

# Value-Added Networks Will Aid Data Users

### By Ronald A. Frank

Of the CW Staff WASHINGTON, D.C. – The specialized needs of data communications users may require the establishment of "valueadded" networks, according to Clay T. Whitehead, Director of the Office of Telecommunications Policy. Speaking to more than 800

Speaking to more than sou computer communications professionals attending the first International Conference on Computer Communication (ICCC), Whitehead said these networks would utilize common carrier transmission facilities with switching, error control and other special services provided by "separate equipment." Citing a "definite knowledge

Citing a "definite knowledge gap" that exists between the computer and communication disciplines, Whitehead said this gap must be closed. Joining Whitehead in a keynote session that explored computer communications in "industrially advanced nations," were Dr. S.I. Samoylenko, vice-chairman of the Council of Cybernetics for the USSR Academy of Sciences; Yasuo Makino, director of telecommunications for the Japanese ministry of posts and telecommunications; and T. Larrson, deputy director general of the Swedish telecommunications administration.

In Russia, computer capabilities are organized along industry lines, Samoylenko said, adding that 1,800 factories will have computerized operations by 1975.

The key to the success of present Russian computer operations lies in the standardization of about 100 functions including standards for such systems com-(Continued on Page 4)

# Foreign Communications Systems Expanding

(Continued from Page 1) ponents as tape and drum memories, keyboards, and I/O specifications, Samoylenko said.

Among the computerized systems now operating in the USSR, Samoylenko listed management system, a patient multichent, and a dagnostic on-line system for heart disease. This on-line system has been tested experimentally over data channels of several miles, he added. In 1971 there were about 300 data communications systems operating in Japan, Makino told the conference. Three

> types of data facilities are available to c Japanese computer users, Makino said.

Users can configure privately owned and sa operated networks, with their own lines; they can have privately owned networks with lines supplied with the Nippon Telegraph and Telephone Corp. (NTT); or they can subscribe to facilities which are owned and operated by NTT, Makino said. Joint usage of data facilities is permitted where "closed business relationmitted where the data users, he the data data facilities is perant the data users is the the

Japanese users are presently operating on about 12,600 circuits of which about 53% are related to banking, 20% are used by the government, 15% are utilized for management functions, and 11% are used for stock dealings, transport management, and scientific uses, he said.

In Sweden, about 15 teleprocessing systems are "under implementation or planned" Larrson told the conference. An evaluation has been made on be feasible, the Swedish official said. The study shows that a common network

> could operate "at roughly the same costs" as the present individual nets, he said. But a lack of standardization would require a common net be based on message switching, he added.

The first modems were introduced in Sweden in 1962. The Swedish telecommunications administration currently supplies modems operating at speeds from 200 bit/sec to 40.8 kbit/sec with the annual user costs ranging from \$261 for the slow speed devices to \$2,613 for the highest speed units. An "initial fee" which must be paid by the user is extra, Larrson said.

While U.S. data systems have advanced "far ahead" of those in Europe, the Europeans have the advantage of studying our methods and perhaps implementing their networks more quickly toward "sophisticated solutions," Larrson said. The ICCC brought together interna-

tional computer and communications experts to consider a variety of common problems. The 3-day conference included more than 20 sessions dealing with such topics as social responsibility, data banks and privacy and digital network design. DRAFT McCarthy/Enslow/Whitehead 10/24/72

### COMPUTER COMMUNICATIONS SPEECH October 24, 1972

No one questions that today we are in the midst of a virtual information explosion. Computers and communications are being scattered worldwide. There are very few phases of our life that aren't touched, in one way or another, by these new developments. Computer communications systems rather (tld) but growing too. This conference very appropriate.

The development of data communications is having profound effects both on the users and suppliers of these information systems. Data communications development has been the focus for the drive to introduce competition into (prev) regulated sectors of the communications industry. Now both customer-owned terminal equipment and specialized common carriers, catering to the data users, are permitted. Innovations in both equipment and services are being introduced and made available to users at an accelerated rate.

Today, many traditional industries have been completely restructured through the use of data communications. New ones are being established. Securities, airlines, banking, . . . and more.

In addition, computer communications developments promise substantial improvements and expansion in a number of important governmental services such as health care, education, and library systems.

Information of all kinds, from FBI crime control data to real estate and vital statistics at the county and local government level, are now readily retrievable and accessible to users. The result has been an increase in the efficiency of government and a narrowing of the gap between government and citizen. I would now like to concentrate a little and briefly explore a few of the implications and effects of government regulatory policy on computer communications -- both present and future.

Government policies will have a profound effect on the growth and development of the information industry. Past experience in communications has taught us that a policy designed to regulate the transmission of information often affects the content of the information that is ultimately conveyed. In the broadcasting field, for example, Government regulations affecting the number of television channels, programming requirements, and program financing have been instrumental in shaping the character of television programming.

The regulatory problems in the computer communications area do not fall into either of the rather neat regulatory categories of broadcasting and common carriage. Computers are available in a wide variety of configurations and prices, and their services are provided in a freely competitive atmosphere. When information services expand into the communications area, however, present regulatory decisions require that they must operate in a totally different structure centered around the more conventional forms of regulated communications. This adds an unnecessary inflexibility into data communications operations.

We need to develop a dynamic regulatory framework for communications which is less oriented towards the traditional technologies. Policies need to be developed that provide the proper economic and social incentives for the balanced growth of these newer technologies which today are precariously straddling the traditional regulatory boundary lines. In this

- 2 -

vein, the development of the new specialized common carriers has prompted a reexamination of some of the basic principles of present common carrier policies.

We must find some means of accommodating all of the special requirements of data transmission in an industry whose major revenue source is voice traffic. The flexibility and adaptability of the common carriers networks have been ably demonstrated in recent years; but fundamental problems remain. It may be best to establish specialized value-added networks to overcome differences in the capabilities of the facilities available and the requirements of the data customer. These networks would utilize the common carrier's transmission facilities with the switching, error control, and other special services being provided by separate equipment. However we do it, we must balance (error of spec and error of \_\_\_\_).

We must find solutions to issues like the individual's legal right to privacy and the industry's technical problem of providing the security in their systems necessary to safeguard and insure that privacy.

We must fully consider the property rights of the creator of an information source or data bank when developing access rules for their use. Only a proper balancing of creator rewards and access costs will promote quality and diversity in new sources and their utilization.

Finally, we must work out the problems raised by the international trade of both information services and pure remote computing.

Government policymaking in communications must meet several important criteria if we are to deal. It must be anticipatory. If it is not, then it becomes nothing more than a defense of the status quo and a

- 3 -

red tape frustration to new systems and services.

It must project into the future. Major changes in computer hardware become widespread in about six or seven years; however, it traditionally has taken from 15 to 20 years to implement a fundamental change in communications.

- 4 -

Policymaking cannot operate in a vacuum. The policymakers require inputs from both the suppliers of the communications as well as the users. These inputs are especially important in the area we are discussing here today, for new there is interposed between the supplier and the ultimate user an important intermediary, the operator of the computer.

The ultimate objective of regulatory policy in the communications sector is to develop a properly structured competitive framework wherein the most productive use can be made of future developments and of national resources.

But even the most enlightened restructuring of the regulatory framework is not going to solve all of the problems. It is also essential that representatives of the two technical disciplines involved, the computer operators and the communicators, sit down and work out some of the difficulties themselves. Our own experience in this field has shown that a definite knowledge gap exists between the providers of these two services as to their present needs and capabilities. This schism is even more obvious in the important area of future planning. The gap in communications between these two industries must be closed. Government has been at fault, but ultimately up to you. If this sounds like a large order, I think we must bear in mind that we are speaking of a new technology and a new industry. The opportunity is there for all of us to guide it into the proper framework where it can provide the most good to society as a whole. It is important, therefore, that we stand back and take a long, hard, searching look into present and future problems in this area.

The emphasis of this Conference is rightly placed on the total problem. We need meetings that transcend the boundaries of academic disciplines, of industries, and of nations. The results of dialogues such as these will have a tremendous influence on the solution to your long-range problems and they can't help but lead to better informed government regulation. I wish you the best of luck.

- 5 -

. ....

DRAFT McCarthy/Enslow 10/18/72

### COMPUTER COMMUNICATIONS SPEECH October 24, 1972

Las T

No one questions that today we are in the midst of a virtual informa-The impact from this explosion is being scattered worldtion explosion. wide. There are very few phases of our life that aren't touched, in one cfc systems with the way or another, by these new developments. The development of data communications is having profound effects both on the users and suppliers of these information systems. Data communications development has been the focus for the drive to introduce competition into contain sectors of the communications industry. This drive has been successful resulting in a number of changes in our regulatory policies. Now both customer-owned terminal equipment and specialized common carriers, catering to the data users, are permitted. The result has been an acceleration in the rate at which innovations in both equipment and services are being introduced and made available to usersat an anclerated rate. The changes wrought by this new capability have also affected the users themselves. Today, many traditional industries have been completely restructed through the use of data communications, and other established based primarily on the capabilities provided. new ones have b

entencive computer communications systemen Securities, ailing, 7, ..

The effects of accessible, low-cost information services are being feit in some degree by practically every basiness, but there are some industries that are going to feel the impact from readily-available computer communication services more than others. I am thinking particularly of the securities, airlines, and other industries heavily dependent on the specialized transmission of information.

In addition, computer communications developments **Generat** substantial improvements and expansion in a number of important services. **Good comples are the health care delivery**, educations, and library systems. A cide effect of these applications will be the requirement for changes in the education and training of both the service

provider and recipient.

The computer communications business is also affecting government at all levels. Information of all kinds, from FBI crime control data to real estate and vital statistics at the county and local government level, are now readily retrievable and accessible to users. The result has been an increase in the efficiency of government and a narrowing of the gap between government and citizen. I would now like to concentrate a little and briefly explore a few of the implications and effects of government regulatory policy on computer communications -- both present and future.

Government policies will have a profound effect on the growth and development of the information industry. Past experience in communications has taught us that a policy designed to regulate the transmission of information often affects the content of the information that is ultimately conveyed. In the broadcasting field, for example, Government regulations affecting the number of television channels, programming requirements, and program financing have been instrumental in shaping the character of television programming.

The regulatory problems in the computer communications area do not fall into either of the rather neat regulatory categories of broadcasting and common carriage. Computers are available in a wide variety of configurations and prices, and their services are provided in a freely competitive atmosphere. When information services expand into the communications area, however, present regulatory decisions require that they must operate in a totally different structure centered around the more conventional forms of regulated communications. This adds an unnecessary inflexibility into data communications operations.

-3-

We need to develop a dynamic regulatory framework for communications which is less oriented towards the traditional technologies. Policies need to be developed that provide the proper economic and social incentives for the balanced growth of these newer technologies which today are precariously straddling the traditional regulatory boundary lines. Some progress in this direction seems to have been made. The development of the new specialized common carriers has prompted a reexamination of some of the basic principles of present common carrier policies. I think this can only be interpreted as a heating development

It is generally not too hard to point out some of the impacts of computer communications technology. The real problem is in resolving the difficult issues that surround the whole industry and affect its growth.

We must find solutions to issues like the individual's legal right to privacy and the industry's technical problem of providing the security in their systems necessary to safeguard and insure that privacy.

We must fully consider the property rights of the creator of an information source or data bank when developing access rules for their use. Only a proper balancing of creator rewards and access costs will promote quality and diversity in new sources and their utilization.

-4-

We must find some means of accommodating all of the special requirements of data transmission in an industry whose major revenue source is voice traffic. The flexibility and adaptability of the common carriers networks have been ably demonstrated in recent years; but fundamental problems remain. Specialized value-added networks to overcome differences in the capabilities of the facilities available and the requirements of the data customer. These networks would utilize the common carrier's transmission facilities with the switching, error control, and other special services being provided by separate equipment. Hammanda it we muttheline with the

Finally, we must work out the problems raised by the international trade of both information services and pure remote computing. Government policymaking in communications is several important difference in the several international in the several internation of the status this will be comes nothing more than a mognitude of the status que er a submating to conform to an existing environment.

It must project into the future. Major changes in computer hardware become widespread in about seven years; however, it the any seven years to implement a fundamental change in communications.

¥

Policymaking cannot operate in a vacuum. The policymakers require inputs from both the suppliers of the communications as well as the users. These inputs are especially important in the area we are discussing here today, for now there is interposed between the supplier and the ultimate user an important intermediary, the operator of the computer.

The ultimate objective of regulatory policy in the communications sector is to develop a properly structured competitive framework wherein the most productive use can be made of future developments and of national resources.

But even the most enlightened restructuring of the regulatory framework is not going to solve all of the problems. It is also essential that representatives of the two technical disciplines involved, the computer operators and the communicators, sit down and work out some of the difficulties themselves. Our own experience in this field has shown that a definite knowledge gap exists between the providers of these two services as to their present needs and capabilities. This schism is even more obvious in the important area of future planning. The gap in communications between these two industries must be closed.

that we are speaking of a new technology and a new industry. The opportunity is there for all of us to guide it into the proper framework where it can provide the most good to society as a whole. It is important, therefore, that we stand back and take a long, hard, searching look into present and future problems in this area. The emphasis of this Conference is rightly placed on the total problem. We need meetings that transcend the boundaries of academic disciplines, of industries, and of nations. The results of dialogues such as these will have a tremendous influence on the solution to long-range problems. I wish you the best of luck.

+ they can't help but land to bethe informed for and to gout neg.

- 7 -

Draft McCarthy/Enslow 10-13-72

### COMPUTER COMMUNICATIONS SPEECH October 24, 1972

No one questions that today we are in the midst of a virtual informas being tion explosion. The impact from this explosion a scattered world-wide as new technologies and new methods of transmitting proand storing information are introduced in all sector Society: initially, these technologies were used merely WI SIT DUSTINGS JOG TA DEC TheRe are very are'nt few phases of our life that touched, in one way or developm another, by these new The development of data communications from ero com timber a recumentar accest is having profound effects both on the users and systems. suppliers of these information. WP .. Data communications development the focus for the drive to introduce competition into certain sectors of the communications industry. has been This drive successful resulting in a number of changes in our regulatory policies. Now both customer owned terminal equipment and specialized common carriers, catering to the data users, are permitted. The result has been an acceleration in the rate at which innovations introduced and made available in both equipment and services to users.

### OFFICE OF TRUE COMMUNICATIONS FOLICY

-2-

The changes wrought by this new capability have also affected the users themselves. Today, many traditional industries have been completely restructured through the use of data communications, and other new ones have been established based primarily on the capabilities provided by extensive computer communications systems

ORECO

In addition, computer communications developments with substantiation and training of both the serfice provider and recipient.

The coputer communications business is also effecting government at all levels. Information of all kinds, from F.B.I. crime control data to real estate and vital statistics at the county XeV and local government level, are now readily retrievable and sesult accessible to users. The effect has been an increase in the efficiency of government and a

### OFFICE OF TELECOMMUNICATIONS POLICY EXECUTIVE OFFICE OF THE PRESIDENT WASHINGTON, D.C. 20504

inition contained in the second of a contained of a second of a second of a contained of a second of a second

In a difficult indicate communications in all provide the second of the

- 3 narrowing of The gap between government and citizen, There are number of other areas where computer communications developments generally forecast substantially improved and expanded services. Good examples are the health care delivery, educational and library systems A side effect of these applications will be the requirepent for changes in the education and training of both the service 2100 provide and recipient. me. now I would like to con-

centrate a little and briefly explore a few of the implications and effects of Government regulatory policy on computer communications-both present and future.

Government policies will have a profound effect on the growth and development of the information industry. Past experience in communications has taught us that a policy designed to regulate the transmission of information aften affects the content of the information that is ultimately conveyed. In the broadcasting field, for example, Government regulations affecting the number of television channels, programming requirements and program financing have been instrumental in shaping the character of television programming.

The regulatory problems in the computer communications area do not fall into either of the rather neat regulatory categories of broadcasting and common carriage. Computers are available in a wide variety of configurations and prices and their services are provided in a freely competitive atmosphere,

tion services expand into the communications area, present regulatory decisions require that they must operate in a totally different structure centered around the more conventional forms of regulated communications.

bility into data communications operations.

We need to develop a dynamic regulatory framework for communications which is less oriented towards the traditional technologies.

Policies need to be developed that provide the proper economic and social incentives for the balanced growth of these newer technologies which today are precariously straddling the traditional regulatory boundary lines. Some progress in this direction seems to have been made. The development of the new specialized common carriers

principles of present common carrier policies. I think this can only be interpreted as a healthy development.

STR. Annuts

- bot million -

- 5 -

OFFICE OF TELECOMMUNICATIONS POLICY EXECUTIVE OFFICE OF THE PRESIDENT WASHINGTON, D.C. 20504 DRALT--10/17/72 PHEnslow.clt (Speech for CTW)

It is not too hard to point out some some of the impacts and the frame computer communications technology. The real problem is in resolving the difficult issues that surround the whole industry and affect its growth.

generally

We must find solutions to issues like the individual's legal right to privacy and the industry's technical problem of providing the security in their systems necessary to safeguard and insure that privacy.

We must fully consider source or data bank when developing access rules for their use. Only a proper balancing of creator rewards and access costs will promote quality and diversity in new sources and their utilization.

recent years; but fundamental problems remain. R Specialized value-added networks may be established to

overcome differences in the capabilities of the facilities available and the requirements of the data customer. These networks would utilize the common carrier's



trade of both information services and pure remote computing.

Government policy making in communications has several important characteristics?

It must be anticipatory. If it does not have this quality, then it becomes nothing more than a recognition of the <u>status quo</u> or a rule making to conform to an existing environment. PIt must project into the future. Major changes in computer hardware become widespread in about seven years; however, it takes anywhere from 15 to 20 years to implement a fundamental change in communications.

Policy making cannot operate in a vacuum. The policy makers require inputs from both the suppliers of the communications as well as the users. These inputs are especially important in the area we are discussing here today, for now



there is interposed between the supplier and the ultimate user an important intermediary, the operator of the computer.

The ultimate objective of regulatory policy in the communications sector is to develop a properly structured competitive framework wherein the most productive use can be made of future developments and of national resources.

even the most enlightened restructuring of the regulatory framework is not going to solve all of the problems. It is also essential that representatives of the two technical disciplines involved, the computer operators and the communicators, sit down and work out some of the difficulties themselves. Our own experience in this field has shown that a definite knowledge gap exists between the providers of these two services as to their present needs and capabilities. This schism is even more obvious in the important area of future planning. The gap in communications between these two industries must be closed.

If this sounds like a large order, I think we must bear in mind that we are speaking of a new technology and a new industry. The opportunity is there for all of us to guide it into the proper framework where it can provide



the most good to society as a whole. It is important, therefore, that we stand back and take a long, hard, searching look into present and future problems in this area.

The emphasis of This conference is rightly placed on the total problem. We need meetings that transcend the boundaries of detter academic disciplines and these of industries, and nations.

It is the results dialogues such as these that will have the most influence on the solutions to our long-range problems. I wish you the best of luck.

### OFFICE OF TELECOMMUNICATIONS POLICY EXECUTIVE OFFICE OF THE PRESIDENT WASHINGTON, D.C. 20504

### CONFERENCE ON COMMUNICATION POLICY RESEARCH November 17-18, 1972

The Conference will be held in Room 2008, New Executive Office Building, 17th and H Streets, N.W. For information contact: Bruce M. Owen, Office of Telecommunications Policy, Room 711, 1800 G Street, N.W., Washington, D. C. (202) 395-5170.

### Schedule for Formal Sessions

NOTE: Since the papers will be distributed in advance, authors will have only 15 minutes to summarize their major points. Discussants will then have 15 minutes to comment on the paper. The remainder of the time will be devoted to general discussion by the participants and members of the audience.

Friday, November 17

1.5

- 9:00 AM Welcoming Remarks by Clay T. Whitehead, Director, Office of Telecommunications Policy.
- 9:15 AM Edward Zajac, Bell Labs: "Economics of Regulation." Discussant: Thomas Moore, Michigan State.
- 10:00 AM Coffee break.
- 10:15 AM Robert Meyer, Purdue: "Public vs. Private Utilities: A Policy Choice." Discussant: William Capron, Harvard.
- 11:00 AM Ross Eckert, USC: "Spectrum Allocation and Regulatory Incentives." Discussant: Alfred Kahn, Cornell.
- 11:45 AM Lunch break.
- 2:00 PM James Rosse, Stanford: "The Role of Regulation." Discussant: William Baumol, Princeton.
- 2:45 PM Roger Noll, Brookings: "The Role of Localism in Public Television." Discussant: Thomas Moore, Michigan State.
- 3:30 PM Coffee break.
- 3:45 PM Stephen Barnett, Berkeley: "Media Control, News Control, and the FCC." Discussant: Ronald Coase, Chicago.
- 4:30 PM Adjournment.

### Saturday, November 18, 1972:

1.0

T

- 9:15 AM Stanley Besen, Rice: "The Economics of the Cable Television 'Concensus."" Discussant: George Hilton, UCLA.
- 9:45 AM Coffee break.
- 10:00 AM Lionel Kestenbaum, "Issues in Common Carrier Regulation of Cable Television." Discussant: Merton Peck, Yale.
- 10:45 AM Rolla E. Park, RAND: "The Role of Analysis in the Formation of Cable Policy." Discussant: Merton Peck, Yale.
- 11:30 AM End of Conference.

Stop mits 9/

OFFICE OF TELECOMMUNICATIONS POLICY EXECUTIVE OFFICE OF THE PRESIDENT WASHINGTON, D.C. 20504

September 8, 1972

OFFICE OF THE DIRECTOR

MEMORANDUM FOR MR. WHITEHEAD

From:

Helen C. Hall

Subject:

Invitation to speak at the International Conference on Computer Communication, October 24

You have been invited to participate in the keynote session of the International Conference on Computer Communication, Tuesday morning, October 24, at the Washington Hilton Hotel, in Washington, D.C. Dr. Maurice Karnaugh, who is with IBM's T.J. Watson Research Center and Chairman of the Conference, extended the invitation through Phil Enslow who is serving as executive director of the Conference.

You would be one of four speakers at the keynote session which is scheduled to be from 9:30 to 11:45. The other speakers will be: Yasuo Makino, Administrative Director of Telecommunications for Japan; T. Larsson, Deputy Director General of the Central Administration of Swedish Telecommunications; and a speaker from the Council for Cybernetics of the U.S.S.R. Academy of Sciences, probably the Director of the Council. You would be expected to speak for approximately 20 minutes. The title of the keynote session is "Computer Communications in Industrially Advanced Nations: the Social, Political, and Economic Cynamics of a New Technology" and it is hoped that the speeches will explore the needs, genesis, status, and plans for computer communications in Japan, the U.S.A., the U.S.S.R. and Western Europe.

According to Col. Enslow this is the first major international computer conference with a very broad interdisciplinary flavor and there is a great deal of international enthusiasm for it. The attached program indicates the large number and variety of papers and topics to be discussed. A partial list of sponsors and cooperating associations include the following: IEEE, the Association for Computing Machinery, the ABA, the FCC Bar Association, the Business Equipment Manufacturers Association, the Public Utilities Group of the American Economists Association, the CCITT, the American Federation of Information Processing Societies, the International Federation of Information Processing, the National Academy of Sciences, the National Academy of Engineering, and UNESCO. Col. Enslow has spoken to Bromley Smith and they both agree that, if at all possible, this is a very important international forum for you to address. This is a burgeoning field in which there is a great need for international understanding and cooperation. Steve Doyle also advises that the quality of the other speakers at the keynote session would probably require someone from our Office at least at the Deputy Director level. Even though T. Larsson is the Deputy Director General from Sweden, he is a well known European telecommunications expert who has played a key role with the ITU for years. Steve recommends that you accept the invitation.

Accept the invitation

Accept the invitation with the possibility that Mr. Joyce may substitute for me at the last minute

Regret the invitation and ask Mr. Joyce to speak to the group

Attachment



INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION

## TOM WHITEHEAD



# PROGRAM for the International Conference on Computer Communication

October 24-26, 1972 The Washington Hilton Hotel Washington, D. C., U.S.A.

### Theme:

INTERNATIONAL and INTERDISCIPLINARY ASPECTS of COMPUTERIZED COMMUNICATIONS and of COMMUNICATION-ORIENTED COMPUTING



conference at a glance

### **KEYNOTE SESSION**

Computer Communication in Industrially Advanced Nations: The Social, Political and Economic Dynamics of a New Technology



### CHAIRMAN:

Dr. Maurice Karnaugh IBM Thomas J. Watson Research Center Yorktown Heights, New York, U.S.A.

### **KEYNOTE PAPERS**:

Dr. Maurice Karnaugh, "Opening Remarks"

Yasuo Makino, Administrative Director of Telecommunications, Ministry of Post and Telecommunications, Tokyo, Japan, "Data Communication in Japan"

T. Larsson, Deputy Director General, Swedish Telecommunications Administration, Farsta, Sweden, "Data Communication in Sweden – and Some Aspects of the Situation in Europe"

### **KEYNOTE SPEAKER:**

Dr. Clay T. Whitehead, Director, Office of Telecommunications Policy, Executive Office of the President, Washington, D.C., U.S.A., "Data Communication in the United States"

### **DISTINGUISHED GUEST:**

Dr. S. I. Samoylenko, Vice-Chairman, Council for Cybernetics, USSR Academy of Sciences, Moscow, USSR

THEME: This session will explore the needs, genesis, status, and plans for computer communications in Japan, the U.S.A., the USSR and Western Europe. Sociopolitical and economic factors will be emphasized and their influences on the implementations will be examined.



conterence at a glance

### **KEYNOTE SESSION**

Computer Communication in Industrially Advanced Nations: The Social, Political and Economic Dynamics of a New Technology



### CHAIRMAN:

Dr. Maurice Karnaugh IBM Thomas J. Watson Research Center Yorktown Heights, New York, U.S.A.

### **KEYNOTE PAPERS:**

Dr. Maurice Karnaugh, "Opening Remarks"

Yasuo Makino, Administrative Director of Telecommunications, Ministry of Post and Telecommunications, Tokyo, Japan, "Data Communication in Japan"

T. Larsson, Deputy Director General, Swedish Telecommunications Administration, Farsta, Sweden, "Data Communication in Sweden – and Some Aspects of the Situation in Europe"

### **KEYNOTE SPEAKER:**

Dr. Clay T. Whitehead, Director, Office of Telecommunications Policy, Executive Office of the President, Washington, D.C., U.S.A., "Data Communication in the United States"

### **DISTINGUISHED GUEST:**

Dr. S. I. Samoylenko, Vice-Chairman, Council for Cybernetics, USSR Academy of Sciences, Moscow, USSR

THEME: This session will explore the needs, genesis, status, and plans for computer communications in Japan, the U.S.A., the USSR and Western Europe. Sociopolitical and economic factors will be emphasized and their influences on the implementations will be examined.

### SPECIAL PROJECT

Participating Demonstrations of a Multi-Purpose Network Linking Dissimilar Computers and Terminals



### CHAIRMAN:

Dr. Larence G. Roberts, Director for Information Processing Techniques, Advanced Research Projects Agency Department of Defense, Arlington, Virginia, U.S.A.

### **PROJECT COORDINATOR:**

Dr. Robert E. Kahn\* Bolt, Beranek and Newman Cambridge, Massachusetts, U.S.A.



### PAPER:

"Participating Demonstrations of a Multi-purpose Network Linking Dissimilar Computers and Terminals"

### **EXAMPLE DEMONSTRATIONS:**

"Multi-Computer Support of Cross-Country Interactive Graphics", Bolt, Bernaek and Newman, Cambridge, Massachusetts, U.S.A. Institute of Technology, Cambridge, Massachusetts, U.S.A., The MITRE Corporation, McLean, Virginia, U.S.A.; and University of California, Santa Barbara, Goleta, California, U.S.A.

"An Aid for Collaboration for Geographically Distributed Groups", Stanford Research Institute, Menlo Park, California, U.S.A.

"MACSYMA-An Interactive Formal Mathematics System", Massachusetts Institute of Technology Cambridge, Massachusetts, U.S.A.

THEME: Conference attendees will exercise a variety of computers and terminals in a range of applications. The computers are widespread geographically and under diverse managements.

\*Now at Advanced Research Projects Agency, Arlington, Virginia, U.S.A.
#### RESPONSIBILITY



CHAIRMAN:

Dr. Herbert Maisel, Director, Computation Center and Associate Professor of Computer Science Georgetown University, Washington, D.C., U.S.A.

## **PROGRAM COORDINATOR:**

Louis Feldner, Common Carrier Bureau Federal Communications Commission Washington, D.C., U.S.A.

#### PAPERS:

Dr. Herbert Maisel, "Responsibility for the Humanistic Use of the Information Revolution: Where Will the Battle be Fought?"

Commissioner Robert E. Lee, Federal Communications Commission, Washington, D.C., U.S.A., "The Role of the Federal Communications Commission"

Professor Victor C. Ferkiss, Department of Government, Georgetown University, Washington, D.C., U.S.A., "Computers and Communications: Boon or Bane? Information Technology, Freedom and Social Control"

#### SPEAKERS:

Professor Joseph Weizenbaum, Project MAC, Massachusetts Institute of Technology, Cambridge, Massachusetts, U.S.A., "Responsibility of the Technologist as an Individual"

Yoneji Masuda, Director, Japan Computer Usage Developement Institute, Tokyo, Japan, "Responsibility and the Information Revolution: An Overseas Perspective"

THEME: Everyone concedes the tremendous impact that computer communications will have in our society in the coming decades. Some say that this impact is already substantially upon us. A new technology with enormous impact necessarily modifies many of our day-to-day activities. It is important that this modification benefit mankind and especially that it promote, in Norbert Wiener's words, "The human use of human beings." This implies responsibility—the need to establish principles and guidelines and to channel these technological developments in accordance with these principles and guidelines.

#### TELECONFERENCING: THE COMPUTER, COMMUNICATION AND ORGANIZATION



CHAIRMAN: Professor David W. Conrath Department of Management Sciences University of Waterloo, Waterloo, Ontario, Canada

> PROGRAM COORDINATOR: Gordon B. Thompson, Manager, Communications Studies Bell Northern Research Ottawa, Ontario, Canada



## PAPERS:

Professor David W. Conrath, "Teleconferencing: The Computer, Communication and Organization"

A. J. Lipinski, H. M. Lipinski and R. H. Randolph, Institute for the Future, Menlo Park, California U.S.A., "Computer-Assisted Expert Interrogation A Report on Current Methods Development"

James A. Schuyler, Northwestern University, Evanston, Illinois, U.S.A., and Robert Johansen, Sociology Department, Upsala College, East Orange, New Jersey, U.S.A., "ORACLE: Computerized Conferencing in a Computer-Assisted Instruction System"

Dr. Murray Turoff, Office of Emergency Preparedness, Washington, D.C., U.S.A., "PARTY-LINE and DISCUSSION: Computerized Conference Systems"

Professor M. L. Constant and Professor P. L. Seeley, Department of Systems Design, University of Waterloo, Waterloo, Ontario, Canada, "Computer Mediated Human Communications in an Air Traffic Control Environment: A Preliminary Design"

## DISCUSSANTS:

Douglas Engelbart, Stanford Research Institute, Menlo Park, California, U.S.A.

David Abbey, Ontario Institute for Studies in Education, Toronto, Ontario, Canada

THEME: The general theme of the session will be the role of the computer as an intermediate processor in communication between two or more individuals with a common purpose. What can the computer do in such a role? How might it enhance communication effectiveness over non-processed messages? Can it speed up the pace of sending and receiving between two or more parties to a communication interaction? Can computer aided communication bring about new dimensions to the communication experience? What are the constraints of computer aided communication? How should individuals interface with each other when using the computer as an intermediary?

## COMPUTERS AND A TELEPHONE COMMUNICATION SYSTEM OF THE FUTURE



## CHAIRMAN:

Laurin G. Fischer Systems Division, Computer Sciences Corporation Falls Church, Virginia, U.S.A.

PROGRAM COORDINATOR: Dr. Wayne B. Swift Policyholder Service Corporation Falls Church, Virginia, U.S.A.



#### **PAPERS**:

J. Crompton, Plessey Company, Ltd., Liverpool, England, "Structure and Internal Communications of a Telephone Control System"

D. C. Cosserat, Plessey Company, Ltd., Liverpool England, "A Capability Oriented Multi-Processor System for Real-Time Applications"

K. J. Hamer-Hodges, Plessey Company, Ltd., Liverpool, England, "Fault Resistance and Recovery within System 250"

Dr. C. S. Repton, Plessey Company, Ltd., Liverpool, England, "Reliability Assurance for System 250: A Reliable Real-Time Control System"

#### DISCUSSANTS:

Mark Davies, Bell-Northern Research, Ottawa, Ontario, Canada

Paul E. Muench, American Telephone and Telegraph Company, New York City, New York, U.S.A.

THEME: The problems of developing a dial telephone system with programmable digital control equipment are analyzed in the context of the U.K.: an approach taken at Plessey to solve these problems is outlined to the extent of illuminating clearly the nature of the choices available and a rationale for the choice of one particular approach.

## COMPUTER COMMUNICATIONS-AN EMERGING TOOL IN RESPONSE TO SOCIETY'S NEEDS



CHAIRMAN:

Reg A. Kaenel, AMF Incorporated Stamford, Connecticut, U.S.A.

## **PROGRAM COORDINATOR:**

Dr. Raymond L. Pickholtz George Washington University Washington, D.C., U.S.A.



#### PAPERS:

Dr. Reg A. Kaenel, "Computer Communications—An Emerging Tool in Response to Society's Needs?"

Dr. Takeshi Utsumi, Assistant Department Manager, Information Processing Department, Mitsubishi Research Institute, Tokyo, Japan, "Global Gaming-Simulation with Computer Communication for International Cooperation" (abstract only)

#### DISCUSSANTS:

Dr. W. J. Bray, Director of Research, British Post Office, London, England

Dr. N. Seshagiri, Director, Information Planning Analysis Group, Electronics Commission, New Delhi, India

Professor I. Paz, Government of Israel, Armanent Development Authority, Tel-Aviv, Israel Professor F. Reza, Ambassador, Permanent Delegate of Iran to Unesco, Paris, France Dr. Addison Richmond, Department of State, Washington, D.C., U.S.A.

THEME: Combination of the established technologies of computers and communication is giving rise to an accelerating emergence of information networks. Effective uses of these networks depend on the requirements of the communities they are to serve. This session aims at identifying requirements that can be exceptionally well met by such information networks. In particular, the discussion will explore regulative requirements of different nations and attempt to project the growth profile of the requirements of developing nations.

#### IMPACTS



## CHAIRMAN:

Andrew J. Lipinski Institute for the Future Menlo Park, California, U.S.A.

#### **PROGRAM COORDINATOR:**

Gordon B. Thompson, Manager, Communications Studies Bell-Northern Research Ottawa, Ontario, Canada



#### PAPERS:

Andrew J. Lipinski, "The Impact of Wide-Spread Computer Communication Systems and their Use"

Barrington Nevitt, Director, Innovations and Training, Ontario Development Corporation, Toronto, Ontario, Canada, "Computer at Wits End Leads to Process Pattern Recognition" Professor D.A. Dunn, Engineering-Economic Systems Department, Stanford University, Stanford, California, U.S.A., "Alternative Future Computer-Communications Markets" Professor David W. Conrath, Department of Management Sciences, University of Waterloo, Waterloo, Ontario, Canada, "Measuring the Computer's Impact on Organizational Structure" N. D. Hill and T. F. Watling, International Computers Limited, London, England, "The Impact of LACES" (London Airport Cargo EDP Scheme)

Dr. Thomas L. McPhail\*, Chief, Social Environment Planning Unit, Department of Communications, Government of Canada, Ottawa, Ontario, Canada, "How the Public Perceives the Computer: Some Social-Psychological Dimensions"

Dr. Shigeru Watanabe, The University of Tokyo, Hoichi Itaya, Masayuki Shimada and Kazuo Yagi, Japan Society for the Promotion of Machinery, Industry, Tokyo, Japan, "Computer-Assisted Instruction—A System and its Assessment in Japan"

Dr. Hans J. von Baeyer, Director General, Computer-Communications Task Force, Ottawa, Ontario, Canada, 'Impact of Computer Communications as Tools in the Social and Economic Development of Canada'' (abstract only)

#### SPEAKER:

Kotaro Shimo, Ministry of International Trade and Industry, Tokyo, Japan, "Computer Communication Assisted Community Project in Japan". (presented by Toshio Kitamura, Japan Trade Center, New York, New York, U.S.A.)

#### DISCUSSANTS:

Professor J. C. R. Licklider, Project MAC, Massachusetts Institute of Technology, Cambridge, Massachusetts, U.S.A.

Professor Nathaniel Macon, Department of Mathematics and Computer Science, American University, Washington, D.C., U.S.A.

Raymond G. Fox, IBM Federal Systems Division, Gaithersburg, Maryland, U.S.A. R. John Lansdown, Computer Arts Society, British Computer Society Specialist Group, London, England

THEME: The Impact of Widespread Computer Communication Systems and Their Use.

\*Now Consultant, Computer Systems Division, The MITRE Corporation, McLean, Virginia, U.S.A.

## NETWORKS-RECENT DEVELOPMENTS



CHAIRMAN: Dr. Jack Moshman Moshman Associates Washington, D.C., U.S.A.

> **PROGRAM COORDINATOR:** Dr. Stanley Winkler, Senior Scientist IBM Systems Development Division Gaithersburg, Maryland, U.S.A.



## PAPERS:

N. G. Anslow and J. Hanscott, BOAC, London Airport, Hounslow, Middlesex, England, 'Implementation of International Data Exchange Networks''

A. A. McKenzie, B. P. Cosell, J. M. McQuillan, and M. J. Thrope, Bolt, Beranek & Newman, Inc., Cambridge, Massachusetts, U.S.A., "The Network Control Center for the ARPA Network"

D. L. A. Barber, Division of Computer Science, Department of Trade and Industry, National Physical Laboratory, Teddington, Middlesex, England, "The European Computer Network Project"

B. T. Smith, Central Computer Agency, Civil Service Department of UK Government, Whitehall, London, England, "Mixed Computer Networks: Benefits, Problems and Guidelines"

## **DISCUSSANTS:**

Professor Norman Abramson, Information Sciences Program, University of Hawaii, Honolulu, Hawaii, U.S.A.

Professor Wesley W. Chu, Computer Science Department, University of California, U.S.A.

THEME: In addition to the "bread and butter" issues of what switching equipment, what size lines and what routing algorithms, large networks also entail a large set of operational, administrative and standards—coordinating problems. These issues are explored for four large networks—two operational and two planned.

## DATA NETWORK DESIGN PROBLEMS I



CHAIRMAN: Dr. Paul Oliver, UNIVAC Washington, D.C. U.S.A.

> **PROGRAM COORDINATOR:** Dr. Carl Hammer, Director, Computer Sciences, UNIVAC, Washington, D.C., U.S.A.



PAPERS:

P. Zafiropulo and E. H. Rothauser, IBM Zurich Research Laboratory, Rueschlikon, Switzerland, "Signaling and Frame Structures in Highly Decentralized Loop Systems"

C. S. Nokes, Data Communications Center, IBM Zurich Research Laboratory, Rueschlikon, Switzerland, "A Subscriber Loop Signaling Technique for Synchronous Data Networks"

M. Millman, Computer Sciences Corporation, Falls Church, Virginia, U.S.A., "A Linear Programming Approach to the Design of Efficient Multiplexed Wideband Transmission Systems"

V. Kevin Moore Whitney, GM Research Laboratories, Warren, Michigan, U.S.A., "Comparison of Network Topology Optimization Algorithms"

Eric G. Manning, University of Waterloo, Waterloo, Ontario, Canada, "Newhall Loops and Programmable TDM: Two Facets of Canadian Research in Computer Communications"

#### DISCUSSANTS:

Professor David L. Cohn, Information and Control Sciences Center, Southern Methodist University, Dallas, Texas, U.S.A.

Professor Raymond L. Pickholtz, Department of Electrical Engineering, George Washington University, Washington, D.C., U.S.A.

THEME: The increasing demand in modern computer systems for an efficient man-machine or machine-machine interface suggests that we are quickly approaching the point where most systems will be operating in a communications-oriented environment. This trend is further stimulated by financial and response-time considerations. Unfortunately, it is often the case that a computer network, rather than solving problems, simply shifts them from the data processing to the data communication parts of the system. The papers in this session address themselves to the techniques and considerations required in the design of cost-effective data communication networks. The design approaches and the types of networks to which these are applied differ considerably within the framework of the common goal; the improvement of cost-performance.

#### THE WIRED CITY



## CHAIRMAN:

Weston E. Vivian, Vicom Manufacturing Company, Inc. Ann Arbor, Michigan, U.S.A.

#### **PROGRAM COORDINATOR:**

Dr. Phillip H. Enslow, Jr. Office of Telecommunications Policy, Executive Office of the President Washington, D.C., U.S.A.



## **PAPERS**:

R. M. Alden, United Telecommunications, Inc., Kansas City, Missouri, U.S.A. "The Wired City: The Role of an Independent Telephone Company"

W. F. Mason and R. K. Lay, The MITRE Corporation, McLean, Virginia, U.S.A., "The Wired City: Services for Home Delivery via Interactive Cable TV"

John P. Thompson, Arthur D. Little, Inc., Cambridge, Massachusetts, U.S.A. "The Wired City: Commercial Services to be Provided by Broadband Telecommunications Systems"

#### **DISCUSSANTS:**

David Foster, President, National Cable TV Association, Washington, D.C., U.S.A.

Paul Visher, Assistant Group Executive, Hughes Aircraft Company, Culver City, California, U.S.A. William Butters, President, Transworld Communications, Inc., New York, New York, U.S.A.

Dr. Nathaniel Feldman, Senior Engineer, Rand Corporation, Santa Monica, California, U.S.A.

THEME: Technical standards for community cable television networks recently have been published by the FCC which will require all future cable television networks in metropolitan areas to provide to and from every home, office and store, multi-megahertz-bandwidth duplex transmission capacity. In several cities today, messages, data, and private television already are being transmitted under computer control over portions of the city's cable television network.

Within this decade, most United States metropolitan areas can be expected to have such service. Over half the homes in Canadian metropolitan areas are served by cable now. As broadband two-way, city-wide transmission capacity comes into existence, new uses, new services, new communications, computer and peripheral configurations, and new computer programs will proliferate. Existing telephone installations also will provide competing services. By 1990, an investment of 30 to 50 billion dollars can be expected.

During this Session, the types of uses foreseen will be summarized and experimental tests to date described. Expected revenues, costs and capital requirements will be projected. Social and legal implications will be discussed.

## CONFERENCE LUNCHEON



TOASTMASTER: Dr. Reg A. Kaenel AMF Incorporated Stamford, Connecticut, U.S.A.

## DISTINGUISHED SPEAKER:

Dr. Hans J. von Baeyer, Director General, Canadian Computer-Communication Task Force, Department of Communications,

Ottawa, Ontario, Canada



"Conflict in Computer Communications"

## COMPUTER COMMUNICATION NETWORKS FOR HIGHER EDUCATION



#### **CHAIRMAN:**

Professor Martin Greenberger, Department of Computer Science, Johns Hopkins University, Baltimore, Maryland, U.S.A. and EDUCOM, Princeton, New Jersey, U.S.A.

## **PROGRAM COORDINATOR:**

Stuart L. Mathison Arthur D. Little, Inc. Cambridge, Massachusetts, U.S.A.



## PAPERS:

Professor Martin Greenberger, "Computer Communication Networks for Higher Education"

R. H. Howell, International Computers Limited, ICNS Project, University of Bristol, Bristol, England, "The Integrated Computer Network System"

John deMercado, René Guindon, John DaSilva, and Michel Kadoch, Department of Communications, Ottawa, Ontario, Canada, "The Canadian Universities Computer Network-Topological Considerations"

D. D. Aufenkamp, Office of Computing Activities and E. C. Weiss, Office of Science Information Service, National Science Foundation, Washington, D.C., U.S.A., "NSF Activities Related to a National Science Computer Network"

#### DISCUSSANTS:

Professor Eric G. Manning, Faculty of Mathematics, University of Waterloo, Waterloo, Ontario, Canada

Professor Norman Abramson, Information Sciences Program, University of Hawaii, Honolulu, Hawaii, U.S.A.

THEME: The motivation for regional and national computer networks for higher education will be discussed along with a summary of the major networking efforts underway. Included will be the ARPA network, the National Science Foundation Network, and several presently operating regional networks. Other topics to be covered include network management, usage of networks for computing and instruction, research applications, implications for computer centers in higher education, and future trends.

## DATA NETWORK DESIGN PROBLEMS II



#### CHAIRMAN:

George J. Lissandrello IBM World Trade Corporation New York, New York, U.S.A.

## **PROGRAM COORDINATOR:**

Dr. Carl Hammer, Director, Computer Sciences, UNIVAC, Washington, D.C., U.S.A.



#### **PAPERS**:

Rémi F. Despres, Centre National D'Etudes des Telecommunications, (CNET), Issy les Moulineaux, France, "A Packet Switching Network with Graceful Saturated Operation"

Joseph F. Marchese, Manager, Telecommunication Systems, and W. Gerhard, Data Communications Center, IBM World Trade Corporation, IBM Zurich Research Laboratory, Rueschlikon, Switzerland, "Some Effects of Switched Network Time Delays and Transmission Speed on Data Based/Data Communication Systems"

John M. Husted, COMSAT Laboratories, Clarksburg, Maryland, U.S.A., "Current and Near Future Data Transmission via Satellites of the Intelsat Network"

David J. Farber and Frank R. Heinrich, Department of Information and Computer Science, University of California, Irvine, California, U.S.A., "The Structure of a Distributed Computer System-The Distributed File System"

Grayce M. Booth, Senior Systems Engineer, Advanced Systems Design, Phoenix Computer Operations, Honeywell Information Systems, Phoenix, Arizona, U.S.A., "The Use of Distributed Data Bases in Information Networks"

#### **DISCUSSANTS:**

Professor David L. Cohn, Information and Control Sciences Center, Southern Methodist University, Dallas, Texas, U.S.A.

Professor Mischa Schwartz, Department of Electrical Engineering, Polytechnic Institute of Brooklyn, Brooklyn, New York, U.S.A.

Professor Raymond L. Pickholtz, Department of Electrical Engineering, George Washington University, Washington, D.C., U.S.A.

THEME: Two distinct approaches have been employed during the past years as data network designers either adapted to existing facilities or proposed new facilities to meet special requirements.

It is still too early to draw definite conclusions about the relative merits of these and related concepts but their continued study is expected to provide us with the analytical tools needed to design for the future.

#### THE ROLE OF COMPETITION



CHAIRMAN:

Donald I. Baker, Director of Policy Planning, Antitrust Division, U.S. Department of Justice, Washington, D.C., U.S.A.

PROGRAM COORDINATOR: Philip M. Walker Georgetown University, Law Center Washington, D.C., U.S.A.



#### PAPERS:

Donald I. Baker, "Access to Large Computer Systems"

Kenneth A. Cox, Senior Vice President, MCI Communications Corporation, Washington, D.C., U.S.A., "The Promise and Peril of Competition in Intercity Communications"

Yasuo Makino, Administrative Director of Telecommunications, Ministry of Posts and Telecommunications, Tokyo, Japan, "Competition in the Fields of Computers and Communications in Japan"

Professor William H. Melody, University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A., "Interconnection: Impact on Competition-Carriers and Regulation"

Charles R. Cutler, Kirkland, Ellis & Rowe, Washington, D.C., U.S.A., "Beyond the Computer Inquiry: Who Should Be Regulated in Computer/Communications"

#### DISCUSSANTS:

Philip M. Walker, Georgetown University, Law Center, Washington, D.C., U.S.A.

Lt. Col. Sebastian Lasher, Office of Telecommunications Policy, Executive Office of the President, Washington, D.C., U.S.A.

THEME: This session will explore the role and implications of competition in the computer-communications industry, focusing on the following aspects of the subject:

Access to large computer-communications systems-efficiency versus competition.

Competition among common carriers-specialized carriers and domestic satellites.

Competition in the remote-access data processing services industry-comparison of the U.S. experience with that of other countries.

Competition and carrier performance-a case study in interconnection.

#### **COMPUTER COMMUNICATION – THE QUIET REVOLUTION**



CHAIRMAN:

Dr. Stanley Winkler, Senior Scientist IBM Systems Development Division Gaithersburg, Maryland, U.S.A.

**PROGRAM COORDINATOR:** 

Norman A. Heck IBM Federal Systems Division Gaithersburg, Maryland, U.S.A.



#### **PAPERS**:

Dr. Stanley Winkler, "Computer Communication - The Quiet Revolution"

Dr. Carl Hammer, Director, Computer Sciences, UNIVAC, Washington, Washington, D.C., U.S.A., "Computer Communications: The Future"

Gordon B. Thompson, Manager, Communications Studies, Bell-Northern Research, Ottawa, Ontario, Canada, "Three Characterizations of Communications Revolutions"

#### SPEAKER:

Kaoru Ando, Managing Director, Fujitsu Ltd., Tokyo, Japan, "Social and Economic Implications of Computers and Communications"

#### **DISCUSSANTS:**

Professor K. Venkitaraman, Chairman, Electronics and Telecommunications Engineering Division, The Institution of Engineers (India), Sivaram Nivas, Kerala, India

Professor F. Reza, Ambassador, Permanent Delegate of Iran to Unesco, Paris, France

THEME: A non-technical exploration of the technological innovations which are changing the nature of the world and the environment in which we live.

## DATA BANKS AND INDIVIDUAL PRIVACY



#### CHAIRMAN:

Dr. Alan F. Westin, Professor of Public Law Department of Political Science, Columbia University New York, New York, U.S.A.

## **PROGRAM COORDINATOR:**

Philip M. Walker Georgetown University Law Center Washington, D.C., U.S.A.



## **PAPERS**:

Dr. Bryan Niblett, Chairman, Law Specialist Group, British Computer Society, London, England, "Data Banks and Individual Privacy: Developments in the United Kingdom"

Dr. Hans P. Gassmann, Directorate for Scientific Affairs, Organization for Economic Cooperation & Development, Paris, France, "Data Banks and Individual Privacy: The Situation in the German Federal Republic"

#### SPEAKERS:

Dr. Calvin C. Gotlieb, Professor, Department of Computer Sciences, University of Toronto, Toronto, Ontario, Canada, "Data Banks and Individual Privacy: Developments in Canada" Dr. Alan F. Westin, "Data Banks and Individual Privacy: Implications for the U.S. from

Foreign Developments"

THEME: This session will attempt to compare the experience of the U.S., Canada and several European countries in developing, using and controlling computer-based data banks which contain information on the individual citizen. The current state of data bank development in each country will be described and the legal measure—legislation, regulatory agency actions, and court decisions—taken to prevent infringement of the individual's civil liberties will be explained. Any steps taken by the computer industry or professional organizations in these countries to protect privacy in data banks will also be explored. Finally, each speaker will discuss those government and private actions which he feels should be taken in his country to safeguard the right of privacy in the computer data bank.

## **TELEPROCESSING - THE UTILITY OF THE COMPUTER UTILITY**



## CHAIRMAN:

Gerald H. Brody, Manager Telecommunications Marketing Systems, Engineering, Raytheon Data Systems, Norwood, Massachusetts, U.S.A.

> PROGRAM COORDINATOR: Dr. Philip H. Enslow, Jr. Office of Telecommunications Policy, Executive Office of the President Washington, D.C., U.S.A.



## PAPERS:

Max P. Beere, Tymshare, Inc., Cupertino, California, U.S.A. "Teleprocessing-The Utility of the Computer Utility, New Problems? New Challenge!"

George J. Feeney, General Electric Company, Bethesda, Maryland, U.S.A. "The Future of Computer Utilities"

Peter T. Kirstein, Professor of Computer Systems, University of London Institute of Computer Science, London, England, "On the Development of Computer and Data Networks in Europe"

#### DISCUSSANTS:

John C. LeGates, Executive Director, Educational Information Network (EDUCOM), Princeton, New Jersey, U.S.A.

Charles Dalfen\*, Legal Advisor to Canadian Department of Communications, Ottawa, Ontario, Canada

William M. Zani, Associate Professor of Business Administration, Harvard University Graduate School of Business, Cambridge, Massachusetts, U.S.A.

THEME: The existence of Teleprocessing networks and computer utilities is an accepted fact, both on a national and global scale. This session will examine the effectiveness of today's operations, what direction they may go towards in the future, what benefits, both social and economic are possible, and what impediments may exist in the technical and legal domains.

\*Now at Faculty of Law, University of Toronto, Toronto, Ontario, Canada

## COMPUTERS, COMMUNICATIONS AND DISTRIBUTED HEALTH CARE SYSTEMS



#### CHAIRMAN:

Martin Elliot Silverstein, M.D. President, Health Analysis, Inc. Bethesda, Maryland, U.S.A.

## **PROGRAM COORDINATOR:**

Lynn Hopewell, Vice President Network Analysis Corporation Glen Cove, New York, U.S.A.



#### **PAPERS**:

Martin Elliot Silverstein, M.D., "Computers, Communications and Distributed Health Care Systems" Dr. Maxine L. Rockoff, Chief, Logistics Branch, Health Care Technology Division, National Center for Health Services Research and Development, Department of Health, Education and Welfare, Rockville, Maryland, U.S.A., "Health Care Communication Systems"

#### SPEAKERS:

Morton E. Ruderman, President, Medical Information Technology, Inc. Cambridge, Massachusetts, U.S.A., "A Modular Hospital Information Utility"

Melville H. Hodge, Executive Vice President, Technicon, Medical Information Systems, Corporation, Mountain View, California, U.S.A., "A Regional Hospital Information Utility"

Richard K. Tompkins, M.D., Department of Medicine, Dartmouth Medical School, Hanover, New Hampshire, U.S.A., "The Use of Interactive Clinical Algorithms for the Education and Performance Audit of Physician Assistants"

Edward F. Vastola, M.D., Department of Neurology, State University of New York, College of Medicine, Brooklyn, New York, U.S.A., "Effective Use of a Computer for Neurological Patient Screening"

## DISCUSSANTS:

Dr. Alex Reid, Long Range Studies Division, Telecommunications Headquarters, London, England

Gerald S. Cohen, Associate Director, Health Care Technology Division, National Center for Health Services Research and Development, Department of Health, Education and Welfare, Rockville, Maryland, U.S.A.

The assistance of Dr. Bruce D. Waxman and his staff in the initial organization of this session is gratefully acknowledged.

THEME: This session delineates the impact that computers and communications are likely to have on distributed health care systems of the future. This session will also address those highly applied applications of computers and communication to health care delivery. Major attention will be focused on those obstacles which hinder large scale deployment and diffusion of technological systems in the health care field.

## SOFTWARE ASPECTS IN COMPUTER COMMUNICATION



CHAIRMAN:

Dr. Wayne B. Swift, Policyholder Service Corporation, Falls Church, Virginia, U.S.A.

PROGRAM COORDINATOR:

Dr. Carl Hammer, Director, Computer Sciences, UNIVAC, Washington, D.C., U.S.A.



#### **PAPERS**:

Dr. Wayne B. Swift, Falls Church, Virginia, U.S.A., "Software Aspects in Computer Communications"

Professor J. S. Sobolewski, Assistant Professor of Electrical Engineering and Computer Science, Washington State University, Pullman, Washington, U.S.A., *'Programmable Communication Pro*cessors''

Monique Somia, Department of Scientific Development, IBM France, Paris-La Defense, France, "The Approach of Software Problems in the SOC Experimental Computer Network"

C. R. M. Singer, National Accounts Area Sales Manager, International Computers Limited, Harrow, Middlesex, England, "The User Department and the Computer"

Roy N. Freed, Widett & Widett, Boston, Massachusetts, U.S.A., "Protection of Proprietary Software Programs in the United States"

#### DISCUSSANTS:

Dr. Kurt Walk, Manager, Programming Center, IBM Austria, Vienna, Austria

Edward M. Ryan, Central Intelligence Agency, Washington, D.C., U.S.A.

Professor Franklin F. Kuo, Director, The ALOHA System, University of Hawaii, Honolulu, Hawaii, U.S.A.

THEME: Practical networks bring a variety of system-wide problems. Intended primarily for the overall manager of a network, this session discusses communications processor functions, intercomputer interface standards, effective user coupling and the legal protection of proprietary software.

## SOCIAL CONCERNS



#### CHAIRMAN:

William E. Hanna, Jr., Director of the Bureau of Data Processing, Social Security Administration Baltimore, Maryland, U.S.A.

## **PROGRAM COORDINATOR:**

Dr. Peter E. Jackson Bell Telephone Laboratories Holmdel, New Jersey, U.S.A.



#### PAPERS:

Dr. Robert H. Kupperman and Richard H. Wilcox, Office of Emergency Preparedness, Washington, D.C., U.S.A., 'EMISARI – An On-Line Management System in a Dynamic Environment''

Donn B. Parker, Stanford Research Institute, Menlo Park, California, U.S.A., "The Nature of Computer-Related Crime"

Gerald A. Petersen, National Oceanic & Atmospheric Administration, Silver Spring, Maryland U.S.A. "AFOS: A Program for National Weather Service Field Automation"

James W. Evans, Program Analyst, and Robert A. Knisely, Director, Division of Community Management Systems, U.S. Department of Housing and Urban Development, Washington, D.C., U.S.A., "Integrated Municipal Information Systems: Some Potential Impacts"

## **DISCUSSANTS:**

John F. Grady, Consultant Medford, Oregon, U.S.A.

Dr. Roy Herrmann, President, The Institute for Socio-Economic Studies, Ltd. Washington, D.C., U.S.A.

Professor Mischa Schwartz, Department of Electrical Engineering, Polytechnic Institute of Brooklyn, Brooklyn, New York, U.S.A.

THEME: The diverse and virtually unlimited potential for application, good or bad, of computers and data communications to man in his role as a social being.

## PUBLIC DATA COMMUNICATION NETWORKS: NEED, TECHNOLOGY AND POLICY



CHAIRMAN: Lynn Hopewell, Vice President Network Analysis Corporation Glen Cove, New York, U.S.A.

PROGRAM COORDINATOR: Virginius N. Vaughan, Jr. American Telephone and Telegraph Company New York, New York, U.S.A.



#### **PAPERS**:

Lynn Hopewell, "Public Data Communication Networks: Need, Technology and Policy"

Gordon B. Thompson, Manager, Communications Studies, Bell-Northern Research, Ottawa, Ontario, Canada "Potential Impact of User/Author Relationships on Public Data Network Design"

Dieter Kimbel, Organization for Economic Cooperation and Development, Paris, France, "Planning of Data Communications Networks-Economic, Technological and Institutional Issues"

August Ohlmer, Ministerialrat, Bundesministerium Fuer Das Post Und Fernmeldewesen, Federal Republic of Germany, "Summary of the Existing Data Communications Services in Western Europe and Tentative Forecast of New Services for the Next Decade"

Ken'ichiro Hirota, Director of Total Telecommunication Network, Engineering Division, Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan, "Public Telephone Network and Computer-Communication"

#### DISCUSSANTS:

Jean F. Berry, French Telephone and Telecommunications Users' Association (AFUTT), Marnes-La-Coquette, France

Dr. M. Clayton Andrews, Director of Data Communications, IBM World Trade Corporation, IBM Research Laboratory, Zurich, Switzerland

Lee Talbert, Packet Communications, Inc., Burlington, Massachusetts, U.S.A.

I. P. Sharp, I.P. Sharp Associates, Toronto, Ontario. Canada

THEME: Telecommunications common carrier administrations in many countries are considering strategies for developing new networks for meeting the specialized communications requirements of computer-communication system users. Although all administrations are viewing basically the same user market, substantially different conclusions regarding user requirements and resulting carrier technical strategies are resulting.

The purpose of this Conference session is to provide a forum for the carriers, users and policymakers, to interact and explore this complex environment.

#### COMPUTERS AND LIBRARIES OF THE FUTURE



#### CHAIRMAN:

Dr. Lawrence P. Grayson, Director,Division of Technology Development,National Center for Education Technology,U.S. Office of Education, Washington, D.C., U.S.A.

## **PROGRAM COORDINATOR:**

Charles R. Fisher, Director, Switching Systems Engineering, Data Transmission Company, Vienna, Virginia, U.S.A.



#### PAPERS:

Dr. Lawrence P. Grayson, "Computers and Libraries of the Future"

Dr. Carlos A. Cuadra, Manager, Education and Library Systems Department, System Development Corporation, Santa Monica, California, U.S.A., "Computer Technology and Libraries of the Future"

Warren L. Ziegler, Co-Director, Educational Policy Research Center, Syracuse University, Syracuse New York, U.S.A., "Notes on Social Considerations that May Affect Future Libraries"

Frederick G. Kilgour, Director, The Ohio College Library Center, Columbus, Ohio, U.S.A. "Library Economics – The Future" (abstract only)

### SPEAKER:

Dr. John B. Farmakides, Member Atomic Safety and Licensing Board Panel, Washington, D.C., U.S.A., "Legal Considerations that May Affect Future Libraries"

#### **DISCUSSANTS:**

Frank K. Cylke, Executive Secretary, Federal Library Committee, Library of Congress, Washington, D.C., U.S.A.

Dr. Ruth M. Davis, Director, Center for Computer Sciences and Technology, National Bureau of Standards, Gaithersburg, Maryland, U.S.A.

Dr. Donald L. Katz, Alfred Holmes White University Professor of Chemical Engineering, University of Michigan, Ann Arbor, Michigan, U.S.A.

THEME: This session explores the fundamental questions relating to the application of computers to libraries.







DRAFT McCarthy/Enslow 10/18/72

## COMPUTER COMMUNICATIONS SPEECH October 24, 1972

No one questions that today we are in the midst of a virtual information explosion. The impact from this explosion is being scattered worldwide. There are very few phases of our life that aren't touched, in one way or another, by these new developments.

The development of data communications is having profound effects both on the users and suppliers of these information systems. Data communications development has been the focus for the drive to introduce competition into certain sectors of the communications industry. This drive has been successful resulting in a number of changes in our regulatory policies. Now both customer-owned terminal equipment and specialized common carriers, catering to the data users, are permitted. The result has been an acceleration in the rate at which innovations in both equipment and services are being introduced and made available to users.

The changes wrought by this new capability have also affected the users themselves. Today, many traditional industries have been completely restructed through the use of data communications, and other new ones have been established based primarily on the capabilities provided by extensive computer communications systems. The effects of accessible, low-cost information services are being felt in some degree by practically every business; but there are some industries that are going to feel the impact from readily-available computer communication services more than others. I am thinking particularly of the securities, airlines, and other industries heavily dependent on the specialized transmission of information.

In addition, computer communications developments forecast substantial improvements and expansion in a number of important services. Good examples are the health care delivery, educational, and library systems. A side effect of these applications will be the requirement for changes in the education and training of both the service provider and recipient.

The computer communications business is also affecting government at all levels. Information of all kinds, from FBI crime control data to real estate and vital statistics at the county and local government level, are now readily retrievable and accessible to users. The result has been an increase in the efficiency of government and a narrowing of the gap between government and citizen.

-2-

I would now like to concentrate a little and briefly explore a few of the implications and effects of government regulatory policy on computer communications -- both present and future.

Government policies will have a profound effect on the growth and development of the information industry. Past experience in communications has taught us that a policy designed to regulate the transmission of information often affects the content of the information that is ultimately conveyed. In the broadcasting field, for example, Government regulations affecting the number of television channels, programming requirements, and program financing have been instrumental in shaping the character of television programming.

The regulatory problems in the computer communications area do not fall into either of the rather neat regulatory categories of broadcasting and common carriage. Computers are available in a wide variety of configurations and prices, and their services are provided in a freely competitive atmosphere. When information services expand into the communications area, however, present regulatory decisions require that they must operate in a totally different structure centered around the more conventional forms of regulated communications. This adds an unnecessary inflexibility into data communications operations.

-3-

We need to develop a dynamic regulatory framework for communications which is less oriented towards the traditional technologies. Policies need to be developed that provide the proper economic and social incentives for the balanced growth of these newer technologies which today are precariously straddling the traditional regulatory boundary lines. Some progress in this direction seems to have been made. The development of the new specialized common carriers has prompted a reexamination of some of the basic principles of present common carrier policies. I think this can only be interpreted as a healthy development.

It is generally not too hard to point out some of the impacts of computer communications technology. The real problem is in resolving the difficult issues that surround the whole industry and affect its growth.

We must find solutions to issues like the individual's legal right to privacy and the industry's technical problem of providing the security in their systems necessary to safeguard and insure that privacy.

We must fully consider the property rights of the creator of an information source or data bank when developing access rules for their use. Only a proper balancing of creator rewards and access costs will promote quality and diversity in new sources and their utilization.

-4-

We must find some means of accommodating all of the special requirements of data transmission in an industry whose major revenue source is voice traffic. The flexibility and adaptability of the common carriers networks have been ably demonstrated in recent years; but fundamental problems remain. Specialized value-added networks may be established to overcome differences in the capabilities of the facilities available and the requirements of the data customer. These networks would utilize the common carrier's transmission facilities with the switching, error control, and other special services being provided by separate equipment.

Finally, we must work out the problems raised by the international trade of both information services and pure remote computing.

Government policymaking in communications has several important characteristics: It must be anticipatory. If it does not have this quality, then it becomes nothing more than a recognition of the <u>status</u> quo or a rulemaking to conform to an existing environment.

It must project into the future. Major changes in computer hardware become widespread in about seven years; however, it takes anywhere from 15 to 20 years to implement a fundamental change in communications.

Policymaking cannot operate in a vacuum. The policymakers require inputs from both the suppliers of the communications as well as the users. These inputs are especially important in the area we are discussing here today, for now there is interposed between the supplier

-5-

and the ultimate user an important intermediary, the operator of the computer.

The ultimate objective of regulatory policy in the communications sector is to develop a properly structured competitive framework wherein the most productive use can be made of future developments and of national resources.

But even the most enlightened restructuring of the regulatory framework is not going to solve all of the problems. It is also essential that representatives of the two technical disciplines involved, the computer operators and the communicators, sit down and work out some of the difficulties themselves. Our own experience in this field has shown that a definite knowledge gap exists between the providers of these two services as to their present needs and capabilities. This schism is even more obvious in the important area of future planning. The gap in communications between these two industries must be closed.

If this sounds like a large order, I think we must bear in mind that we are speaking of a new technology and a new industry. The opportunity is there for all of us to guide it into the proper framework where it can provide the most good to society as a whole. It is important, therefore, that we stand back and take a long, hard, searching look into present and future problems in this area. The emphasis of this Conference is rightly placed on the total problem. We need meetings that transcend the boundaries of academic disciplines, of industries, and of nations. The results of dialogues such as these will have a tremendous influence on the solution to our long-range problems. I wish you the best of luck.

.

## **GENERAL CHAIRMAN'S MESSAGE**

Computer communication is rapidly becoming a vital tool of government and of business management. Additional applications in medicine, education, and other important services will require research and development; but they are not beyond the horizon. Many of the necessary data processing and communication techniques are available today, including data base maintenance, data retrieval, real time control, interactive computation, and network control. Other desired features, notably privacy and security, are being studied.

It is our fond hope that ICCC 72 is not too late to be effective; but it is surely not too soon to address the social, political, and economic aspects of computer communications. Important new technologies evolve rapidly under the influence of competitive factors and other economic forces that make effective control increasingly difficult. If reason is to prevail, then it must be applied very early. One might as well try to reason with a stampede of cattle as try to revise by persuasion the economic and legal basis for a mature technology.

The Program Committee of ICCC 72 has worked very hard to give this conference the breadth of view that is necessary to an understanding of all important aspects of computer communications. Each individual session aims to present international and interdisciplinary views of its particular topic. Taken together, the sessions described in the following pages have much to offer anyone who is concerned with the socio-economic impacts, legal and regulatory problems, means of implementation, specific new applications, or international coordination of computer communications. Moreover, it is our goal to understand the multiple interactions among these factors.

The Special Project Committee plans to offer you access to a number of computer terminals. From these, you will be able to explore some of the uses of teleprocessing and of resource sharing computer networks.

Above all, I hope that you will accept this invitation to join the international community of computer communications and that you will actively participate in the free exchange of ideas during our discussion periods, at the reception, at the luncheon, and at other opportune times during the conference.

Please examine this booklet carefully. It contains a description of the program and useful information on local activities, on registration, on the Proceedings, and on accommodations. Appropriate return forms are also included.

Welcome to ICCC 72.



Maurice Karnaugh General Chairman



INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION P.O. BOX 639 SILVER SPRING, MD. 20901

# ADVANCE PROGRAM for the International Conference on Computer Communication

October 24-26, 1972 The Washington Hilton Hotel Washington, D. C., U.S.A.

Theme:

INTERNATIONAL and INTERDISCIPLINARY ASPECTS of COMPUTERIZED COMMUNICATIONS and of COMMUNICATION-ORIENTED COMPUTING

Non-Profit Org. U. S. Postage Paid Permit 6506 Washington, D. C



## PROCEEDINGS

One copy of the proceedings will be included with the registration fee. Additional copies will be available for purchase at the conference. Price: \$15.00 Non-members. \$12.50 Members. Copies will be available after the conference from:

Association of Computing Machinery 1133 Avenue of the Americas New York, New York 10036

IEEE 345 East 47th Street New York, New York 10017

IEEE. Computer Society, Suite 202 8949 Reseda Boulevard Northridge, California 91324



## REGISTRATION

#### **Pre-Registration**

A pre-registration form for the conference is enclosed. This pre-registration form should be completed and mailed, with your check or money order, to the ICCC Conference, P.O. Box 639, Silver Spring, Maryland 20901, Attention: Mr. Harry Hayman.

#### Pre-Registrants Can Save \$10

Conference registration fees will be \$10 higher at the meeting than for pre-registrants. TO TAKE ADVANTAGE OF THE PRE-REGISTRATION DIS-COUNT, YOUR PRE-REGISTRATION MUST BE MAILED IN TIME FOR ICCC TO RECEIVE IT BY OCTOBER 6, 1972. NO REFUNDS AFTER THAT DATE.

#### **Conference Registration**

Includes admittance to all technical sessions and demonstrations, the Keynote Conference Luncheon, and a copy of the Conference Proceedings.

#### Fees

Pre-Registration. IEEE Members and ACM Members-\$40 (Non-members-\$50)

Registration at Conference. IEEE and ACM Members-\$50 (Non-members-\$60)

Payments. Checks should be made payable to Treasurer, ICCC.

Pre-registration will save you money (a single payment can be made to cover registration fees, publication and luncheon ticket, TIME (no waiting in lines at the Conference in order to register—your packet containing receipt, tickets, and other Conference materials will be waiting for you at the Pre-Registration Counter), and DISAPPOINTMENT (pre-registration will guarantee your attendance attendance is limited).

#### **Cocktail Party**

An additional activity, an "ice breaker" cocktail party, will be held on the night of the first day of the Conference. Attendees will receive TWO drinks and hot and cold hors d'oeuvres. Price of this cocktail party is \$8.00 per person which is not included in the registration fee. Tickets may be purchased when pre-registration packets are picked up at the Conference.

ADDRESS       ZIP         CITY/STATE       HOUR       AM/PM       DEPARTURE DATE       HOUR       AM/PM         ARRIVAL DATE       HOUR       AM/PM       DEPARTURE DATE       HOUR       AM/PM         VITE: Check-out time to signed.       It rates requested is not available, the next available rate will be assigned.       NOTE: Check-out time 1:00 p         SINGLES       26       28       30       32       34       TWINS       36       38       40       42         All rates plus 5% D. C. Sales Tax       All rates plus 5% D. C. Sales Tax       Sources       Sources       Sources       Sources	RE LE	WIN I	ROOMS	apting	1 date of m	leks prior to opening	three we	than 1	not later	received	must be	Reservations
ADDRESS       ZIP         CITY/STATE       AUVR       AM/PM       DEPARTURE DATE       HOUR       AM/PM         ARRIVAL DATE       HOUR       AM/PM       DEPARTURE DATE       HOUR       AM/PM         VIDTE: Check-out time 1:00 p       NOTE: Check-out time 1:00 p       NOTE: Check-out time 1:00 p         SINGLES       26       28       30       32       34       TWINS       36       38       40       42         DOUBLES       36       38       40       42       44       SUITES       80 and up						s 5% D.C. Sales Tax	rates plus	All				
ADDRESS       ZIP         CITY/STATE       AM/PM       DEPARTURE DATE       HOUR       AM/PM         ARRIVAL DATE       HOUR       AM/PM       DEPARTURE DATE       HOUR       AM/PM         VIDES       OFF       Check-out time 1:00 p       NOTE: Check-out time 1:00 p         Please circle rate desired. If rate requested is not available, the next available rate will be assigned.       Singles       26       28       30       32       34       TWINS       36       38       40       42				du bi	80 an	SUITES	44	42	40	38	36	DOUBLES
ADDRESS       ZIP         CITY/STATE       AM/PM         ARRIVAL DATE       HOUR         AM/PM       DEPARTURE DATE         NOTE: Check-out time 1:00 p         Please circle rate desired. If rate requested is not available, the next available rate will be assigned.	N	4	40	38	36	TWINS	34	32	30	28	26	SINGLES
ADDRESS     ZIP       CITY/STATE     ZIP       ARRIVAL DATE     HOUR     AM/PM       DEPARTURE DATE     HOUR     AM/PM       NOTE: Check-out time 1:00 p			ned.	be assig	e rate will t	ble, the next available	ot availal	ed is no	request	red. If rate	rate desir	Please circle
ADDRESS CITY/STATE ZIP ARRIVAL DATE HOUR AM/PM DEPARTURE DATE HOUR AM/PM	1:00 p	ut time	Check-o.	NOTE								
ADDRESSZIPZIP	PM	AMI	R	HOUP		DEPARTURE DATE	PM	AM/	R	HOU	Ē	ARRIVAL DAT
ADDRESS			ZIP									CITY/STATE_
												ADDRESS

ONLY UNTIL 6

P.M. ON DATE

Q

ARRIVAL, UNLESS GUARANTEED. Telephone: 202+483+3000

Please

reserve accommodations at the Washington Hilton for:

NAME



## conference at a glance

The aim of the technical program committee has been to assemble a series of challenging approaches to significant issues relating to the Conference Theme. to portray the relationships of the 21 sessions planned.

It is hoped that attendees will be both challenged and informed by the outstanding presentations planned.

A schedule is shown in the above diagram



## **TECHNICAL PROGRAM**

Each session of the Technical Program is briefly outlined below. In most cases the speakers and their subjects are identified and an indication of the Program Coordinator's aims in arranging the session is given.



Stan Winkler Program Chairman

## **KEYNOTE SESSION:**

#### Tuesday, October 24, 9:30-11:45 a.m.

Chairman: Dr. Maurice Karnaugh, IBM, T. J. Watson Research Center, Yorktown Heights, New York.

*Title:* Computer Communications in Industrially Advanced Nations: the Social, Political, and Economic Dynamics of a New Technology.

Theme: This session will explore the needs, genesis, status, and plans for computer communications in Japan, the U.S.A., the U.S.S.R., and Western Europe. Sociopolitical and economic factors will be emphasized and their influences on the implementations will be examined.

#### Keynote Speakers:

Yasuo Makino, Administrative Director of Telecommunications, Ministry of Post and Telecommunications, Tokyo, Japan.

T. Larsson, Deputy Director General, Central Administration of Swedish Telecommunications, Farsta, Sweden.

(Speaker to be named), Office of Telecommunications Policy, Executive Office of the President, Washington, D. C., U.S.A.

(Speaker invited) Council for Cybernetics, U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.

## SESSION 2:

#### Tuesday, October 24, 2:00-4:30 p.m.

Title: RESPONSIBILITY - A PANEL

Chairman: Dr. Herbert Maisel, Director, Computation Center and Associate Professor of Computer Science, Georgetown University, Washington, D. C.

Program Coordinator: Louis Feldner, F.C.C., Common Carrier Bureau, Washington, D. C.

Theme: Everyone concedes the tremendous impact that computer communications will have in our society in the coming decades. Some say that this impact is already substantially upon us. A new technology with enormous impact necessarily modifies many of our day-to-day activities. It is important that this modification benefit mankind and especially that it promote, in Norbert Wiener's words, "The human use of human beings." This implies responsibility – the need to establish principles and guidelines and to channel these technological developments in accordance with these principles and guidelines.

This panel will speak on several aspects of the subject of responsibility.

#### Speakers:

Commissioner Robert E. Lee, Federal Communications Commission, Washington, D. C.

Dr. Yonosuke Nagai, Professor of Politics, Tokyo Institute of Technology, Tokyo, Japan.

Dr. Joseph Weizenbaum, Professor of Computer Science, Massachusetts Institute of Technology, Cambridge, Massachusetts.

#### SESSION 3:

#### Tuesday, October 24, 2:00-4:30 p.m.

Title: TELECONFERENCING: THE COMPUTER, COMMUNI-CATION, and ORGANIZATION

Chairman: David W. Conrath, University of Waterloo, Waterloo, Canada.

Program Coordinator: Gordon B. Thompson, Bell-Northern Research, Ottawa, Canada.

Theme: The general theme of the session will be the role of the computer as an intermediate processor in communication between two or more individuals with a common purpose. What can the computer do in such a role? How might it enhance communication effectiveness over non-processed messages? Can it speed up the pace of sending and receiving between two parties to a communication interaction? Can computer aided communication bring about new dimensions to the communication experience? What are the constraints of computer aided communication? How should individuals interface with each other when using the computer as an intermediary?

#### Papers:

Computer Assisted Expert Interrogation – Andrew J. Lipinski, Hubert M. Lipinski, & Robert M. Randolph, *Institute for the Future, Menlo Park, California.* 

Oracle: Computerized Conferencing in a Computer-Assisted-Instruction System-James Schuyler & Robert Johansen, Northwestern University, Evanston, Illinois.

Party Line and Discussion: Computerized Conference System-Murray Turoff, Office of Emergency Preparedness, Washington, D. C. Computer at Wits End Leads to Process Pattern Recognition – H. J. B. Nevitt, Ontario Development Corporation.

Alternative Future Computer-Communications Markets-D. A. Dunn, Stanford, University.

Measuring the Computer's Impact on Organizational Structure-David W. Conrath, University of Waterloo, Waterloo, Canada.

#### **Discussants:**

Professor J. C. R. Licklider, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Professor Nathaniel Macon, American University, Washington, D. C.

## SESSION 7:

#### Wednesday, October 25, 9:00-11:30 a.m.

Title: NETWORKS-RECENT DEVELOPMENTS

Chairman: Dr. Jack Moshman, Moshman Associates, Washington, D. C.

Program Coordinator: Dr. Stanley Winkler, IBM, Gaithersburg, Maryland.

#### Papers:

Implementation of International Data Exchange Networks – N. G. Anslow & J. Hanscott, BOAC, London Airport, Hounslow, Middlesex, England.

The Network Control Center for the ARPA Network – Alexander A. McKenzie, Bernard P. Cosell, John M. McQuillan & Martin J. Thrope, *Bolt, Beranek and Newman Inc., Cambridge, Massachusetts.* 

CANUNET Topological Analysis & Design – John deMercado, Rene Guindon, John Da Silva, & Michel Kadoch, Communication Study Group, Terrestrial Planning Branch, Department of Communications, Ottawa, Canada.

The European Computer Network Project-D. L. A. Barber, National Physical Laboratory, Teddington, Middlesex, England.

Mixed Computer Networks: Benefits, Problems, and Guidelines-B. T. Smith, *Civil Service Department*, U. K. Government, London, England.

### SESSION 8:

Wednesday, October 25, 9:00-11:30 a.m. Title: DATA NETWORK DESIGN PROBLEMS I

Chairman: Dr. Paul Oliver, UNIVAC, Washington, D. C.

Program Coordinator: Dr. Carl Hammer, UNIVAC, Washington, D. C.

#### Papers:

Signaling and Frame Structures in Highly Decentralized Loop Systems – P. Zafiropulo & E. H. Rothauser, *IBM Research Laboratory, Zurich, Switzerland.* 

A Subscriber-Loop Signalling Technique for Synchronous Data Networks-C. S. Nokes, *IBM Research Laboratory, Zurich, Switzerland.* 

A Linear Programming Approach to the Design of Efficient Multiplexed Wideband Transmission Systems – Maurice Millman, Computer Sciences Corporation, Falls Church, Virginia.

Comparison of Network Topology Optimization Algorithms – Dr. V. Kevin Moore Whitney, *GM Research Laboratories, Warren, Michigan.*  How the Public Perceives the Computer: Some Social-Psychological Dimensions-Thomas L. McPhail, Ph.D., Chief, Social Environment Planning Unit, Department of Communications, Government of Canada, Ottawa, Canada.

Computer-Assisted Instruction – National Project in Japan – Mr. Itaya, Japan Society for Promotion of Machine Industry (KISHINKYOU); Dr. Shigiru Watanabe, University of Tokyo; Dr. Takao Mura, Hitachi, Ltd.

Impact of Computer-Communications as Tools in the Social and Economic Development of Canada-H. J. von Baeyer, Department of Communications, Ottawa, Ontario.

#### Discussant:

Raymond G. Fox, IBM, Gaithersburg, Maryland.

#### SESSION 11:

#### Wednesday, October 25, 2:00-4:30 p.m.

Title: COMPUTER COMMUNICATION NETWORKS FOR HIGHER EDUCATION

Chairman: Professor Martin Greenberger, Chairman of the Computer Science Department, Johns Hopkins University.

Program Coordinator: Stuart L. Mathison, Arthur D. Little, Inc., Cambridge, Massachusetts.

Theme: The motivation for regional and national computer networks for higher education will be discussed along with a summary of the major networking efforts underway. Included will be the ARPA network, the National Science Foundation Network, and several presently operating regional networks. Other topics to be covered include network management, usage of networks for computing and instruction, research applications, implications for computer centers in higher education, and future trends.

#### Papers:

Implementation of a Network for the Universities of South West England – R. H. Howell, International Computers, Ltd., University of Bristol, Bristol, England.

Canadian Efforts to Develop University Networks-Prof. Eric G. Manning, Associate Chairman, Department of Computer Science, University of Waterloo, Waterloo, Canada.

NSF Activities Related to a National Science Network-Dr. Don Aufenkamp & E. C. Weiss, Office of Computing Activities, National Science Foundation, Washington, D. C.

The ARPA Network and American Universities – Dr. Robert E. Kahn, Bolt, Beranek and Newman, Inc., Cambridge, Massachusetts.

#### SESSION 12:

#### Wednesday, October 25, 2:00-4:30 p.m.

Title: DATA NETWORK DESIGN PROBLEMS II

Chairman: G. J. Lissandrello, IBM World Trade Corporation, New York, New York.

Program Coordinator: Dr. Carl Hammer, UNIVAC, Washington, D. C.

#### Papers:

A Packet Switching Network With Graceful Saturated Operation-Remi F. Despres, Centre National D'Etudes des Telecommunications (CNET), Issy-Les-Moulineaux, France.

Some Effects of Switched Network Time Delays and Transmission Speed on Data Based/Data Communications Systems-J. F. Marchese & W. Gerhard, *IBM Research Laboratory, Zurich, Switzerland.* 

Current and Near Future Data Transmission Via Satellites of

## SESSION 15:

#### Thursday, October 26, 9:00-11:30 a.m.

Title: DATA BANKS AND INDIVIDUAL PRIVACY Chairman: Dr. Alan F. Westin, Professor of Law and Political Science, Columbia University, New York, New York,

Program Coordinator: Philip M. Walker, Georgetown University Law Center, Washington, D. C.

Theme: This session will attempt to compare the experience of the U. S., Canada, and several European countries in developing, using, and controlling computer-based data banks which contain information on the individual citizen. The current state of data bank development in each country will be described, and the legal measures – legislation, regulatory agency actions, and court decisions – taken to prevent infringement of the indivudual's civil liberties will be explained. Any steps taken by the computer industry or professional organizations in these countries to protect privacy in data banks will also be explored. Finally, each speaker will discuss those government and private actions which he feels *should* be taken in his country to safeguard the right of privacy in the computer data bank.

#### Papers:

Developments in the U.K.-Dr. G. B. F. Niblett, Chairman, Law Specialist Group, British Computer Society, London, England.

Developments in Canada-Dr. Caleb C. Gotlieb, Professor of Computer Science, University of Toronto, Toronto, Canada.

Developments in West Germany and Continental Europe-Dr. Hans P. Gassman, Directorate for Scientific Affairs, Organization for Economic Co-operation & Development, Paris, France.

Implications for the U.S. from Foreign Developments-Dr. Alan F. Westin, Professor of Public Law and Government, Columbia University, New York, New York.

#### SESSION 16:

#### Thursday, October 26, 9:00-11:30 a.m.

Title: TELEPROCESSING-THE UTILITY OF THE COMPUTER UTILITY

Chairman: Gerald H. Brody, Manager, Telecommunications Marketing, System Engineering, Raytheon Data Systems Company.

Program Coordinator: Dr. Philip H. Enslow, Jr., OTP, Executive Office of the President, Washington, D. C.

Theme: The existence of Teleprocessing networks and computer utilities is an accepted fact, both on a national and global scale. This session will examine the effectiveness of today's operations, what direction they may go towards in the future, what benefits, both social and economic are possible, and what impediments may exist in the technical and legal domains.

#### Papers:

The Computer Utility: New Problem or New Challenge – Max P. Beere, Director of Telecommunications Systems, TYM-SHARE Inc.

The Future of Computer Utilities – Dr. George J. Feeney, Information Systems Division, General Electric.

On Some Trends in Computer and Data Networks in Europe - Professor Peter Thomas Kirstein, Institute of Computer Science, University of London, London, England.

#### Papers:

Programmable Communication Processors – J. S. Sobolewski, Departments of Computer Science, Electrical Engineering and the Computing Center, Washington State University, Pullman, Washington.

The Approach of Software Problems in the SOC Experimental Computer Network-Monique Somia, *IBM France, Paris, France.* 

The User Department and The Computer-or How to Get More Profit Out of the Computer Investment, *Quickly*-C. R. M. Singer, *International Computers*, *Ltd., London, England*.

Protection of Proprietary Software Programs in the United States-Roy N. Freed, Widett & Widett, Boston, Massachusetts.

#### Discussants:

K. Walk, IBM Austria, Vienna, Austria.

Edward Ryan, Central Intelligence Agency, Washington, D. C.

#### SESSION 19:

#### Thursday, October 26, 2:00-4:30 p.m.

Title: SOCIAL CONCERNS

Chairman: William E. Hanna, Jr., Social Security Administration.

Program Coordinator: Dr. Peter E. Jackson, Bell Telephone Laboratories.

*Theme:* The diverse and virtually unlimited potential for application, good or bad, of computers and data communications to man in his role as a social being.

#### Papers:

EMISARI-An On-Line Management System in a Dynamic Environment-Dr. Robert H. Kupperman & Richard H. Wilcox, Office of Emergency Preparedness.

The Nature of Computer Related Crime-Donn B. Parker, Stanford Research Institute.

A Program for National Weather Service Field Administration - Gerald A. Petersen, National Weather Service.

Data Communications Sovereignty and the Electorate – Robert A. Knisely, *Department of Housing and Urban Devel*opment.

#### SESSION 20:

#### Thursday, October 26, 2:00-4:30 p.m.

Title: PUBLIC DATA COMMUNICATION NETWORKS: NEED, TECHNOLOGY AND POLICY

Chairman: Lynn Hopewell, Vice President, Network Analysis Corporation, Glen Cove, New York.

Program Coordinator: Virginius N. Vaughan, Jr., American Telephone and Telegraph Company, New York, New York.

Theme: Telecommunications common carrier administrations in many countries are considering strategies for developing new networks for meeting the specialized communications requirements of computer-communication system users. Although all administrations are viewing basically the same user market, substantially different conclusions regarding user requirements and resulting carrier technical strategies are resulting.

The purpose of this Conference session is to provide a forum for the carriers, users and policymakers, to interact and explore this complex environment.

#### Papers:

Planning of Data Communication Networks: Economic, Technological and Institutional Issues-Dieter Kimbel, OrNO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

> BUSINESS REPLY CARD CLASS PERMIT NO. 35590, WASHINGTON,

Ö

FIRST CLASS PERMIT NO. 35590, WASHINGTON, D.

Postage will be paid by addressee:

# INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATION The Washington Hilton Connecticut Avenue at Columbia Road, N.W. Machington, D. C. 20009

Attention: Front Office Manager



The Computer Mediated Interactive Human Communication System For Air Traffic Controllers-Maurice Constant & Peter L. Seeley, *University of Waterloo, Waterloo, Canada*,

#### Discussants:

Douglas Engelbart, Stanford Research Institute, Menlo Park, California.

David Abbey, Ontario Institute for Studies in Education, Toronto, Canada.

## **SESSION 4:**

#### Tuesday, October 24, 2:00-4:30 p.m.

Title: COMPUTERS AND A TELEPHONE COMMUNICATION SYSTEM OF THE FUTURE

Chairman: Laurin G. Fischer, Computer Science Corp., Falls Church, Virginia.

Program Coordinator: Dr. Wayne B. Swift, Policyholder Service Corp., Falls Church, Virginia.

Theme: The problems of operating a dial telephone system with programmable digital control equipment are analyzed in the context of the U.K.; an approach taken at Plessy to solve these problems is outlined to the extent of illuminating clearly the nature of the choices available and a rationale for the choice of one particular approach.

#### Papers:

Structure and Internal Communications of a Telephone Control System-J. M. Crompton, *Plessy Co., Ltd., Liverpool, England.* 

A Capability-Oriented Multi-Processor System for Real-Time Application-D. C. Cosserat, *Plessy Co., Ltd., Liverpool, England.* 

Fault Resistance and Recovery Within System 250-K. J. Hammer-Hodges, Plessy Co., Ltd., Liverpool, England.

Reliability Assurance for System 250-Dr. C. S. Repton, Plessy Co., Ltd., Liverpool, England.

#### SESSION 5:

#### Tuesday, October 24, 2:00-4:30 p.m.

Title: COMPUTER COMMUNICATIONS - AN EMERGING TOOL IN RESPONSE TO SOCIETY'S NEEDS?

Chairman: Reg A. Kaenel, AMF Inc., Stamford, Connecticut. Speakers invited from India, Japan, Israel, Mexico, and England.

#### **SESSION 6:**

### Wednesday, October 25, 9:00-11:30 a.m.

Title: IMPACTS I

Chairman: Andrew Lipinski, Institute for the Future, Menlo Park, California.

Program Coordinator: Gordon B. Thompson, Bell – Northern Research, Ottawa, Canada.

Theme: The Impact of Widespread Computer Communication Systems and Their Use.

#### Papers:

Computer-Communications Assisted Community of Tama, Japan – Kotaro Shimo, *Minister of International Trade and Industry (M.I.T.I.), Japan.* 

#### **SESSION 9:**

#### Wednesday, October 25, 9:00-11:30 a.m.

Title: THE WIRED CITY

Chairman: Weston E. Vivian, Vicom Manufacturing Co. Inc., Ann Arbor, Michigan.

Program Coordinator: Dr. Phillip H. Enslow, Jr., OTP, Executive Office of the President, Washington, D. C.

Theme: Technical standards for community cable television networks recently have been published by the FCC which will require all future cable television networks in metropolitan areas to provide to and from every home, office and store, multi-megahertz-bandwidth duplex transmission capacity. In several cities today, messages, data, and private television already are being transmitted under computer control over portions of the city's cable television network.

Within this decade, most United States metropolitan areas can be expected to have such service. Over half the homes in Canadian metropolitan areas are served by cable now. As broadband two-way, city-wide transmission capacity comes into existence, new uses, new services, new communications, computer and peripheral configurations, and new computer programs will proliferate. Existing telephone installations also will provide competing services. By 1990, an investment of 30 to 50 billion dollars can be expected.

During this Session, the types of uses foreseen will be summarized and experimental tests to date described. Expected revenues, costs and capital requirements will be projected. Social and legal implications will be discussed.

#### Papers:

The Wired City: The Role of an Independent Telephone Company – R. M. Alden, *Executive Vice President for Operations*, United Utilities, Inc., Kansas City, Missouri.

The Wired City: Services for Home Delivery via Interactive Cable TV-William Mason, *Mitre Corporation, McLean, Virginia.* 

The Wired City: Commercial Services to be Provided by Broadband Telecommunication Systems – John Thompson, Arthur D. Little, Inc., Cambridge, Massachusetts.

The Wired City: National and International Intercommunication – Paul Visher, Asst. Executive, Hughes Aircraft, Space and Communications Group, Culver City, California.

#### **CONFERENCE LUNCHEON**

Wednesday, October 25, 12 noon-1:45 p.m.

Speaker: Dr. Hans J. von Baeyer, Canadian Computer Communication Task Force, Ottawa, Canada. Title: CONFLICT IN COMPUTER COMMUNICATIONS

#### SESSION 10:

#### Wednesday, October 25, 2:00-4:30 p.m.

Title: IMPACTS II

Chairman: Andrew Lipinski, Institute for the Future, Menlo Park, California.

Program Coordinator: Gordon B. Thompson, Bell-Northern Research, Ottawa, Canada.

Theme: The Impact of Widespread Computer Communication Systems and Their Use.

#### Papers:

Impact of LACES-London Airport Cargo EDP Scheme-N. D. Hill & T. F. Watling, ICL, England.
the Intelsat Network-John M. Husted, COMSAT Laboratories, Clarksburg, Maryland.

The Structure of a Distributed Computing System – The Distributed File System – Frank Heinrich & David J. Farber, University of California, Irvine, Irvine, California.

The Use of Distributed Data Bases in Information Networks – Grayce M. Booth, Senior Systems Engineer, Honeywell Information Systems, Phoenix, Arizona.

# SESSION 13:

Wednesday, October 25, 2:00-4:30 p.m.

Title: THE ROLE OF COMPETITION

Chairman: Donald I. Baker, Director of Policy Planning, Antitrust Division, U. S. Department of Justice.

Program Coordinator: Philip M. Walker, Georgetown University Law Center, Washington, D. C.

Theme: This session will explore the role and implications of competition in the computer-communications industry, focusing on the following aspects of the subject:

1. Access to large computer-communications systems - efficiency vs. competition.

2. Competition among common carriers-specialized carriers and domestic satellites.

3. Competition in the remote-access data processing services industry – comparison of the U.S. experience with that of other countries.

4. Competition and carrier performance-a case study in interconnection.

## Papers:

Donald I. Baker, Director of Policy Planning, Antitrust Division, U. S. Department of Justice, Washington, D. C.

Kenneth A. Cox, Senior Vice President, MCI Communications Corporation, Washington, D. C.

Yasuo Makino, Administrative Director of Telecommunications, Ministry of Posts and Telecommunications, Tokyo, Japan.

Dr. William H. Melody, Professor, Annenberg School of Communications, University of Pennsylvania, Philadelphia, Pennsylvania.

Charles R. Cutler, Kirkland, Ellis & Rowe, Washington, D. C.

# **EVENING SESSION 14:**

## Wednesday, October 25, 7:30-9:45 p.m.

Title: COMPUTER COMMUNICATION - THE QUIET REVOLUTION

Chairman: Dr. Stanley Winkler, *IBM*, Gaithersburg, Maryland. Program Coordinator: Norman A. Heck, *IBM*, Gaithersburg, *Md*.

Theme: A non-technical exploration of the technological innovations which are changing the nature of the world and the environment in which we live.

## Papers:

A Survey of White-Collar Workers' Attitudes in the Environment of Rapid-Response Computer Systems – David Butler, Senior Consultant, Urwick Dynamics, Ltd., London, England.

Computer Communications: The Future – Dr. Carl Hammer, Director, Computer Science, UNIVAC, Washington, D. C.

Three Characterizations of Communications Revolutions – Gordon B. Thompson, Bell-Northern Research, Ottawa, Canada.

(Additional speakers from Western Europe and Asia invited)

### Discussants:

John C. LeGates, Executive Director, Educational Information Network EDUCOM.

Charles Dalsen, Legal Advisor to Canadian Department of Communications, Ottawa, Canada.

William M. Zani, Associate Professor of Business Administration, Harvard University Graduate School of Business Administration, Cambridge, Massachusetts.

# SESSION 17:

Thursday, October 26, 9:00-11:30 a.m.

### Title: HEALTH SERVICES

Chairman: Bruce D. Waxman, Director, Health Care Technology Division, Department of Health, Education, and Welfare, Public Health Service, Health Services and Mental Health Administration, Rockville, Maryland,

Program Coordinator: Lynn Hopewell, Vice-President, Network Analysis Corp., Glen Cove, New York.

Theme: This session will address itself to those highly applied applications of computers and communication to health care delivery. Major attention will be focused on those obstacles which hinder large scale deployment and diffusion of technological systems in the health care field.

Papers: Hospital Information Systems

Mort Ruderman, President, Meditech, Cambridge, Massachusetts.

Professor John Anderson, Department of Medicine, Kings College Hospital Medical School, University of London.

Mel Hodge, Technicon, Medical Information Systems Corp., Mountain View, California.

## Discussant:

Gerald S. Cohen, Associate Director, Health Care Technology Division, National Center for Health Services Research and Development, Rockville, Maryland.

## Papers: Ambulatory Care

Dr. Herbert Sherman, Beth Israel Hospital, Boston, Massa-chusetts.

Dr. Edward Vastola, Associate Professor of Neurology, State University of New York, Downstate Medical Center, Brooklyn, New York.

### **Discussant:**

Dr. Richard Tompkins, Dartmouth College, Hanover, New Hampshire.

Papers: Broadband Communications Systems

Dr. Maxine L. Rockoff, Chief, Logistics Branch, Health Care Technology Division, National Center for Health Services Research and Development, Rockville, Maryland.

#### Discussant:

Dr. Alex Reid, Communications Studies Group, University College of London.

# SESSION 18:

# Thursday, October 26, 9:00-11:30 a.m.

Title: SOFTWARE ASPECTS IN COMPUTER COMMUNICA-

Chairman: Dr. Wayne B. Swift, Policyholder Service Corp., Falls Church, Virginia.

Program Coordinator: Dr. Carl Hammer, UNIVAC, Washington, D. C. ganization for Economic Coordination and Development, Paris, France.

Data Communication Services in Western Europe: Present and Future-August Ohlmer, *Ministeriatrat, Bundesministerium fur das Post-und Fernmeldewesen, Federal Republic* of Germany.

The Public Telephone Network and Computer Communications in Japan-Ken'ichiro Hirota, Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan.

(Title unavailable)-I. P. Sharp, I. P. Sharp Associates, Ltd., Toronto, Ontario, Canada.

### Discussants:

Jean F. Berry, AFUT, France. Clayton Andrews, IBM, Zurich, Switzerland.

# SESSION 21:

## Thursday, October 26, 2:00-4:30 p.m.

Title: COMPUTERS AND LIBRARIES OF THE FUTURE

Chairman: Dr. Lawrence P. Grayson, Acting Director, Division of Technology Development, National Center for Educational Technology, U. S. Office of Education.

Program Coordinator: Charles R. Fisher, Director, Switching Systems Engineering, Data Transmission Co., Vienna, Virginia.

### Paper:

What the Library of the Future Might Be Like-Dr. Carlos A. Cuadra, Manager, Education and Library Systems Department, Systems Development Corporation.

### Discussants:

Frank K. Cylke, Executive Secretary, Federal Library Committee, Library of Congress.

Dr. Donald L. Katz, Alfred Holmes White University Professor of Chemical Engineering, University of Michigan.

#### Papers:

Societal Considerations That May Affect Future Libraries – Warren L. Ziegler, Co-Director, Educational Policy Research Center, Syracuse University.

Legal Considerations That May Affect Future Libraries – Dr. John Farmakides, *Atomic Safety and Licensing Panel, Atomic Energy Commission*.

Economic Considerations That May Affect Future Libraries – Frederick G. Kilgour, *Director, The Ohio College Library Center.* 

