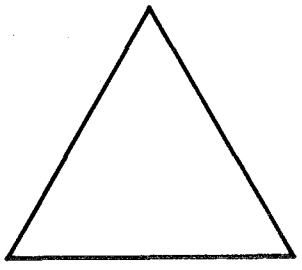
# The Network Alternative

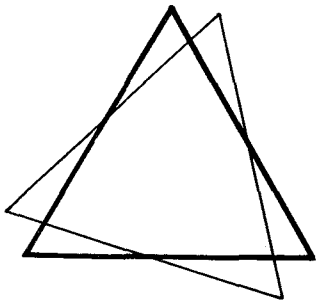
A proposal for encounters between practitioners, social scientists and specialists (incorporating the summary of a preliminary meeting in Montreal, 18-20 November 1976, to assess the feasibility of such a project).



## Introduction

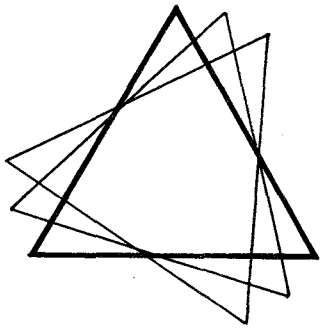
The term « network » is encountered more and more frequently in the social sciences, in administrative documents and in public debate as reflected in the news media. In each case use of the term seems to be associated with new perceptions of the complex and subtle patterns of relationships between social structures characteristic of society today.

It becomes increasingly clear that social scientists and practitioners are seeking a new vocabulary, one that would provide a means for objectifying and de-mystifying the complexity of the organizational, problem, and other networks by which we are surrounded and within which our activity is embedded. At present, because clear and unambigous concepts for discussion of social complexity are lacking or have very limited currency, communication can only be achieved with the aid of extremely cumbersome and lengthy phrases which tend to create more confusion than they eliminate. In the absence of adequate terms to handle urgent but complex realities, debate tends to concentrate on issues which can be adequately expressed via the traditional vocabularies. The same issues recur, maintaining a high level of visibility and an assumed legitimacy due to the relative ease with which they can be stated, rather than to their importance.



While the term « network » may be currently doing some service to contain the complexity with which social scientists and practitioners are confronted, there is a strong possibility that both groups could benefit from each others insights and from exposure to the more sophisticated forms of representation already developed by the small group of mathematicians concerned with networks (e.g. in the case of topology, graph theory and related disciplines).

The special advantage of using the term « network » as the point of departure is that it is capable of encompassing and inter-relating a great variety of social entities and links. This is in contrast to exclusive focus on partial or fragmentary features of the social fabric, an approach which has been the cause of much difficulty in communication about social structures and processes.



## Proposal

It is proposed that exploratory encounters be organized between the following groups :

— **mathematicians** concerned with topology and graph theory but who are interested in the perceptions and needs of social scientists

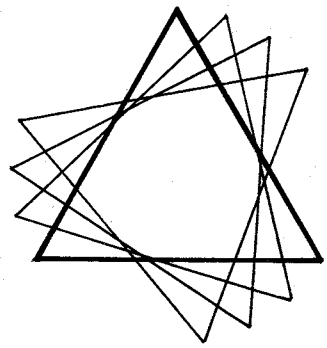
— **social scientists** sensitive to the possibility that a more extensive use of topology / graph theory concepts could help to clarify current thinking about inter-organizational structures and their relationship to problem complexes

— **other specialists**, (including engineers, ecologists, etc.) involved in some way with conceptual handling of networks

— **practitioners** using the concept of « network » and « networking » as a means of ordering their perception of the relationships between the organizations with and through which they work — and who may be able to draw the attention of the other groups to types of complexity which they have difficulty in describing or analyzing.

The meeting should be organized in such a way as to ensure optimum transfer of insights to informed or interested members of the public (e.g. students) who may usefully benefit from the presence of the above groups.

*(N.B. It is recognized that there is already a considerable literature on « Social networks » (1). However, the sociologists having this preoccupation are almost entirely concerned with networks of individuals, usually perceived as centred on one key individual. So although extensive use has been made of graph theory and sociometric techniques, this does not appear to have been made relevant either to networks of groups and organizations, or to the broader concept of « network » and « networking » now being used by social activists. Furthermore, those working on « social networks » do not appear to be interested in such applications).*



## Report of a preliminary meeting

The feasibility of the proposed encounter was tested and examined at a preliminary meeting organized by the Science and Human Affairs Programme, Concordia University (Montreal, 18-20 November 1976) (3).

The justification for the meeting was developed by Dr. J.W. O'Brien, Rector and Vice-Chancellor of the University, by J.C. Callaghan, Dean of Engineering, and by Dr. D. Charlton, Director of the Centre for Interdisciplinary Studies during the opening session.

There were 56 participants, of whom 27 were from universities, and the remainder from a variety of governmental, nongovernmental and social activist organizations.

The following international bodies formally associated themselves with the initiative :

— International Foundation for Social Innovation (Paris)
— Mankind 2000 (Brussels)
— Union of International Associations (Brussels)
— International Bureau for Professional Development (Montreal)
— World Future Studies Federation (Rome).

It was announced that a similar exploratory encounter was to be held in Paris in March 1977 on the initiative of the International Foundation for Social Innovation to examine the questions in a European context in the light of the Montreal initiative (2).

Due to the experimental nature of the meeting, and the deliberate diversity of participants the coordinators of the meeting refrained from pre-determining the programme's expected products (particularly since the subject matter and the predisposition of participants rendered questionable any such initiative). The documents distributed to participants suggested topics for discussion, objectives and possible products.

*(3) The meeting was convened by Professor Christian de Laet, currently Science Adviser to the Commonwealth Secretariat.*

The first day of the meeting was devoted to plenary sessions in which the topic, group processes and options were clarified.

During these sessions discussion was interspersed with informal presentations from a number of individuals who thus helped :

1. to develop a common focus for the group as a whole and
2. to determine the topic areas which could be further explored in smaller groups

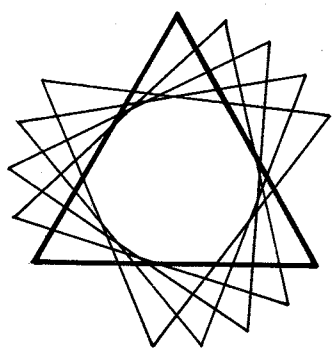
On the second day three groups met in parallel :

1. Concept clarification
2. Network organization and decision-making
3. Education and communication.

The session on the morning of the third day was devoted to discussion of the reports of the three groups and the implications for the organization of a larger meeting.

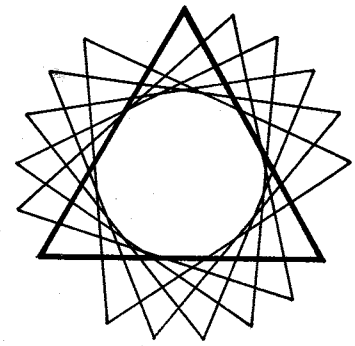
## Group 1 : Concept clarification

In its first session the group continued the process initiated in the plenary session whereby participants were exposed to the particular concepts of networks used or applied in electrical engineering, control engineering, and ecology. During this process, members collectively attempted to determine how relevant such insights could be to ordering their own insights into the social networks with which they were familiar.



Although some of the distributed documents identified a number of network-related concepts, the group did not consider it appropriate to use its time to focus directly on any form of terminological standardization. The discussions were in fact revealing in that they brought out the conceptual richness which could be usefully explored during such group processes and the value of the discussion process itself for clarifying understanding about different kinds of non-technological networks.

During its second session the group decided to concentrate its discussion on the distinction, if any, associated with current usage of « network » and



« system ». This was considered particularly important in order to meet any charge that use of « network » corresponded to a current fad rather than to any fundamental distinction. The discussion moderated by Professor Fiksel was extremely lively and examined a wide variety of possible distinctions (see report : pages 360-364. Although there was a fair degree of consensus on the value of some of these distinctions, participants considered it premature to arrive at any final distinction. In fact, it was the discussion process itself which, as before, proved to be of most value — namely the effect of explaining different aspects of possible distinctions and their implications for non-technological networks.

The group tentatively agreed that any efforts to pull together collections of network-related concepts could best be done through background reports but that the process of « concept clarification » could better be concerned with the exploration of different concepts of networks (from different disciplines) rather than with an immediate and somewhat artificial attempt at developing a standardized terminology.

## Group 2 : Network organization and decision making

The group was primarily composed of people working in or with social change networks. Participants first engaged in a brain-storming session to share their perceptions of networks and « networking ».

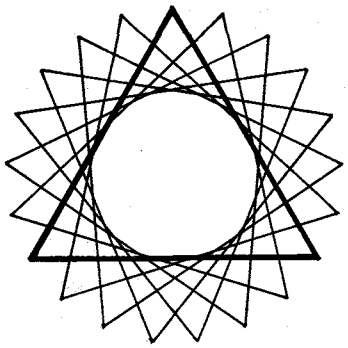
This procedure was then followed by presentation from each of the participants concerning the networks with which they were working in an effort to determine what techniques were used and the extent to which each participant could learn from the others.

(An extract from the group report will be given in a future issue).

## Group 3 : Education and communication

This group was primarily composed of participants with some direct involvement with education or audio-visual

media. It first examined the manner in which network organization was inherent in some aspects of education and communication and the desirability of greater use of network organization in place of other approaches.
The second concern was with the manner in which an understanding of networks could be conveyed in audio-visual materials and of how an appropriate environment could be created for the proposed future meetings in order to facilitate understanding of networks and network formation.



## Conclusion

It was agreed at the plenary session that a report should be prepared clarifying the options for future meetings in the light of the discussion of this matter. These options are identified in the following sections.

## Footnotes :

*(1) Scott A Boorman. Outline and Bibliography of Approaches to the Formal Study of Social Networks. Harvard University, Department of Sociology, 1973 (Fels Discussion Paper 87)*
*Linton C Freeman. Bibliography of Social Networks. Monticello, Illinois, Council of Planning Librarians, 1976.*

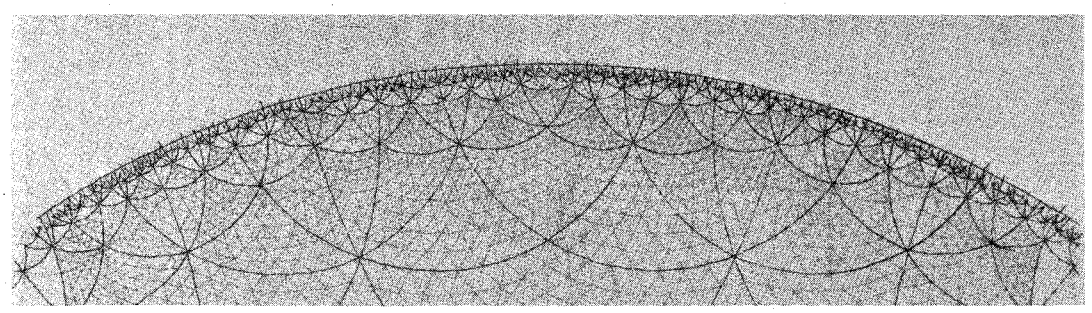
*(2) Some of the papers for the group* on « Complexity » have been printed *in past issues of Transnational Associations (1977 : 4, 5 and 7-8). The summary of the discussion is reproduced in this issue (pages 341-364).*
*Other papers are available from the secretariat of the Foundation, 20 rue Laffitte, 75009 Paris.*

# Options for the proposed meetings

### 1. Objectives

The preliminary meeting, after considerable discussion, concluded that it was undesirable to fix precise objectives for any proposed meeting as a whole, but rather to create a facilitative environment within which a number of activities could take place, each with more precisely defined objectives. It was felt that this approach was consistent with the common concerns of participants and the shared understanding of the network alternative, whereas overall objectives would tend to alienate some potential participants.
The activities or programme events for which precise objectives would be defined could therefore be :
— academically or research oriented
— aimed at engaging participants in a process of sharing experiences concerning their networks
— or any other concern related to the development of understanding and use of networks, including critical evaluation of their significance.
The objectives of any specific activity might therefore be any combination of the following :

1. clarify how people work with, or through networks, how they perceive them and their characteristics, how they respond to them;
2. explore similarities and differences in order to define the interface between technical uses of the network concept and the use of the term by people obliged to respond consciously to networks encountered in their working life;
3. determine through interaction with people working with or through networks whether they may gain insight from those conceptualizing about networks in other ways, so as to obtain a working structure within which to incorporate their intuitions; and to enhance their ability to think about, discuss and work more efficiently with networks;
4. identify those features or characteristics of networks which could usefully be more clearly described or labelled to facilitate the activities of practitioners and increase the precision of their discussion about those networks with which they deal;
5. provide an occasion for those conceptualizing about networks to obtain feedback on the relevance of some applications of the concepts they are developing and draw their attention to features of networks encountered in practice, on which inadequate conceptual work has been done, if such is the case;
6. explore the significance, if any, of preference for « network » in place of « system » and clarify the distinction, if any, indicated by this preference;
7. explore, if relevant, the modes of transition between systems and networks, whether in concept, in organization or in practice, in order to clarify what may be considered socially desirable or undesirable features of each;
8. determine the variety of social, economic, political, administrative and related domains in which the network concept is used as a means of ordering experiences and responses;
9. clarify the question of whether society may not be faced with a hidden problem, complementary to illiteracy and innumeracy, namely an inability amongst a significant proportion of the decision-making population to be able to handle structures and networks with the facility demanded by the degree of reticulation of society;
10. identify ways of improving the general ability of policy-makers, administrators, concerned citizens, researchers, etc. to engage in fruitful discussion about existing networks in society and about the possible forms of alternative networks in a network-oriented society;
11. develop the network of people who participate in such meetings to share experience amd perceptions about networks (while being aware of the advantages and disadvantages of creating a « network of networkers »);



12. determine whether programmes could usefully be initiated, in support of the above, in such areas as :
    — education about networks, how to think about them, and how to work with them;
    — audio-visual portrayal of existing (or proposed alternative) networks, and the problems of designing and operating displays sufficiently powerful and detailed to be useful in practice (rather than simply for illustrative purposes);
    — surveys of networks and the degree of reticulation of societies and the relation to the debate on social indicators;
    — research required on networks.

**2. Size**

It was agreed that the number of people participating in any particular activity dependent on group dynamics should not exceed 40 - 60. However, the number of such activities need only be limited by;
— the availability of funding
— the availability of people willing and able to coordinate each activity
— the time required to establish an appropriate setting

It was agreed that
— a small meeting would not justify effots to create and experiment with appropriately facilitative environments
— the creation of any such environments could only be justified if a wider group of people could be exposed to them in some way (whether through special sessions or outside the time frames of the core activities).

**3. Specific Activities**

A number of specific activities, or programme events, were identified in a background document (see box A).

**4. Associated Products**

The main purpose of such meetings is to explore the possibility of obtaining useful products from further work in this area. Such meetings could however give rise to the following products to serve as a benchmark for any further explorations (whether on the part of the amateur conceptualizer or the hardcase practitioner) :

1. Select bibliography of papers and resources;
2. Roster of people or bodies relevant to exploration of particular aspects of the subject area;
3. List of topics for meaningful theses;
4. Draft of a structured glossary of network terms with indication of characteristics for which unambiguous terms are lacking;
5. Annotated list of human activities in which the network concept is of potential or actual use, possibly ranked in order of susceptibility to such use (possibly with selected quotes from texts in each area, illustrating any such use). Such information could also be ordered to clarify the time when such a perspective becomes appropriate in the evaluation of a particular domain;
6. A collection of audio-visual materials providing visual support for any network perspective.
7. The basis for a collection of papers which could be used to develop a reader for this area.

**A possible programme outline** — **Box A**

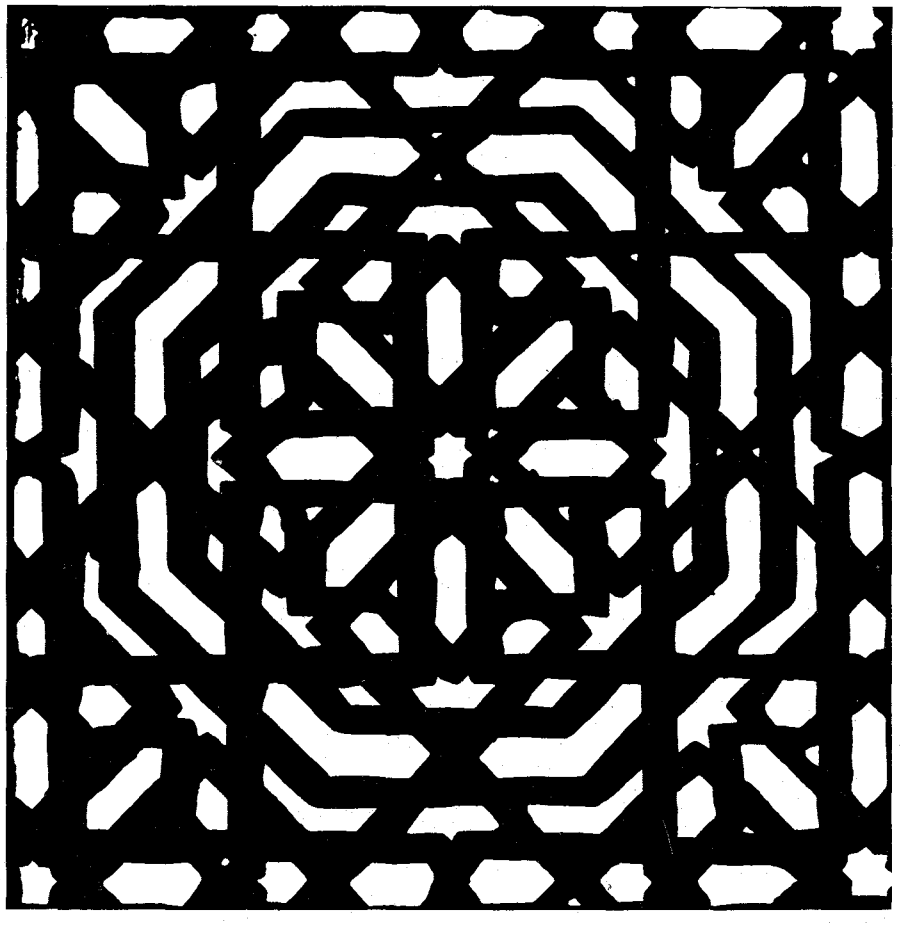
A — Structural features of networks : key concepts
— Processes within networks : key concepts
— Growth of networks (development of existing structures) : key concepts
— Evolution of networks (emergence of new structures) : key concepts

B — Movement of individuals within networks, and their understanding of them
— Working with networks
— Education about networks

C — Strong and weakpoints of networks and their detection
— Controlled (centralized) versus relatively uncontrolled (decentralized) networks
— Network auto-coordination and network strategy.

D — Visual representation of changing complex networks
— Computer software for network analysis
— Computer software for network map generation on CRTs and graph plotters

E — Alternative kinds of networks; networks in the future
— Networks versus systems and hierarchies.



# Indicative listing of types of networks

There are numerous uses of the term « network » to describe features of the psychosocial system. However, although these call attention to the complexity of the social system, they denote a static structure and contain no reference to the essential dynamism of networks. Networks are dynamic both in terms of the flows between the nodes but also because of the evolution of the network itself over time in response to new challenges and opportunities. This dynamic feature could well be highlighted by using « network » as a verb as well as a noun. « Networking » becomes therefore the process of operating in an (inter-organizational) network, including the progressive evolution of this network over time (1). In the following section an attempt is made to list together a variety of social networks to give some idea of the areas in which the concept can be used.

**A : SOCIETAL NETWORKS** *(Deliberately developed)*

The following networks are characterized by any of the following :

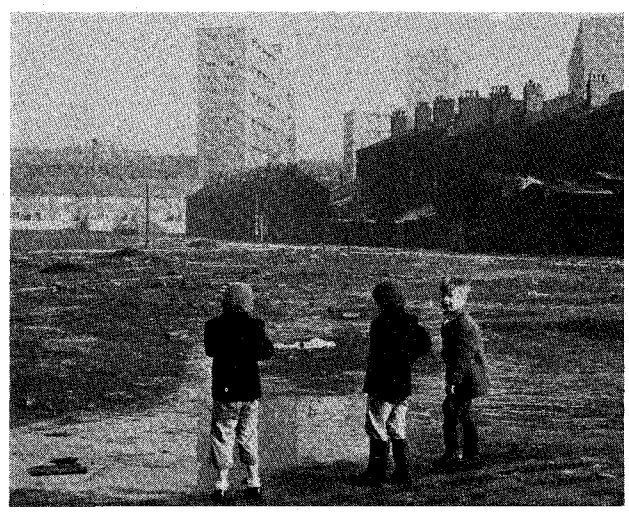
— movement of personnel or staff between centres in the network
— movement of goods between centres in the network
— movement of members (or customers) between centres in the network (possibly on the basis of reciprocal membership)
— reallocation of personnel or resources between the centres
— movement of information between centres
— movement or reallocation of funds between centres

**1. Networks of Organizations and Groups**

*In which distinct organizations are linked together in networks which may include one or more of such types as the following :*

— *Government agencies*
— *Voluntary agencies*
— *Political groupings*
— *Communes*
— *Corporate enterprises*
— *Pressure / interest groups*
— *Community groups*
— *Spiritual communities*
— *Libraries*
— *Museums / Art galleries*
— *Research institutes*
— *Youth hostels*
— *Sports clubs*
— *Holiday resort clubs*
— *Business clubs*
— *Country clubs*
— *Missions / Monasteries*
— *Youth work camps*
— *Theatres*
— *Medical centres*

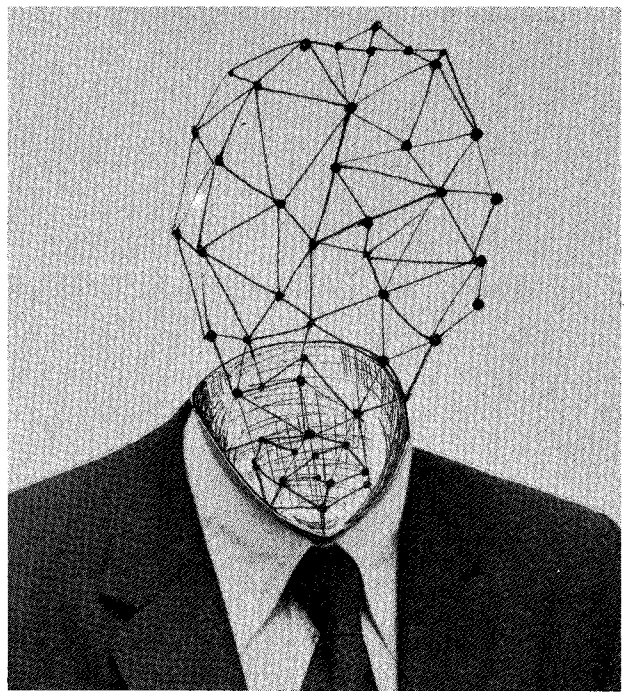
Systems viewed by a social network. WHO



**2. Institutional Networks**

*In which the size and complexity of a particular institution, and the range of its many associated subunits, makes it useful to perceive the institution itself as a network through which people, decisions, goods, funds, etc. may pass :*

— *Civil service (national)*
— *Diplomatic service*
— *Multinational corporation*
— *Criminal networks, rings, etc.*
— *Espionage networks*
— *Civil service (international)*
— *Military service(s)*
— *Religious networks*
— *Police-informer networks, security networks*
— *Counter-espionage networks*
— *Chain store*
— *Hotel chain*
— *Restaurant chain*
— *Health service*



**3. Networks of Individuals**

*3.1 Specialist dealers (antique, art, book, etc... « the trade »)*
*Professions (doctors, lawyers, architects, etc.)*
*Academic (philosophers, sociologists, etc... « invisible colleges »)*
*Elites (moneyed, social, cultural, etc.)*
*Business / industry / commerce communities*
*Fraternal societies / « Old boy » networks*

*3.2 Secret societies*
*« Deviant » groups (drug users and pushers, homosexuals, vegetarians, etc.)*

*3.3 Inter-personal networks*
*Intimate networks*

*3.4 Intellectual influence networks (sciences)*
*Intellectual influence networks (letters)*
*Artistic influence networks*
*Innovation influence networks*
*Rumour diffusion networks*

3.5 *Collectors*
*Radio amateurs*
*Pen friends*
*Correspondence chess*

3.6 *Genealogical trees*

**4. Networks of Regulations**

— *Laws, treaties*
— *Bye-laws*
— *Standards*
— *Contracts, agreements*
— *Regulations (health, safety, etc.)*
— *Patents*

**5. Service Networks of Individuals**

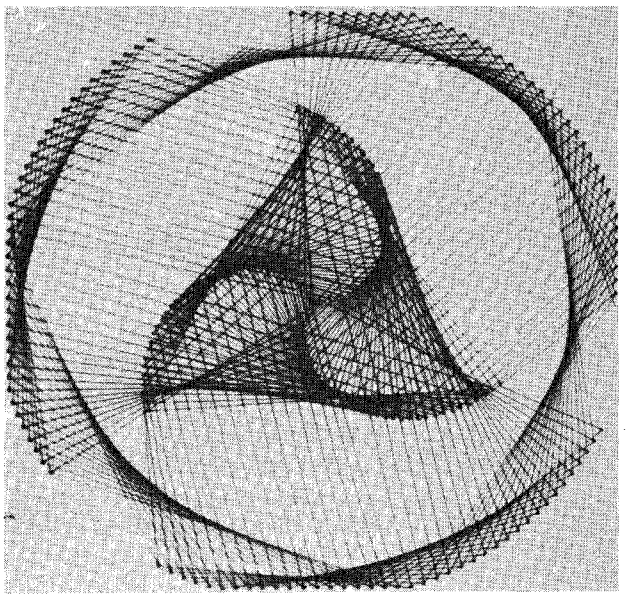
*In which individuals are on-call or despatched, such that they may be perceived as constituting a network or as being constantly on the move between a network of possible locations :*

— *Maintenance serviceperson (telephone, electricity, machine, etc.)*
— *Freelance fashion models*
— *Secretaries (temporary)*
— *Police*
— *Ambulance*
— *Actors, entertainers (« the night-club circuit »)*
— *Journalists*
— *Call girls*
— *Caterers*

**B. INANIMATE NETWORKS** *(deliberately constructed)*

*The following networks may be perceived in different ways, such as :*
— *by those planning or redesigning the networks in question;*
— *by those charting, mapping, describing or (re)presenting the networks for purposes of communication;*

Unesco — Temple Ta Som : Tête de pierre envahie par racines



— *by those operating the networks (despatchers, exchange controllers, etc.);*
— *by those whose job requires that they move constantly through a network (airline personnel, railway personnel, etc.);*
— *by those who benefit from the existence of the network as a simple user of part of it (e.g. bus service passengers, etc.);*
— *by those who are in some way negatively affected by the existence or functioning of the network.*

**1. Transportation Networks**

1.1 *Pipelines (for oil, water, etc.)*
*Electrical power grids*

1.2 *Railways (goods, passenger)*
*Subways*
*Airline networks*
*Bus networks*

1.3 *Truck delivery*
*Police car (radio)*
*Taxi (radio)*
*Merchant ship / tanker*

**2. Communication Networks**

2.1 *Telephone, telex*
*Cable*
*Pneumatic tubes*
*Data links (computer)*
*Wire services*

2.2 *Post*

2.3 *Data gathering (scientific)*
*Data gathering (meteorological)*
*Data gathering (military)*

**3. Transaction Networks**

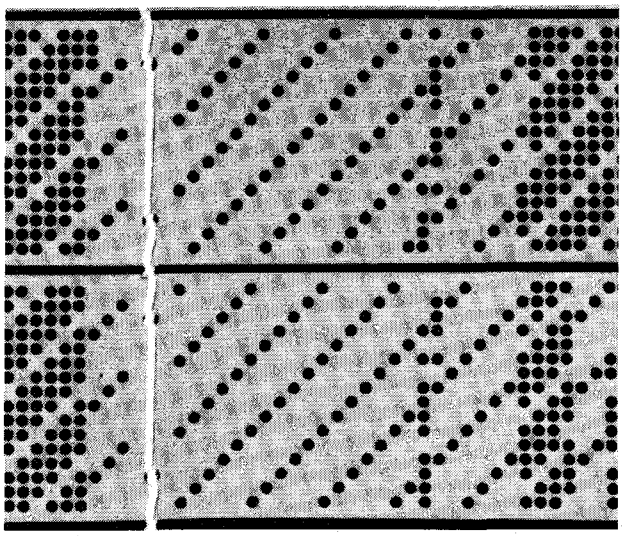
*Fund / payment / cheque clearing services*
*Foreign exchange (dealers)*
*Commodity exchanges (metal, agricultural products)*
*Stock exchanges*

**C. METHODS OF HANDLING NETWORKS**

**1. Mathematically based / oriented disciplines**

A *Topology*
*Graph theory*
*Lattice theory*
*Mathematical typology*

B *Systems analysis*
*Cybernetics*
*Operations research*



*C Transaction analysis (Trade)*
*Input / Output analysis (Economics)*
*Cross-impact analysis*

*D Sociometry*
*Central place theory / Location analysis (geography)*
*Ekistics (related to urban networks)*
*Ecosystem analysis*
*Network analysis / synthesis (circuit design)*
*Citation analysis*

*E Synergetics (topology plus vectorial geometry)*

**2. Aids to handling Networks**

*A : PERT*
*CPM*
*GERT*
*Decision trees*
*Relevance trees*

*B : Organization charts*
*a) Railway, bus, road, airline, etc.*
*b) Electronic circuits*
*c) Metabolic pathways*
*d) Flow charts*
*e) Block diagrams*

*D : Computer-aided visual representation of networks (CRTs, graph-plotters)*
*a) Computer aided design (air frames, machines, etc.)*
*b) Computer aided design (building, fractories, towns, etc.)*
*c) Critical path networks on computer*
*d) Display and analysis of complex molecules*

*E : « Decision rooms »*
*a) War rooms*
*b) Corporate policy rooms*
*c) Power grid control rooms*
*d) Factory operations control rooms*

*F : Pattern recognition*

**3. Games, Structured Learning and Strategy**

*A : Team ball games (e.g. football, basketball)*
*In which the network of the players formal functional relationships in the team must adapt (with success) to the specific relationships constituted by the current state of the opposing side's network and to the network constituted by the actual and potential movements of the ball within the two inter-woven networks.*

*B : Board games (e.g. chess, go)*
*In which the players seek to resolve to their own advantage the interactions between the networks of : the formal relationships between their own pieces (and those of the opponent), the positions they currently do or could occupy, and the network of optional move sequences.*

*C : Games with moving craft (eg. computer simulated dogfights and space warfare)*
*In which the players combine the skills required to handle the network situations of A and B (above).*

*D : Military strategy*
*In which many situations like that in C are embedded in a resource allocation (logistic) network which may itself be modified in the light of the assessment of the network of optional change sequences within the relevant space-time framework.*

*E : Programmed learning (eg. on computer, or in special texts).*
*In which material is structured as a network such that the student is either taken on to new material or back through the network to whatever associated material is appropriate to reduce his uncertainty about the subject.* ■

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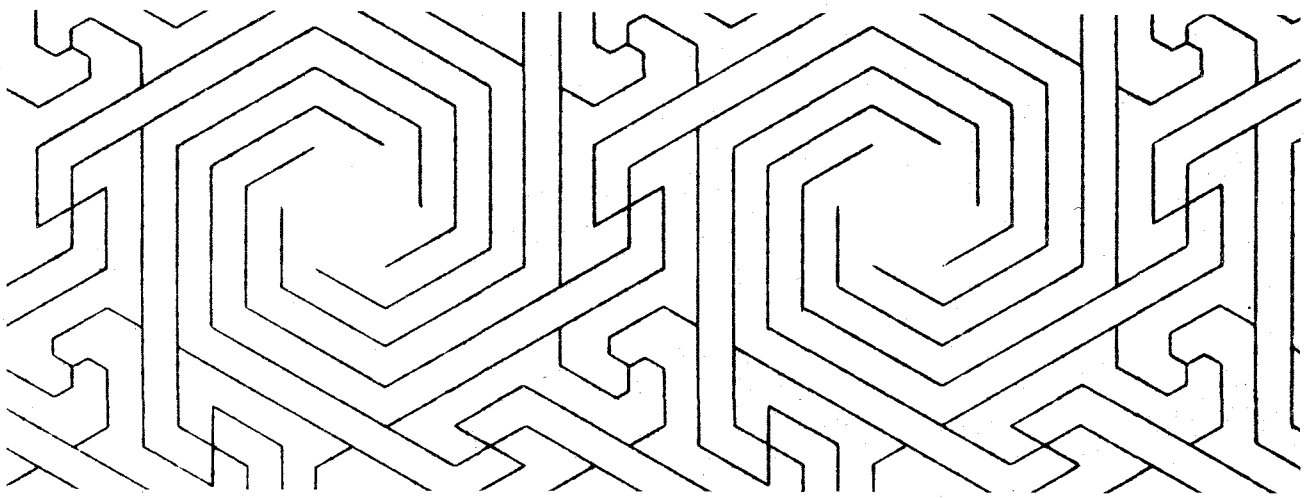
*(1) See also : Networking, the need for a new concept. International Associations, 26, 1974, 3, pp 170-173 Reprinted in : Les Problèmes du Langage dans la Société Internationale. Bruxelles, Union des Associations Internationales, 1975, pp 145-147).*



# Types of networks :

## Indicative relationships between focal and contextual topic areas

| | | Structure perceived internally | | | | Structure perceived externally | | Process / System |
|---|---|---|---|---|---|---|---|---|
| | | Involved Participants | | Professional Users | | Network Mapping (re)presentation tion | Network Planning (re)design | Description analysis modelling |
| | | Negatively Affected | Positively Affected | Moving Through Networks | Operating Networks | | | |
| | Conceptual | VALUE / BELIEF STRUCTURES<br>NATURAL-LANGUAGE STRUCTURES | | | | | | |
| **NATURAL** | Biological | | | | | Plant / Animal Tissues; Food-Webs; Metabolic-Pathways | | |
| **EMERGENT STRUCTURE** | Inanimate | | | | ←<br>← | Crystal-Lattice<br>Complier-Molecules<br>Waterways<br>Ridge / Valley / River Network | | |
| | Societal | | | | | Kinship-Structures<br>Family-Networks<br>Extended-Family-Network | | Sociometry<br>Group-Dynamics |
| **HUMAN** | Societal | | ↔<br>↔<br>↔<br>↔ | | ←<br>←<br>←<br>← | Networks of Individuals<br>Institutional Networks<br>Networks of Organizations<br>Networks of Regulations | ←<br>←<br>←<br>← | Social Systems Analysis / Modelling |
| **CONSTRUCTS** | Inanimare | | ↔<br>↔<br>↔<br>↔ | | ←<br>←<br>←<br>← | Transaction - Networks<br>Transportation Networks<br>Communication-Networks<br>Circuit-Diagrams | ←<br>←<br>←<br>← | Network Analysis<br>Input / Output Analysis<br>Transaction Analysis |
| | Biological | | ↔ | | ← | Designed-Food-Webs | Genetic-Engineering; Resource Conserving-System | Ecosystem Analysis Agricultural Production Systems Analysis |
| | Conceptual | PHILOSOPHIES / CATEGORY-SCHEMES ARTIFICIAL-LANGUAGES<br>PLANS / STRATEGIES COMPUTER-FILE-ORGANIZATION<br>CONCEPT-NETWORKS PROCEDURES / SCHEDULES | | | | | | |
| **THEORETICAL CONSTRUCTS** | | TOPOLOGY<br>GRAPH-THEORY | | | | | OPERATIONS-RESEARCH CALCULUS<br>CYBERNETICS SYSTEMS-ANALYSIS | |
| **REPRESENTATION TECHNIQUES** | | IMAGES PHOTOGRAPHS<br>MODELS | | | | NETWORK-CHARTS | | CHARTS / TABLES / GRAPH<br>FLOW CHARTS |