



THE FUTURE OF TELEVISION

A PRESCRIPTIVE CONFERENCE

FRIDAY, MARCH 4 THROUGH SUNDAY, MARCH 6
1977

AT

THE ANNENBERG SCHOOL OF COMMUNICATIONS
UNIVERSITY OF SOUTHERN CALIFORNIA

SPONSORED BY

THE FILM & TELEVISION STUDY CENTER

THE ANNENBERG SCHOOL OF COMMUNICATIONS

SUPPORTED WITH GRANTS FROM

THE NATIONAL ENDOWMENT FOR THE ARTS
THE CALIFORNIA ARTS COUNCIL

THE FUTURE OF TELEVISION: SOME BASIC PREMISES

During the various sessions of our conference on "The Future of Television," experts from a broad spectrum of academic and professional disciplines shall attempt to identify constraints on, and to specify values for, the future development of the single most powerful force in industrial civilization.

It is apparent that we cannot deal meaningfully with the future of television as an isolated phenomenon. Nor is it sufficient to focus on the purely technical and esthetic possibilities of the medium without paying attention to its larger philosophical and political implications. Television is a meta-cultural medium which overlaps and interpenetrates the total spectrum of technocultural systems in our society.

Neither may we assume that the present nature of the television industry holds the key to an understanding of its future—for the future of television lies within an ongoing revolution in electronic information processing and telecommunications systems which transcends the phenomenology of the industry as we know it.

Indeed, our conference is founded on the premise that the potential now exists for an historically unprecedented revolution in the structure and function of mass communication systems. This potential appears to be embodied in six tool systems which currently are evolving as separate industries. They are:

1. Cable communication networks
2. Portable video recording equipment
3. Video disc and video cassette technologies
4. Home computers and information utilities
5. Domestic communication satellites
6. New information display devices for the home

The potential of these tools for precipitating an historically unprecedented revolution in mass communication systems becomes clear if we consider them not as independent entities but as components of a single, integrated, nationwide telecommunication system which would subsume, invert, supplement and, in some instances, replace the functions now performed by the present mass media—television, radio, newspapers, theatrical cinema.

For the purposes of our conference, the notion of a "communications revolution" shall be understood to indicate that it's theoretically possible to integrate and organize this set of tools in such a manner that the new structure thus realized would implement a radical

inversion of the structure and function of the existing mass media. In other words, it would amount to inversion of the "industrial organizing principle" that is the source of the structural and functional identity of our society in general, and of the mass communication subsystems of our society in particular.

The word "principle" is derived from the Latin *principium* meaning beginning or source. Thus, without implying any vitalistic connotations, an organizing principle may be defined as the root or source or law which determines the nature or identity of a system; it's the ultimate basis on which the existence of something depends; it is "cause" in the widest sense—it is embodied in the logic or system of organization that makes a structure what it is.

Looking at human societies in the twentieth century we may say that their identity derives from what may be called the industrial organizing principle. Simply defined, this is the principle of centralized mass production and mass distribution. This principle is manifest in, and implemented through, the functional organization of any technocultural system which serves that purpose, and that includes almost all tools and institutions in an industrial society.

The industrial organizing principle becomes translated uniquely through the particular social subsystem under analysis. The mass communication subsystems of society, being the cultural arm of the industrial order that makes their operations both possible and necessary, are, like all other social subsystems, a special case of the industrial organizing principle: implemented through their functional organization it becomes the principle of centralized, one-way, mass audience, nonadaptive distribution of messages. Accordingly, the chief functional characteristic of the mass media, that is, the primary purpose of their existence, is that of processing centralized output—the centralized mass production and one-way mass distribution of symbolic messages to a captive mass audience.

Now if we define "revolution" as a radical inversion of the identity of a system—our word radical being derived from the Latin *radix* meaning root—we must conclude that there never has been a true revolution in the structure and function of mass communication systems. Although many developments in the history of the mass media have been characterized as revolutionary, in fact the differences have been of degree rather than kind.

There have been changes in the way messages are encoded for mass distribution (print, movies, radio, television), and there have been changes in the numbers of persons simultaneously addressed by these messages (always larger captive audiences); but throughout all these "revolutions" there's been no change in the industrial organizing principle of centralized, one-way, mass-audience, nonadaptive message distribution which has been the root or source of identity for virtually all mass communication systems since the invention of moveable type.

All the so-called revolutions up to now have resulted only in changes in the way the industrial organizing principle is implemented; they haven't inverted the principle itself. In other words, there have been technical innovations but no structural transformations. Indeed, each successive innovation in the technology of mass communication systems not only has embodied and implemented the industrial organizing principle but actually has reinforced it and extended its range of influence, making possible ever more centralized control over the means of mass producing and mass distributing symbolic messages to ever larger captive audiences.

Only today, and only through electronic information processing and telecommunications systems, is a truly radical revolution possible for the first time. Unlike all previous transformations in the technology of mass communication systems, the revolution that could theoretically be realized through proper integration and organization of these tools would represent a difference of both degree and kind. Such a revolution would be far more profound than a mere shift in ownership or power; it would mean not only a retooling but a radical inversion of the basic principles served by tools. In other words, the new structure would implement a principle of organization exactly inverse of that which is the source of the mass media's structural and functional identity. We may characterize this inverse principle as the cybernetic organizing principle.

COMMUNICATIONS REVOLUTION

INDUSTRIAL ORGANIZING PRINCIPLE	CYBERNETIC ORGANIZING PRINCIPLE
★ Centralized	★ Decentralized
★ One-Way	★ Two-Way
★ Mass Audience	★ Special Audience
★ Nonadaptive	★ User Controlled
★ Message Distribution	★ Feedback Communication

Implementing this inverse principle of organization would have several profound consequences, not only for the mass media but for our society as a whole. Operationally, it would mean replacing the processing of centralized output with the processing of decentralized input as the chief functional characteristic of the mass media, that is, the primary purpose of their existence. This in turn would make possible public access to information specified by the user and public access to communications channels controlled by the user. The important words here are "specified by the user" and "controlled by the user." Those criteria make the premise significantly different from traditional notions about "public access" which don't assume structural inversion of the institution being accessed. According to our definition, however, these criteria would have to be satisfied for any changes in the function of the mass media to qualify as revolutionary; and that's why it's possible to say that a communications revolution is a cultural revolution or it's no revolution at all.

PROCESSES AND PURPOSES OF THE CONFERENCE

This conference shall take a prescriptive rather than predictive approach to the potential communications revolution. It shall be our purpose to prescribe what *should* be the impact of new technologies on the mass media rather than trying to predict what *will* be.

Of course, some notion of probable developments during the next five to ten years is necessary for any such prescriptive activity; this technical overview will be provided by means of six panel discussions in which more than twenty experts will address the state of the art and probable developments in the six industries with which we are concerned.

Superimposed over this technical foundation will be a series of discussions among the sixteen members of our "Interdisciplinary Council on the Future of Television." During these closed evening sessions anthropologists, sociologists, cyberneticists, political theorists, artists, critics, and professionals from the television industry will dialogue with each other and with a small "participating audience" of invited observers, including representatives of several major foundations and academic and professional institutions.

Their purpose will be to specify a "preferred state" for the structure and function of the mass media from their own point of view, and to identify probable constraints—political, economic, technical, cultural—on the realization of their prescribed goal. It is in this sense that the overall purpose of the conference may be seen as a political one.

—Gene Youngblood
Conference Producer

SCHEDULE OF EVENTS

FRIDAY, MARCH 4

9:00 a.m.

DEMONSTRATION OF MCA DISCO-VISION VIDEODISC PLAYER

10:00 a.m.

TECHNOLOGY PANEL: VIDEO DISC AND VIDEO CASSETTE TECHNOLOGIES

John Findlater,
President, MCA Disco-Vision

Jack Hanks
Magnetic Audio-Video Products Division, 3M Company

Martin Roberts
Publisher, "Videocassette & CATV Newsletter"

Kent Broadbent
Vice President for Research & Development, MCA Disco-Vision

Norman Glenn
Vice President for Program Planning, MCA Disco-Vision

11:30 a.m.

LUNCH

1:00 p.m.

TECHNOLOGY PANEL: CABLE COMMUNICATION NETWORKS

Burt I. Harris
Chairman, National Cable Television Association

Walter S. Baer
Communications and Energy Programs, The Rand Corporation

Herbert S. Dordick
Senior Research Associate, The Annenberg School of Communications

Mitsuru Kataoka
Director, Dickson Video Lab, U.C.L.A.

3:00 p.m.

COFFEE BREAK

3:30 p.m.

VIDEO ARTISTS AND CRITICS PANEL

David A. Ross

Deputy Director for Film & Television
Long Beach Museum of Art

David Antin

Professor of Visual Arts, U.C. San Diego

Eleanor Antin

Assistant Professor of Visual Arts, U.C. San Diego

Nam June Paik

Video Artist, New York City

Woody Vasulka

Center For Media Study, State University of New York at Buffalo

Ira Schneider

Video Artist and editor of *Video Art*

Shirley Clarke

Video Artist, Film & TV Department, U.C.L.A.

5:30 p.m.

DINNER

8:00 p.m.

THE INTERDISCIPLINARY COUNCIL (CLOSED SESSION)

SATURDAY, MARCH 5

9:30 a.m.

TECHNOLOGY PANEL:

HOME COMPUTERS AND THE INFORMATION UTILITY

David J. Farber

Associate Professor of Information & Computer Science
University of California at Irvine

Alan Kay

Head of Learning Research Group
Xerox Palo Alto Research Center

Thomas H. Martin

Assistant Professor
The Annenberg School of Communications

11:30 a.m.

LUNCH

1:00 p.m.

TECHNOLOGY PANEL:

HOME INFORMATION DISPLAY SYSTEMS

Ben Kazan

Xerox Palo Alto Research Center

Alex Jacobson

Exploratory Studies Department, Hughes Aircraft Company

Joseph Roizen

Video Communications Consultant, Telegen, Palo Alto

3:00 p.m.

COFFEE BREAK

3:30 p.m.

INTERDISCIPLINARY COUNCIL OPEN SESSION

Heinz Von Foerster

Professor Emeritus of Electrical Engineering and Biophysics
University of Illinois at Urbana

Humberto Maturana

Professor of Neurophysiology and Biology
University of Chile, Santiago

Sol Worth

Professor of Communications
The Annenberg School of Communications
University of Pennsylvania, Philadelphia

Roderic Gorney

Director, Program on Psychosocial Adaptation and the Future
U.C.L.A. School of Medicine

5:30 p.m.

DINNER

8:00 p.m.

THE INTERDISCIPLINARY COUNCIL (CLOSED SESSION)

SUNDAY, MARCH 6

9:30 a.m.

TECHNOLOGY PANEL:

DOMESTIC COMMUNICATION SATELLITES

Phillip Rubin

Director of Engineering and Development
The Corporation For Public Broadcasting

C. Richard Jones

Associate Manager, NASA Systems Division
Space and Communications Group, Hughes Aircraft Company

John Witherspoon

President, Public Service Satellite Consortium

11:30 a.m.

LUNCH

1:00 p.m.

TECHNOLOGY PANEL

PORTABLE VIDEO RECORDING EQUIPMENT

Joseph Roizen

Video Communications Consultant, Telegen, Palo Alto

Peter Kirby

Technical Director, Video Workshop
Long Beach Museum of Art

Arthur Schneider

Video Tape Editorial Supervisor, Consolidated Film Industries
Representative of Broadcast Television Industry
(To Be Announced)

2:30 p.m.

COFFEE BREAK

3:00 p.m.

COMMUNICATIONS POLITICS PANEL

Monroe E. Price

Professor of Communications Law, U.C.L.A.

Tracy Westen

Director, Communications Law Program, U.C.L.A.

Forrest P. Chisman

Associate Director
Aspen Institute Program on Communications and Society

Frederick M. Nicholas

Chairman, California Public Broadcasting Commission

5:00 p.m.

INTERDISCIPLINARY COUNCIL SUMMARY SESSION

5:30 p.m.

CONFERENCE ADJOURNS

**THE INTERDISCIPLINARY COUNCIL
ON THE FUTURE OF TELEVISION**

(PARTICIPANTS IN CLOSED SESSIONS)

David Antin

poet, critic,
U.C. San Diego

Eleanor Antin,

artist,
U.C. San Diego

H. M. Boettinger,

Director of Corporate Planning,
AT&T

Shirley Clarke,

video artist,
U.C.L.A.

Roderic Gorney,

psychiatrist,
U.C.L.A., author: *The Human Agenda*

Alan Kay,

Learning Research Group,
Xerox Palo Alto Research Center

David Loye,

psychologist-sociologist,
U.C.L.A.

Humberto Maturana,

neurophysiologist,
University of Chile, Santiago

Nam June Paik,

video artist, New York City

David Ross,

Deputy Director,
Long Beach Museum of Art

Herbert Schiller,

Professor of Communications
U.C. San Diego

Ira Schneider,

video artist, editor: *Video Art*

Barbara Schultz,

television producer,
KCET, Ch. 28, Los Angeles

Woody Vasulka,

video artist,
S.U.N.Y. at Buffalo, New York

Heinz Von Foerster,

Professor Emeritus,
University of Illinois

Sol Worth,

anthropologist,
The Annenberg School, Philadelphia

PARTICIPANTS

DAVID ANTIN is a poet, art critic and art historian who has also been an engineer, a linguist, and director of a scientific publishing company. Mr. Antin has improvised and talked his poems throughout the United States, most recently at the Whitney Museum in New York City and at Wesleyan University in Connecticut. He is the author of numerous books of poetry, including *Meditations* (Black Sparrow Press), *Talking* (Kulchur Foundation), and *Talking At the Boundaries* (New Directions). He has also written critical articles for numerous journals including *Art Forum*, *Art News*, and *Boundary 2*. Professor of Visual Arts at the University of California, San Diego, Mr. Antin also is a member of the California Arts Council and has served as a consultant to the National Endowment For the Arts.

ELEANOR ANTIN is an internationally recognized artist who works in a variety of media including video, live performance, photography, painting, drawing, and writing. She has had one-woman exhibitions at numerous galleries and museums including the Museum of Modern Art in New York City, The Everson Museum in Syracuse, N.Y. and, most recently, the M.L. D'Arc Gallery in New York City. Her performances have been presented at The Clock Tower in New York City, the Palace of Fine Arts in San Francisco, and at the Venice Biennale in Venice, Italy. Ms. Antin is an Assistant Professor in the Visual Arts Department at the University of California, San Diego, and has served as a consultant to the National Endowment For the Arts and the New York State Council on the Arts.

WALTER S. BAER is a senior physical scientist and deputy director of the Energy Program of the Rand Corporation. Since 1970 his research has focused on the effects of government regulation and technological change in the communications and energy fields. He is co-author of *The Electronic Box Office* (Praeger, 1974), *Cable And Continuing Education* (Praeger, 1973), and is author of *Cable Television: A Handbook For Decisionmaking* (Rand, 1974) as well as three other books in Rand's cable television series. Dr. Baer has been communications consultant to The United Nations and has served on the Office of Science and Technology staff in the Executive Office of the President. Former director of the Aspen Cable Workshop, he is an advisor to the Aspen Institute's Program on Communications and Society. Dr. Baer has been a member of the Computer Science and Engineering Board of the National Academy of Sciences, the Cable Television Advisory Committee of the FCC, and the Technical Advisory Council of the General Telephone and Electronics Corporation.

KENT D. BROADBENT is Vice President of MCA Disco-Vision, Inc., and is director of MCA's videodisc research program. He is a specialist in the field of information storage and processing, holder of 18 patents, and author of numerous articles on advanced information processing systems and solid-state research. Prior to his affiliation with MCA, Mr. Broadbent was president of Broadbent Laboratories, Inc., and before that was director of American Systems, Inc.'s solid state division. Previously he was head of the subsystems, components and devices section of Hughes Research Laboratories. He has also served as technical consultant to Hughes Aircraft Company, North American Aviation, and Lockheed Electronics.

MORRIS P. CHISMAN is Associate Director of the Aspen Institute's Program on Communications and Society, with headquarters in Washington, D.C. In this capacity, and in accordance with the Institute's three-year Project on Communications Policy Making, Mr. Chisman has since 1976 been responsible for a continuing series of government staff seminars on communications policy. A graduate of Harvard and of Oxford University, Mr. Chisman was Program Officer of the John & Mary R. Markle Foundation from 1970 to 1975. Prior to that he taught History of Political Thought and American Government at the University of Toronto. He is the author of several major essays on communications policy, including "Politics and the New Mass Communications" (1973), and "Options for Federal Promotion of Advanced Rural Telecommunications Systems and Services," published in 1976 by the U.S. Office of Technology Assessment.

SHIRLEY CLARKE is an internationally famous filmmaker and video artist whose major films include *The Connection* (1960), *The Cool World* (1963), and *Portrait of Jason* (1968). Her 1964 film *Robert Frost: A Love Letter To The World* won an Academy Award for best feature documentary. She has also received Best Film awards at the Venice Film Festival, the Cannes Film Festival, the Locarno Film Festival, an Award of Special Merit at the Edinburgh Film Festival, as well as a coveted Flaherty Award for documentary filmmaking. In 1971 Ms. Clarke began working in video and has produced more than 200 videotapes to date. In 1973 she founded the Videospace Troupe, a touring company which staged more than 50 video workshops and shows at universities and museums on the east coast. Also in 1973 her Troupe produced a one-hour musical comedy, *Angels Of Light*, for the Experimental Video Workshop at Channel 13 in New York City. Since 1974 Ms. Clarke has been teaching experimental video production at U.C.L.A., and, in addition, this year she is producing a video version of the San Francisco Mime Company's production of Brecht's *The Mother*.

HERBERT S. DORDICK is an urban communications consultant who has been chiefly responsible for developing the cable television Master Plans for New York City and the City of Los Angeles. In addition, he is currently Senior Research Associate and Associate Director of the Center For Communications Policy Research at The Annenberg School of Communications at U.S.C. Previous to serving as Director of the Office of Telecommunications for the City of New York, Mr. Dordick was a member of the research staff of the Rand Corporation, a chief engineer for the Burroughs Corporation, and a program manager for RCA. He has been communications consultant to The Ford Foundation, The John & Mary R. Markle Foundation, The Department of State, The Department of Justice, The Department of Health, Education & Welfare, The White House Office of Telecommunications Policy, and The Corporation For Public Broadcasting.

DAVID J. FARBER is Associate Professor of Information and Computer Science, and of Electrical Engineering, at the University of California at Irvine. He is Principal Investigator of the Distributed Computer Project, funded by the National Science Foundation, and serves also as Principal Investigator of the Department of Defense Advanced Research Projects Agency in Network Security and Local Network Architecture. Dr. Farber also is a member of the National Science Foundation's Computer Sciences and Engineering Advisory Panel. Previously he worked at Bell Telephone Labs, where he participated in the design of the Electronic Switching System, and was a member of the Computer Science Department where he was one of the SNOBOL inventors.

JOHN W. FINDLATER is a vice President of MCA Inc. and, in addition, is President of Chief Executive Officer of MCA Disco-Vision, Inc., a position he has held since the formation of the company that developed MCA's optical videodisc system. Mr. Findlater has functioned in a wide range of high level corporate affairs at MCA since joining the company as general counsel during its days as a talent agency. In addition, he is an officer and director of ITA, the world's largest international audio-video industry trade association. Mr. Findlater also is a member of the Board of Visitors of the Annenberg School of Communications at the University of Southern California.

NORMAN W. GLENN is Vice President in charge of Program Planning for MCA Disco-Vision. In this capacity, he has activated a market-evaluation program to establish short-term and long-term guidelines for the selection of material for video disc publication, and he is involved in the development of new programming to be produced especially for video disc distribution. Mr. Glenn has been a Vice President of Universal TV since 1966, primarily involved with the development of new program material for TV. He came to Universal from United Artists Television, where he was Executive Vice President in charge of Programming. Prior to that he was Vice President for Radio and Television at Young & Rubicam, and earlier he was with NBC.

RODERIC GORNEY, renowned author of *The Human Agenda* (Simon and Schuster, 1972), is Associate Professor of Psychiatry at the UCLA School of Medicine. He is also Director of the Program on Psychosocial Adaptation and the Future, whose purpose is to investigate the impact of television on the attitudes and behavior of American adults, as well as the effects of acculturation in 58 cultures around the world. A generalist whose concern is to integrate the findings of disparate fields in the service of human survival, Dr. Gorney lectures and publishes widely. His paper, "Interpersonal Intensity" won the 1971 prize of the American Psychiatric Association for essays on alternatives to violence. His book *The Human Agenda* was nominated for the 1972 Pulitzer Prize in general non-fiction; was recommended for the 1972 National Book Award in non-fiction, and was nominated for the 1972 Hofheimer Prize of the American Psychiatric Association for outstanding research in psychiatry and mental hygiene.

LEITA HAGEMANN, associate producer for the conference, is a free-lance television producer and a part-time instructor of television and film at California State University, Los Angeles. She has been a research and production coordinator for Intermedia Systems Corp., a multimedia presentations firm in Cambridge, Mass., and research director for a San Francisco based documentary film company. During the period 1973-74 she was a staff producer for the NBC-TV network show "Tomorrow," and has produced several local television programs since that time. Educated at Boston University, Ms. Hagemann currently is producing a series of video portraits at U.C.L.A.

JACK B. HANKS is Market Operations Manager of the Magnetic Audio-Video Products Division of the 3M Company, with headquarters in St. Paul, Minnesota, for whom he has worked since 1955. In addition, Mr. Hanks is a member of the International Tape Association, the National Association of Educational Broadcasters, the National Association of Broadcasters, and numerous other industry-related organizations.

BURT I. HARRIS is a broadcasting pioneer who has been engaged in the television industry since 1953. He is President of Harris Cable Corporation, which serves approximately 50,000 cable TV subscribers, and of Harriscope Broadcasting Corporation, which owns six television stations, two radio stations and numerous cable television systems. In addition, Mr. Harris is Chairman of the National Cable Television Association in Washington, D.C., which represents a majority of the more than 12 million cable television subscribers and nearly one million pay-cable subscribers in the United States.

ALEXANDER D. JACOBSON is Associate Manager, Exploratory Studies Department, Hughes Research Laboratories, where he has worked since 1955. Currently he supervises experimental programs on light valve displays, optical signal processing, and holographic optics displays. Dr. Jacobson has supervised extensive research and development in pulsed laser holography and holographic lenses, and has done considerable work on the applications of laser devices to communication systems. In addition, he has conducted extensive research in motion picture holography and directed the research team that made the first pulsed ruby laser hologram in 1965. In 1968, Dr. Jacobson made the first true holographic motion picture.

C. RICHARD JONES is associate manager of the NASA Systems Division of Hughes Aircraft Company's Space and Communications Group at El Segundo, California. He is responsible for the development of spacecraft systems for planetary exploration, astronomy, earth observation, meteorology, and space applications, primarily for NASA. Among these programs are the Orbiting Solar Observatory, developed for NASA's Goddard Space Flight Center; the Pioneer Venus spacecraft, for NASA's Ames Research Center; the multispectral scanner for the Landsat spacecraft; and the Geostationary Meteorological Satellite, being developed for the Japanese National Space Development Agency for Japan's participation in the Global Atmospheric Research Program.

MITSURU KATAOKA is a pioneer in innovative use of cable television technology, having designed and implemented a decentralized two-way television system in the city of Irvine, California. Originally proposed in 1971 as a project funded by and for the Irvine Unified Schools System, Kataoka's user-controlled two-way TV system is technically simple enough to be operated by elementary school students; more recently, through the development of 17 community cable-casting stations, the system has been expanded to serve more than 90 percent of the population of Irvine. Recipient of a Fulbright-Hays Senior Research Fellowship to Japan in 1972, he became the First Foreign Scholar at Kwansei Gakuin University and in 1973 established the world's first regular exchange of videotape "letters" between students in Japan and America. Associate Professor in Design and Vice Chairman of the Design Department at U.C.L.A., Kataoka has been making videotapes and teaching experimental video production for more than nine years.

ALAN KAY is a mathematician, molecular biologist, physiologist, computer scientist, musician, composer, designer of musical instruments, and designer of hardware and software systems for interactive learning tools. An NBC Radio "Quiz Kid" in 1951 at the age of 11, Dr. Kay is presently Head of the Learning Research Group and Principal Scientist at Xerox Palo Alto Research Center, and is also Visiting Associate Professor of computer science at Caltech.

Former Research Associate in the Artificial Intelligence Project at Stanford University, and Assistant Professor at the University of Utah, Salt Lake City, Dr. Kay has invented and designed more than 30 hardware and software systems for education, information retrieval, information display, and music composition and synthesis since 1963. Inventor of several "personal computers" and interactive graphics systems for personal computing, Dr. Kay lectures and publishes extensively. His most recent essay, "The Mind-Body Problem," will be published this year in *CoEvolution Quarterly*.

BEN KAZAN is corporate research consultant on display devices at the Xerox Palo Alto Research Center. He received his B.S. degree from Caltech in 1938, the M.A. degree from Columbia University in 1940, and the D.Sc. Degree from the Technical University of Munich in 1961. From 1951 to 1958 Dr. Kazan was employed at the RCA Research Laboratories, where he worked on color television tubes and solid state image intensifiers. From 1958 to 1962 he was head of the Solid State Display Group at the Hughes Research Laboratories, continuing work on solid-state imaging devices. From 1962 to 1968 he was Chief Scientist of the Solid-State and Electro-Optical Division of Electro-Optical Systems, a Xerox affiliate. From 1968 to 1974 he worked at the IBM Watson Research Center in Yorktown Heights, New York. Holder of 80 patents, Dr. Kazan is a Fellow of the IEEE, a Fellow of the Society for Information Display, and a member of the American Physical Society.

PETER KIRBY has been working with small format video since 1970 at the California Institute of the Arts, the Neurophysiatic Institute at U.C.L.A., and at Video Works, Inc., in Los Angeles, as well as independent productions in Los Angeles and New York. He has worked extensively with artists using video, as well as producing tapes in the fields of health science, education, social science, and documentary. Currently, Mr. Kirby is Technical Director of the Video Workshop of the Long Beach Museum of Art.

DAVID LOYE, a graduate of Dartmouth College, received his M.A. in the psychology of personality and his Ph.D in social psychology from The New School for Social Research in New York City. Formerly with the psychology department at Princeton University, Dr. Loye currently is Research Director of the Program on Psychosocial Adaptation and the Future, Department of Psychiatry, School of Medicine, U.C.L.A., where he is completing a three-year study of the effects of television on adults. Dr. Loye is author of *The Leadership Passion: A Psychology of Ideology* (Jossey-Bass, 1977), and *The Healing Of A Nation* (Norton, 1971; Delta, 1972). Before becoming a social scientist, he was a television newsman, writer, film producer, and an advertising agency account executive.

DR. THOMAS H. MARTIN is an Assistant Professor at the Annenberg School of Communications at U.S.C. Director of the Ph.D. program on Human Interaction with Computers, he also teaches courses in Communication Technologies, Network Information Services, and Computer/Communication Law. Dr. Martin received a Ph.D. in Communication at Stanford University, and while there helped design the Stanford Public Information Retrieval System (SPIRES). He received an LL.B. (Law Degree) from the University of California at Berkeley and a B.A. in mathematics from Dartmouth College. Dr. Martin's principal research interests are in communications policy formulation, and in "human factors" implications of new interactive communications technologies.

HUMBERTO R. MATURANA was born in 1928 in Santiago, Chile. He received his Ph.D. in biology at Harvard University in 1959. Since 1965 he has been Professor of Biology at the Department of Biology, Faculty of Science, University of Chile at Santiago. In addition, he has been Visiting Professor of Neurophysiology at the Center For Advanced Study, University of Illinois, and the Electrical Engineering Research Department at M.I.T. Since 1961 Dr. Maturana has been working on the formulation of a General Theory of Living Systems. Many of his essays in this endeavor, such as *The Neurophysiology of Cognition*, *Cognitive Strategies*, and *Autopoietic Systems*, were published by the Biological Computer Laboratory at the University of Illinois from 1970 to 1974. Dr. Maturana's most recent essay, *Representation and Communication Functions*, will be published this year in Jean Piaget's *Encyclopedia Pleziade*.

FREDERICK M. NICHOLAS, Chairman of the California Public Broadcasting Commission, is also founder, President, and Director of Public Counsel, a public interest law firm of the Beverly Hills Bar Association. A specialist in real estate law, he is the author of numerous publications in that field and is President of The Hapsmith Company, a real estate development organization. Mr. Nicholas is a member of the Executive Committee of the Lawyers' Committee for Civil Rights Under Law in Washington, D.C.; a Trustee of the Fund for the Republic, and a Trustee of the Center for the Study of Democratic Institutions. A member of the Los Angeles Mall Advisory Committee, he received the Distinguished Service Award from the Beverly Hills Bar Association in 1974.

NAM JUNE PAIK, a seminal figure in Western contemporary art, is internationally famous as the founder of Video Art and as a cofounder of the movement which has come to be known as Conceptual Art. The Korean-born philosopher, composer and inventor, often referred to as "the George Washington of video," co-invented the world's first video synthesizer with Shuya Abe in 1968. In the early 1960s, while studying philosophy and music at the University of Heidelberg in Germany, he joined the group of poets, painters, musicians and theatrical performers known as Fluxus who have had major influence on the field of Conceptual Art. Also in Germany Paik met Karlheinz Stockhausen, John Cage and Marcel Duchamp, all of whom influenced his subsequent work in music and video. Fluent in five languages, Paik has for several years been a major consultant to the Rockefeller Foundation on Video Art and the future of television. His videotapes, produced over the past 12 years, are shown continually around the world. A major retrospective of Paik's video art was held last year at the Cologne Kunstverein in West Germany. He has recently completed a major video composition for NET, titled *Guadalcanal Requeim*, and in February he gave a "Fluxus Concert" with long-time colleague Charlotte Moorman at Carnegie Hall in New York City.

MONROE E. PRICE is Professor of Law at UCLA. He was Deputy Director of the Sloan Commission on Cable Communications and helped establish the Communications Law Program at UCLA. He has written on direct broadcast satellites and cable television, including a book with John Wicklein, *Citizens Guide To Cable Television*. In addition to his writings in the field of television, Professor Price is known for his work in federal-state-Indian relations, partly as the author of a book called *Law and the American Indian*. A graduate of the Yale Law School and former Law Clerk for Associate Justice Potter Stewart, Mr. Price is founder and director of Advocates for the Arts, and is a member of the Board of Directors of the Los Angeles Institute of Contemporary Art.

MARTIN ROBERTS is publisher and editor of the monthly *Videocassette & CATV Newsletter*, which he founded in 1970. He is the author of the first textbook on videocassettes, titled *Videocassettes: The Systems, The Market, The Future*. For the past 18 years Mr. Roberts has been President of Martin Roberts and Associates, a Beverly Hills advertising agency specializing in the promotion and marketing of films and television programs. He is also president of Tape Books, Inc., a company which produces and distributes educational and informational programming on audio and videocassettes. Mr. Roberts lectures on broadcast and cable television at UCLA and at the USC Graduate School of Business. Author of numerous articles on video tools and cable television, Mr. Roberts has lectured throughout the world and is a telecommunications consultant to major companies in the U. S., Europe and Japan.

JOSEPH ROIZEN is an international television consultant based in Palo Alto, California. He has supervised color television exhibitions for the U.S. State and Commerce Departments in the Soviet Union, Poland, Hungary, Brazil, Mexico, and The People's Republic of China. Since 1970 he has been a major consultant to the Compagnie Française de Television, in relation to the SECAM color TV process. He has served as technical consultant for seven Olympic Games, from the Summer Olympics in Rome in 1960 to the 1974 Asian Olympic Games in Tehran. Mr. Roizen has been director of television coverage of several international conferences, including the 4th International Conference on Peaceful Uses of Atomic Energy, and the conference on the Energy Crisis sponsored by the American Association for the Advancement of Science in 1974. Author of more than 200 articles in international journals, Mr. Roizen is Video Editor of *Broadcast Engineering* and *Video Systems*, and a contributing editor to *Television Digest* and *Television International*.

DAVID A. ROSS is a pioneer in museum-curatorial exhibitions of video art, having established the world's first museum program in video art at the Everson Museum in Syracuse, New York, during the period 1971 to 1974. He has continued this work since 1974 as Deputy Director for Television and Film at the Long Beach Museum of Art, where he is Director of the Video Workshop, a production facility where more than 75 artists produced videotapes during 1976 alone. In addition, Mr. Ross collaborated with architect I. M. Pei in designing the proposed new facility for the Long Beach Art Museum, which will be the world's first art museum conceived with a cable television station intrinsic to its operations. Organizer of nearly 50 major video art exhibitions throughout the United States, Canada, and Europe since 1971, Mr. Ross received a research grant from the JDR 3rd Foundation in 1974 to prepare an exhibition of Japanese video art. Consultant to Electronic Arts Intermix in New York City, and the European Museum Video Network, Mr. Ross writes and lectures extensively.

PHILIP A. RUBIN is Director of Engineering and Development for the Corporation For Public Broadcasting, a position he has held since 1970 when the office was created. He is responsible for technical research in satellites, cable television, videocassette and video disc technologies, UHF and VHF broadcasting, and the application of computers to public broadcasting. In 1965 Mr. Rubin was selected as the United Nations' first Expert in Satellite Communications, and was named Program Manager of the Centre for Research and Training in Satellite Communications in India. Later he was communications advisor to the government of Ceylon. A pioneer developer of

television satellite systems for Hughes Aircraft Company and TRC Research Laboratories, Mr. Rubin designed the first earth station licensed by the FCC for earth-space communications.

HERBERT I. SCHILLER, educated at the College of the City of New York, Columbia University, and New York University, has been Professor of Communications at the University of California, San Diego, since 1970. Previously he was research professor and editor of *The Quarterly Review of Economics and Business* at the University of Illinois. Author of *Mass Communications and American Empire*, and *The Mind Managers*, his most recent book is *Communication and Cultural Domination* (International Arts & Sciences Press).

ARTHUR SCHNEIDER is a pioneer in television and videotape production and post-production techniques who has won three Emmy Awards for videotape editing. Originally a film editor, Mr. Schneider joined NBC-TV in 1951 as a kinescope recording engineer; during 17 years with NBC he made many significant contributions to television and film editing techniques, including the magnetic film synchronizer now in use around the world. He also initiated the first videotape "instant replay" at the 1965 Rose Bowl Game. A veteran of nearly every phase of film and tape production and post-production for more than 26 years, Mr. Schneider is the only videotape editor to be accepted into the Honorary Society of the American Cinema Editors (ACE). From 1971 through 1976 he was Video Tape Editorial Supervisor for Consolidated Film Industries, and helped design the software for a computerized video editing system. A graduate of the U.S.C. Cinema Department and author of numerous articles on film and video editing, he is now at work on a non-technical book on video production for the layman.

IRA SCHNEIDER is an internationally recognized filmmaker, video artist and publisher and editor of books and journals on video communication and video art. From 1969 to 1974 he was founder, publisher and co-editor-in-chief of the pioneering "alternate video" journal *Radical Software*. He is co-editor of *Video Art: An Anthology*, published in 1976 by Harcourt, Brace, Jovanovich, and was consultant and/or contributor to three other books on alternate video: *Guerilla Television* (1971), *Spaghetti City Video Manual* (1972), and *Independent Video*, (1973). Mr. Schneider produced eight short experimental films during the period 1963-1968; one of these, *Lost In Cuddihy* (1966), is in the collection of the Museum of Modern Art Film Archives. He has produced several dozen video tapes and video installation pieces since 1969, and has exhibited at universities, museums, galleries and theatres throughout the United States, Canada and Europe. A major work, *Manhattan Is An Island*, will be shown at the Whitney Museum of American Art in New York City in May of this year. A graduate of Brown University and the University of Wisconsin in physiological psychology and neurophysiology, Mr. Schneider taught video art in the Visual Art Department, U.C. San Diego, during the academic year 1976-77.

BARBARA SCHULTZ has had a distinguished career of more than 20 years as producer of numerous award-winning television programs and network series. Currently Artistic Director for the P.B.S. series *Visions*, she has been Director of Program Development for the CBS Television Network on the East Coast; Executive Producer of *CBS Playhouse* and of the *CBS Children's Hour*; Co-Producer of the children's version of *You Are There* for the CBS News Division; and consultant to *The Electric Company*, produced by NET's

Children's Television Workshop. Ms. Schultz also prepared the *Elizabeth R* series for syndication by Time-Life Films, and was Story Editor for many network series, including *Trials Of O'Brien*, *The Defenders*, *The Reporter* and *The Armstrong Circle Theatre*. A graduate of Barnard College, she has taught Advanced Writing Seminars at New York University.

WOODY VASULKA is a pioneer video artist and electronics systems designer who has made significant contributions to the development of electronic image-synthesizing technologies. A graduate of the School of Engineering at Brno and of the Film Academy of Prague in his native Czechoslovakia, Mr. Vasulka emigrated to the United States in 1965. In 1971 he founded "The Kitchen" in New York City, one of the world's first electronic media theatres. He has also been associated with the Alternate Media Center at N.Y.U., and with Electronic Arts Intermix, also in New York City. Mr. Vasulka's videotapes have been exhibited throughout the United States, Canada, England, France, Japan, and elsewhere. Currently he is Associate Professor in the Center For Media Study at the State University of New York at Buffalo, and continues independent work in, and development of, electronic art tools.

HEINZ VON FOERSTER was born in Vienna, Austria, in 1911. His distinguished scientific career of nearly 50 years encompasses a broad spectrum of disciplines and concerns, including work as a plasma physicist, biophysicist, electrical engineer, cyberneticist, anthropologist, epistemologist and philosopher of science. Newly arrived in the United States in 1949, he joined the famous group of scientists who laid the conceptual foundations for the science of cybernetics; from 1949 to 1955 he was co-editor, with Margaret Mead, of the *Transactions of the Conferences On Cybernetics* which included Norbert Wiener, Gregory Bateson, John Von Neumann, Arturo Rosenblueth, Julian Bigelow and others. Former President of the Wenner-Gren Foundation for Anthropological Research, Dr. Von Foerster is President of the Society for General Systems Research and a member of the Board of Directors of the American Society for Cybernetics. Since 1949 he has taught at the University of Illinois at Urbana, serving variously as Professor of Electrical Engineering, Professor of Biophysics, Director of the Electron Tube Research Laboratory, Chairman of the Committee for Cognitive Studies, and Director of the Biological Computer Laboratory. Author of more than 100 papers and editor of dozens of books, Dr. Von Foerster lives in Pescadero, California, and is Professor Emeritus of Electrical Engineering and of Biophysics at the University of Illinois.

TRACY WESTEN is Professor of Law and Director of the Communications Law Program at the UCLA School of Law. He is nationally recognized as a courageous public interest and consumer protection advocate and has initiated many legal reforms relating to First Amendment rights. Former legal assistant to FCC Commissioner Nicholas Johnson, Mr. Westen is Chairperson of the National Board of the Pacifica Foundation (KPFK-FM in Los Angeles), a member of the Advisory Board to the House Subcommittee on Communications (for revision of the 1934 Communications Act), a member of the Los Angeles Cable Television Task Force, and Chairperson and Director of Public Communication, Inc., a public interest law firm. A graduate with highest honors in philosophy of University College, Oxford, England, and of the School of Law at U.C. Berkeley, Mr. Westen also is an accomplished pianist, oboist, and musicologist.

JOHN P. WITHERSPOON is President of the Public Service Satellite Consortium, which currently represents more than 68 major educational, medical, governmental, and other public service institutions throughout the United States, dedicated to the use of satellites for public service communications. Mr. Witherspoon formerly was Vice President of public broadcasting station KCET, Ch. 28 in Los Angeles, and before that was the first principal executive for television at the Corporation For Public Broadcasting. He was the founding General Manager of KPBS-TV in San Diego, with responsibility also for San Diego's public radio service, KPBS-FM. He was founding Chairman of the Board of Directors of National Public Radio, and has also served as Chairman of the Radio Division of the National Association of Educational Broadcasters (NAEB), National Education Radio, and as a member of the NAEB Executive Committee. Mr. Witherspoon has served on the faculties of Stanford University and San Diego State University.

SOL WORTH is a renowned anthropologist, ethnologist, and filmmaker and theorist. He is Professor of Communications at The Annenberg School of Communications at The University of Pennsylvania, where he also is Director of the Media Laboratories Program and Chairman of the Undergraduate Program in Communications. A former painter and photographer, Dr. Worth has produced more than 100 documentary films; one of these *Teatteri* (1957), is in the permanent collection of the Museum of Modern Art in New York City. His current research is in "Interpretive Strategies"—how people make meaning with and from symbolic events in various modes, codes, and media. Dr. Worth is author of *Through Navajo Eyes: An Exploration in Film and Communication and Anthropology* (1974), "The Development of a Semiotic of Film," "Cognitive Aspects of Sequence in Visual Communication," "Toward an Anthropological Politics of Symbolic Form," and many other studies.

GENE YOUNGBLOOD, producer of the conference, is a researcher, writer, lecturer, and teacher specializing in the study of mass communications media, their social implications and uses. He is author of *Expanded Cinema* (1970), and of the forthcoming *The Videosphere* (Spring, 1978), a political and philosophical book about the effects of the mass media on human evolution. Mr. Youngblood has received research grants from The National Endowment for the Arts, The Rockefeller Foundation, and The Rockefeller Brothers Fund. He has taught communications theory at U.C.L.A., California Institute of the Arts, Otis Art Institute, and the State University of New York at Buffalo. He is a Research Fellow of Buckminster Fuller's Design Science Institute in Washington, D.C., and of Media Study, Inc. in Buffalo, New York.

THE ANNENBERG SCHOOL OF COMMUNICATIONS AT U.S.C. is perhaps the world's most advanced graduate institution seeking solutions to contemporary and future communications problems. Its students are offered advanced training in four communications areas: theory, technology, practices, and research. The three-level building, designed by A. Quincy Jones, now Dean of the U.S.C. School of Architecture and Fine Arts, is regarded as a headquarters building rather than a classroom building: there are no customary classrooms; students and faculty work in clusters of offices and carrels, studios and control rooms, serviced by sophisticated electronic equipment designed to facilitate the learning process. Vertical cores throughout the building provide an electronic nervous system capable of transforming all public spaces into television and radio studios by means of two-way communication with a master control area. The Annenberg School of Communications, Inc., was founded by Walter H. Annenberg, a leading American publisher and former Ambassador to Great Britain; it operates schools at The University of Pennsylvania and The University of Southern California.

THE FILM & TELEVISION STUDY CENTER is a consortium of academic and professional institutions in Southern California dedicated to the archiving, study, and appreciation of film and television. Member institutions include The University of California at Los Angeles (UCLA), The University of Southern California (USC), The California Institute of the Arts (Cal Arts), Loyola Marymount University, The American Film Institute (AFI), The Academy of Motion Picture Arts and Sciences, The National Academy of Television Arts and Sciences (NATAS), The Los Angeles County Museum of Art, and The Los Angeles International Film Exposition (Filmex).

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