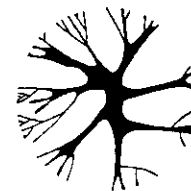


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Communication, Technology, and Culture

“...from the alphabet to the motorcar, Western man has been steadily refashioned in a slow technological explosion that has extended over 2,500 years. From the time of the telegraph onward, ... Western man began to live an implosion. He began suddenly ... to play the movie of his 2,500 year explosion backward”.

In characteristically vivid imagery Marshall McLuhan in *Understanding Media* expresses his belief in the power of technology to transform culture. McLuhan's words raise a host of questions about the complex interrelationship of culture, technology, and human consciousness. Questions such as: does technology determine cultural change? how do changes in technology alter patterns of communication? what is the effect on human consciousness and culture of rapid technological change? and, most importantly, can human beings control the rate and direction of either cultural or technological change?

All these questions seem especially pertinent in an age that is constantly presented as a period of transition to a new society and culture. In the face of the exhortations and warnings concerning the coming 'information', 'wired' or 'post-industrial' society, people in all societies need to be able to stand back and examine their relationship with technology. The rhetoric of progress, of doom, or even of Utopia, is no substitute for reflection. This issue aims to assist that process of reflection by bringing together and analysing some of the recent research that attempts to elucidate the significance of technological change in communication for the lives of individuals, cultures and societies.

I: Communication Technology and the Transformation of Culture

Walter J Ong. *Orality and Literacy: The Technologizing of the Word*. (London: New York: Methuen, 1982).

How do communication technologies affect the ways in which people think about and perceive the world? Do communication technologies determine cultural change?

In his book, *Orality and Literacy*, Walter Ong (Dept. of English, St Louis Univ., MO 63103, USA) attempts to throw some light on these questions by exploring the psychological and cultural differences between societies with and without the technology of writing. One reason for studying writing is that in modern literate societies it is so familiar a tool of ordinary social communication and so taken for granted that it is hard for people to consider it a technology at all. And yet writing is a sequence of skills that has to be learnt; it requires the use of tools (pens, pencils etc), materials upon which those tools can operate (paper, clay etc) and other equipment (ink, paints etc). In Ong's view the reason that writing is not usually thought of as a technology is that over 2,500 years the human mind has adapted itself to the demands made by writing so that the artificiality of writing has come to seem completely natural. Human consciousness has successfully interiorized a basic technology of communication.

The Bias of Communication

The consequences of this technological penetration of the human psyche have been explored by a number of other scholars, most notably the two Canadians, Harold Innis and Marshall McLuhan. In two books, *Empire and Communications* (1950) and *The Bias of Communication* (1951), Innis argued that technologies of communication bias individual perceptions of reality. He also argued that different technologies favour different forms of social organization and control over knowledge. Thus, for example, in oral cultures people perceive and interpret the world through the spoken word, and intellectual and cultural power is held by a priesthood which preserves the oral tradition. By contrast, literate people find the world mediated by written or printed texts, and because tradition is no longer so important, control over knowledge is exercised by a variety of secular powers: political or commercial.

These basic ideas were taken up and elaborated by Marshall McLuhan, notably in *The Gutenberg Galaxy* (1962) and *Understanding Media* (1964). McLuhan claimed that the modern media (radio, tv, film etc) were bringing about a shift in human

perception comparable to that initiated by the invention of writing. According to McLuhan, technologies are the extensions of human senses, and as such act as filters of the data of everyday experience. Writing and print had accentuated the dominance of sequential, logical, and visual modes of perception over the more intuitive, symbolic, and aural experience of oral culture. McLuhan emphasized that oral culture was a "magical world of the ear", and written and printed culture a more "neutral visual world". The world opened by the electronic media is in turn a new kind of audio-visual environment in which eyes and ears are being bombarded with ever increasing amounts of information and sensory stimulation.

Electronic Media and Secondary Orality

The new oral culture which McLuhan sees emerging as a consequence of electronic media is characterized by Ong as a secondary orality. This is quite different from the 'residual' orality found in cultures in which writing and reading are special skills practised by only a few people. Modern cultures are wholly conditioned by literacy.

The consequences of this cultural domination of literacy is that the modern mind cannot escape the transforming power of writing.

From their earliest days in modern Western societies (and at various stages in their lives in less technologically or economically complex societies) people are taught how to interpret and use the written word. Literate people have access to a growing store of knowledge and experience unavailable in pre-literate cultures. Moreover, by being able to fix and to scrutinize their own and other people's thoughts in written form, literate people develop a more self-aware, questioning, detached and 'objectivizing' frame of mind. As a result, literates become more conscious of themselves as individuals. Even the young people who attend huge rock music concerts and who experience a powerful sense of group identity at such events are individuals first and group members second. Though such people may not read a great deal, and may write even less, they carry their literacy with them into McLuhan's new electronic 'global village'.

Innis, McLuhan, and Ong suggest that communication technologies are not simply external instruments, but extensions and transformers of human thought. In a sense, therefore, communication technologies are determining factors in cultural change — but less as external forces than as internal structures of the human mind.

II: Communication Media in Perspective: The History of Technology

The speculations of Innis, McLuhan, and Ong prompt one to ask how new communication technologies become established in society and what are the specific historical consequences of technological change. Two historians who have recently explored these questions are Elizabeth Eisenstein and Daniel Czitrom.

Eisenstein has tried to determine the specific consequences of the 15th century shift from script to print, and Czitrom has explored how the telegraph, the wireless and the motion picture were integrated into American popular and intellectual culture.

Printing: A Communication Revolution

Elizabeth L Eisenstein. *The Printing Press as an Agent of Change: Communication and Cultural Transformations in Early Modern Europe*. 2 vols. (Cambridge: New York: Cambridge University Press, 1979).

Elizabeth Eisenstein (Univ. of Michigan, Ann Arbor, MI 48109) argues that the invention and expansion of printing helped cause a diverse set of cultural and social transformations that together constituted a communication revolution. This revolution was felt primarily within the Western European 'commonwealth of learning'. Between 1450 and 1700 methods of collecting, storing, organizing, and disseminating knowledge were altered fundamentally and irrevocably. Eisenstein discusses the impact of this shift on three major intellectual and cultural movements: the Renaissance, the Reformation, and the 17th century scientific revolution.

The Preserving Power of Print

A constant theme of Eisenstein's book is that the impact of printing was never simply in one direction only. Thus, though print was instrumental in ensuring that the 'new' learning of the Renaissance became a permanent part of European culture, it ensured also that the 'old' learning of the Middle Ages was preserved and made more widely available.

For both 'old' and 'new' learning, printing provided a new and relatively cheap method of reproducing multiple copies of the same text at the same time. In addition, these duplicated texts, whether of medieval romances or newly edited classics, were sold and distributed across Europe by an international network of publishers, printers and booksellers. Prior to print, texts could only circulate in manuscripts, and writing and copying manuscripts was a laborious, time-consuming, expensive, and notoriously error-ridden task. Only a few popular texts were available in more than a few manuscripts and destruction or loss of manuscripts might easily mean the irretrievable loss of valuable writings. Printing's

duplicating power meant that for the first time a revival of classical learning could be sustained and built upon as more and more scholarly works became available in not just one or two, but hundreds of copies.

Diversifying Belief and Standardizing Practice

As with learning, so with belief. Printing provided Protestant Reformers across Europe with a means of propagating their ideas. In pamphlets, prints, tracts, and learned books, and accompanied by vernacular editions of the Bible, the reformed religion undermined traditional Catholicism. Yet printing also provided a weapon to defend the Catholic Counter-Reformation. The Catholic counter-attack relied heavily on the use of standard printed texts of missals, breviaries, and catechisms to ensure that belief and practice were adequate, reliable, and uniform everywhere.

In a similar fashion printing helped new scientific ideas to come to birth and assisted the process of standardizing the expression of scientific knowledge. Copernicus, for example, was able to formulate his new theories of the solar system because printing had made it possible for him to consult and compare at the same time different explanations of the same phenomena. In addition these different explanations were increasingly using a common printed language of mathematical symbols, diagrams, charts, maps, and tables. The printed index made it ever easier to retrieve specific bits of information. The growth and standardization of scientific knowledge in turn seemed to make the natural world more predictable and science a truly objective and certain form of knowledge. In contrast, the printing of variant texts of Scripture seemed only to underline the subjectivity and unreliability of traditional religious beliefs.

Popular, Intellectual, and Commercial Responses to Communication Media

Daniel J. Czitrom. *Media and the American Mind: From Morse to McLuhan* (Chapel Hill, NC: University of North Carolina Press, 1982).

While Eisenstein explores the ways printing changed intellectual life, Daniel Czitrom examines how intellectuals, the general public, and business interests have perceived and responded to new communication media. Czitrom asks two basic questions: 1) how have American attempts to comprehend the impact of modern communications evolved since the mid-nineteenth century? and 2) what has been the relationship between these ideas and changing communication technologies and institutions?

Czitrom considers these questions in relation to three major communication technologies: the telegraph, the wireless and the motion picture, and three major intellectual traditions: the 'progressive' thought of Cooley, Dewey, and Park, the empirical behavioural research of Lazarfeld et al., and the 'holistic' theories of Innis and McLuhan.

Redefining Popular Culture

From Czitrom's analysis a number of central themes emerge. In the first place, the commercial exploitation of the telegraph, the wireless, and the motion picture interacted with changing popular tastes to redefine traditional popular culture. The telegraph's main impact on the popular mind was as a distributor of 'instant' news to the new sensationalist press across the country. The wireless soon became a vehicle of advertiser-supported popular programming, such as the radio 'soap operas', which blended old themes with new formats to create products appealing to all age groups and social classes. In the same way the movies transformed vaudeville and other traditional entertainment into a popular art form that had international appeal.

Utopian Hopes and Commercial Realities

Secondly, Czitrom demonstrates how in the case of the telegraph and the wireless popular 'Utopian' dreams were undermined by commercial realities. In 1848 the telegraph was hailed as opening up a new era of universal communication and community. Samuel Morse, the telegraph's inventor, spoke of it bringing the people of America into one 'neighbourhood', an idea which was echoed by sociologists Charles Cooley, John Dewey and Robert Park. The wireless too was hailed as an instrument of community-building which would link together individual amateur wireless operators into a nationwide network.

However, by the 1890s the telegraph was a joint monopoly of Western Union and the Associated Press news agency, and its primary function was to provide the new sensationalist press with up-to-the-minute news. Similarly, the amateur wireless dream was undermined by the advent of advertiser-supported radio broadcasting dominated by a few large networks. As Czitrom stresses, the end result was that commercial exploitation of these new media eventually came to be regarded as both inevitable and logical, so that the general public simply forgot its earlier dreams.

Celebrating, Criticizing and Serving Technology

The third major theme of Czitrom's study is the loss and rediscovery of 'holistic' thinking about communication, culture and technology. The intellectual tradition of Cooley, Dewey and Park was concerned to understand and come to terms with the new technologies (telegraph, wireless, movies) and their cultural impact. All three men hoped that these technologies might help re-establish a sense of local community in an America disrupted by urbanization, industrialization, and mass immigration.

The second tradition, that of the behavioural scientists, was more interested in understanding 'impacts' and 'effects' of new media forms. Researchers like Paul Lazarfeld answered the need of radio broadcasters to know more about their audiences by conducting large scale surveys. By the 1960s however this approach was challenged by 'critical' researchers, such as Theodore Adorno, who began to ask questions not only about the place of the media and media technologies in American culture but also about the role of the media in maintaining established social and political power.

The third tradition, that of Innis and McLuhan, is a return to the 'holistic' concerns of the earlier sociologists. The major difference is that both Innis and McLuhan saw changes in communication technologies as the central factor in historical development. Innis followed Cooley, Dewey and Park by being pessimistic about the value of mass popular culture and especially about the press. McLuhan on the other hand eventually came to celebrate the potential rather than criticize the limitations of the new technologies. In McLuhan's idea of the 'global village' one can, therefore, see something of a resurgence of the popular and intellectual 'Utopian' hopes first prompted by the invention of the telegraph.

III: Assessing the Present and Forecasting the Future

Following on from the work of Lewis Mumford (*Technics and Civilization*, 1934) and William Ogburn (*Machines and Tomorrow's World*, 1938) present-day scholars such as Daniel Bell (*The Coming of Post-Industrial Society*, 1973) try to forecast the social effects of new information and communication technologies. Such

predictions they hope will help society decide the pace and direction of technological change. The following analysis of the work of Pool and Mercier et al. indicates some of the strengths and weaknesses of modern technology forecasting and social impact studies.

Technology Assessment: Coming to Terms with Progress

Itihel de Sola Pool: *Forecasting the Telephone: A Retrospective Technology Assessment of the Telephone*. (Norwood, NJ: Ablex, 1983).

The dominant method of present technology forecasting is technology assessment or TA. It is a response to public concern about the 'unintended' effects of technological change, for example, radiation hazards associated with nuclear power stations, or the devastating 'side-effects' of drugs like Thalidomide. TA assumes that: 1) it is possible to assess and forecast successfully the consequences of technological innovation (including unwanted or unintended consequences) and 2) such knowledge will lead to

enlightened public action to shape and control technological progress for the common good.

A systematic TA research programme was first proposed in the US Congress in 1966, and in 1972 the Office of Technology Assessment (OTA) was set up. Since then numerous studies, including some on communication technologies, have been conducted. There have been research projects on mobile land communications, the computerization of criminal justice records,

and most recently, a study of the potential of videotex and teletext in the US.

Retrospective TA: Forecasting the Present

In addition, a number of studies have been devoted to the history of technology forecasting. These 'retrospective' studies aim to determine how successful past forecasters have been and to discover what makes an forecast accurate. The hope is that such studies will assist present-day TA exponents to improve their forecasting. A good example of such a 'retrospective' study is Ithiel de Sola Pool's *Forecasting the Telephone*, which is an inventory of 186 effects that were discussed, assessed or denied in the US, Britain, and Sweden, between 1876 and 1940.

The major conclusion is that the most accurate forecasts were made by people in the telephone industry who combined technical and economic market analysis. Alexander Graham Bell, for example, from the earliest days envisaged his telephone service as a universal point-to-point service connecting callers through locally based 'switch-boards' in turn linked by a network of long-distance lines.

Pool also points out, however, that forecasts based on technical and market analysis were most successful in the US. In other countries, such as France and Britain, other social factors were decisive. In France, for example, private telephone growth was held back by successive governments anxious to keep tight control of national telecommunications. Similarly, British governments restricted telephone system development in order to protect existing investment in the telegraph.

Pool concludes that US development of the telephone was, given certain practical technical constraints, 'determined' by entrepreneurial decisions as to what could be marketed effectively, what activities capital could be raised for, and what arrangements would allow efficient billing of subscribers.

The Limitations of TA

TA appears to have had only a limited influence on public policy. This may be because TA studies take place too late to affect the pace or direction of technological change. An even more basic reason may be that TA's main purpose is to legitimate existing economic, political and technical decisions.

This is the critique of TA offered by Jennifer Daryl Slack.¹ In Slack's view TA is based upon an inadequate 'symptomatic' model of the relationship between technology and society. In this model, technology is thought of as entering into a social system where institutional, social and cultural forces interact with it to shape its effects. For example, the telephone enters a particular social structure where it is used in certain ways, its effects depending upon these uses. What is missing is the social context within which the technology was developed in the first place. The telephone is not only a *cause* of change, but also an *effect* of social change. TA fails to consider what social and economic values are embodied in technological systems and so acts to deflect radical criticism of existing social conditions.

1 Jennifer Daryl Slack. 'Technology Assessment for the Information Society'. In Jerry L. Salvaggio, (ed.) *Telecommunications: Issues and Choices for Society*. (New York: London: Longman, 1983). p. 135-147.

Alternative Futures: Economics, Technology and Social Change

P A Mercier, F Plassard, V Scardigli. *La Société Digitale: Les Nouvelles Technologies au Futur Quotidien* (Paris: Éditions du Seuil, 1984).

The rhetoric of technological and economic progress characterizes the majority of books written to describe how industrial societies are becoming 'information' societies. The recent study by Mercier and Scardigli (at the Centre d'Etudes Sociologiques, 82 rue Cardinet, 75017 Paris) and Plassard (Laboratoire d'Economie des Transports, Lyon), argues, however, that such rhetoric is positively harmful. It tends to reduce the concept of information to the level of a mere consumer product transported by a variety of electronic systems, and assumes that new technologies are responding to social demand. Social demand, for Mercier et al., is simply technology in search of a market.

In place of the rhetoric of progress Mercier et al. offer a complex model of the multiform interactions between technological innovation and social life. Their model is an attempt to clarify some of the social, cultural, political and economic choices which must be made as new communication technologies impinge upon industrial societies. The Mercier model attempts to do this at the micro-level (home, family, everyday life) and the macro-level (the economy, society in general).

Technology and Society: Modes of Interaction

At the micro-level Mercier et al. distinguish three modes of interaction between technology and social life. These are: 1) integration: in which people are comfortable with technology and find that it serves their needs; 2) dysfunction: in which people are at odds with their technologies; and 3) subjection: in which people are oppressed or constricted by technology. In any particular society people and social groups will experience these modes in a variety of ways. For example, a woman may find that her office work is more tightly controlled by the use of word processors than before

(subjection), her husband may fear that the introduction of computer-controlled equipment will cost him his factory job (dysfunction), and their children may be addicted to playing with their personal computers (integration).

At the macro-level the introduction of new technologies is correlated with economic conditions and the degree of social transformation. The future development of the 'information society' is considered as following one of four basic scenarios. Scenario I postulates a continuation of the present economic recession with new technologies stimulating no radical social changes. Scenario II is of a stable society dependent upon new technologies stimulating economic growth. Scenario III offers a society in economic crisis but in which new technologies do bring about transformations which enable people to live with the crisis. Scenario IV is a vision of the information society founded upon economic growth.

The importance of the work of Mercier, Plassard and Scardigli lies not so much in their particular extrapolations of future trends as in their research methodology. The attempt to create a model which takes seriously the notion of 'interaction' between technology and society is a significant contribution to 'information society' research. Their work also represents a method of avoiding an undue emphasis on the dominating role of technology. In their first two scenarios, for example, the key factor is the state of the economy. For the information society to emerge, economic growth will have to go hand in hand with technologically stimulated social transformation. As Mercier, Plassard, and Scardigli's scenarios indicate, that combination is by no means the only future open to Western society.

IV: Critical Research and Social Transformation

The work of Mercier, Plassard and Scardigli demonstrates that technology forecasting can employ a sophisticated model of technology and society and be critical of established ideologies. Researchers in the neo-Marxist critical tradition, however, are even more radical in their approach. As the work on working people by Nielsen, Robins, Webster, and Goldhaber reveals, critical

researchers aim not just to uncover power relationships but also to promote a social transformation which will lead to human emancipation. The related work by Crombers, Sangregoria, and Ernst on technology's impact on women and on the Third World indicates how deep rooted and complex existing power structures are and how difficult to alter.

Communication Technology and Working People

Vincent Mosco and Janet Wasko (eds). *The Critical Communications Review: Volume 1: Labor, the Working Class and the Media*. (Norwood, NJ: Ablex, 1983)

One strength of the critical perspective is its sensitivity to the impact of technology on different social groups. The first volume of the *Critical Communications Review*, for example, pays much attention to technology in the lives of working people. Three major articles are those of Nielsen, Robins and Webster, and Goldhaber.

Film Technology and Film Workers

Michael Nielsen's 'Toward a Workers' History of the US Film Industry' observes that academic histories of the movies virtually ignore the technical work of stagehands, carpenters, electricians, painters and other skilled craftsmen who were essential in contributing to the success of the 'Hollywood style'. Nielsen discusses how technological changes, such as the introduction of sound motion pictures in 1926 and the present-day shift from film to videotape, have affected working people.

Writers and actors were the most obviously affected by the transition to sound, but as Nielsen notes, the lowly 'extras' also felt its effects. Sound films were smaller in scale than silent movies, because of the limitations of sound recording techniques to a single take, and the limitations of microphone pickup patterns. Job opportunities for extras decreased and they had to wait until technical advances, such as post-dubbing, enabled productions to grow in scale once more. However, sound also meant that extras with specialized skills, e.g. singing or sound effects, were in demand. The need for special skills also resulted in the emergence of sound engineers. Both major film unions, the IA and IBEW, began to organize them. Unfortunately, as in many cases since, inter-union rivalry tended to divert workers' energies away from the more important task of organizing to negotiate with management.

Today union jurisdictional disputes centre on the technology of videotape. The major film union, the IA, is challenged by NABET, which organizes those workers concerned with tape. The 35mm film is under threat because videotape allows instant playback of shots, electronic editing, and even the possibility of location shooting linked to a central recording facility via microwave transmission or satellites. Once again the workers are in danger of fighting each other rather than cooperating to defend their common interests.

'Luddism': A Response to Information Technology

Nielsen's interest in writing a history of the film industry from

the bottom up is paralleled by Kevin Robins and Frank Webster's analysis of information technology in Britain from the 'Luddite' point of view. The nineteenth century machine-breakers, the Luddites, are commonly portrayed as irrational and doomed opponents of inevitable technological progress. In Robins and Webster's revisionist account, following that of historian E P Thompson, however, the Luddites emerge as concerned working people fighting to preserve traditional social relations undermined by new modes of accountancy, employment patterns, work rhythms and industrial discipline.

The rehabilitation of the Luddites is the prologue to a restatement of Luddite concerns in twentieth century terms. For Robins and Webster too many trade unions and trade unionists too easily accept the job displacement and job losses caused by the introduction of technology. They acquiesce because of the fear that without new technology British industry will succumb to international competition. Robins and Webster want working people to challenge and question this process of change. They ask unions to refuse new technologies or at least to demand a moratorium on their introduction and so defy the 'logic of technocracy' which demands unacceptable levels of unemployment and social dislocation.

Workers, Microelectronics and Utopia

A less pessimistic view of new information and communication technologies is taken by Michael Goldhaber in his article 'Microelectronic Networks: A New Workers' Culture in Formation'. Goldhaber argues that if enough workers have access to networked micro computers they may be able to institute a kind of electronic collective bargaining with teleconferencing replacing many traditional meetings. Goldhaber points out that IBM computer programmers have already used electronic mail to carry on a dispute with management.

Electronic networking might stimulate new forms of union and interunion organization. It might also be possible to create a kind of electronic workers' collective in which communication technologies would bring together workers with similar interests over a wide geographical area. Goldhaber goes on to mention negative possibilities of information technology, e.g. alienation, etc, but his main interest is in raising the Utopian possibilities of technology as a way of assisting radical social change. In his view, information technology holds forth, more than previous technologies, the possibility of making Utopian hopes real.

The Silent Majority: Women and Technology

Tarja Crombers, and Inga-Lisa Sangregoria. 'More of the Same: The Impact of Information Technology on Domestic Life in Japan'. *Development Dialogue*, No 2, 1981. (Uppsala: Dag Hammarskjöld Centre, 1981).

One group of people who are affected more than most by the introduction of new communication and information technologies is women. Women make up the great bulk of the lowly skilled workforce in the microelectronics industry and women office

workers are the first to be affected by the introduction of word processors and microcomputers. Despite the importance of information technology for the lives of women, most research projects are designed by men with a poor understanding of the needs and

aspirations of women. A particularly clear example of the limitations and bias of such research is provided by Crombers and Sangregoria.

These women researchers took a critical look at the Japanese interactive communications experiments at Higashi-Ikoma (HI-OVIS) and Tama New Town. They found that both projects had target audiences made up almost exclusively of women and children. Because of the social pressure on Japanese women to stay at home and not to work after marriage, and the equally strong pressure on men to dedicate themselves to their work, the women in both towns were somewhat isolated and spent much time watching TV.

For these women the most important benefit of the new technology was the chance to make new social contacts through seeing their neighbours on TV. For the men who designed the projects, however, this use of technology was of minor interest. They were interested in providing more local news and information, which the women found of much less value.

Crombers and Sangregoria note that women are now tied to the home not only by social pressures but also by optical fibres. Women get more of what they already had a surplus of: household appliances and TV services.

Technology and Dependence: The Plight of the Third World.

Dieter Ernst. *The Global Race in Microelectronics: Innovation and Corporate Strategies in a Period of Crisis*. (Frankfurt: Campus Verlag, 1983).

Belief in the power of information technology to promote economic growth is not confined to governments of the industrialized nations. In the Third World, the newly industrializing countries (NICs) such as Brazil, Mexico, Singapore, South Korea and Taiwan have encouraged electronics multinationals from the US (Texas Instruments), Europe (Siemens) and Japan (Mitsubishi) to set up semiconductor manufacturing subsidiaries.

Unfortunately for Third World countries Dieter Ernst's recent study suggests that in the present period of economic crisis only SE Asian, Middle Eastern and Latin American countries near to potentially huge markets for electronic, computing, and telecommunications products will continue to expand semiconductor manufacturing. However, even in Singapore or Taiwan, for example, the impact of the technology-based industry will be less than hoped. Multinationals are less ready than ever, because of increased world competition, to share their technical knowledge, and Third World employment opportunities are decreasing as corporations continue to automate production to increase efficiency and reduce costs.

Ernst makes two basic points. Firstly, the complex interaction between economic expansion and technological innovation cannot

be reduced to either an economic or technological determinism. Thus, for example, it is wrong to assert that the advance of automated techniques in industrialized countries has inevitably resulted in manufacturers transferring their Third World operations back home. Semiconductor manufacturers might have done this as independent firms, but as segments of large electronics corporations they have had to balance withdrawal against the potential benefits of access to new markets and skilled personnel. In addition weak trade union organization in NICs has enabled companies to introduce work practices, e.g. the automated seven-day-a-week, three-shift-a-day factory, which would be opposed in their home countries.

Secondly, Ernst emphasises how Third World countries are constrained by their reliance on imported technology. In the case of semiconductor manufacturing, the products made in developing countries are for export. Some Third World companies, e.g. Samsung Semiconductor of Korea, have set up their own US subsidiaries, in order to learn how to build up their own microelectronics industries; but even this possibility is open to only a few companies in a few technically and economically advanced NICs.

V: Technology and Freedom

The nature, extent, and possibility of authentic human freedom and dignity is at the heart of the debate about technology and society. It is no accident that the most famous work of the behavioural psychologist B F Skinner should be called *Beyond Freedom and Dignity* (1971). What Skinner believes to be a liberation from illusion, that is, that human beings are determined and conditioned by their environment, other authors consider as the threat posed by the relentless advance of technology. Two philosophers who have struggled to understand how human

freedom may be preserved and enhanced in the face of technological progress are Jürgen Habermas and Jacques Ellul.

At first glance the theories of Habermas and Ellul have little in common. Yet a more careful examination reveals that they deal with many of the same themes and issues, though in sometimes radically different ways. Together they offer a sustained and penetrating critique of the role of technology in modern society. In so doing they suggest how it might be brought under more effective human control and made to serve human dignity and freedom.

The Ideology of Technical Reason

Jürgen Habermas. 'Technology and Science as "Ideology"' in *Toward a Rational Society*. (London: Heinemann, 1971). First published in *Technik und Wissenschaft als 'Ideologie'*. (Frankfurt-am-Main: Suhrkamp Verlag, 1968).

For Habermas the main threat to human freedom comes from an ideology which systematically distorts the process of public communication and decision-making in modern industrial societies. This ideology functions to keep the mass of the population ignorant of the true distribution of power and control within society. It does so, first, by reducing political debate to technical argument, and secondly, by building a mythology of technology. The result is that citizens rarely have a chance to participate freely, openly and effectively in debate about the morality and justice, as well as the practical possibilities, of particular courses of political action.

The Politics of Technology

Habermas' analysis of the problem is well illustrated by recent communication policy making in countries such as Japan, West Germany, France and Great Britain. All these countries have committed large sums of money to promoting information technology, laying new cable systems, and building communications and broadcasting satellites. In each country new communication technologies have been regarded as inevitable developments. The dominant voices in public have been those of government and industry asserting that new technologies are essential for economic

growth and future prosperity. When critics have raised the question of what kind of society these technologies are meant to serve they have been ignored. It is, after all, obvious to most governments and to industry, that the information society is coming — the only real question is how to adjust to the changes it will bring. The most passionate arguments are not about the possibility of using new communication technologies to further the diversity and quality of programmes available to the public, but about whether optical fibre and other advanced technology should be used in new cable systems in order to stimulate the electronics industry.

Not only is the public ill equipped to consider the merits of rival technical systems, it is also ill informed about the process of decision-making which eventually results in public policy. In Britain, for example, the important arguments about the desirability of building a national cable network were held in specialized policy groups such as the Information Technology Advisory Panel. By the time the reports of these groups are published the political questions are not about *whether* there is to be such a cable network, but *how* such a network can be built and *how* it is to be financed.

The problem which Habermas exposes is the fact that technology has become both an instrument of political action and a rival force to politics. In both cases the nature of political action is changed. Politics ceases to be about the choice of social goals and becomes the management of pre-determined means. In Habermas' terminology, politics, which is a form of communicative action or symbolic interaction between people, is reduced to the level of instrumental action which is guided by technical reason in the ordering and manipulating of the external world.

The Need for Critical Theory

Against this reductionism Habermas argues that philosophers must develop a critical theory which will assist human beings to

emancipate themselves from ideology. In this Habermas is firmly in the tradition of the Frankfurt School of critical theory, and the work of scholars such as Horkheimer, Adorno, and Marcuse. Like them Habermas has to face the problem of translating his critical theory into a revolutionary practice that will change the world.

Habermas attempts to overcome this problem by arguing that theory can never provide a blueprint for political action. The role of critical theory is to alert human beings to the ways in which they are being manipulated by ideology. It is a continuing process in which people are helped to become more self-reflective and more conscious of the realities of social and economic exploitation. Habermas follows Marx in believing that only when the socioeconomic conditions which give rise to exploitation are changed will technology be harnessed in the common good and ideology be replaced by a truly 'rational' process of public communication. In the thinking of Habermas therefore, technology is neither the determining factor in society nor a vehicle for radical social change. Technology is simply out of its proper place in modern societies. To put back technology into its proper relation with human beings it is necessary to reassert the priority of communicative over instrumental action, and practical (ie political and moral) over technical reason.

The strength of Habermas's theory is that it alerts one to the extent to which instrumental action and technical rationality have pervaded political thinking and communication. His major problem is to identify the agents of conscientization and radical change. Habermas no longer believes that the working class is the destined agent of radical change. He has some hopes for the student movement and for various minority groups (political, ecological, feminist etc) but these have yet to prove their revolutionary potential.

The Sacralization of Technology: Jacques Ellul

Jacques Ellul. *The Technological System*. (New York: Continuum Publishing, 1980). First published as *Le Système Technicien*. (Paris: Calmann-Lévy, 1977).

The Technological System is the successor of Jacques Ellul's most famous book *The Technological Society*, which first appeared in 1954. Together with *Propaganda* (1962), these three books provide a sustained sociological analysis and critique of the power of technology as a determining force in modern societies. These purely sociological works, however, do not stand alone. Ellul has also written a number of theological books which explicitly complement his sociological analysis. Among the most important of these are *The Presence of the Kingdom* (1984), which outlines the main themes of his theology; *The Meaning of the City* (1975), which is a biblical commentary on *The Technological Society*; and *The Judgement of Jonah* (1952), which is a biblical reflection on the themes of *Propaganda*.

Because many commentators on Ellul have focussed solely on his sociological analyses, the notion has grown up that Ellul is simply a pessimistic technological determinist. Consideration of his theology, however, reveals that Ellul does not think that technology must inevitably subordinate all other aspects of human life. Technology will triumph only if men and women continue to believe the illusion that technological progress will bring freedom and happiness. Only when people realize how unfree they are will they be able to liberate themselves from the demands of technology. Ellul is thus allied to Habermas in believing that human beings have to be alerted to the reality of their present oppressed condition.

Autonomous Technology as Sacred Power

Ellul differs from Habermas, however, in his diagnosis of the technological problem and in the remedy he suggests. In the first place, Ellul argues that the major determining factor in

contemporary society is technology itself. Furthermore, he asserts that the various technologies in society make up a coherent system which has its own laws of development and which is in some sense autonomous and beyond human control.

As understood by Ellul, technology is 'the ensemble' of the absolutely most efficient means at a given moment. Technology is thus both material *and* abstract. Ellul considers that machines, tools, instruments, management techniques, psychological therapies and advertising strategies are all technologies and all part of the technological system. So, too, are the 'technicians' who serve and service each technology.

Ellul's second major difference with Habermas lies in Ellul's conception of technology as 'sacred'. Technology has enabled humanity to subjugate nature. In so doing it has created a new 'natural' environment for humanity which is entirely artificial. In industrial societies even the countryside has become a factory and agriculture has become an increasingly automated agri-business. Having displaced the sacred from the natural world, technology itself has become the object of humanity's awe and veneration.

The Placation of Technology

The sacred is the absolute power upon which human beings feel dependent for their very existence. Such power is ultimately outside of human control. It demands instead to be served and placated lest it overwhelm humanity's fragile attempts to build and maintain social order. Just as the ancient Egyptians depended upon the annual flooding of the River Nile for the existence of their civilization, so modern societies depend upon continuing advances in tech-

nology. As the Egyptians sought to placate their gods by religious rites, so modern societies engage in the ritual of politics in the hope of binding the power of the sacred to human purposes. The mythology of the Egyptians is paralleled by the modern use of the technologies of advertising, propaganda, public relations and mass media to assure people that progress is inevitable, necessary and just.

Because technology has become sacred, people are willing to offer it sacrifices. Unemployment, for example, is presented as the sacrifice which must be paid if modern society is to obtain the full benefits of automation and information technologies. In a similar fashion there are those who would cheerfully sacrifice the practice of public service broadcasting built up so carefully over half a century in order that new technologies of communication such as cable or direct broadcast satellites be not hindered in their advance. Those critics who argue that this kind of technological progress is not needed, or too costly in human terms are not simply refuted, they are attacked and ridiculed as dangerous unbelievers.

Technology: Beyond Good and Evil

The sacred knows no limits. The power of the gods or of nature is not subject to human norms. The sacred is beyond good and evil. In precisely the same way the autonomy of the technological system consists in its indifference to human value judgements. Of course people (scientists, technicians, politicians, citizens) try to orient technology in accordance with their own values and norms. But as Ellul points out, at the heart of the modern conception of scientific research and technological progress is the belief that what *can* be known *should* be known, and that what *can* be done, *will* be done or even *should* be done. As Ellul and Habermas both agree, a particular problem here is the extent to which scientists and technologists continue to make a sharp distinction between pure research (or theory) and its application. Ellul and Habermas agree that decisions taken by 'pure' researchers to investigate, for example, the potential of genetic engineering have political, social, and ethical implications which the scientist must address as a scientist as well as a citizen.

Desacralizing Technology

In order to set limits on technology it is first necessary to de-sacralize it. But de-sacralization cannot be achieved by rational argument. For example, though studies have shown that many large-scale computerized information systems are only marginally more efficient or even less efficient than comparable manual ones, the administrators of the computerized systems are convinced that the research cannot be true. The research is challenging a deeply interiorized belief about the inevitable superiority of the computer. The only effective way to challenge that belief is to convert the believer to another faith.

It may be argued that more and more people today are losing

faith in the beneficence of technology. One has only to think, for example, of the anxieties expressed by many groups about pollution, nuclear power, and the arms race. Yet even here in the despair of technology there remains a hope that if only it were better ordered and better controlled technology could be made to deliver security and happiness. Some people go as far as to envisage a Utopia in which modern technologies are a source of human liberation because basic power relationships have been transformed. For Ellul all these fears and hopes are equally futile.

The Reassertion of Human Freedom

Ellul claims that the only true hope for human freedom lies in a recognition that the course of technological progress cannot be changed. Men and women must come to see that possibilities for change are totally blocked, that the worst is inevitable. Only when human beings face up to their impotence in the technological system will they be able to make the leap of faith which believes in the impossible. In other words, when all human possibilities are exhausted, men and women become totally dependent upon God. It is this total dependence which then frees people to hope and believe that the technological momentum can be controlled. For it is precisely the human belief in technology's power that enables that power to grow.

For the believer the prime way to witness to the transcendence of God is by developing an ethics of restraint. The free person is one who shows how it is possible to live in a technological society and yet not seek the goods or goals of that society. Freedom consists in deciding not to use the latest technology because it is more efficient. Efficiency becomes only one criterion of action, not the sole one. Ellul believes that this ethics has to be practiced by individuals who have each undergone a process of conversion. The very fact that they choose to act as individuals is in itself a denial of technology, which inevitably reduces individuals to mere components in large-scale systems. Furthermore, these individuals are not to become the nucleus of an organization, for through organization technology will reassert its power.

Finally, Ellul stresses the value of what is 'useless' in the technological society. Prayer, contemplation, love, solitude, friendship — all these are activities in which the logic of efficiency is meaningless. The work of Mother Theresa of Calcutta in caring for the dying poor is a perfect example of Ellul's thesis. For those who think in technological terms Mother Theresa is doing something irrelevant, for she does not change the socio-economic system which has brought about Calcutta's problems of destitution and deprivation. Yet in asserting the unique irreplaceable value of each single individual the compassion of Mother Theresa holds up to judgement the technological society as a whole. At the same time it witnesses to the possibility of living free of technology's demands and indifferent to its logic.

Communication, Technology, and Culture: Reframing the Research

A word which encapsulates some of the key concerns raised by the research discussed in this survey is 'appropriate'. 'Appropriate' in the sense of 'to take for one's own use' and in the sense of 'suitable, fitted, or proper'. There is an evident need for researchers to work out a language and terminology that will be fitted to discuss the complex relationship between technology, culture and communication. Moreover, this appropriate language will be needed in order to understand better how communication technologies are taken for their own use by persons and cultures. Finally, personal and

cultural appropriation of technology raises the important issue of deciding which technologies are really 'appropriate' and which are the 'appropriate' ways to use them.

Developing an Appropriate Language

The complexity of the interaction between cultural, technical and communication factors in this research area makes it tempting to indulge in reductionism or determinism. Does culture determine technological change, or technology determine cultural change?

The question is as unanswerable as that of the chicken and the egg! In a similar fashion it is no answer to reduce technology and culture to economics, or geography, or politics or any other single factor. In the end, researchers will have to create theories and models which recognize and come to terms with the whole range of salient factors present in any particular historical set of circumstances. Researchers could begin to tackle this huge task by being more conscious of their language and terminology. Words like 'develop', 'evolve', 'progress', 'impact', 'cause' and 'effect' are all temptations to avoid dealing with complexity. One historian of technology who has been grappling with this problem, John Staudenmaier, SJ, from the University of Detroit, speaks of 'technological design' and 'cultural ambience'. For him the word 'ambience' stresses the interpenetration of culture and technology. Culture is not a box which contains a thing called 'technology', but neither is technology an independent force impinging upon a separate cultural structure. The word 'design' is also important as it draws attention to the fact, easily forgotten, that technology is the result of human decisions and human values.

Appropriate Technology: The Task of Historical Research

Better understanding of how persons and cultures appropriate communication technologies will not be achieved without a better grasp of the history of technological and cultural change. At present we know very little about how technologies become commonplace and taken-for-granted. What are the mechanisms of social, cultural, and psychological assimilation? How do cultural ambience and technological design combine to create new designs, new cultural forms and new economic and social structures? How do technological design and cultural ambience combine to reinforce or reinvigorate existing institutions, attitudes and social power? These questions demand that historians of culture, historians of communication, and historians of technology join in dialogue to create new interdisciplinary approaches and models. Such an interdisciplinary approach might be fruitfully applied, for example,

to the history of radio and television in the Third World.

Encouraging Appropriate Technology

Finally, there is the question of using appropriate technologies in appropriate ways. This is, of course, the issue raised so forcefully by Jacques Ellul and Jürgen Habermas. Historical research could help here, too, especially by drawing attention to the decision-making processes used in different cultures to foster certain technological trends. If people are to have control over their technologies, they need to know how control is presently organized and how it has been exercised in the past. Who decides, on what criteria, for what ends?

In addition, research is needed which attempts to discover what real needs are waiting to be served by new technologies. In this respect the study '*Sozialpolitische Chancen der Informationstechnik*' [Socio-political Opportunities for Information Technology] (Frankfurt: New York: Campus Verlag, 1982) by Bernd-Peter Lange, Herbert Kubicek, Jürgen Reese, and Uwe Reese is of particular interest. This book suggests a number of pilot projects for using information technology to meet specific social and personal needs, e.g. the needs of the isolated elderly, of single-parent families, and of consumers. In each case the research begins, not with technology, but with people.

In the last resort, the search for an appropriate technology is an ethical and moral search. If technology is to be used in an appropriate way, researchers will have to ask questions about the values and ethical assumptions underlying technical decisions and technological systems. Helping to make explicit the values embedded in technologies and subjecting these values to honest and careful scrutiny is perhaps the single most useful service that research could perform.

Issue Editor
James M. McDonnell

Current Research on Communication, Technology and Culture

AUSTRIA

MEDIACULT: International Inst. for Audio-Visual Communication & Cultural Development (Metternichgasse 12, A-1030 Vienna). (Sec. Gen. **Prof Kurt Blaukopf**). In 1983 preliminary studies began on the economics of the performing arts and communication technologies, record industries in Western Europe, and transborder communication impacts on cultural identity.

Dr Benno Signitzer (Dept of Communication, Salzburg Univ., Sigmund-Haffner-Gasse 18/iii, A-5020 Salzburg) conducted a study on 'Communication Areas/Spaces in Austria' with **Frank Rest** which analysed local communications before the entry of new media and assessed potential impacts.

CANADA

The Canada Council, Media Arts Section (Head. **Tom Sherman**, 255 Albert St., PO Box 1047, Ottawa K1P 5V8) gives grants to artists and organizations using information technologies for creative expression and communication. Sherman is exploring presenting literary works in a non-linear form via interactive systems.

The GAMMA Institute (Pres. **Kimon Valaskakis**, 3764 Côte-des-Neiges, Montréal H3H 1V6) studies the 'information society' and its implications for Canada. With **E. Iris Fitzpatrick**, Valaskakis has studied the social, effects and psychology of 'informediation': the taking over of human activities by information machines.

McLuhan Program in Culture & Technology (**David Olson**, Dir., **Derrick de Kerkhove**, Acting Dir., Univ. of Toronto, 39A Queen's Park Circle, Toronto M5S 1A1) promotes research on psychological and social effects of literacy, radio, tv and computers. Kerkhove studies the effects of cultural patterns and communication media on the human nervous system (neuro-cultural research).

Prof William H Melody (Dept. of Communication, Simon Fraser Univ., Burnaby, BC V5A 1S6) researches policy alternatives for the introduction of new telecommunications technologies in the US, Canada, and developing countries.

Dr Vincent Mosco (Dept. of Sociology, Queen's Univ., Kingston, Ont., K7L 3N6) is editor, with **Janet Wasko** (Temple Univ., Dept of Radio-TV-Film, Philadelphia, PA 19122, USA) of Vols 2 & 3 of *The Critical Communications Review*. (Norwood, NJ: Ablex, Spring/Winter 1984).

Gordon B Thompson (5 Bayhill Ridge, Amberwood Village, Stittsville, Ont. KOA 3G0) has written 'Changing Telecommunications Services and Social Impact' in P.D. English, (ed.) *The Wired Society* (Maidenhead, Berks., Pergamon Infotech, 1983, £215.00).

Toronto Community Videotex (299 Queen Street West, No. 501, Toronto M5V 1Z9) is planning research into the cultural feasibility of small-scale databases for artistic, community and cultural uses.

United Media Arts Studies (454 King St. West, Suite 201, Toronto M5V 1L6) is investigating ways of decentralizing telecommunications media.

CHILE

ILET: Instituto Latinoamericano de Estudios Transnacionales (Casilla 16637, Correo 9, Santiago). **Gabriel Rodriguez** is directing the project 'Information and social participation: international data base networks, new challenges for development and participation in Latin America'.

FRANCE

Centre du XX^e Siècle (Dir. **Prof. Michel Sanouillet**, U.E.R. Civilisations, 117 rue de France, 06000 Nice) studies the impact of new technologies on the production and consumption of print.

Xavier Dupuis (6 Esplanade Salvador Allende, F-95100 Argenteuil) studies the economics of 'cultural development' in relation to new technologies and state policies.

Laboratoire d'Economie des Transports, Université Lyon II (16 quai Claude-Bernard, 69007 Lyon) under the direction of **G Claisse** is studying the domestic use of the telephone.

Prof Bruno Lussato (Conservatoire National des Arts et Métiers, 4 Rond Point des Champs-Élysées, 75008 Paris) is preparing with **F Lanord**, **M. Saint Paul** and **M. Bonine**, a book on the relationship between new information and communication technologies and ideas about the formation and acquisition of knowledge, to be published by Ed Laffont.

Gérard Métayer (GESTE: Group D'Études Sociales Techniques et Économiques, 42 rue Galilée, 75116 Paris) is studying the impact of new telecommunication networks on urban structure.

UNESCO, Div. of Free Flow of Information and Communication Policies (7 place de Fontenoy, 75700 Paris) organized (December 1983) a meeting in Rome on the cultural, social, and economic impact of new communication technologies. A report was published in March 1984. (Further info. from **Alan Hancock** at UNESCO).

Jean Voge (Direction Général des Télécommunications, Direction des Affaires Industrielles et Internationales, 7 Bvd Romain Rolland, 92128 Montrouge) explores the potential for 'centres of communication' set up as parts of local multiservice multimedia networks using new technologies.

Dominique Wolton (Science-Technologie-Société, Centre National de la Recherche Scientifique, 87 Bvd St Michel, 75300 Paris) has written with **Jean-Louis Missika** *La Folle du Logis: La Télévision dans les Sociétés Démocratiques* (Paris: Gallimard, 1983).

GREAT BRITAIN

K.H.F. Dyson, **R. Barker**, **G.E. Hare**, **C. Laudet** and **A. Williams** (Postgraduate School of European Studies and Modern Languages, Univ. of Bradford, Richmond Rd., Bradford BD7 1DP) propose to study cable in France, West Germany and Britain.

Nicholas Garnham (School of Communication, Polytechnic of Central London, 18/22 Riding Hse St., London W1P 7PD) and **Richard Collins** are studying the impact of cable and satellite on the structure of cultural production and consumption in Europe.

Prof. James D. Halloran, **Paul Hartmann** and **Peggy Gray** (Centre for Mass Communication Research, Univ. of Leicester, 104 Regent Rd., Leicester LE1 7LT) are studying the social implications of technological and institutional changes in communications in Britain.

Dr R Negrine (City of London Polytechnic, Dept. of Politics, Calcutta Hse, Old Castle St., London E1 7NT) is studying cable tv in Britain.

Frank Webster (Dept. of Social Studies, Oxford Polytechnic, Headington, Oxford OX3 0BP) and **Kevin Robbins** (Dept. of Languages and Culture, Sunderland Polytechnic, Sunderland SR1 3SD) are completing *Information Technology: A Luddite Analysis* (Ablex, forthcoming).

JAPAN

Prof. Shuhei Aida (Univ. of Electro-Communications, Chofugaoka, Chofu-City, Tokyo 182) gave a paper on "The Japanese Debate on Technology and Culture" at the seminar 'Technology and Social Change: Japan and Italy', Turin, 19-21 Sept., 1983.

MEXICO

Centro de Estudios Economicos y Sociales del Tercer Mundo (CEESTEM) (Magnolia 39, San Jeronimo Lidice 10200, Mexico, D.F.). **Patricia Arriaga** (Dir., Communication Studies) is researching the 'informatization' of developing countries within a political economy framework. **Ligia Ma Fadul** is studying

satellite communications in Latin America.

NETHERLANDS

Dr Dieter Ernst (Institute of Social Studies, Badhuisweg 251, PO Box 90734, 2509 LS The Hague) is directing a project 'The Impact of Microelectronics on the Worldwide Restructuring of the Electronics Industry: Implications for the Third World'. This is part of the Indo-Dutch Programme on Alternatives in Development and works closely with a number of Indian researchers.

Dr Cees J Hamelink (Institute of Social Studies, PO Box 90733, 2509 LS The Hague) is leading a research project (1982-6) 'The Third World in the Information Age' which aims to develop a more adequate 'technology assessment' model to aid communication policy planning for development.

SINGAPORE

Asian Mass Communication Research and Information Centre, (AMIC) (39 Newton Rd., Singapore 1130) (**Harald von Gottberg**, Deputy Sec. General). Among 1984 research activities is a study of the penetration and use of advanced communications and computer technology in S.E. Asia.

SWITZERLAND

Dr Juan Rada (International Management Institute (IMI), 4 chemin de Conches, CH-1231 Conches, Geneva) studies the impact of information technology on the international division of labour.

Prof. Ulrich Saxer (Seminar für Publizistikwissenschaft der Universität Zürich, Kurvenstr. 17, Postfach 201, 8035 Zurich) recently wrote *Lokale Rundfunk-Versuche* (Aarau, 1983) which deals with research on local new media.

UNITED STATES

Prof. Ronald Abler (Dept. of Geography, Pennsylvania State Univ., 302 Walker Bldg., University Pk., PA 16802) is studying (with **Dr. Thomas Falk**, Stockholm School of Economics, Box 6501, S-11383 Stockholm) the historical geography of postal, telegraph, telephone, telex and computer-mediated communications systems in Sweden.

Prof. Sidney H Aronson (Dept. of Sociology, City Univ. of New York, Brooklyn, NY 11210) continues to study the social history of the telephone and telegraph.

Harland Cleveland (Dir., Hubert H. Humphrey Institute of Public Affairs, 909 Social Sciences, 267 19th Ave. South, Minneapolis, MN 55455) directs two projects: 1) 'Information as a Resource' and 2) 'Democratic Strategies for the New Information Environment'.

East-West Center, Institute of Culture and Communication (177 East-West Rd., Honolulu, Hawaii 96848) has a 5-year project in collaboration with Asian and Pacific nations, international and national organizations under the leadership of **Dr. George Beal** on 'Knowledge Generation, Exchange and Utilization'.

Prof. Claude S. Fischer (Dept. of Sociology, Univ. of California, Barrows Hall 410, Berkeley, CA 94720) is researching the social role of the telephone in the US during the first half of the 20th century.

Prof. Miles M. Jackson (Graduate School of Library Studies, Univ. of Hawaii, Hamilton Library, 2550 The Mall, Honolulu, Hawaii 96822) is collaborating on a paper on telecommunication and information needs in the Pacific Islands.

Dr Mary S. Mander (Dept. of Speech Communication, Pennsylvania State Univ., 212 Sparks Bldg., University Pk., PA 16802) is examining the Utopian motifs associated with the discourse surrounding the birth of US broadcasting.

Dr Charles R. Perry (Dept. of History, Univ. of the South, Sewanee, TN 37375) is completing a study of the British Post Office in the 19th century.

Prof. John R. Pierce (Center for Computer Research in Music and Acoustics-Music, Stanford Univ., CA 94305) wrote with **Prof. Hiroshi Inose** *Information Technology and Civilization* (a report to the Club of Rome) (W.H. Freeman & Co., 1984).

Prof. Brent D. Ruben (Dept. of Communication, Room 222C, Rutgers Univ., 4 Huntington St., New Brunswick, NJ 08903) is studying the relationship between communication, culture, and technology.

Dr Jerry L. Salvaggio (Dir., Int. Telecommunication Research Unit, Univ. of Houston, Houston, TX 77004) is working on privacy and computer misuse and the lack of US laws relative to computer use.

Dr Dan Schiller (Dept. Radio-TV-Film, Temple Univ., Philadelphia, PA

19122) is working on a study of information as a commodity.

Lenny Siegel (Pacific Studies Center, 222B View St., Mountain View, CA 94041) is currently co-authoring *Where the Chips May Fall: The Impact of High Technology* (Harper & Row, forthcoming).

University of Hawaii, Dept. of Communication (2560 Campus Rd., Honolulu, Hawaii 96822) **Prof. Majid Tehranian** has nearly completed a UNESCO sponsored study based on a world wide survey of over 50 experimental projects on the use of new interactive technologies to encourage political participation. **Dr Dudley D. Cahn** is studying the impact of new communications technology on interpersonal relationships in different cultures e.g. "socialist"/"non-socialist", traditional/modern.

University of Illinois, College of Communications. **Prof. James Carey** (119 Gregory Hall, 810 S. Wright., Urbana, IL 61801), has written 'Technology and Ideology: The Case of The Telegraph'. *Prospects*, 1983. **Dr Clifford Christians** (Institute of Communications Research, 222B Armory Bldg., 505 E. Armony St., Champaign, IL 61820) is developing a need-conception of justice as it relates to global satellite transmission. **Dr Thomas Guback** (Inst. of Com. Research) is finishing a book on the economic structure and policies of the US cinema industry.

Robert A. Vitro (Information Economy Co., Inc., PO Box 8099, Silver Spring, MD 20907) researches the role of the information sector/knowledge industry in economic and social change.

Dr Atul Wad (UN Centre for Science and Technology for Development, United Nations, NY 10017) is helping develop the Advance Technology Alert System to help Third World policy-makers assess the potential positive and negative implications of new technologies.

WEST GERMANY

ABT Forschung — Büro Bonn (Kaiserstr. 29, D-5300 Bonn 1) **Werner Korte** is leading a project for the Federal Government on the impact of new communication technologies on art and culture.

Gesellschaft für Mathematik und Datenverarbeitung (Postfach 1240, Schloss Birlinghoven, D-5205 St Augustin 1) published in 1982 *A Catalogue of Research Projects of Information Technology*.

Dr. Barbara E. Mettler-Meibom (Institut für Politische Wissenschaft, Von-Melle-Park 15, 2000 Hamburg 13) is analysing the contribution of social science research to telecommunications policy and the way it is used to serve economic interests.

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