scientific interest therein" [*Laws of Kenya*, National Parks Ordinance, CAP 377, 1945]. The ordinance in Uganda is just as vague, Tanzania's more so. Such general terms do not assist an individual park in deciding what particular policy it should attempt. International criteria are somewhat more specific, if often less suited to Africa's particular requirements: The United Nations List of National Parks and Equivalent Reserves postulates "a relatively large area where one or several ecosystems are not materially altered by human exploitation and occupation . . . and where the highest competent authority of the country has taken steps to prevent or to eliminate as soon as possible exploitation or occupation in the whole area" [*I.U.C.N. International Commission on National Parks* (Hayez, Brussels, ed. 2, 1971), p. 13]. The U.N. list goes on to state that "an area should enjoy general *legal* protection against all human exploitation of its natural resources and against all other derogations of its integrity resulting from human activity"; specifically excluded are agricultural and pastoral activities, hunting, fishing, lumbering and mining, dam construction, and so on (p. 24). This definition would eliminate almost all parks in East Africa if the final phrase, "all other derogations . . ." is taken to mean human activity outside the park as well as within it.

21. R. M. Laws, I. S. C. Parker, R. C. B. Johnstone, *East Afr. Wildl. J.* **8**, 163 (1970).
22. The principle of active management, on an extensive scale if necessary, was clearly established by the *First World Conference on National Parks* (Government Printing Office, Washington, D.C., 1962), which stated: "Where animal populations get out of balance with their habitat and threaten the continued existence of a desired environment, population control becomes essential. This principle applies, for example, in situations where ungulate populations have exceeded the carrying capacity of their habitat through loss of predators, immigration from surrounding areas, or compression of normal migration patterns."
23. F. Bourliere, *Zool. Afr.* **1**, 1 (1965).
24. W. J. Hart, *A Systems Approach to Park Planning* (International Union for the Conservation of Nature, Morges, Switzerland, 1966).
25. C. M. Turnbull, *The Mountain People* (Simon & Schuster, New York, 1972).
26. By extension, there is hardly a factor of wildlife conservation in Africa that better deserves a rigorous analysis than poaching: Is it immoral by some objective standard, or merely illegal by some transient, European notion?
27. D. Western, *Animals* **13**, 532 (1971); *Afr. Wildl. Leadership Found. Newsl.* **7**, 1 (1972).
28. A "vignette of primitive America" was proposed as an objective for U.S. parks by A. S. Leopold, *N. Amer. Wildl. Natur. Resour. Conf. Trans.* **28**, 28 (1963).
29. Serengeti Research Institute, *Annual Report* (Tanzania National Parks, Arusha, 1969).
30. E. W. Russell, *Management Policy in the National Parks* (Tanzania National Parks, Arusha, 1968).
31. F. Mitchell, *East Afr. Econ. Rev.* **2**, 1 (1970).
32. All figures given are in U.S. dollars.
33. F. Mitchell, *East Afr. Agr. Forest. J.* **33**, 98 (1968).
34. Mitchell (*31*) mentions that, until Lake Nakuru Park was accorded the administration for a full national park, anyone who arrived at the entrance on foot was allowed in free. Now all must pay, and they may enter only if traveling by car.
35. It is ironic that, at a time when Africa's wildlife in its natural habitat is coming under increasing pressure from competitive uses of the land, extensive tracts of land are being set aside in several parts of the United States in order that people can view African animals "safari style"; even in densely populated Great Britain, France, and other countries of Western Europe, good agricultural land can make more money from similar establishments than from agriculture—for example, "Lions of Longleat."
36. To this extent, it is important that educational projects not restrict their emphasis to the school child in Kikuyuland who has never seen a lion. They must place far more emphasis on the man who has seen more wildebeests than he ever wants to see (trampling his maize crops) and to whom the question is not whether international prestige is a good thing, but whether it is a better thing than other uses of the land in the environs.
37. D. Western, *Institute of Development Studies Staff Paper No. 53* (University of Nairobi, Nairobi, Kenya, 1969).
38. There is now extensive reporting on this topic, but for a detailed account, see L. M. Talbot, W. J. A. Payne, H. P. Ledger, L. D. Verdcourt, M. H. Talbot, *The Meat Production Potential of Wild Animals in Africa: A Review of Biological Knowledge* (Commonwealth Agricultural Bureau, Tech. Commun. No. 16, Farnham Royal, U.K., 1965). For details of a more recent project see J. A. Bindernagel, *Game Cropping in Uganda*, (Uganda Game Department, Entebbe, 1968).
39. *Wildlife Management in Kenya* (Food and Agriculture Organization, Publ. No. WS/A6404, Rome, 1970); I. S. C. Parker, *Anim. Prod. Soc. Kenya* **1**, 14 (1968); *ibid.* **2**, 51 (1969).
40. W. H. Longhurst and H. F. Heady, Eds., *East African Range Problems* (Rockefeller Foundation, New York, 1968).
41. I. S. C. Parker and A. L. Archer, unpublished manuscript.
42. G. Caughley, *Proceedings of Ad Hoc Working Party on Wildlife Management* (Food and Agriculture Organization, Publ. No. WM/C4459, Rome, 1972).
43. J. Huxley, *IUCN New Series* **1**, 203 (1963).
44. F. F. Darling has expressed a similar idea ". . . national parks are nuclei of cells in the body of the nation. The rest of the country must supply the cytoplasm, as it were, both to help in the renewal of the nuclei and to sustain the biological systems of the country" [*Nat. Parks Mag.* **43**, 21 (1969)].
45. H. J. Dirschl, *Management and Development Plan for the Ngorongoro Conservation Area* (Ministry of Agriculture, Forests, and Wildlife, Dar es Salaam, Tanganika, 1966).
46. W. C. Verboom, personal communication.
47. *Report on a Project to Develop the Murchison Falls Area of Uganda* (Uganda Development Corporation, Kampala, 1967).
48. C. R. Field, *East Afr. Wildl. J.* **9**, 99 (1971).
49. J. M. Boyd, *New Sci.* **30**, 254 (1966); *East Afr. Agr. Forest. J.* **33**, 178 (1968).

Lessons from the History of American Broadcasting

Stanley Scott

In their article outlining the possibilities of cable television (CATV), Edwin Parker and Donald Dunn suggest that "the information utility that we have described is a system designed to provide better quality education and information to everyone in the United States. . . . In order to accomplish these positive social goals, a detailed plan for federal action and participation is needed" (*1*, p. 1398).

A look at the 50-year history of broadcasting in the United States suggests that a full realization of CATV's potential will be an uphill struggle. Those powerful forces generated by the ways in which we allocate access to and finance broadcasting over AM, FM, and television channels will act as strong counterinfluences.

Erik Barnouw, in his three-volume history of American broadcasting, quotes a 1922 speech by Herbert Hoover, who was then Secretary of Commerce in the Harding Administration. Hoover addressed the Washington Radio Conference with these words on the future of first-generation radio, then scarcely in its infancy: "It is inconceivable that we should allow so great an opportunity for public service to be drowned in advertising chatter" (*2*).

Yet we proceeded to fumble our way toward a system under which advertising and its influence, while not "drowning" the media, certainly dominated its development, preempted its time, and controlled its programming. This system has seen three generations of electronic communications—AM, FM, and over-the-air television—experience abysmal failures to achieve the social benefits that the developing technology could have produced. Now, in the 1970's, we see television showered with time-consuming, obtrusive, and sometimes dishonest commercials endeavoring to sell a captive audience products that the viewers often do not need—or that may be useless or down-

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right harmful—and at artificially elevated prices. Moreover, much of the material between the commercials, employed primarily as a lure for the largest number of customers, is little better than the commercials themselves. These programs comprise warmed-over reruns of dubious value; repetitious whodunits starring guns and gore; noisy, violence-prone children's cartoons; interminable soap operas; gossipy talk shows; old movies cut into convenient slices and interspersed with the hard-sell ads of used-car lots; and phony Westerns whose purported portrayal of our nation's past is thoroughly false and misleading. This list of media lamentations can be documented and extended by consulting the critiques of any of the discerning and more literate television columnists.

Much of the variety that these questionable offerings seem to display is not really all that diversified. In fact, the electronic media are afflicted by a "sameness syndrome." True variety has been squeezed out, and a multitude of potential minority and special-interest audiences are not being served. In sum, the media devote most of their time to sensationalism and mindless violence, lightweight entertainment, frivolous diversion, escapism, and advertising.

In the last 50 years we have had three opportunities to guide the use of broadcasting technology in ways that could have served a much more varied array of publics and furthered a multitude of socially desirable goals. Three times we were assured that the high hopes of the media's future would "certainly" be realized, partly because it seemed so inconceivable—as it did in the beginning to Hoover—that we would forego the magnificent opportunities of the media in favor of sorry uses. Yet three times we have seen questionable and unworthy offerings overwhelm quality, depth defer to shallow superficiality, and the trivial smother the significant.

In the following passage, Barnouw describes and explains what has happened (*3*, pp. 335–336).

> The "American system of broadcasting," as it has developed over the years, has been an extraordinary example of governmental laissez-faire. It has allowed private companies, almost without restraints, to set up tollgates across public highways of communication and to exact a toll from the traffic. Fortunes have been made from this privilege.
>
> Meanwhile the tolls, levied substantially on a what-the-traffic-will-bear basis, have tended to eliminate some elements of society from the marketplace of ideas and to give dominance to others. Thus the private tollgates have caused a vast reshuffling of social influences—just as control points relating to other media have done in the past.
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> The rationale for the private tollgates has been that the tollkeepers, in gratitude for their privilege, would handle the traffic with regard to the welfare of society as a whole. Some such obligation is enshrined in law in the phrase "public interest, convenience, and necessity," but its meaning has remained vague, and the tollkeepers have resisted governmental attempts to define it. Such attempts have in any case been only sporadic, and ineffective in the long run, partly because of ties between tollkeepers and government leaders—especially in the executive and legislative branches.
>
> Most licensees have felt that their paramount obligation to the public interest was to "move goods" and keep the wheels of industry turning. Any other services they might render were considered subsidiary to this main function, which was also the source of profit. The conjunction of duty and profit was looked on as the beauty and strength of the system and the reason for its certain triumph.
>
> If such a system had been outlined in 1927 or 1934, when our basic broadcasting laws were written, it would certainly have been rejected.

Why should it not be rejected now, when the fourth generation of the electronic media, CATV, is in its formative years? If such a system is not rejected, we may be assuring that media history will repeat itself, with commercialization again dominant. Barnouw describes how the American system of broadcasting tightened up and became more restrictive as it became more lucrative (*3*, p. 337).

> The postwar period and the rise of television brought sharp changes. Prosperity gradually eradicated the frontier of unsold time. A consumer-goods era put the accent first on big-money quizzes, then on action melodrama, which became an international phenomenon as business-military interests spread worldwide. These interests, often using the weapon of political blacklists, narrowed the zone of permitted conflict in ideas, and tended to thrust dissent into other media. The dominance of business-military interests became all-pervasive, leaving mainly news programming of various sorts, along with noncommercial broadcasting, as areas of comparative independence—used generally with caution, occasionally with boldness. Even here there were constant pressures to get in line.

Similar pressures are likely to dominate CATV if it is not (i) given public-interest-oriented organizational support and (ii) endowed with a strong financial base that does not depend primarily on advertising (unless the destructive forces of advertising can be neutralized or otherwise brought under control).

We should face squarely the fact that CATV's multiplicity of channels will not ensure either quality or variety. Both AM and FM feature multiplicity of channels, with demonstrated results. That is one lesson to be drawn from the history of American broadcasting.

Thus the hard facts of history support a gloomy but realistic prognostication. The economics of commercial communications, as now organized and financed, will almost inevitably dim, if not extinguish, many of the bright hopes of this fourth and potentially greatest generation of electronic media, whose possibilities were so ably sketched by Parker and Dunn (*1*).

The only viable alternative is a deliberate act of public will. As a body politic, we can determine to do what is necessary to ensure that every American has access to a quality broadcasting and communication service. A suitable goal should be a broadcasting system that supplies high-quality and wide-ranging material from a multitude of sources and that represents a variety of interests, viewpoints, and tastes. All Americans should have access to varied offerings and quality service, north and south, east and west, urban and rural, poor and affluent.

Thirty-five years ago, it was determined that rural citizens should receive the same benefits of home electrification that urban residents were getting. The goal had been neglected by the privately owned power systems. Accordingly, the Rural Electrification Administration was established to achieve the objective, and it did the job admirably.

We need analogous imaginative and effective goal-setting and institution-building if the potentials of CATV are to be realized. Perhaps we should try an American analog of the BBC (British Broadcasting Corporation). Perhaps broadcasting needs regional or national equivalents of a Tennessee Valley Authority. Some of the emerging councils of governments, such as the Association of Bay Area Governments or Detroit's SEMCOG, have expressed an interest in CATV and may be able to influence the development of regional networks. Maybe some new forms of joint public-private ventures can contribute. Parker

and Dunn suggest, in broad brush fashion, a variety of other challenging possibilities.

In addition to new organizational arrangements, perhaps new sources of financing can be employed, such as taxing the huge profits of commercial broadcasting, or assessing a direct, media-supporting tax on advertising. It may even be judged desirable to finance regional or national networks out of the income tax, as the best insurance that *all* citizens will receive the quality service they deserve.

The opportunities for experimenting with organizational and social engineering are as enormous as the potential rewards. Probably never has technology been more in need of informed and intellectually inspired guidance than it is now, as we move into the era of the all-pervasive "wired city." An understanding of the history of broadcasting, in this country and elsewhere, can supply guideposts to help us figure out ways to proceed—and routes to avoid.

References

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NEWS AND COMMENT

The Aftermath of Apollo: Science on the Shelf?

The Apollo moon voyages belong to history now. And it will be for history to judge whether the scientific returns of six lunar landings were worth the expenditure of 12 years' effort and $25 billion. Whether historians will have a fair chance to make that judgment, though, is a question of growing concern to many of the scientists who helped to plan the lunar expeditions of the past 3½ years.

At the Manned Spacecraft Center near Houston—the focal point of lunar science and the main repository for all that Apollo has returned—a number of scientists and research administrators have an uneasy feeling that the hundreds of pounds of samples, the thousands of photographs, and the miles of magnetic data tape now on hand will not receive the study and the protection from contamination and deterioration that they deserve in the years ahead. As Paul Gast, the chief of planetary and earth science at the MSC, expresses it, "There is a real concern that, with the end of the Apollo flights, lunar science will lose its patrons. And really, the science is just beginning."

To be sure, lunar science is healthy enough now. This year the National Aeronautics and Space Administration (NASA) will spend about $20 million to collect and process data from the Apollo orbital experiments and from the five instrument stations still operating on the moon; to care for all the photographs; and to analyze, preserve, and catalog the collection of moon rocks and soil. University researchers will receive about $8 million of this in contract grants directly from NASA, a figure that puts the space agency on a par with the National Science Foundation as a leading government supporter of geoscience. NASA has asked the White House Office of Management and Budget to let it spend the same overall amount for lunar science in fiscal 1974, but whether the OMB will consent is still an open question.

The point of concern, though, is not so much what happens to lunar science this year as what happens to it 3 to 5 years hence, when the excitement of flying to the moon has receded in the public memory and the expense of bank-rolling scientists to pick tediously through lunar soil is balanced against the cost of more captivating ventures, such as the unmanned Viking lander destined for Mars and the Venus probes that are rising on NASA's wish list. Will the care and feeding of lunar research come to seem more like a nuisance than a national obligation? As one prominent lunar scientist at the MSC phrases his concern, "We have a commitment from NASA headquarters and from Chris Kraft [director of the center] to support this work. But the question is, How long will it last?"

Such fears are not without foundation. They spring from several sources, among them the sheer success of the landing missions and the sudden realization of the moon's complexity. The quantity of lunar rock and soil now on deposit at the MSC is far greater than anyone dared anticipate before Apollo 11, the first landing mission, in 1969. Whereas scientists once talked of having to preserve and study as little as 3 to 5 pounds of a "grab sample" snatched from the moon somewhere along the way—or at best 100 pounds or so—the landings in fact amassed more than 800 pounds of samples, counting that returned by Apollo 17.

Only about a quarter of this has received more than a cursory inspection, and detailed analysis is going to be a painfully slow task. In part, this is because lunar history is turning out to be a much more subtle affair than most knowledgeable people had expected. The notion, for example, that the moon was a dead hunk of the "primordial" material from which the terrestrial planets coalesced now seems as quaint as the Ptolemaic idea that it was all shining crystal. It now appears likely that if any bits of primordial crust do remain, they will have to be tracked down laboriously in the samples of soil, a task rather like hunting for pearls on a beach.

Certainly the moon's complexity and heterogeneity make it a more interesting place, but as a Rosetta stone of cosmic history it is turning out to be as difficult to decipher—and therefore as time-consuming and expensive—as the earth itself.

Concerns for the future of lunar science also stem from the well-known dichotomy between the scientists involved in mission planning and the engineers who dominated the management of Apollo. Nowhere was this division more evident than at the Manned Spacecraft Center, where scientists fought long and hard—and, ultimately, with success—to increase the scientific content of the landing missions. The pulling and hauling between the two sides abated somewhat with the last