

— the U.A.I. as an international data bank*.

By Anthony J.N. Judge, Assistant Secretary-General, Union of International Associations

*« The most probable assumption is that every single one of the old demarcations, disciplines, and faculties is going to become obsolete and a barrier to learning as well as to understanding. The fact that we are shifting from a Cartesian view of the universe, in which the accent has been on parts and elements, to a configuration view, with the emphasis on wholes and patterns, challenges every single dividing line between areas of study and knowledge. » (P.F. Drucker, *The Age of Discontinuity: guidelines to our changing society.*)*

INTRODUCTION

Since its creation in 1910, the idea governing the programmes of the U.A.I. has been to use information in such a way as to maintain and disseminate a comprehensive overall view of world society — « une perspective d'ensemble ». This has always meant remaining open to information from every sector of human activity across ideological and other barriers — a stance which is in itself extremely rare in a period of increasing specialization. The amount of information quickly created pressure to concentrate not on the documents produced — a static focus on the past — but on the producers of the documents and programmes — a dynamic focus on the present and potential future. This then led the U.A.I. to concentrate on international bodies — both governmental and nongovernmental — as the potential focal points for the coordination of activity or the exchange of information, and thus the key to a balanced view of world society.

The information collected was first made available in the *Yearbook of International Organizations*² and other publications and this procedure has been continued since the Second World War³. Since 1945, however, two significant trends have developed to the point where an entirely new look at the U.A.I.'s role and possibilities is necessary.

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The first of these is the considerable increase in the amount and degree of interrelatedness of the information necessary to an adequate « vue d'ensemble », for which the traditional manual documentalist approach is almost completely inadequate. These developments and some associated social problems are explored in the next sections together with U.A.I. plans for a computer-based information centre. The second is the incredible development in the technology of information processing and computers which not only offers the key to the solution of the U.A.I.'s traditional difficulties, but also opens up exciting vistas of totally unsuspected and much more powerful methods of conveying the « vue d'ensemble » in a more dynamic integrated way. It suggests means of using this perspective more skilfully as one key to many important problems in society. Some of these possibilities are explored in later sections.

ORGANIZATION COMPLEXITY

Over the past twenty years the number of organizations concerned with a given subject or problem area has increased considerably⁴. The growth in the number of independent organizations has been paralleled by a *fragmentation* within them as their size has grown. This has led to a proliferation of agencies, commissions, divisions and sub-sections⁵. Accompanying these trends is an uncharted growth in the *variety* of forms of organized activity, which is particularly evident in business enterprises and in mixed business-government-research bodies.

Within and between large organizations, sub-sectional structures ramify to the point of overlap⁶. These developments have a direct impact on the treatment of data about organizations and their activities within the world system. The value of grouping organizations into neat categories, based haphazardly on out-of-date concepts becomes highly questionable.

Some examples of the superficiality of conventional distinctions are : a small « organization » meeting rarely with few activities and a regular « meeting » of a large number of people; the tendency of « programmes » to be transformed into « organizations » as in the case of the World Food Programme; the variation in the meaning of « profit » and « non-profit » organizations from country to country, and even from state to state (within the U.S.A.); the variation in the meaning of « international » to include bodies with 99 % of their members in one country, « national » bodies acting internationally, bodies with members in three small European countries, but to exclude « national » bodies with members in all the constituent republics of the U.S.S.R.; the variation of the meaning of « intergovernmental » to exclude Interpol, the Bildeberg Group and « non-governmental » « front » organizations, but to include organizations grouping representatives of the constituent states of the U.S.A.⁷; and the existence of « nongovernmental » organizations in the socialist countries.

Furthermore, under certain conditions a governmental body, or journal, etc. may be performing the functions of nongovernmental, or business bodies, etc. in other situations⁸. In addition, organizations may become from year to year more or less governmental, profit-oriented, international, etc., depending on fluctuation in membership, sources of finance, nationality of decision-makers, choice of programme, etc.

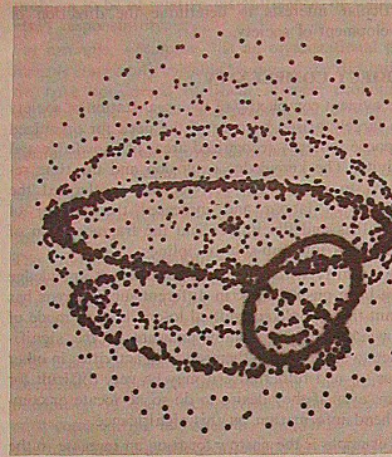
The ease with which thinking is trapped into one or two of these categories has important consequences. Current official use of « international » to mean « inter-governmental » leads people into « the elementary error of identifying the state with the whole hierarchy of social institutions »⁹. The majority of international relations research has swung onto intergovernmental relations whilst ignoring other possible interactions between nations and their citizens. A survey of research in the period 1960-1969 showed that 66 % dealt with the United Nations (28 agencies), 85 % with intergovernmental organizations (229 bodies), 14 % with interna-

tional nongovernmental bodies (2577 bodies), and 0 % with international business organizations (2819 bodies). No research dealt with the relations between organizations¹⁰. The situation at the national level is no better¹¹.

Whilst the conventional categories may be perfectly adequate for conventional problems over a short period of time, a new problem may require a cross-category grouping of organizations or other types of structure. The flux of problems requires new ways of looking at this « organized complexity ». It becomes necessary to take the emphasis off the conventional concept of an organization as an isolated unit and place it on the web of relationships into which an organization is embedded¹². The problem to be solved is that of designing a data bank to reflect this level of complexity.

NETWORK CONCEPT

The first difficulty to be faced is that due to the educational background supplied by Cartesian thinking, few mental models exist to contain the shifting patterns of organized activity evoked in the last section¹³. It is so much easier to simplify the situation, ignoring inconvenient organizations or vaguely understood relationships, so that it may be handled with the aid of a small number of categories. There is however one fairly common concept which evokes the complexity required, whilst lending itself at the same time to mathematical treatment and computer processing methods. This is the concept of a network¹⁴. Just as a fishing net is made up of strings crossing at knots, it is possible to visualize each organized entity as being represented by a node (knot) linked or related to other nodes in a complex network. The links (strings) may be flows of information, funds, goods, or more concrete in the form of telephone lines or roadways. The nodes may be in the most general sense any information processing entities such as organizations, programmes, individuals, bibliographies, etc. Unlike fishing nets, the organizational network is not flat or two-dimensional but is very definitely multidimensional. It is useful to think of organized entities one is able to detect as being spread through a multidimensional space in a manner similar to the spread of the stars through the galaxy « around the Earth ». There are clusters of organizations with related interests, organizations which appear (from a given viewpoint) to be of greater significance than others which can be barely detected, etc.



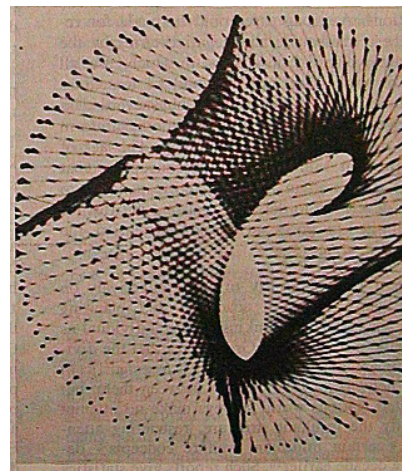
A display of organizational nodes in three dimensions, grouped into clusters — a view of "organizational space".

A display of inter-organizational links in three dimensions — another view of « organizational space ».

TWO VIEWS OF THE SCREEN OF A COMPUTER DISPLAY DEVICE

(Photos : frames from IBM computer art films illustrating the display power and flexibility of such devices)

INTERNATIONAL ASSOCIATIONS, 1970, No 5 267



The network of organizations is not a rigid unchanging structure. To be useful as a concept it must reflect the dynamism of society. It is therefore possible to visualize certain nodes as being visible for only a short time, as in the case of ad hoc meetings on a new subject or perhaps a 6-month project, or of being visible intermittently (with a characteristic frequency and type), as in the case of regular series of meetings. Similarly, the links between nodes might be permanent, corresponding to lines of responsibility between an organization and a dependent body, or only intermittent (with a characteristic frequency and type), corresponding to regular exchanges of information, or participation in a meeting, etc.

Visualization of the total network gives to an « observer » the impression of nodes and links activating with such rhythms as to create shifting patterns of relationships between nodes. These are currently only registered semi-intuitively, making the structure of society difficult to objectify. There is a lack of suitable terminology to describe such concepts and to provide an objective conceptual framework for such historically defined conventional social building blocks as « nongovernmental », « nonprofit », etc. organizations. A strong case could be made for replacing these inadequate and negative terms by the general and dynamic term « net ». In which case, all information processing entities could be treated as nets with different characteristics, but nevertheless linking together or blending into one another to form more and more comprehensive networks. The lack of some such term reinforces the misconception that society is structured in a manner corresponding to the terms developed to delimit organized entities for specific limited purposes such as tax legislation, the law of contract, etc.

The current lack of ability to focus effectively on social structure for both academic and planning purposes has restricted thinking to the individual as an economic unit. Bertram Gross notes that the division of human beings into categories is less significant than the network of relationships between them, but that United Nations world surveys make no attempt to identify the resultant structure, restricting attention to « certain minimum welfare concepts » developed a decade earlier¹⁵. Such reports give statistics on the number of cinemas, newspapers, radios, etc. per capita — the methods of informing, and influencing individuals from centres of power. No details are given on the groups and interlacing structures via which individuals express, protect and further their

particular interests to determine the direction of development of society.

SUBJECT COMPLEXITY

The evident complexity of the organization of society has largely arisen because of the need for organized response to newly recognized areas of knowledge and activity. The knowledge explosion and the time required to master any activity has accelerated the division of labour and increased the number of specialists and disciplines and the fragmentation of disciplines into sub-sub-disciplines. The rapidity with which the frontiers of knowledge have been pushed back in different subject areas has meant that people committed to one area or mode of knowledge may be totally unaware of the significance to society or to themselves of activities in other areas — and furthermore it may be very difficult for them, even if they desire to do so, to locate or comprehend information on this significance. An example is the narrow focus on an increase in the efficiency of « development » programmes and information systems in the context of the 2nd United Nations Development Decade, when it is precisely during this period that more sophisticated information systems will be required to guarantee adequate information on the *environmental and pollution* problems known to be caused directly by uncoordinated, misdirected or over-development¹⁶.

Each group of persons committed to one area of knowledge or activity is from its own viewpoint, surrounded by a more or less chaotic collection of activities of barely understood importance. A useful picture of the situation may be obtained by adapting a theme in futur-oriented novels concerning the period in the history of mankind when man will have long left Earth to colonize planetary bodies throughout the universe. The point made is that in this situation it is highly probable that distance, time and communication problems and the relatively much greater psychological pull of events in local planetary society will isolate each group into independently developing sub-cultures which will eventually have no clear memory of their common origin on Earth or of the structure of the universe in parts distant from them. In man's colonization of, and commitment to, the different domains in the universe of knowledge, the equivalent of this situation may already be considered to exist. Each group therefore considers its own disciplines of most relevance to the solution of any problem — or else considers the

problem to be of relative insignificance, or someone else's responsibility.

For example, « Suppose that an organizational problem is completely solvable by one of the disciplines we have considered (political science, economics, sociology, etc.)...how is a practitioner of any one discipline to know in a particular case if another discipline is better equipped to handle the problem than is his ? It would be rare indeed if a representative of any one of these disciplines did not feel that his approach ...would be very fruitful, if not the most fruitful...»¹⁷.

The traditional possibility of « acting as though nature were organized into disciplines in the same way that universities are »¹⁷ is now challenged by complex social and environmental problems. For « as systems analysts know, few of the problems that arise can adequately be handled within any one discipline.... Complete understanding ..requires an integration of these perspectives....The integration must come during not after the research. »¹⁷. The counterpart to the relationship between disciplines is that between the problems themselves. It is recognized that « they are so interrelated that to proceed to try to solve any one of them in isolation from the others is often to create more problems than are solved by the effort. »¹⁸. This is unfortunately matched by a situation in which, for example, « Virtually the entire legal, intellectual, and administrative base of the redevelopment and urban renewal programs throughout the United States is based on the intensive treatment of a fragment of the problem. »¹⁹. An adequate world system-oriented data bank cannot therefore afford to be frozen into concern for any particular problem area, whether development, peace, education, etc. It must be possible to switch between each perspective, combine them and above all be prepared for new perspectives.

FUNCTIONAL COMPLEXITY

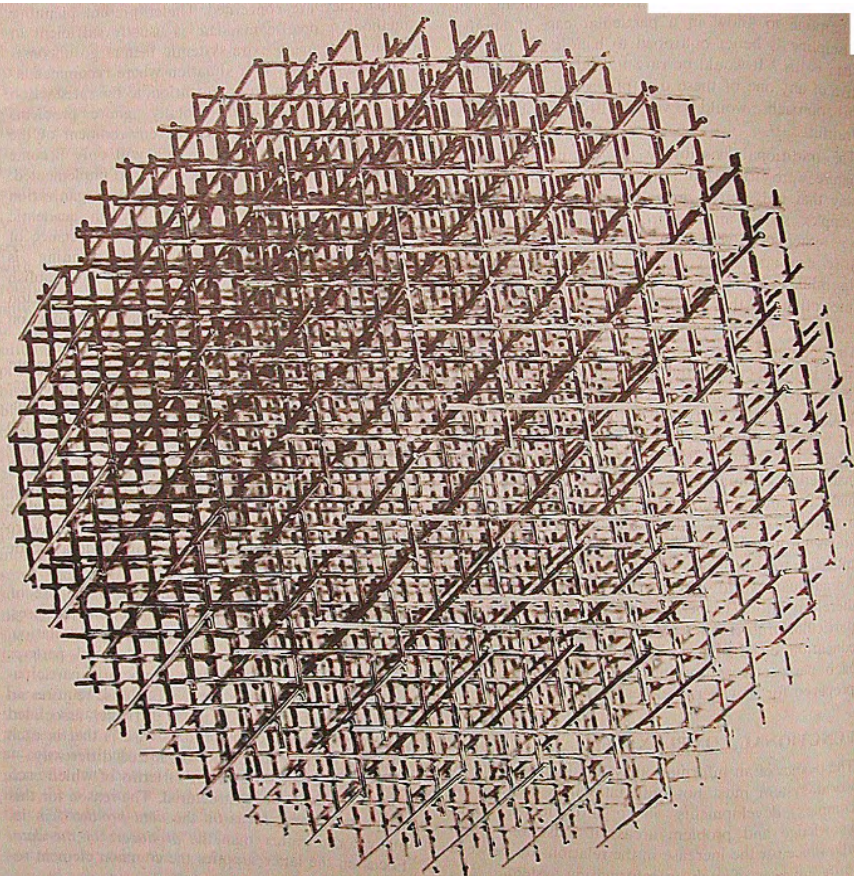
The design of an information system focussing on the world system must not only take into account the complex developments in organization systems, knowledge and problem areas, it must also make allowance for the increase in the relationship between different uses of such an information system. World system data is not only of value for academic research in such fields as international relations and political science. Such data is also required by those groups concerned in different ways with the control of change, namely planners, politicians, policy-makers

and the managers of large, complex organizations. The value to them of a comprehensive information system is that it draws to their attention those features of the environment or context which affect, or are affected by, the organization system with which they are concerned. Under present planning methods a precise mandate is usually sufficient to ensure that many extra-systemic factors go unconsidered. This leads to a situation where recommendations are made for an organization, to the satisfaction of all concerned, which totally ignore problems which have their origin in the environment of the organization — problems which will only become evident when the recommendations are implemented. The relevance of such factors outside the organization may have only been detected through academic research. It is at this point that the importance of interaction between research and planning is highlighted. It is the function of research to establish the interaction between factors, and it is the function of the planner to formulate recommendations on what he knows to be relevant. If the research information system is totally separate from that used for planning and programme management then there will be no adequate channel of communication between the two groups and: (a) research resources will not be directed toward the problems to which planners are exposed but will instead tackle problems and produce results not structured to the planner's needs; (b) planners will have to formulate recommendations on the basis of concepts which were out-of-date in research circles perhaps up to a decade earlier.¹⁵

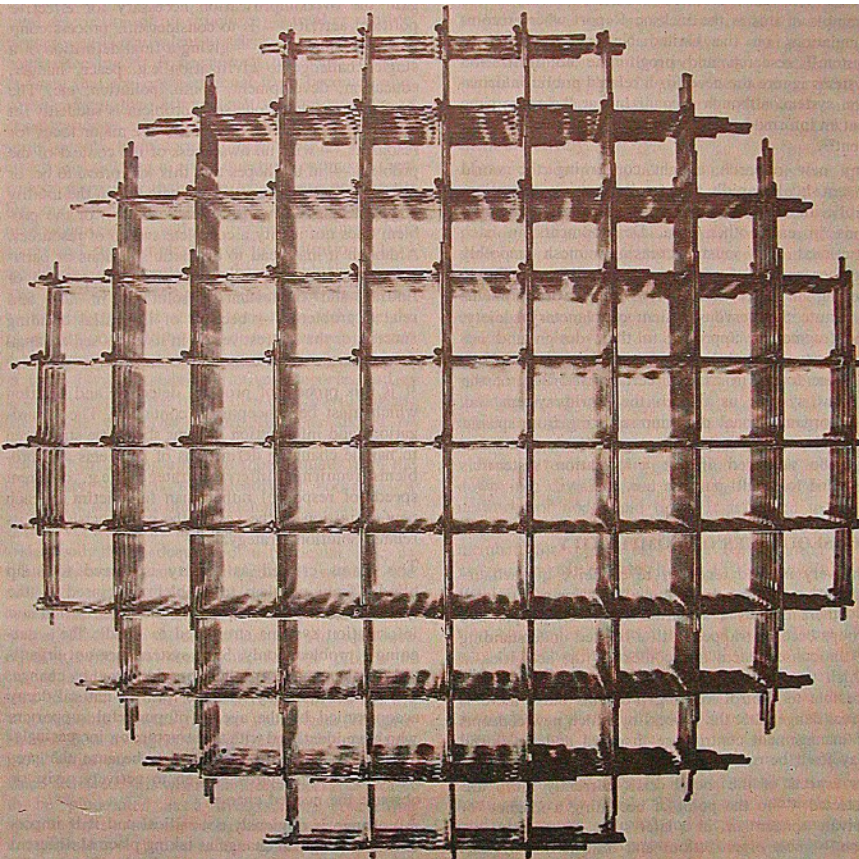
Similar importance may be attached to the use of world system data for public information purposes, programme administration purposes, documentation, education (in universities and schools), and, perhaps most important, to guarantee democratic participative decision-making processes. Each use requires an extra item of data. The usual difficulty associated with developing a common data base is that in each case the data is apparently organized differently — there is no common element in terms of which each form of data could be structured. The reason for this is the traditional focus on the *data produced* in its many forms rather than the *producers of the data*. Focus on the latter supplies the common element required²⁰.

The importance of all the many interactions between these different uses of data cannot be explored here. It should however be clear that any factors hindering or delaying interaction — particularly the creation of

A **COMPLEX SOCIETY**, hostile to participation — a conception born of a superficial perception of social structure.



A TRANSPARENT SOCIETY, inviting participation — a
conception born of a perception guided by an over all,
in depth view of social structure.



TWO VIEWS OF THE SAME SOCIETY

*(Two views of the Morellet Sphere. Photographed at the
Galerie Rive Gauche, Brussels)*

independent non-compatible systems for each function by unrelated organizations or departments, creates communication lags which immediately give rise to new misconceptions, unnecessary social problems, and an associated waste of resources. An example of this is the Jackson Report where recommendations on the United Nations Development System²¹ research and programme administration systems ignore the need for a related public information system, although recognizing at the same time that an informed public opinion is the key to development²².

Any new research insight concerning the world system should rapidly affect policymaking, education, public information, etc. The same is true for innovations in each other area. Developments in each functional area must increasingly mesh smoothly together and reinforce one another instead of proceeding in leaps and starts. Information systems constitute the nervous system of planetary society. The fragmented approach to their design and use would seem to lead directly to social crises analogous to those found in case of certain disorders of the nervous system, as though the world system was some organizational dinosaur suffering from spastic paralysis and aphasia. Integrated development can only be achieved if the information system is designed for multi-purpose use.

CONSEQUENCES OF COMPLEXITY

The very marked tendency to conceive of each organization, subject, problem and function as unrelated to others creates a situation in which people and groups become trapped with a limited understanding of the consequences and context of the activities in which they are engaged. Not only is it almost impossible to control existing problems but « there is a real danger that the process by which new concepts of management control are invented and developed may itself be out of control... »²³. As aspects of the social crisis currently faced are detected — to the point of becoming a magnet for private concern or, at a later stage, government action — new organizations and information systems are created in response to each stimulus. By the time the new structures are operational and careers have been dedicated to them, they often become a positive hindrance to the solution of the original problem, which is then recognized to be dependent on factors not included in the organization's original mandate. This is revealed in the light of newly acquired under-

standing of the nature and ramifications of the problem's setting in the total social crisis. The development of this understanding is an ongoing process. The mistake frequently made — often deliberately to gain the oversimplification necessary for effective political activity — is to consider this process completed at some point — giving a final definition of a single challenge to civilization e.g. peace, hunger, education, development, youth, pollution, etc. The danger arises when one such problem is suddenly set up through political processes as *the* major focus for resources — with no awareness of the context of the problem — in the hopes that this will prove to be, or give promise of being, the ultimate key to the totality of problems. A new or better definition of the problem does not justify a complete switch of resources. Although it may lead to dramatic solutions of particular problems, it may jeopardize the process of finding and implementing solutions in new and related problems — because of its initial blinding success (or the interest vested in its supposed eventual success).

It is this process of problem detection and solution which must be conceptually contained. The organizations and information systems should be structured to handle changing definitions of problems and problems requiring different strategies (e.g. different speeds of response) rather than fall victim to each new definition of the key to the social crisis and its related solution strategy.

The hiatus created as society is forced to jump blindly from problem to problem is caused by the obsolescence and inadequacy of the organization and information systems structured to handle the « outgoing » problems only. Such systems are not organized for change and are therefore destroyed by change. The destruction may take the form of natural decay accompanied by the ageing of powerful supporters who have identified with the structure or, increasingly, by sudden « violent » liquidation because the presence of the structures is seen to actively resist or obscure the needed change.

All change is obviously not radical and it is important to distinguish change as taking place at different rates at many levels from the barely significant to the fundamental. If this graduation is apparent and understood then clearly the need for a minor structural change will not entail — through a process of guilt by association — unnecessary fundamental change, which would sweep away valuable social structures.

The consequence of the perceived complexity of society as explored in earlier sections is however to obscure thoroughly this graduation (except for some elites), thus magnifying the perceived extent of guilt by association, to the point of justifying to some the total destruction of all structures — total revolution. Complexity is equivalent to a lack of transparency to comprehension. It is because of this lack of transparency that the organizational form becomes inseparable from the visible negative consequences of organizational activity. Perceived complexity prevents people from locating organizations that are effectively tackling a given question, or makes them rightly suspicious that those located are only fronts for inactivity. This leads either to the creation of new organizations and information systems which compound the complexity, or to frustration, claustrophobia and alienation of the individual. The question is whether the process of change can be contained whilst at the same time reducing the instability provoked by lack of transparency. Clearly if the organizational structures are conceived of both in terms of inadequate restrictive categories and as isolated one from the other, then critics will suggest that whole categories of organizations should be swept away because of the lack of effective means of detecting or making apparent the adequate from the inadequate — it is the category of bodies as a « system » which is then condemned. If however a network approach is used and generally understood, the inadequacy of a particular link, or sub-sub-network, can be pin-pointed without the need to reject all associated links and nodes because of lack of transparency. It is a case of the scalpel rather than the sledgehammer. This approach offers a conceptual framework for the process of change, since the links changing at any one time will tend to form part of a sub-network for which the encompassing network remains unchanged. The problem is how to objectify this framework so that its possibilities can be realized.

Once achieved, this would permit democratic protest to be pinpointed as a disagreement concerning specific links or sub-networks within an unquestioned encompassing network rather than as at present, where the parties split into camps with no perceptible common framework.

THE U.A.I. INTER-CONTACT SYSTEM

The preceding sections reveal many opportunities to be seized in order to obtain a more realistic and

powerful « vue d'ensemble » through the design of a world system-oriented data bank to be used and continually developed over the coming decades. Some of these opportunities are closely linked to major social problems which it would be presumptuous to believe that any organization could solve single-handed. The U.A.I. can however — in solving its own information handling problems — create a tool which will provide a valuable integrated perspective on many of these problems and particularly on the organizational network which is the key to tackling them effectively.

Action is now being taken to collect together in a computer information on the internationally significant nodes and links in the world system network. A portion of this information already exists as the text descriptions of each international organization in the *Yearbook of International Organizations*². These descriptions may consist solely of an address or extend to several pages of text. The old text presentation has however to be broken down to enable the computer to pick out each link associated with a given organization or its subsections, in order to treat the data in network terms. Thus an organization has a link to member organizations, each linked perhaps to its own member organization, and in turn to individuals. In terms of its organization chart, it is broken down into divisions and sections forming different networks of nodes and links. It is linked to other organizations for a variety of purposes (e.g. as a member, for receipt of aid, or collaboration on a programme). It may be linked to the network constituted by a regular conference and the organizations represented there, or by a periodical distribution, etc. And of course it is linked to its officers who may themselves have roles in, and thus be linked to, other organizations. (It is instructive to conceive of the individual as organizing roles — the roles being « members » of the individual in network terms and *through* such roles he may be the key node linking government, academic and university bodies.) The information collected is not limited to the contents of one Yearbook. The contact addresses (including libraries, national and local groups, multinational business enterprises, embassies, government agencies, etc) which the UAI uses to distribute its journal²³ are also included as part of a planned long-term development to focus on the national and local points of activity which are of importance internationally.

Similarly it is planned to extend coverage to include other types of node on which the U.A.I. has col-

lected data in the past : meetings²⁴, programmes and projects, periodicals²⁵, meeting reports²⁶, etc. In each case the relationship of each node to other nodes will be indicated.

The advantage of this approach is that any point or node in the network of information already incorporated may be used as a nucleus for further growth. The minimum information held on each is that necessary to contact the node, namely the name and address. Growth may take the form of incorporating details on the network of organs which make up the internal structure of the node contacted, or on the bodies to which the node is linked — so that link by link an organic picture of particular sectors emerges. The directions of growth are not pre-planned. The U.A.I. has a vested interest in emphasizing the international picture, but whenever interested groups are prepared to supply funds to develop the network in a particular sector — health, agriculture, etc — or a particular country, or any combination of characteristics this will be done. A currently important counterpart to the focus on the international end of the international-local dimension, is that on the multidisciplinary end of the specialization dimension. Funds may therefore be allocated to locating and including multidisciplinary bodies whether international or local.

The data bank will develop in several other senses. Increasingly more sophisticated methods will be used in association with university groups to analyze the network to improve understanding of the world system. In particular it is hoped to maintain links with the International Relations Program (Northwestern University, USA), International Peace Research Institute (Oslo University), and a group developing in the USSR which will use a powerful cybernetic approach — for which the Inter-Contact system is ideally suited.

Efforts will also be made to develop methods for displaying information on the network more simply and effectively to increase its value for non-technical policymakers and as an educational tool²⁷. The system may be developed in another sense whose potential significance it is difficult to estimate. Inter-Contact is being created at a time when data banks exist in the U.S.A. with information on over 500 million people, when many governments are developing their own data systems, when the U.N. is attempting to create a bank of over one million addresses of individuals, and when the network of World Trade Centers around the world will hold and

manipulate commercially valuable data in powerful computer systems (possibly linked by satellite). This increase in concentration of information under the control of government and business bodies, however benign, is recognized as a dangerous threat to privacy and to traditional methods of democratic control against abuse²⁸. The danger is increased because it is now recognized that the rapidity with which world problems are developing will shortly lead to a situation in which society « may be tempted to sacrifice (or may not be able to afford) democratic political processes »²⁹ — a situation predicted in George Orwell's « 1984 ».

The Inter-Contact system — or the technique — offers a means for nongovernmental, nonprofit groups of all shapes, sizes and persuasions to enhance their effectiveness by making use of a powerful computer system. The development foreseen is the creation of a flexible, sophisticated method of : sharing data between bodies using the system, preserving security and the privacy of each where required, compensating each body when others use specified parts of the data it has collected, cooperative financing methods, and permitting some organizations (such as foundations) to subsidize the use of the system by specified nonprofit bodies whose activities they wish to facilitate. (This approach is of great potential importance as a means of by-passing the traditional procedural, personality and political problems of coordination at administrative levels, by achieving a degree of « self-coordination » as a result of partial integration at the information processing level. The range and flexibility of the technical possibilities are more than sufficient to meet the range of criteria for autonomy.) It is expected that this unique development would also help to increase the effectiveness with which such bodies fulfil their function in democratic society of rapidly counter-balancing, or protesting against, the actions or omissions of other bodies (whether government agencies, associations, businesses, etc.), which according to *their* value systems, they consider to be dangerous or irresponsible. Many of these bodies can now introduce greater instability into the world system because of their current information processing superiority, and thus are in great need of more rapid and effective reactions from bodies in a position to detect excesses. It is important that such a nonpolitical, noncommercial system should be created to avoid a situation in which the effectiveness of associations is jeopardized by the criteria or cost barriers imposed on access to governmental and business information systems. An Inter-Contact type system also

has many implications for the problem of participation and for more effective formulation of the guiding values of society.

The important questions governing the realization of these cooperative possibilities are the degree to which potential users (a) reject the computer as a tool and a key to a better future because of its association in their minds with the use made of it by some organizations; (b) diminish their combined effectiveness by working independently through incompatible computer systems and competing for the limited available resources (the crippling error made by nearly every intergovernmental organization, even within the United Nations system); (c) recognize the need to prepare actively for, and to seek out and demand collectively, the information processing techniques of the near future from which they can derive the greatest benefit; (d) recognize the trend towards a situation in which their survival and effectiveness depends in a new way on how they increase or decrease the availability of information which they control (a situation in which it is the isolationist bodies which will wither).

IMMEDIATE APPLICATIONS

a) Production of reference books

The Inter-Contact system will be used during 1970 to produce the 13th edition of the *Yearbook of International Organizations* via a computer typesetting process. This means that the computer orders the data line by line, page by page on magnetic tape, incorporating corrections and additions and making 8 or more indexes, some in several languages. This leads to the production of a film from which the directory can be printed. The same data can be ordered in a different way to produce directories of organizations fulfilling any combination of criteria. For example a French edition of the Yearbook is planned³⁰, also several other related UAI publications on : meetings²⁴, periodicals²⁵, meeting reports²⁶, National directories could also be prepared under contract.

b) Research

Requests for information on bodies fulfilling certain criteria will be answered from the same data (e.g. lists of organizations : with headquarters or members in Belgium, interested in a given subject, which have not held meetings in Tunisia, etc.). More complex structural studies will be undertaken in collaboration with university groups.

c) Mailings

The system will be used for various kinds of mailing : questionnaires to obtain new information (e.g. for the production of new Yearbooks) and for special surveys; distribution of the monthly journal *International Associations* and those of other organizations on request; distribution of meeting invitations; etc. One important aspect of this will be the ability to supply organizations who have become interested in a new field of activity with the addresses of all the bodies with whom they should be in contact.

FUTURE DEVELOPMENTS

Science and technology have reached the stage at which « for the first time in man's history, we are at the point where we can do virtually anything we wish if we are willing to pay the price »³¹. This applies not only to the production of new things but also — and this is rarely mentioned — to the development of techniques to provide an integrated overall view of the social processes in which man is engaged. Hence the importance of futures research, it helps society to decide what it wants in the future as a guide to the allocation of resources now.

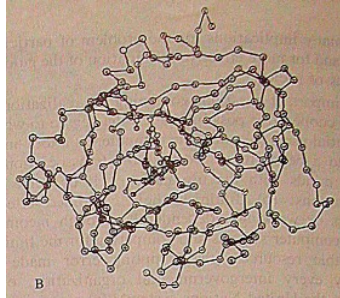
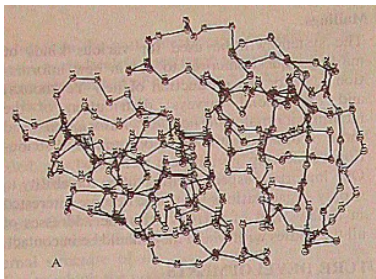
In the first section below some developments of the Inter-Contact system are described which are currently feasible technically. In the second section, the developments described indicate possibilities which are likely to be available within the next thirty years and to the realization of which the development of the UAI system would contribute.

a) The Immediate Future

Organization Charts. Surprisingly enough many, if not most, large organizations like national government administrations or the United Nations family of organizations are unable to produce a detailed organization chart covering all their constituent bodies and organs;

A European government, for example, after having built up a complete list of the 300 international bodies concerned with development, was forced to renounce its intention of formulating a global policy for 1970-1980 because it was not possible to determine within its administration which departments were responsible for liaison with each such body. Attention has since been restricted to thirty of them, namely ten per cent.

Using the Inter Contact system, it would be possible to hold information on such internal bodies and print out organization charts, plus indexes, and even ar-



COMPUTER-PREPARED VIEWS OF PORTIONS OF THE NETWORK OF ORGANIZATIONS. Note, for example, how two critical communication paths are highlighted between the left and right portions of network A.

(Single views of computer-prepared stereoscopic diagrams of the main chain conformations of the enzymes elastase and alpha-chymotrypsin. Diagrams of these chemical molecules were prepared by Professor R.E. Dickerson and were first published in *Nature*, vol. 225, p. 8/2)

range to match the organization charts of two national governments to pick out the « opposite numbers » in each hierarchy. Alternatively, it would be possible to pick out the lines of responsibility for decisions on a particular subject through such a hierarchy.

Graphics. It is also possible to display organization chart information on television-type tubes linked to computers — a display procedure now used on a large scale for airline bookings at London Airport. The really important breakthrough may however lie in the possibility of actually displaying parts of a network of organizations as a network in two, three or four dimensions so that it can be inspected as a pictorial representation of interorganizational relationships. Information may be added to or extracted from the display by using a light-pen to interact with the computer. Such displays are currently used for the design of electronic circuits, engineering structures (airplanes, automobiles, etc.) and the analysis of three-dimensional models of complex molecules (see above). The latter can for example be rotated, reduced or magnified on the display screen. The fundamental importance of interactive graphics¹⁹ is the ability to facilitate understanding. Progress in understanding is made through the development of mental models or notations that permit a simple representation of a mass of complexities not previously

understood. The greater the complexity however, the more difficult it is to use mental models, and hence the greater the risk of dangerous conceptual shortcuts and oversimplifications. For example, in a description of his own mental models of the operation of electrical circuits one author writes :

« Unfortunately, my abstract model tends to fade out when I get a circuit that is a little bit too complex. I can't remember what is happening in one place long enough to see what is going to happen somewhere else. My model evaporates. If I could somehow represent that abstract model in the computer to see a circuit in animation, my abstraction wouldn't evaporate. I could take the vague notion that « fades out at the edges » and solidify it. I could analyze bigger circuits. In all fields there are such abstractions. We haven't yet made any use of the computer's capability to « firm up » these abstractions. The scientist of today is limited by his pencil and paper and mind....

We could let him represent all kinds of very complex and very abstract notions, and we could let him work with them in a way that he has never been able to do before. I think that the really big gains in the substantive scientific areas are going to come when somebody invents new abstractions which can only be represented in computer graphical form.³² »

It is this sort of facility which the political, social, information and management scientists and educationists require in their studies of the world system and its subsystems. It appears highly probable that only abstractions of the above order will prove an

adequate basis for an understanding and representation of the world system for purposes of sophisticated planning and decision-making. The use of this tool opens up the way to render the world system transparent — its importance for obtaining a rapid understanding of complex intra-governmental structures, or of the relationships between enterprises in a given industrial sector is clear. Such research will help identify structural weaknesses to the point where instead of creating new organizations, coordinating groups, information systems, bibliographies, journals, etc. the available funds will be used with great precision to improve the effectiveness of existing structures where possible — thus avoiding the vicious circle of duplication, overlap and ineffectiveness. Not only will the logic of such a decision be apparent in research terms, but the power of the visual display will validate the research view in the terms of the non-technical politician, planner or interested citizen, due to the ease with which complexities can be simplified or examined from many angles (see below).

Education. A visual display unit linked to a computer has considerable advantages as a technique for the communication of new concepts. As the world system increases in complexity new techniques must be sought to simplify education concerning it and the many roles and interactions open to the individual, the citizen and his organizations. The problems posed by the time currently required to communicate an adequate working knowledge of the world system and the difficulty of building up an integrated picture of its complexity, suggest that a visual display unit with computer mass memory support may have many possibilities.

An important possibility in building understanding is the ability to manipulate part of a multidimensional network via the visual display unit so as to portray the world system network from an origin chosen anywhere within the network. Thus an organization (or even a concept), known and understood by a particular user, may be used as visual origin and all other organizations (or concepts) displayed in terms of their relationship to it — according to a variety of models helpful to differing personality types. Entities « distant » in communication terms can be reduced in visual importance, whereas « nearby » organizations of relatively little absolute importance can be made of greater significance (approximating the recognition normally accorded them by the user). The student can work from his base system by requesting a restructuring of the display in terms of

other system viewpoints as he builds up knowledge of, and a « feel » for, those originally conceptually distant from his starting point. In this way he can progress toward the more general levels of the world system or into other areas of detail. Of greatest importance, the student can work out and locate which organizations or systems offer the best avenue of fulfillment for him, or alternatively precisely in what way he must initiate some new activity to achieve such a measure of satisfaction or correct some trend which his values rate as unsatisfactory. Exploration of the organizational network can be recorded on videotape for educational purposes, briefings or newsreels.

b) More distant future

The purpose of this section is to envision briefly the sort of communication facilities and environment that seem desirable, or perhaps essential, for the last decade of this century in terms of the problems and technological opportunities — as a development of the contribution of the type of data structure being built by the U.A.I.³²

The greater the number of relevant factors which must be taken into account in a decision-making situation the more complex becomes the structure necessary to display information revealing the problem. The use of interactive graphics, described above, will therefore be extended to give a working environment which may be described from the point of view of the executive (or member) as follows. He will conceive of his organization as the integrating or coordinating point of a set of networks of relationships between individuals and other bodies concerned with a web of problem areas. This concept will be given precise form by an appropriate display on a three-dimensional projection screen linked to a computer. He will be able to examine the current state of development of these networks. Each event and the passage of time will modify the pattern of links between organizations. The display will signal as he watches new links formed and broken and areas of inter-organizational conflict. New integrating points of various degrees of effectiveness and duration will appear and require decisions and reactions from his organization. His decisions to allocate resources in new ways will modify the patterns of links on his own display and on those of others concerned with the same field. A related display will highlight for him the current problem areas and the rates of their development. He will be able to determine which organizations and associated project networks are concerned with which problem

area, their effectiveness and need for resources. The computer will highlight problem areas of interest to him with which no organization is concerned and indicate bodies from which he might obtain funds, or which might be willing to collaborate or sponsor action on the part of his organization³³. Because of developments in communication, organizations — which are structures for processing information — will decreasingly take the forms which are currently recognized. No office will be necessary because the files, accounts and documents are stored and used electronically. No meeting room will be necessary because of the inconvenience and delays of travel and the convenience of videophone conference calls³⁴. The purely administrative organization becomes a concept concretized in a computer program and file structure.

This will have the advantage of reducing the ability or need to identify with the non-essential features of organizations which are often a major source of resistance to change. Even the concept of an organization as a permanent structure will be modified. The facility with which structures can be altered or created will increase the rate of modification of such structures to the point where new links are brought into play to cope with each new problem. This takes us to a point where the concept of an organization as a distinct and well defined structure (other than in computer terms) is replaced by an emphasis on the potential components of structure at any one time in terms of a given problem pattern and the stimulus necessary to encourage their participation. The emphasis on organization dynamics is foreign to traditional thinking in formal organizations but is very close to the normal intuitive understanding of the operation of small groups, informal organizations and pressure groups.

A more vivid appreciation of the flexibility which this will make possible is obtained by considering the organization (in sociological terms) which can be set up now by concerned people telephoning between one another to arrange joint action or protest over some new issue. In the future this procedure will be accompanied, over the same short period, by the formulation of (and bargaining over) the necessary computer-held structure, selection of contact mailing lists, acquisition of funds (by credit transfers) etc. A formal body will therefore have been set up which could act to apply pressure or be wound up at the same speed.

The current range of organizations is severely limited because of the need for simple voting and

control procedures and easily identifiable membership groups. The calculating and display power of the computer will permit and render understandable complex groupings of many types — making possible the existence of bodies which only « cohere » and « exist » on particular issues, change their structure and method of operation in a pre-negotiated way over time³⁵, or which might have a wide voting membership on one issue but a very limited one on another.

These new types of organization will pose considerable problems if they seek legal status — until legislation recognizes the fact that the computer program is an operationalized constitution and in fact offers a considerably more precise definition than that currently possible.

Perhaps the most important possibilities lie in the improvement of the relationship between the man-in-the street and the specialists detecting new ways of understanding, changing and controlling society. The situation predicted for the world of 1976 in which

«...the politician, working in tandem with his technological advisers and program designers, is in a position to put forth interpretations of « urban reality », programs to deal with it, and evaluations of those programs as implemented based on knowledge either unavailable to those who might challenge him or unavailable at the time that a challenge might be most effective»²⁸.

will be overcome. The type of display envisaged could be adapted to receive both the most subtle insights of diplomats and even of artists³⁶, as well as those of mathematically oriented researchers. These could in turn be converted by the computer either directly, or via appropriate educational programmes, into explanations framed according to the demands of the man-in-the street. The immensely improved possibilities for participation are implicit in the flexibility and ease with which organizations can be formed and controlled — or even protested against. It is only the extension of national data systems to facilitate democratic action *through* such systems that will prevent such systems from being swept away by processes of change or abused for oppressive purposes. The key lies in using the same system for different purposes and thus avoiding the spastic response of a society based upon a fragmented non-participative information system. In this context the conclusion may be reached that the only sufficiently complex and yet understandable dynamic model for the large variety of processes

about which the policy-maker will have to be prepared to learn, receive and integrate related information — whilst at the same time retaining a concept of the ongoing process as a whole — is the policy-maker as a fully developed human being. This would provide considerable philosophic satisfaction to many as well as providing a conceptual framework within which the balance between man and his organized environment could be reestablished. The problem would then become how to educate individuals as generalists to model within themselves the interacting sub-systems of world society, with the necessary increase in precision and breadth of vision, and how, to enable them to reflect these subtle insights back onto a visual display screen for objective discussion, testing and further refinement.

CONCLUSION

The fact that there is no centre, university faculty or institute in existence or proposed which specializes in the study of the world system *as a whole*, or of the web of interacting problems *as a whole*, increases the significance of the activities and plans of the U.A.I. It also has a possible consequence which seems to have been ignored.

The lack of such central collections of information means that nobody is stimulated to think about either (or the ways of using such information) in broad enough terms to cope with the synergistic effects which may be the eventual cause of disaster. And, while «...the difficulties and dangers of problems increase at a geometric rate, the knowledge and manpower qualified to deal with these problems tend to increase at an arithmetic rate »³⁷ The fragmented approach to society may even reinforce, and in turn be reinforced by, a degree of conceptual fragmentation within man which opposes any sense of human fulfillment³⁸ and — to the extent that the key to peace lies in the minds of man³⁹ — blocks any approach to satisfactory world peace or to the solution of other world problems. « Because our strength is derived from the fragmented mode of our knowledge and our action, we are relatively helpless when we try to deal intelligently with such unities as a city, an estuary's ecology, or « the quality of life ». »⁴⁰ — or with the world system as a whole. Development of more sensitive methods to interrelate fields of knowledge and activity⁴⁴ leads to more effective relationships between organizations and problem areas.

The elaboration of the network — an unexplored resource in terms of its synergistic effects — within

which all organizations are embedded in terms of their actual pattern of contacts would decrease the tendency to treat organizations as isolated entities (which emphasizes conflict rather than cooperation) or conversely to treat problems as isolated and amenable to solution by isolated organizations. The techniques available to structure this information in visual form, adaptable to educational requirements, opens up exciting possibilities for improvement in understanding about society.

The network would provide one realistic physical model of what has hitherto been an abstract and relatively meaningless concept, namely « world society ». The existence of such a model could have important educational and social consequences. The strength of the UAI derives from a simple idea reinforced over 60 years — the overriding necessity for a « vue d'ensemble » across all the conventional categories. The rate at which the Inter-Contact system can be developed to concretize the organizational network depends directly on (a) the ability of bodies interested in particular subject or geographical areas to understand the advantages of making available funds to include such specialized information within an Inter-Contact *general* framework and (b) the enthusiasm aroused in potential users and in groups anxious to collect systematically and prepare information on bodies active on questions which *they* consider to be important. Its ultimate significance will depend on the degree to which the Inter-Contact concept echoes the perspectives and needs of young people, stimulates their imagination and provides them with an instrument of the 1970's to help make society transparent to the man-in-the-street, and a fulfilling environment for him.

¹ P.F. Drucker. *The Age of Discontinuity; guidelines to our changing society*. New York, Harper and Row. 1968, P. 350.

² *Annuaire de la Vie Internationale*, publié avec le concours de l'Institut International de Bibliographie et l'Institut International de la Paix, par H. Fried. H. La Fontaine et P. Otlet, 1908-1909. 1,370 p. 1er édition (publ. no. 3).

Annuaire de la Vie Internationale, publié avec le concours de la Fondation Carnegie pour la Paix Internationale et de l'Institut International de la Paix. 1910-1911. 2,652 p., 2e édition (publ. no. 47).

³ *Annuaire des organisations internationales*. 1950. 902 p., 3e édition (publ. 146). *Yearbook of International Organizations*, 1968-1969, 1220 p. 12e édition (publ. no. 210).

⁴ No information exists on the total number of organizations. From 1950 to 1968 the number of international

- bodies increased from 718 to 319 (United Nations bodies 28, other intergovernmental bodies 201, international nonprofit bodies 2577: together with 2819 multinational business enterprises.³) This represents a 4.5 % increase per year in governmental bodies giving 855 in the year 2000, and a 5.0 % increase per year in nongovernmental nonprofit bodies giving 9,600 in the year 2000.
- ⁵ As an example, the U.S.A. Federal Government has 13 Congressional Committees, 90 programs, 26 quasi-governmental bodies and 14 inter-agency committees dealing with environmental questions. At the international level, no information exists on the number of bodies within the United Nations structure.
- ⁶ Consider the overlap in the responsibilities between ministries within a government or between the specialized agencies within the United Nations structure. See 21.
- ⁷ For example, the Intergovernmental Task Force on Information Systems.
- ⁸ The existence of a journal with a network of subscribers may avoid the need for an organization with members. Eurochemic is an intergovernmental business organization.
- ⁹ H.J. Laski. *Grammar of Politics*. New Haven, Yale University Press, 1925. On the « permeability » of the nation-state to outside influences, see A.M. Scott, *The Functioning of the International Political System*, N.Y., Macmillan, 1967.
- ¹⁰ A survey of 14 journals and 10 international relations readers in the period 1960-1969 by Chadwick F. Alger. Research on research : a decade of quantitative and field research on international organizations. Paper presented to American Political Science Association annual meeting. September 1969. (Numbers of organizations taken from reference in note ³).
- ¹¹ See B. M. Gross. *Organizations and Their Managing*. New York, Free Press, 1968, p. 636.
- ¹² «...technology has made human society into a seamless web, with mutual interrelationships that can be disentangled only at peril of losing touch with reality. » V. Ferkiss. *Technological Man; the myth and the reality*. London, Heinemann, 1969, p. XII.
- ¹³ « The greater part of current discussion of systems in sociology is embarrassingly naive and out of date in the light of modern systems research in other disciplines... » W. Buckley. *Sociology and Modern Systems Theory*; presenting a case for replacing outmoded models of society with a more viable and appropriate conceptual framework. Englewood-Cliffs, Prentice-Hall, 1967, p. 7.
- ¹⁴ The concept of a communicating network of organizations seems first to have been suggested by Colin Cherry. *On Human Communication*, N.Y., Wiley, 1957. See also J.C. Mitchell (Ed.) *Social Networks in Urban Situations*. Manchester University Press, 1969.
- ¹⁵ B.M. Gross, discussing the United Nations reports on the World Social Situation. In : R.A. Bauer (Ed.) *Social Indicators*. Cambridge, M.I.T., 1966, p. 194-9, 269-270.
- ¹⁶ Current recognition of the importance and ramifications of environmental problems warrants a reconception of the Decade as the « U.N. *Environmental Development Decade* ». This conveys more clearly the notion that it
- is not development at any price that is required, but change controlled in terms of the consequences of change — precisely the notion which is lacking in the development concept. This relates the development problems of the Third World to the over-development, problems of the industrialized society — the creation of which is the goal of development.
- ¹⁷ R.L. Ackoff. *Systems, organizations, and interdisciplinary research*. General Systems Yearbook, Society for General System Research, vol. 5, 1960, p. 1-8.
- ¹⁸ K.G. Harr, Jr. quoted in *Harvard Business Review*, March-April 1967, p. 10.
- ¹⁹ E.N. Bacon. *Urban Process*. *Daedalus*, Fall 1968, p. 1167.
- ²⁰ This is tantamount to isolating information in a higher state of order due to the increase in the number of ways it can be used. — a greater than usual reduction in entropy.
- ²¹ United Nations. *The Capacity Study of the United Nations Development System*. Geneva. 1969. 2 vols.
- ²² See review of the Capacity Study in A.J.N. Judge, *International Organizations and the Generation of the Will to Change — the Information Systems Required*. Brussels, U.A.I., 1970 (INF / 5).
- ²³ *International Associations*, 1949-, monthly.
- ²⁴ *International Congress Calendar* (of future international meetings), annual with supplements in ref. 23.
- ²⁵ *Directory of Periodicals Published by International Organizations*, Brussels, U.A.I., 1969, 3rd edition.
- ²⁶ *Yearbook of International Congress Proceedings 1960-1967*. Brussels, U.A.I., 1969, 640 p.
- ²⁷ Research has already started on the use of television-type screen displays for organizational networks.
- ²⁸ D.M. Michael. On coping with complexity: planning and politics. *Daedalus*, Fall 1968, p. 1179-1185.
- ²⁹ H. Kahn and J. Wiener. Faustian powers and human choices. In : W.R. Ewald (Ed.) *Environment and Change*. Bloomington, Indiana University Press, 1968.
- ³⁰ The last French edition was published in 1961.
- ³¹ W.D. McElroy. National Academy of Science, *News Report*, November 1969.
- ³² I. Sutherland. Computer graphics. *Datamation*, May 1966, p. 22-27.
- ³³ A system technically similar to this is already in operation for the direct purchase and sale of shares between parties who remain anonymous during the bargaining process (A computer to bypass the broker. *Business Week* March 8, 1969, p. 96-97).
- ³⁴ Apart from the technological convenience of this change, society has already reached the point where a three-dimensional array of offices tends to be a direct hindrance to the multidimensional contact needs of individuals with many functions to fulfil in a variety of committees and working groups.
- ³⁵ This could lead to a breakthrough in the handling of minority / majority problems like those in Southern Africa.
- ³⁶ This has many implications for more imaginative and harmonious solution of interorganizational problems. The possibility is foreshadowed by current developments;

«The computer which handles fantastic amounts of data for processing brings the artist close to the scientist. Both can now use the same disciplines and knowledge in different ways. For the first time, the artist is in a position to deal directly with the basic scientific concepts of the twentieth century.» (C. Csuri and J. Shaffer. *Art, computers and mathematics*. In : Computer Art Society, Event One, London, 1969).

³⁷ Yekezekel Dror. Prolegomenon to policy sciences : from muddling through to meta-policymaking. Paper presented at a symposium of the American Association for the Advancement of Science, December 1969.

³⁸ See for example, N.W. Chamberlain. The life of the mind in the firm. *Daedalus*, Winter 1969, p. 134-146. Also the possibility of « organizational apartheid » as a future world issue, discussed in A.J.N. Judge. Organizational apartheid; who needs whom in the Second United

Nations Development Decade ?, *International Associations*, vol. 21, October 1969, p. 451-466.

³⁹ René Maheu, Director-General, UNESCO.

⁴⁰ Editorial. *Fortune*, February 1970, p. 92.

⁴¹ J. Clark and A.J.N. Judge. Development of trans-disciplinary conceptual aids. Brussels, U.A.I., 1970, project proposal.

⁴² Some of the possibilities in this section have been explored in greater detail in A.J.N. Judge. Communication and international organizations. *International Associations*, vol. 22, February 1970, p. 67-79.

⁴³ Introduction to a 1968 session of the College of Management Control Systems (The Institute of Management Sciences).

⁴⁴ These points are explored in greater detail in A.J.N. Judge. The improvement of communication within the world system. Brussels, U.A.I., 1969 (INF / 2).



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