia's achieving the status of a Commonwealth in which the seven colonies became a federation of states in 1901. It was a process of successive approximations. The seven colonial postmasters had federated as the Colonial Postmasters-General by 1893 — which Moyal terms a "deceptive uniformity". Upon their merger into the Commonwealth Postmaster General's Department in 1901, the magnitude of the rationalisation process becomes obvious. Its assets were 6 million pounds; its employees 16,000, which was 90 per cent of the new national government total. It had 7400 offices across the country. It ". . . developed as the country's major technological instrumentality" (p.88). Obviously it was a principal force of production and continued to be to the present.

The first decade of the 20th century saw rationalisation of telegraph and telephone plant and practices begun on a national scale. Diverse state rates were abolished and uniform rates instituted for the postal, telegraph and telephone service; uniform procedures adopted for construction and maintenance of plant. Expert guidelines were established for monitoring exchange equipment, building trunk lines, etc. It was a struggle in which centralising engineering considerations were pitted against stubborn "states' rights" vestiges from the past. The engineers who accomplished this were the first of their profession who in the next 60 years formed the bureaucratic hierarchy which managed an increasingly centralised system. The first chief engineer judiciously screened the burgeoning variety of foreign equipment, accepting some (rural party line and timed toll tariffs from the US, the Wheatstone automatic telegraph system from the UK) and for a time rejecting the Strowger step by step automatic phone exchange in favour of indigenous common battery manual exchanges. Meanwhile, the imperial 'red' cable was installed, east to Vancouver and west to South Africa. The first Royal Commission on the Post Office, 1908, identified serious unsolved problems. There was a lack of planning on a national scale, inadequate budget, no proper accounting (the first

annual report was in 1910-11). Its report recommended a policy for a telecommunications system that was strategically planned, technically up to date, capable of developing its own inventions and some manufacture of equipment for itself. It recommended that the PMG be freed from the control by the Public Service Board of hiring and compensation for employees — a change not adopted until at least the next Royal Commission in 1974 — if then.

Moyal tells well the story of the innovation of radiotelegraph but not radio telephony. After early demonstrations, the Government "deliberately delayed" the innovation of radiotelegraphy until 1909 and then with a push from the Navy. The authorising bill spoke for its use for defence, the use by merchant shipping and for saving life and property at sea. An Act had been passed in 1905 giving the Government absolute control over the use of the radio spectrum but allowing for licenses for experiments. Funds were provided for stations at Sydney and Fremantle and before World War I, wireless stations appeared around the coastline. They were linked to a chain which ran to Ceylon and South Africa to London. The PMG Department gladly relinquished operational control of the Australian radiotelegraph system to the Navy in 1915 and did not want it returned after 1918. This schism was to haunt Telecom, culminating in the efforts of OTC to help the private sector dismember Telecom in the gold rush based on DOMSAT, 1973-83 (p.348). This curious blindspot in the telecommunications administration increasingly influenced by engineers is not explained. Nor does Moyal ever deal with the radio spectrum as a resource or examine the subsequent policy for radio frequency allocation in Australia. She tells us at several points that radio spectrum management has remained vested in the PMG, and we learn that at one critical stage in the struggle over DOMSAT, the PMG's veto of use of a particular frequency was crucial to a major politico-economic decision. The radio spectrum is to telecommunications as is water to fish, soil to plants. And its management is no sterile, neutral process; it is political in every sense of the word.

From this point our analysis takes a categorical more than chronological form. And because telecommunications technique has been the most conspicuous feature of Australian communications, we trace the successive 'enhancements' of the network system. The first generation of telephone technique, as noted above, was limited to local and suburban calls.

The first enhancement spanned innovations from the 1920s to the early 1970s which affected telephone transmission by maintaining signal strength regardless of distance (the vacuum tube, or valve, in the 1920s), and by providing increasing abundance of channel width (coaxial cables and micro-wave automatic relay links, from 1959). It

affected exchanges by substituting in the 1960s the cross-bar automatic switching for the mechanical Strowger switching which the PMG had adopted in 1912. The cross-bar switch automatically selected the best available transmission path, but lacked the versatility of the fully electronic switches which belong to the second enhancement. Essential software was added to the switched telephone network in the form of a national (and international) plan for area codes for exchanges in 1958, together with automatic subscriber toll dialling. Access to the switched public telephone network was provided in 1950 in interconnection by radiotelephone with police, taxi and ambulance mobile units, and by permitting private manufacturers to sell, rent and interconnect PABXs (private automatic branch exchanges) for customers' premises. For telegraphy, the innovation of transmission by carrier current and electromechanical multiplexing expanded the transmission capacity of open wires by a factor of eight in the 1920s. Teletype printing and wire-photo were innovated in the 1920s. The telex switched telegraph printing system was innovated in 1954, and automatic switching of telegraph traffic by reperforators in 1958. The long duration of the second enhancement permitted the incremental absorption of the capital cost of the innovations without drastic changes in subscriber rates. The rate for a local call rose slowly from one penny in 1915 to four in 1959 — an increase probably much less than increases in the Australian general price level.

The second enhancement began in the mid-1970s when electronic switching was introduced. It was qualitatively different from previous switching equipment. The difference lay in the versatility and power of its uses. As applied within the Australian telecommunications network, in addition to switching *per se,* the computers within it could provide computerised billing and charging, and the capacity to diagnose and locate faults in the network itself. First applied to central city exchanges and the links between them, it was then applied to local exchanges. Revolutionary as these changes within Telecom were, it was the fact that the same computer capabilities could be built into the PABXs within business, military and government premises which ushered in the 'information society'. A PABX "offered an entire management system for data networks . . . the hub of the office of the future. Word processors, minicomputers, facsimile transmission units, store-and-forward message devices plugged into it and the integration was seen as a transformation of office technology . . . a phenomenon whose importance is comparable to the beginning of railroads or aviation" (p.359). It made the explosive 'interconnect' market so alluring that the ensuing gold rush was only stopped from gutting Telecom Australia by the perhaps fortuitously timed election of the Hawke Government in 1983.

By the early 1980s, Australia's Telecom had developed a comprehensive system serving the various segments of the society with an efficient, and diversified kit of services. It had even developed in its own research laboratory a terrestrial digital radio system to serve the outback; it would bring private line, automatic telephone service to the 44,000 people in remote areas (half in the far Northern area who were two-thirds aboriginals). Service to these people required heavy cross-subsidisation from profitable areas. Its telephone penetration ranked third in the world in residential telephones (exceeded only by the US and Canada) and in business telephone customers (exceeded only by the US and Japan). As Moyal says, it had earned a leadership role among Third World countries, especially as to long-line internal communications. She does not offer analysis of the effects of telephone comparable to that of Du Boff regarding telegraph, but no one has done that in other highly industrialised countries either.

Contributing to this development were four other forces of production which may be mentioned briefly. Indigenous R and D, professional training and domestic manufacturing capability were underpinnings for Australia's autonomous growth. The Royal Commission of 1908 had recommended that the PMG develop capability for inventions and some manufacture. During World War I, PMG workshops produced some equipment (which ended after the war in 1919) and there was a start in private sector manufacturing with the advent of AWA as a nucleus which was accelerated during the 1930s with the addition of plants operated by subsidiaries of the British Standard Telephone Company (an ITT subsidiary itself), and the Dutch Philips company. The PMG created its own research laboratories in the early 1920s — "the nucleus of advanced telecommunication studies in Australia" (p.125). At the same time, the PMG implemented another recommendation from the 1908 Royal Commission that it develop in-house training for engineers — when it offered work-study programmes for young cadet engineers. In the 1950s the universities began producing electrical engineers. Responding to the cessation of imports during World War II, the PMG designed, manufactured and assembled a four-channel voice frequency carrier telegraph system which was operational by 1942. Radar adapted to tropical conditions was independently developed by the combined efforts of the PMG laboratories, the Council for Scientific and Industrial Research, Sydney University and the AWA. Moyal notes that the PMG in 1963 developed the consistent practice of procuring equipment from the private sector by competitive tenders. This is a practice conspicuously absent from the practice of the major telecommunications companies in the US and Canada, which, until the early 1980s, procured non-competitively from their own subsidiaries (and in Canada the BC Telephone Company still

does). Thus, it is refreshing to find that when the issue of substituting cross-bar switching for Strowger arose, the PMG comparison-shopped the English, Belgian, French, West German and Swedish suppliers and having decided on the Ericsson system, required that the switches be manufactured in Australia. The innovation of electronic switching in the 1970s spurred growth of its indigenous manufacturing industry. By 1975, she says of this industry:

> Their ownership and the distribution of their share capital was remarkably evenly divided between Australia and overseas. Of the 36 major [companies] . . . 13 were companies owned wholly overseas (with a share capital of $37.5 million); 11 were Australian owned (with a share capital of $39 million); while ten companies were partly overseas, partly Australian owned and had a total share capital of $92.5 million, $42 million of which was centred in Australia. (p.357)

From a Canadian standpoint, this appears to be a low degree of foreign control, although, as Crough and Wheelwright remind us, "Australia now has the highest level of foreign ownership and control of all advanced countries of the world except Canada. . ."[7] When the chips were down in the public/private ideological struggle over Telecom in the 1970s and 1980s, the telecommunications industry proper (except for the computer industry) was not "substantially" among Telecom's critics (p.356). In the context of that struggle, I find it surprising that Moyal is surprised (p.366) that the role of Telecom Laboratories in contributing substantially and consistently to the development of techniques has been unappreciated. She summarises an impressive record of their creative achievements, including R and D work on solar power and wind power and their innovation (pp.368-70). For this neglect, the mass media may be responsible: government ownership, according to capitalist ideology, is not creative or innovative.

The mass media's role *vis-a-vis* Australian development and in relation to Telecom is a weak area in the book. She gives scant attention to the relation of the press to telecommunications beyond noticing the enthusiasm with which the press exploited telegraphy. Her treatment of the process of innovation of radio broadcasting and later of television is inadequate. There is an inherent symbiotic relation of the press (and later broadcasting and TV) to the telecommunications system; a relation which has both implicit and explicit elements of mutual conflict and support. And the mass media, by mobilising public attention and opinion, have been a powerful force in producing Australia as it now is. It would be interesting to read a study of the relation of the mass media to industry and advertising, to political parties, to salient national issues, and to the

role of Telecom over the past 150 years in Australia. But she doesn't deal with that tantalising process.

By contrast, Moyal gives consistent and insightful treatment of the role of women in relation to the production of telecommunications (and postal) services. We see here the exploitation of the weak position of women in the market, where telephonists were paid poorly and in general victims of male chauvinism in the hiring and training programmes of the PMG. Her treatment of the history and activities of trade unions is also excellent. She also acknowledges the discriminatory and hostile treatment generally accorded the aboriginals in the 19th century.

RELATIONS OF PRODUCTION AND TELECOMMUNICATIONS

In essence the relations of production concern who gets what out of society. This issue is always intertwined with the development of the forces of production in a dialectical process. The relations are evident in the nature of institutional structures and the policies by which they work. For our purposes, they will be discussed with respect to the question of ownership of the telecommunications and postal institutions, and to the matter of who pays for the services performed.

The Australian colonies followed the mother country practice of establishing a public institution to operate the postal service, though initially they were mostly farmed out to private enterprise. By 1850 they were all colonial government institutions. The telegraph was innovated by the PMGs, except in Western Australia where private ownership continued until 1873. The telephone was innovated by private enterprise first in Melbourne, but soon taken over by the PMG. In at least one other colony (Tasmania) it was initiated by the PMG. By 1900, the entire telephone system was publicly operated. Radiotelegraph was innovated, under Navy prodding, by the PMG in 1910. Stations were built under a contract with a private sector syndicate, Australasian Wireless, with the British Marconi Company a half owner, which upon cessation of Navy operation, was returned to AWA for operation, with the government holding half the shares of stock. AWA then proceeded to innovate radio broadcasting. The Post Office monopoly of telecommunications was broken, and while AWA would be bought out by a statutory authority, the Overseas Telecommunication Commission (Australia) in 1946, the monopoly was not regained, with the consequence that OTC, which controls overseas telephony and telegraphy, would 30 years later be in the vanguard of the private sector's thrust to privatise Telecom.

Moyal, referring to TV broadcasting, says, ". . . why did Government relinquish its monopoly control of a new mass medium in a way it had never dreamed of doing with telephony and telegraphy?" (p.195). Surely the answer was that in allowing private participation in

radio-telegraph operation and the substantial privatisation of radio broadcasting, it had allowed the private sector, especially the advertising segment, to establish a power position with parliament which guaranteed that TV broadcasting would follow the radio broadcast institutional pattern. To be sure, there was a struggle for a public TV system. The Labour government in 1949 said just before its defeat by the Menzies Liberal-Country Party Coalition:

> We decided to make television a national monopoly . . . because we believed that the harm that had been done in the field of commercial [radio] broadcasting by those who had been lucky enough to get licenses and who had exploited the public should not be repeated in the field of television. (p.196)

A broad spectrum of educationalists, churchmen, businessmen, economists and newspapermen opposed the replication in substance of the hybrid institutional structure of radio in TV broadcasting — in vain. The model adopted for TV resembled the British model in regard to ownership and technical operation of the broadcasting equipment: that went to the PMG; as to programming, the model roughly was the same as the Canadian, once Canada had a regulatory commission. The author wryly remarks, "Apart from the pressure for rural interests there was no real lobby for Australian television except for those who wanted to sell" (p.198). The profits accruing to advertisers, advertising agencies (half of which are American), and commercial TV broadcasters would later strengthen the private sector in its push to privatise Telecom.

In the late 1970s, a classic example of the interaction of the forces of production with the relations of production took place over essentially one phenomenon: the advent of computerised telecommunications and the great surge of what I call 'consciousness industry' to profit from it.[8] Moyal deals with the struggle as if it were two separate struggles: one over acceptance by organised labour of automation, and the other over DOMSAT. They were two sides of the same coin.

First, the automation/worker struggle. Scientific management (and the engineering component set the ethos for Telecom's management) had dealt severely with the labour resources which made the system's operation possible. At each enhancement of facilities, workers were laid off. Thus, the introduction of reperforator telegraph switching reduced the number of telegraphists from more than 16,000 in 1954 to 500 in 1980. And the automatic exchanges kept the number of telephonists (female) roughly constant from 1950 to 1980, while the number of telephones in service rose about seven-fold. These changes took place without much challenge. However, the innovation of electronic switching threatened Telecom's technicians for whom it meant ". . . de-skilling, and except for a small elite corps of trained

specialist staff at the maintenance centres, loss of job satisfaction, lower classifications and reduced career paths" (p.320). Management failed to consult the union about the impact of computerised automation, a dispute arose in 1977-78 and a nationwide strike ensued. "The business community, prime target of the union bans, suffered severe dislocations. . ." (p.325). The dispute threatened to move from one between Australia's largest employer and the key union of the information age to one between government and the country's trade union movement.

> As the crisis sharpened, the press played an influential role . . . the technicians case [was] an evolving picture for a beleaguered group. . . From the outset the media and the public were sympathetic to the workers' cause. The tide of computerisation was already lapping at the doors of other institutions, challenging banking, clerical and insurance employees and the very newspaper itself. (p.324)

The government was tough, alerted the army to assist emergency communications, and threatened to deregister the union. The press swung over to support government. The dispute was resolved through arbitration on the intervention of Robert Hawke, president of ACTU. The outcome could have been negotiated before the dispute arose, and the author blames Telecom's ". . . engineering orientation tied to economic factors that hitherto unchallenged, had shaped Australia's development for the past 130 years" (p.321). The policy issue at stake, according to Moyal:

> In a period of high unemployment, should a statutory authority like Telecom have the right to steer its organisation into new technology that would reduce the community's store of jobs without proper evaluation of the issues? And why had the Government given no attention to the repercussions of technological change in the service sector? (pp.329-30)

It is refreshing to find that the author of a semi-official history of an important country's telecommunications system could so carefully delineate this major episode of class struggle.

The other side of the coin was a powerful assault aimed at privatisation of Telecom. I disagree with Moyal's interpretation of Telecom's near-defeat in the struggle to preserve public ownership of the substance which Telecom had come to be. She interprets the event in terms of bureaucracy and technology. It was not that "Telecom had suffered a self-imposed defeat" (p.349) or that during the last months of the Fraser government "the reign of Australia's terrestrial telecommunications was coming to an end" (p.354). Moyal had given us the clue to the explanation of the episode. "The overseas telegraph evolved as the medium of speculative investment in the Colonies"

(p.62). If one pieces the parts together (which are scattered over several chapters), it appears that the advent of computer-controlled PABXs opened up a qualitatively new area for the productive forces available to private businesses; and that a well-orchestrated scenario to dismantle Telecom, led by the speculative forces behind OTC, unfolded. A coalition of private sector telecom lobbyists, related to the lobby which prevented the merger of OTC and Telecom in 1974, worked closely with the Liberal/Country government of Fraser who ". . . identified with the [satellite] project from the start" (p.348). It included, pivotally, OTC, the Professional Radio and Electronic Institute of Australia (OTC employees), the Overseas Telecommunications Users Association (OTC customers), the Sydney Chamber of Commerce, the computer industry headed by IBM (which organised an inter-industry lobby group, Business Telecommunications Services, in September, 1980), Hughes Communications International, Kerry Packer and other big TV operators, the military and their industrial allies. This coalition with inside connections monitored the report of the special satellite task force within Telecom as it matured between 1972-77. And the privatisation policy it wanted emerged from four successive studies or committees.[9] The reason why the offensive failed is not the technology of Telecom, but because of the stubborn opposition at each stage of the struggle mounted by organised labour, by the Telecom bureaucracy, and ultimately by the Australian people, who in March 1983 voted the Fraser government out and the Hawke government in. The Hawke government promptly stopped the offensive before structural damage was done to Telecom. For this the people may thank the tyranny of distance which sheltered Australia's damaged autonomy from the domination Canada experiences — for the *lack* of distance from the US. The aftermath is not clear from the book. Presumably, DOMSAT was innovated. But unlike the Fraser plan, AUSSAT is wholly government owned. A hotly disputed issue was whether Telecom would be permitted to offer videotex; that was permitted as of 1984.

It is almost a truism that colonies going through vigorous growth indulge in a limited amount of state socialism in order to get going. Moyal remarks that "Colonial socialism . . . had long been a conspicuous feature of the Australian colonies, encouraged by both entrepreneurs and wage earners in their own different interests" (p.90). The story I read in her book suggests that public ownership of Telecom has been and will be threatened by the private sector, aided by the ideologically slanted agenda-setting by the commercial mass media. It has been supported, up to now, by several forces: the inertial power of the Telecom organisation, the principled and energetic efforts of labour organisations and the basic democratic tradition and

political realism of a majority of the Australian people. The last sentence in the book seems to say as much: "Where we are going, and into what future, depends on every one of us" (p.388).

Who gets what out of the public corporation, PMG, divided in 1975 into two statutory bodies, the Post Office and Telecom Australia? Who pays how much for its services? This issue, which runs through the history of the services, requires examination of the fiscal policy which the state socialist enterprise(s) would follow. In the given capitalist context, the principal contradiction encapsulated in the PMG was stated by Drake in 1901: a public organisation's objective was service to the public, while a private enterprise must seek to maximise its profits. Australia was committed to the former, *but* it should be run ". . . as far as possible on business lines" (p.90). The contradiction inescapably continued. The first statement of the policy which in principle was later followed, that of the 1908 Royal Commission, was that:

> . . . the country's communication system should be treated as 'a complete financial proposition' in which those parts of the service that made a profit should sustain and cross-fertilise those that did not. City people would produce profits that the PMG should spread, using them to provide services to the countryside. States with large populations and large volumes of business should make up losses on services in less populous States. It was an extension of the concept of cross-subsidisation of areas and services (already apparent in Colonial post and telegraphy days) to the federated States. (p.101)

How, in fact, have rates been set? They have been set by the political process (governments, legislators, interest groups, and the administrative staff of the APO-Telecom). It was a viable procedure as judged by the public service system it governed. Of course, multi-product firms in the private sector practice cross-subsidisation commonly and reject fully-allocated costs as the proper basis for pricing. Cost accounting in practice has a short history and the fact that the PMG in 1910 had accounting practices which were non-existent or incomplete also existed commonly in the private sector (Henry Ford's automobile company was a conspicuous example). Not until 1979-80 did Telecom's annual report publish data regarding cross-subsidisation from urban to rural services.

Beginning about 1959 a subtle ideological attack was launched against the mode of operation of the APO-Telecom. In that year an Ad Hoc Committee of Inquiry required the PMG to use annual budgets. From then on it was required to pay interest on capital funds which it had previously drawn as needed from the Treasury without interest charges. The ideological effect of emphasising scientific management and of mystifying machines as 'technology' practiced by

Telecom's dominant engineering component carried a clear, if unnoticed by Moyal, ideological thrust. The whole point of scientific management is to increase profits through rationalising organisation and replacing workers with increasingly automatic machines. We find much being made of the fact that the PMG paid no taxes. Moyal quotes approvingly Jonathon Pincus: " 'No private business of its size would have survived as long as did the Post Office in its first stage when it drew upon the taxpayers' " (p.257). Unless the PMG is a private business and if the PMG is performing overall an operation motivated by public service rather than profit, why should it pay taxes and not the military, police departments and fire departments — for they too perform essential services uncontrolled by the profit incentive? The offensive was pushed further by the 1974 Royal Commission. It qualified the previous policy of favouring cross-subsidisation, saying there was " 'a tolerance beyond which cross-subsidisation of a minority of customers at the expense of the majority of users should not be extended . . . the tariff structures should not reflect a gross distortion in favour of some categories or classes of users of a service at the expense of the majority of customers of the APO' " (pp.271-2). And its spokesman told the press " 'We thought the boards of these new organisations should be charged with running an efficient show and making an acceptable profit' " (p.277). Efficiency has at least several meanings, but the ideological thrust was obvious. Specifically as to rates that Commission directed that:

> . . . the aim should be to minimise, as far as possible, major distortions in financial performance; tariffs for an individual service should be set to recover at least its direct cost even though revenue may not always be sufficient to match fully allocated costs. (p.273)

It opposed government subsidies to offset losses on particular services.

If this view of the fiscal accountability of the APO-Telecom public institutions is taken, what are we to say about the way cross-subsidisation has worked? Regarding the period to 1910, Moyal reports that in the 19th century the postal service ran a deficit (p.11). But she says that in the 19th century the telegraph departments more often were in the red than the black (p.33). Both statements might be correct if taxpayers subsidised both, but she doesn't deal with that possibility. Moreover, she reports the Royal Commission of 1908 as finding that the postal service had subsidised both telegraph and telephone services (p.101). Given the accounting practices in use, probably one will never know what the inter-service cross-subsidies were before 1959. It does appear clear, however, that the press received a subsidy (either at the expense of other telegraph and

telephone users or the taxpayers) of substantial size from telegraph and cable rates. Moyal says that in the 1850s, South Australia allowed the press a "special rate" (unspecified) for their heavy traffic on domestic telegraph (p.31). It is possible the same was true of other Colonies. And she gives the tariffs for both straight and press rates in 1891 for the heavy traffic which the press enjoyed on the submarine cable to Europe. The press rate amounted to 1.8 per cent of the straight rate (p.65). The resulting subsidy was borne either by other users of the telegraph and cable, by the postal service, or by the taxpayer. There is also the question (on which she throws no light) whether the press enjoyed preferential rates on postal service as has been common practice in Canada and the United States and other countries. So profound is the symbiotic relation of the mass media (in this case the press) that it would be interesting to hear whether such a subsidy was ever challenged or justified.

We may pass over the confused information regarding the details of telephone rates which she presents and isolate two issues: the probable subsidy which telephones have given business customers at the expense of residential customers; and the treatment which Telecom gives business users of the 'enhanced' services as against plain old telephone service (POTS).

According to Moyal, business users paid the same rates for POTS as did residential users of the telephone until 1934, from late 1934 to 1941, and from 1964 to 1974. Briefly in 1934, from 1941 to 1964, and since 1974, business rates were higher. The book does not explain what this means. It may mean that business users paid residential user rates for lines to both POTS instruments and privately operated PBXs. If this was so, it represented a substantial subsidy from residential users to business customers. I call it a subsidy because on rate-making principles employed in the United States and Canada, a much higher rate was charged business than residential users, and for one good reason: value of service. Business uses the telephone as one of the nondurable producer goods on the basis of which it conducts its business and earns profits; residential customers are end-users of a service which has no usual profit results. If I have correctly interpreted Australian practice, as filtered through Moyal's cloudy lens, this has been a very substantial subsidy indeed.

The second issue concerns the basis on which rates are determined for residential users of POTS as against users of the enhanced services. As Australians know well, the enhanced services are many and wonderful, but they also require that exchanges and related equipment be rebuilt to accommodate computer-switched voice and data services. The capital investment to modernise the local switched network to accommodate the broadband and digital services is very large. To charge POTS users with depreciation and interest on this

new investment for the benefit primarily of the business and government users of the enhanced services is manifestly inequitable to the POTS users. Inasmuch as one telecommunications administration tends to borrow uncritically from another (particularly if the other is the United States), the question arises as to whether in Australia, the residential user is or will be expected to bear most of the cost of the second great enhancement of the telephone system. In the US and Canada the remaining days of universal telephone service now appear very short indeed, for residential customers simply cannot afford the rate increases which the telephone companies wish to impose on POTS users (in the order of 150 per cent increase over a five year period). In North America the propaganda basis on which the proposed increases are justified is the myth that local telephone service has been historically priced at below-cost levels, and that it has been subsidised by the long distance service. The truth is that the whole of the overhead and joint costs in the local exchange service areas has been charged by the companies to local service, while the toll services have had a free ride on direct costs only. Of course, the overhead costs of the local service are properly joint costs, and along with obvious joint costs should be shared by local and long distances services. But the myth that local-service-has-always-lost-money and has been subsidised by long distance service has been well and deeply implanted. It would be surprising if it had not spread to Australia.

In concluding this analysis, some comparisons with Canada may be in order. The most basic fact is that more than 80 per cent of the Canadian population lives within 100 miles of the US border. The majority of them are Anglophones with a history of powerful cross-border ties in commerce, industry, finance, entertainment, labour unions, churches and educational institutions. A high proportion of textbooks in our universities are US-written and published, and US universities since World War I have educated many of both the US-born and Canadian-born members of Canadian faculties. There are two mainstays for an autonomous country: control of its military, and communications. Canada gave up control of its military informally soon after World War I and formally during World War II and never regained it. Our telecommunications operating system is on the private ownership model and closely integrated with the standards and practice in the US — with a small marginal difference. The three prairie provinces have Crown corporate form for their telecommunications carriers, but the only difference between their policies and those of the privately owned carriers is in more generous cross-subsidisation from urban to rural areas, and the fact that their dividends go into public treasuries. The remaining marginal difference is TELESAT, the Canadian satellite corporation. While it is partly Crown owned, the existing telephone carriers own a substantial part

of its shares. Until quite recently, it has leased satellite circuits only in large transponder bandwidths, excluding all users except the telephone carriers and the Canadian Broadcasting Corporation. It has never had the opportunity to act independently towards efficient commercial development of satellite services. Consequently, its capacity has been mostly idle because the terrestrial carriers prefer to use their own networks on which they earn a return. Some benefits have resulted from extension of services to locations not otherwise serviced, but Professor William H. Melody writes that these are very modest benefits as compared with the enormous cost and great potential of the satellites, and concludes that they are well on their way to becoming Canada's 20th century pyramids.

Our domestic manufacturing of telecommunications equipment has been hamstrung by the fact that Northern Telecom Ltd. is a subsidiary of the giant Bell Canada Enterprises, whose telephone operation serves a high proportion of the market. The latter procured its equipment mostly from the former at non-competitive prices. British Columbia Telephone Company, serving that province, is a subsidiary of the US GTE empire and also buys from its own subsidiaries. Like many other countries, Canada has showered subsidies on firms which it hoped would make it a contender in the international high-tech electronics markets. The result has been that when they become successful they tend to move their manufacturing to the US or to cheap labour market areas. The Progressive Conservative government has used this fact, and the tendency for the US to raise tariff barriers, to promote negotiation of a policy of free trade with the United States. In the area of data and information systems, Canada and the US have agreed that Canadian firms may access the US Satellite Business System, which means they will use data bases in the US. A few years ago, our Post Office took the form of a statutory corporation, but its service has deteriorated simultaneously with its increased automation. The result is that speed of service of the old Pony Express compares favourably with airmail now in Canada. Inevitably a host of private courier services has now entered the market at rates which are multiples of the former (and even present) standard airmail rates. Regarding Canadian mass media, the following figures for the percentage of foreign content are eloquent. For TV (in English), 70 per cent; TV (French), 46 per cent. Film for theatrical market, 98 per cent; film for TV market, 93 per cent. Radio (AM) music, 70 per cent; FM music 70-90 per cent. Records, 93 per cent. Books, 80 per cent. Magazines, 71 per cent. Newspapers, foreign news, 95-100 per cent.[10] In the light of this situation, the CBC faces drastic reductions in its budget and perhaps dissolution.

To sum up the Canadian scene, our national policy on communications has been schizophrenic on several levels. It has spent

hugely to subsidise the production of telecommunications hardware, but it has never spent the funds necessary to produce programme content which would hold viewers' and listeners' attention to Canadian stations in preference to the US TV programmes available to cabled homes (Canada, with 78 per cent of households connected to cable TV, is the most cabled country in the world). The population's political orientation reflects this assimilation to the US. In the second sense our national policy is schizoid in that over the past half century there has been a procession of royal commissions, and innumerable government policy statements — all emphasising the need for Canada to have a communications system which will build Canadian identity, bilingualism, etc. Unfortunately, our governments have never backed these lofty goals with the material support necessary to achieve them. In fact, Canada has never controlled its own communications policy. It moved around 1920 from being a British towards being an American colony.

In the light of our Canadian context, it may be appreciated why it was difficult for me to get 'inside' the Australian scene enough to deal with Ann Moyal's book as if I were an Australian (itself a fate I have often coveted). In matters of telecommunications (and others too), Australians should cherish their evidently sturdy democratic and relatively autonomous condition, to which *Clear Across Australia* is a valuable witness.

NOTES AND REFERENCES

1. If one examines the more responsible books and articles on 'technology' in search of a viable definition, the first thing noticed is that most writers don't bother to define it at all, which is a good way to contribute to the growth of a myth. Then when one finds some responsible writers, it turns out to be a new kind of society. If you press Ellul to find out where it comes from, the answer is lost somewhere in theology — perhaps it is best traced to God. At this point notice that his starting point is a quite material thing: a comparison with pre-existing society — the one we had until about a century ago. And second, notice that there is determinism involved: we are invited to submit to, not argue with, the new order. Ellul helps create the myth enormously. Other experts offer a seemingly hard-nosed material base for their analysis of our society — e.g., McLuhan and Harold Innis. For them, engineering devices (e.g., printing, radio, TV) miraculously appear on the historical scene and provide a 'technological' determinism to govern change. How and why they emerged is not pursued by these idealists. But the weight of critical opinion seems to be that 'technology' is just a cover story for 'capitalism', 'modernism', 'industrialism'.

2. Gerald Long, *InterMedia,* 9, 6, 1981, p. 23. See also Guy Debord, *Society of the Spectacle,* Black and Red, Detroit, 1970.
3. D. Ball, *A Suitable Piece of Real Estate: American Installations in Australia,* Hale and Iremonger, 1980.
4. Leslie B. Tribolet, *The International Aspects of Electrical Communications in the Pacific Area,* John Hopkins Press, Baltimore, 1929.
5. Richard B. Du Boff, 'The telegraph in nineteenth-century America: technology and monopoly', *Comparative Studies in Society and History,* 26, 4, 1984, pp. 571-86. The internal quote is from A.D. Chandler, *The Visible Hand,* Cambridge, Mass., 1977. See also R.B. Du Boff, 'The telegraph and the structure of markets in the United States, 1845-1890', *Research in Economic History,* 8, 1983, pp. 253-77; R.B. Du Boff, 'The rise of communications regulation: the telegraph industry, 1844-1880', *Journal of Communication,* 34-3, Summer 1984, pp. 52-66.
6. *ibid.,* p. 583.
7. Greg Crough and Ted Wheelwright, *Australia: A Client State,* Penguin Books Australia Ltd., Ringwood, Victoria, 1982, p. 1.
8. Dallas W. Smythe, 'Capitalism, advertising and consciousness industry', *Media Information Australia,* 31, February 1984, pp. 20-5; Dallas W. Smythe, *Dependency Road: Communications, Capitalism, Consciousness and Canada,* Ablex, Norwood, NJ, 1981.
9. David Bond (US consultant) report for Packer and Fraser, Summer, 1977; Government Task Force (chaired by White, the senior executive of OTC), 1977-78; a government working group, 1978-79; the Davidson Inquiry Committee, 1981-82. The government also commissioned a report from the consulting firm, McKinsey & Co.: the report which was favourable to Telecom and was supressed.
10. See Robin E. Mansell, *Contradictions and Illusions: The Canadian Communication Policy Experience,* forthcoming publication, 1986.