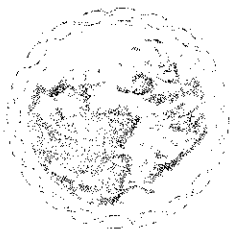

GROUP DECISION MAKING AND PROBLEM SOLVING THROUGH COMPUTERIZED CONFERENCING

by

Peter & Trudy Johnson-Lenz and Julian Scher

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Group communication through the medium of computerized conferencing can be enhanced by using various structuring tools to clarify and "shape" the course of the discussion. People using a computerized conferencing system enter messages, conference comments, or other responses into the system at their own convenience, at different times or locations. Without some guidance or other structuring mechanisms, it is quite possible for a group's conversation to become disorganized. Research indicates that strong leadership is essential to a successful computerized conference, to keep the discussion focused, to call for votes or other kinds of feedback exercises, to mediate disputes, and so on [1]. Computer software tools included in the conferencing system can further augment group problem-solving and decision-making activities by making explicit the convergent and divergent points of view within the group.

A basic computerized conferencing system includes facilities for sending and receiving messages, conducting on-going conferences, and text editing. To provide structures for group communication beyond free-form, asynchronous conferencing (adding and retrieving items to an on-going conference transcript at times of the participants' choosing), two additional features are desirable: (1) a high level programming language in which tailored control programs can be easily and rapidly written, and (2) direct interfaces with other computer systems and networks for access to remote data bases and computing power. The capacity for writing control programs in such a multi-computer environment allows users to create independent software "entities" in the conferencing system to perform a wide variety of tasks automatically, such as searching a remote data base, interviewing other conferees and processing the answers, managing a voting exercise with feedback of the results, or otherwise structuring a group's communication.

Think of an enhanced, flexible conferencing system as a computer-based resource center where individuals can come and go for meetings at their convenience, and where many kinds of information, group process aids, or feedback processes are available to the group at the touch of the terminal keyboard. Such a rich information environment provides the group with an unparalleled opportunity to work together to solve problems and make decisions--with the added advantage of a complete written transcript always available for reference. Computerized conferencing can be used by on-going task groups as well as by groups meeting for a short period of time without a specific problem to solve. Different structuring tools are appropriate for different kinds of groups and provide varying degrees of management. Eventually computerized conferencing systems should provide users with a library of structuring tools, just as mathematical and statistical packages are included in many general data processing systems.

GROUP PROCESS AIDS

Group process aids designed for use in face-to-face settings can be

other points of view in planning exercises and problem solving.

Clearly, many group exercises that are currently used in face-to-face settings can be adapted for use in computerized conferencing. In addition, new tools can be developed to take advantage of this new medium. For example, any kind of exercise that includes events or actions which occur only if certain things happen would work well in a computerized conferencing environment. These might include models with which participants interact, questionnaires which have branches (e.g., if the answer is "yes," go to question 15), or a simulation game with "surprise" events. As groups gain more experience in using this communications medium for decision making and problem solving, many new structuring tools unique to computerized conferencing will be designed, developed, tested, and improved.

GROUP VOTING AND FEEDBACK PROCESSES

Furthermore, computerized conferencing can support various kinds of feedback processes for groups. For example, a simple voting procedure is included in the EIES computerized conferencing system to allow participants to vote on conference comments on a number of different scales: importance, desirability, agreement, pertinence, probability, feasibility, and so on. In addition, voting routines also could be used to help a group direct its own agenda; come to consensus on an issue, problem, or solution; identify divergent points of view; or to collect other types of opinions from participants and display the results. By answering questions about the flow of the discussion, the group can express its preferences ("continue on this topic," "switch to something else," "call for the question," etc.) and keep the conference on track. It is often difficult to give feedback to a face-to-face group about its discussion or the flow of its decision-making process. The interactive quality and computing power of computerized conferencing make such feedback processes easy.

ON-LINE QUESTIONNAIRES

On-line interactive questionnaires provide a convenient method of data collection. Individuals may respond to the questionnaire at their convenience, rather than having to schedule an interview, and the information collected may be processed by the computer immediately and/or at some future time, so no coding or keypunching is necessary. On-line questionnaires can be used to collect opinion data, which can then be analyzed to give the group feedback about various points of view within the group and the differences among them. Data about the participants and their relationships to each other ("who-knows-whom" social network data) can also be collected. This data on the structure of the group may be used by a facilitator or the group itself to understand and increase the flow of communication and information within the group. Such on-line interviews reduce the problems of interviewer error and allow for complex questioning strategies that include branches or "nested" questions. Furthermore, the answers can be checked and verified during the interview. Johnson-Lenz has developed an interactive questionnaire and a special voting routine for EIES participants, using the flexible EIES procedure language provided for writing such control programs.

Through interfaces to other computers or intelligent terminals, many information resources become available to those meeting through computerized conferencing. Interactive computer graphics become available when intelligent and/or graphics terminals are used by participants. On-line simulation games, collaborative design tasks, planning exercises, and other visual activities can be greatly enhanced by moving, color graphics and a common visual "space" within which participants can interact.

Data bases may be searched and the results entered into the conference. By including a microprocessor as part of the conferencing system, such searches can be undertaken automatically. The microprocessor can "dial up" another computer system, do the search, and deposit the results in a message or conference. Similarly, data collected about participants' points of view or preferences or about social network ties can be analyzed on another computer and the results entered into the conferencing system, again automatically. With these interfaces, the conferencing system can be linked to other conferencing systems, networks, or computer systems.

COMMUNITY ACCESS

Imagine a series of computerized conferencing systems that operate at various levels of recursion, starting with a "local" level (neighborhood; task force; committee; etc.), and going up to ever-larger or more complex groups (city, state, region; committee of committee leaders, committee of the whole; governing board; etc.). For example, a neighborhood group could have its own conference on relevant local issues and then relay its conclusions to an on-going conference of neighborhood leaders or city officials. The city level conclusions or policies could be entered into the county conference, and if there were any questions or further discussion needed about specific neighborhood issues, the neighborhood conference could be asked for clarification. Groups would be able to interact with other groups, as desired, before making any final decisions. And all this can take place without leaving one's home, office, or other place where he or she uses a terminal.

Community centers or other places where people congregate, equipped with terminals, could give citizens access to computerized conferencing and group decision-making tools, so that they could participate in more of the decisions which affect them--if the decision makers were willing to allow such participation.

CONCLUSION

There has been little experimentation to date with the design and evaluation of computerized conferencing software for problem solving and decision making, since the medium is still in its infancy. However, group process techniques based on information exchange which help groups work together more effectively can be included in computerized conferencing systems with the proper hardware and high-level software language interfaces. In conferencing, a group shares a rich, computer-based, conceptual "space," and members' interaction with each other can be greatly enhanced with structured problem-solving and decision-making aids. The flexibility of individual participation in the group decision-making process, coupled with the possibilities for extending that process to a broader-based constituency, suggests that computerized conferencing may become a particularly valuable tool

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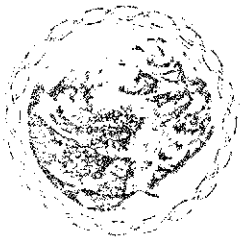

September 6, 1976

GRAPHING AND MAPPING COMMUNITY POINTS OF VIEW

In recent years there has been an upsurge of interest in neighborhood government, local self-reliance, citizen involvement in planning, and a return to the American ideal of participatory/anticipatory democracy. Co-evolving with this has been an increase in the use of questionnaires and balloting as a means of "involving" large numbers of citizens. We suggest here some directions in which these trends may co-evolve further.

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People working on citizen participation technology have designed many methods for obtaining large numbers of responses from citizens with speed and accuracy. Such techniques as Harry Stevens' Feedback Balloting, Tom Sheridan's Electronic Voting and Dialog techniques, Vincent Campbell's TeleVote system, and Ed Corwin's Citizens Response (R) tool are of particular interest. These methods greatly facilitate input to the process. However, of the four, only Tom Sheridan's work provides for any facilitation of the output from the process center to the participants. Even then, his work is limited to a group of people in a meeting hall. No one has really solved the problem of how large-scale balloting results might be made understandable to large numbers of citizens in the community at large, what such information would be, or how it would look.

Most current techniques for large-scale balloting address the problems of analyzing the results, formatting them for distribution, and distributing them to the participants for further discussion with very limited techniques. The primary limitations of these techniques are:

1. The questionnaire responses are tabulated as either one- or two-way frequency distributions. Such tabulations, usually presented numerically, require some experience in order to decipher. Furthermore, they provide a piece-wise look at the data, at best.

2. The questions have no clear inter-question organizational structure that leads to an integrated, informative picture of how the various aspects of an issue interrelate.

3. This lack of overview makes it impossible to determine which common types or styles of thinking--which points of view--exist with any significant frequency in the community.

4. This lack of information about different points of view makes it impossible to determine how many people feel which ways about issues, and where they live, and who might cooperate or conflict with whom.

5. Due to the lack of effectiveness and ease of use of these methods, most questionnaire/ballot processes are formulated by experts, officials, consultants, and specialists. In turn, they are analyzed and interpreted by these same specialists. The participants do not have control over the issues, questions, and general process. They do not receive the full information about their own responses. There is no real dialogue.

There are a few techniques that have been recently developed which may speak to some of these problems. The primary limitation of these new techniques is that they are still couched in jargon and may seem overly technical to the uninitiated. Some of the most relevant of these techniques are:

1. Computer graphics: using maps and other graphic representations of where people live and how they think about issues.

2. Mental maps: using geographic maps to show what a person's internal mental map or concept of a region is.

3. Directed-graphs: drawing graphs of the various aspects of issues, showing the interrelationships between those various aspects as lines on the graph.

4. Cluster or typological analysis: finding the prevalent patterns of responses to a questionnaire.

5. Interactive computer access: from terminals in places where people meet.

In this paper we suggest some ways in which the above techniques may be employed in relatively simple and direct ways to facilitate citizens' involvement in the formulation of questions, and to facilitate wide-scale distribution of easily understood graphic representations of how many people feel which ways about the issues, why they feel those ways, and how they might cooperate. It is our hope that such awareness might provide a bridge toward more empathic understanding and cooperation in solving community problems.

This paper contains examples of computer output to make our points clear. These examples were generated using the Community Information System which is being developed by Johnson-Lenz under an agreement with the Oregon Museum of Science and Industry. When the system is completely developed, it will be made available to the general community through OMSI Computing. The data in these examples are entirely fictitious, and any resemblance to any real issue or community is purely coincidental. The questionnaire responses were generated using random-number generators in the computer and are not at all real.

Formulating the Issue

Suppose a group of concerned citizens and public officials met to discuss some current community problems and to formulate a series of questions that could be asked of the general public, so that many people could participate in a community dialogue about current community problems. How would they formulate these questions? How would they organize them into a framework for discussion which would show that different groups of people had different points of view on the problems?

We suggest that the group might want to talk about the problems and possibilities in the community, and through that discussion come to some agreement as to what the most emergent "issues" were. Then, for each issue, a brainstorm could be conducted to determine what the aspects of that issue were. For example, nearly any issue can be described in greater detail as a network of problems, possibilities, causes, effects, policy choices, and positive and negative impacts. It is most likely that different individuals in the group will have different ideas about the aspects of the issue. This is actually desirable at this point, because the primary objective of the group is to develop a relatively exhaustive list of the aspects of the issues to be discussed, without resolving any conflicts and choices that must be made. The point is to involve the community at large in the issue formulation process.

Once a list of the aspects or elements of an issue has been created, with some patience and determination a directed graph or digraph of each issue can be made. Figure 1 contains a computer output example of such a digraph. This is a graphic representation of an issue relating to the conflict between the downtown area and the surrounding neighborhoods into which the commercial area seeks to expand. Each aspect or element of the issue is shown as a few words which sketchily represent that aspect. The arrows in the graph represent the relationships between each of the elements, and can be thought of as meaning "causes," "leads to," or "supports." Thus, in the lower left hand corner of the digraph, we read that "fear more traffic" from commercial expansion leads to "seek to save neighborhoods" from such expansion.

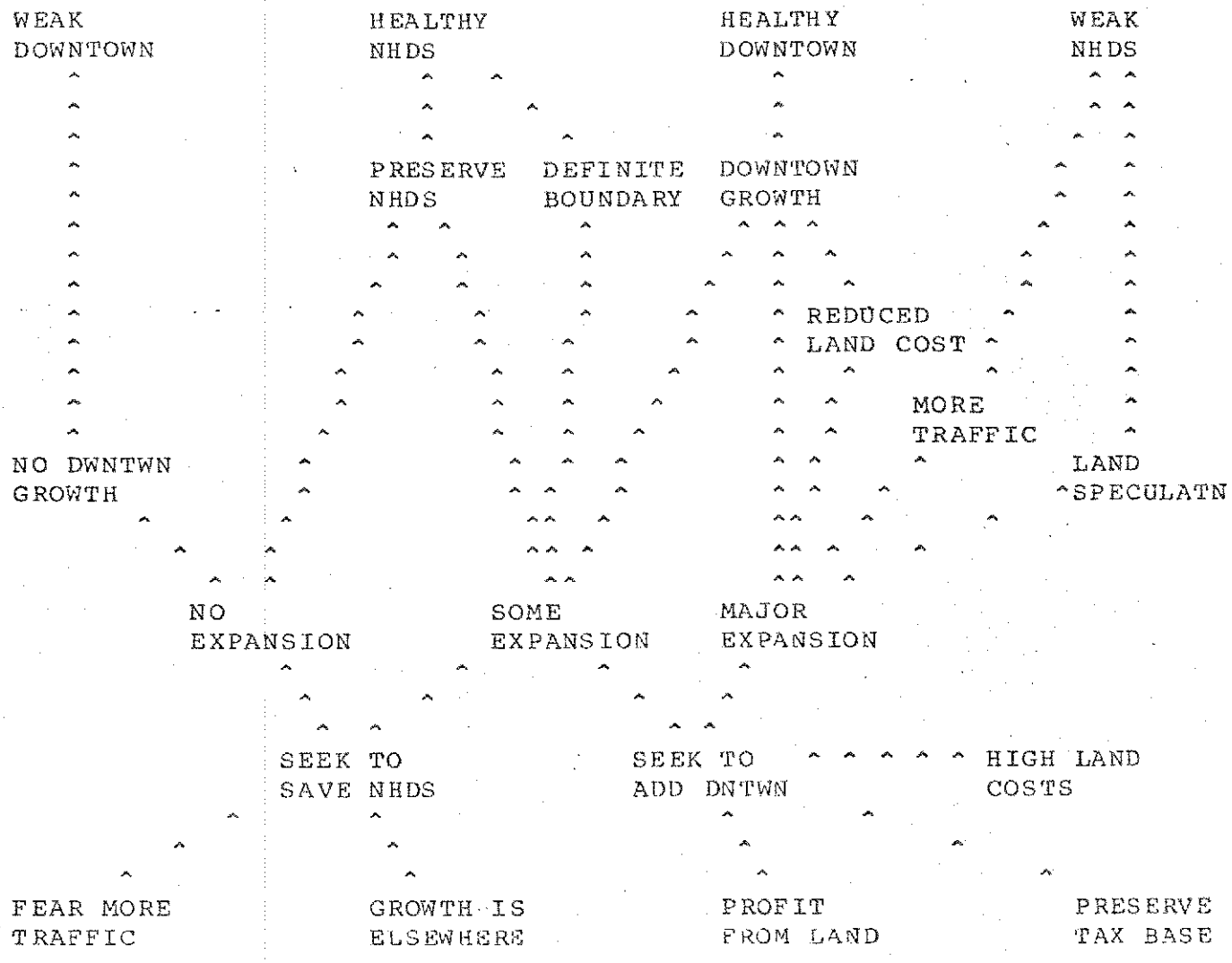


Figure 1: Master Issue Digraph for Commercial Expansion Issue

This pair of elements and the relationship between them reflects one possible component of a person's belief structure or issue model. By looking at the graph, one may see several possible points of view that might exist in a community dealing with such an issue.

Once the digraph of an issue has been created, a series of questions can readily be written that ask which elements of the digraph or issue model any particular person agrees with or identifies with. In this way some estimate of the issue model or map of any participant can be drawn as a subgraph of the master digraph. Such a subgraph or personal issue model then becomes an explicit device for communicating that person's beliefs to other participants in the process.

On the next two pages is a sample questionnaire which was derived from the digraph in figure 1. This questionnaire was written as an example for discussion for the Community Issues Dialogue project of the Northwest Regional Foundation. It incorporates language describing the use of the Citizens Response (R) tool, which will be used by the Community Issues Dialogue project for citizen input to their process. This questionnaire is only an example of a technique, not an actual Community Issues Dialogue questionnaire.

Note that the 17 questions are grouped into three sections: the first asks mostly about people's basic interests and concerns; the second asks mostly about people's beliefs regarding the needs of the neighborhoods and the downtown commercial area; the third asks specifically which policy choice is preferred. A fourth section asks for the zip code in which the participant lives.

Table 1 shows the relationship between each of these questions and the digraph of figure 1 so that the reader may be certain of an accurate interpretation of the results that follow. Table 1 also associates each question with a single word label, as well as with the element in the digraph that corresponds to it. This label is used in the computer examples as a way of referring to each question in a manner that both the computer user and the computer can understand. Note also that a few of the elements in the digraph are not specifically referenced by the questionnaire, namely WEAK DOWNTOWN, WEAK NHDS, DOWNTOWN GROWTH, and PRESERVE NHDS. We can reason that these elements are "givens" and are assumed to exist universally in everyone's personal model of the issue as concepts, even though they may not relate to any of the other elements.

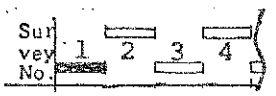
Community Issues Dialogue

Downtown

Survey #1

This is the first Community Issues Dialogue survey. A group of community people have developed these questions to get your point of view on the proposed downtown expansion. As you know, the city council is studying the pros and cons of this issue. The results of this downtown survey will be made public at the Community Forum. They will be the starting point for a community dialogue on the proposed expansion that will be carried out during the next few months, before the city council makes its final decision. Thank you for participating.

Please turn your Citizens Response® tool to an up-and-down position, so that the words survey no. and the numerals 1-0 are at the top. Since this is survey #1, please fill in box 1 next to the words survey no. Be sure to fill it in completely.



Sections A, B, and C all have a number of questions that you can answer yes or no. If you answer yes, please mark the appropriate box. If you answer no, leave the box blank. Again, please be sure to fill in each box completely.

A. Are you concerned about:

1. increasing traffic problems and noise in downtown and the surrounding neighborhoods? (box A-1)
2. preserving the tax base by attracting new businesses to the downtown area? (box A-2)
3. my land as an investment and getting the best possible price for it when I sell it? (box A-3)
4. high land costs in the downtown area? (box A-4)
5. saving and preserving the character of the neighborhoods around downtown? (box A-5)
6. revitalizing the downtown area by expanding it? (box A-6)

B. Do you agree that:

1. the major population growth in the future will be in the suburbs, so new commercial areas should be developed there, rather than expanding the downtown area? (box B-1)
2. extra land made available in the downtown area will encourage more development because land costs will be lower? (box B-2)
3. more traffic and parking in the neighborhoods surrounding downtown will seriously hurt the character of those neighborhoods? (box B-3)
4. the downtown area must grow to stay healthy? (box B-4)
5. the neighborhoods surrounding downtown must be preserved to stay healthy? (box B-5)
6. definite boundary lines around the downtown area will promote neighborhood stability? (box B-6)
7. land held in neighborhoods for possible profit later, if there is future commercial expansion, contributes to the decline of the neighborhoods? (box B-
8. the downtown area will decline if there is no new expansion? (box B-8)

(please turn this sheet over----➤)

C. Do you favor:

1. no expansion of the downtown area? (box C-1)
2. some expansion of the downtown area? (box C-2)
3. major expansion of the downtown area? (box C-3)

D. Please mark your ZIP code (home address) in rows D, E, F, G, and H, as follows:

in row D, mark the box corresponding to the first digit (box 9)
in row E, mark the box corresponding to the second digit (box 9)
in row F, mark the box corresponding to the third digit (box 9)
in row G, mark the box corresponding to the fourth digit
in row H, mark the box corresponding to the fifth digit

This survey is sponsored by DIALOGUE FOR PUSHMAN, P.O. Box 695, Pushman, Washington 99904. Community Issues Dialogue is a project of the Northwest Regional Foundation, P.O. Box 5296, Spokane, Washington 99205.

(This is a sample questionnaire for discussion only. It is not an actual CID questionnaire.)

Table 1 -- Relationship Between Questions and the Master Digraph

question	one-word label	label for element in digraph
A-1	TRAFFIC	FEAR MORE TRAFFIC
A-2	TAXBASE	PRESERVE TAX BASE
A-3	INVESTMENT	PROFIT FROM LAND
A-4	HIGHCOSTS	HIGH LAND COSTS
A-5	NEIGHBORHOOD	SEEK TO SAVE NHDS
A-6	DOWNTOWN	SEEK TO ADD DNTWN
B-1	POPGROWTH	GROWTH IS ELSEWHERE
B-2	EXTRALAND	REDUCED LAND COST
B-3	TRAFFICHURTS	MORE TRAFFIC
B-4	GROW	HEALTHY DOWNTOWN
B-5	PRESERVE	HEALTHY NHDS
B-6	BOUNDARY	DEFINITE BOUNDARY
B-7	SPECULATION	LAND SPECULATN
B-8	DECLINE	NO DWNTWN GROWTH
C-1	NONE	NO EXPANSION
C-2	SOME	SOME EXPANSION
C-3	MAJOR	MAJOR EXPANSION
D	ZIP	(not included in digraph)

Using the Computer

Suppose such a digraph and a list of questions had been devised by a citizen's group. What would they do with that information to permit computer processing of the results? What would the output look like?

The following pages describe an example, using an interactive low-speed computer terminal. This example was run on the OMSI computer, using a sample of randomly-generated responses from 732 "persons." The cost of the processing came to approximately $30 at OMSI not-for-profit rates.

Upon logging into the computer, and calling the Community Information System into operation, the user first gets this identification banner:

```
##########################################################################
#-------------------------------------------------------------------------#
#----- C O M M U N I T Y   I N F O R M A T I O N   S Y S T E M -----#
#----- SECTION 3:  GRAPHING AND MAPPING COMMUNITY POINTS OF VIEW -----#
#-------------------------------------------------------------------------#
#------------- DEVELOPED BY PETER & TRUDY JOHNSON-LENZ -------------#
#-------------------------------------------------------------------------#
#--- (C) 1976, BY OMSI, THE OREGON MUSEUM OF SCIENCE AND INDUSTRY ---#
#- 4015 SW CANYON RD., PORTLAND, OREGON 97221, ALL RIGHTS RESERVED -#
#-------------------------------------------------------------------------#
##########################################################################
```

Figure 2: Example Basic Geographic Grid for Geomaps

The single quote marks (') represent boundaries between zones. The slash marks (/) represent the river flowing through this town. Boundary and special feature characters may be chosen by the user.

Before processing the results, the digraph element labels and relationships, the names of the questions and their relationships to the elements of the digraph, and the basic geographic grid of the community involved must be read into the computer. An example of the basic geographic grid is shown in figure 2. Each responding zip code zone has been identified by a particular letter of the alphabet. Once this basic issue information has been read into the computer, and once the actual responses have been read into the computer, we can begin to get some results.

Typical Output

First, we ask for a frequency count and bar graph of each of the three policy choice questions: NONE, SOME, and MAJOR expansion of the downtown commercial area. The GRAPH command is used to obtain this more traditional kind of statistical analysis.

```
    GRAPH NONE

CODE   COUNT   PERCENT
  0      570     77.86  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  1      162     22.13  XXXXXXXXXX
TOTL     732

    GRAPH SOME

CODE   COUNT   PERCENT
  0      276      37.7  XXXXXXXXXXXXXXXXXX
  1      456     62.29  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTL     732

    GRAPH MAJOR

CODE   COUNT   PERCENT
  0      618     84.42  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  1      114     15.57  XXXXXXXX
TOTL     732
```

The codes of 0 and 1 correspond to the responses of no and yes respectively. So the first graph shows that 570 people, or 77.86 percent of the sample responded no, and 162 (22.13%) people responded yes to the question, "Do you favor no expansion of the downtown area?" The bar graphs indicate the relative proportions of people responding each way for any question. From these graphs we quickly see that most people favor SOME expansion, rather than NONE or MAJOR.

Then, we ask for a count of people responding from each ZIP code. Here the codes indicate the 20 different ZIP code zones on the map.

GRAPH ZIP

CODE	COUNT	PERCENT	
1	14	1.91	X
2	61	8.33	XXXX
3	76	10.38	XXXXX
4	20	2.73	X
5	16	2.18	X
6	16	2.18	X
7	19	2.59	X
8	85	11.61	XXXXXX
9	13	1.77	X
10	81	11.06	XXXXXX
11	8	1.09	X
12	89	12.15	XXXXXX
13	14	1.91	X
14	79	10.79	XXXXX
15	9	1.22	X
16	18	2.45	X
17	9	1.22	X
18	6	0.81	
19	64	8.74	XXXX
20	35	4.78	XX
TOTL	732		

To get a better picture of where the participants live, we ask for a geographic map for the entire sample -- GEOMAP 0. This map is considerably more informative, interesting, and easy to use than the simple frequency counts and bar graphs of the ZIP codes. The map clearly shows how many people responded in which parts of town.

GEOMAP 0

KEY TO MAP

. = 6 TO 9 PERSONS
- = 13 TO 20 PERSONS
^ = 35 TO 35 PERSONS
+ = 61 TO 61 PERSONS
* = 64 TO 76 PERSONS
# = 79 TO 89 PERSONS

Map of the geographic distribution of respondents

(These maps "come to life" when the various densities are colored in and the boundary lines made solid.)

To see where the people who prefer different policy choices live, we ask for a cross-tabulation of how many people in each ZIP code favored NONE, SOME or MAJOR expansion.

ZIP CROSS NONE

	0	1	TOT
1	14	0	14
2	61	0	61
3	46	30	76
4	20	0	20
5	16	0	16
6	16	0	16
7	19	0	19
8	59	26	85
9	13	0	13
10	51	30	81
11	8	0	8
12	50	39	89
13	14	0	14
14	57	22	79
15	9	0	9
16	18	0	18
17	9	0	9
18	6	0	6
19	53	11	64
20	31	4	35
TOT	570	162	732

ZIP CROSS SOME

	0	1	TOT
1	11	3	14
2	6	55	61
3	37	39	76
4	10	10	20
5	10	6	16
6	9	7	16
7	11	8	19
8	33	52	85
9	3	10	13
10	34	47	81
11	4	4	8
12	43	46	89
13	8	6	14
14	28	51	79
15	2	7	9
16	10	8	18
17	2	7	9
18	0	6	6
19	11	53	64
20	4	31	35
TOT	276	456	732

ZIP CROSS MAJOR

	0	1	TOT
1	3	11	14
2	55	6	61
3	69	7	76
4	10	10	20
5	6	10	16
6	7	9	16
7	8	11	19
8	78	7	85
9	10	3	13
10	77	4	81
11	4	4	8
12	85	4	89
13	6	8	14
14	73	6	79
15	7	2	9
16	8	10	18
17	7	2	9
18	6	0	6
19	64	0	64
20	35	0	35
TOT	618	114	732

In the example above, the first row of numerals in ZIP CROSS NONE indicates that 14 people responded no to NONE in ZIP code 1, and 0 people responded yes from that ZIP. If interested, we could continue in this tabular mode, by looking at the frequency of response to each of the other questions, and then comparing them with cross-tabs to each of the policy choices, the ZIP code and other questions, in an effort to understand the issue better. However, a more powerful method is available, and we turn to that instead.

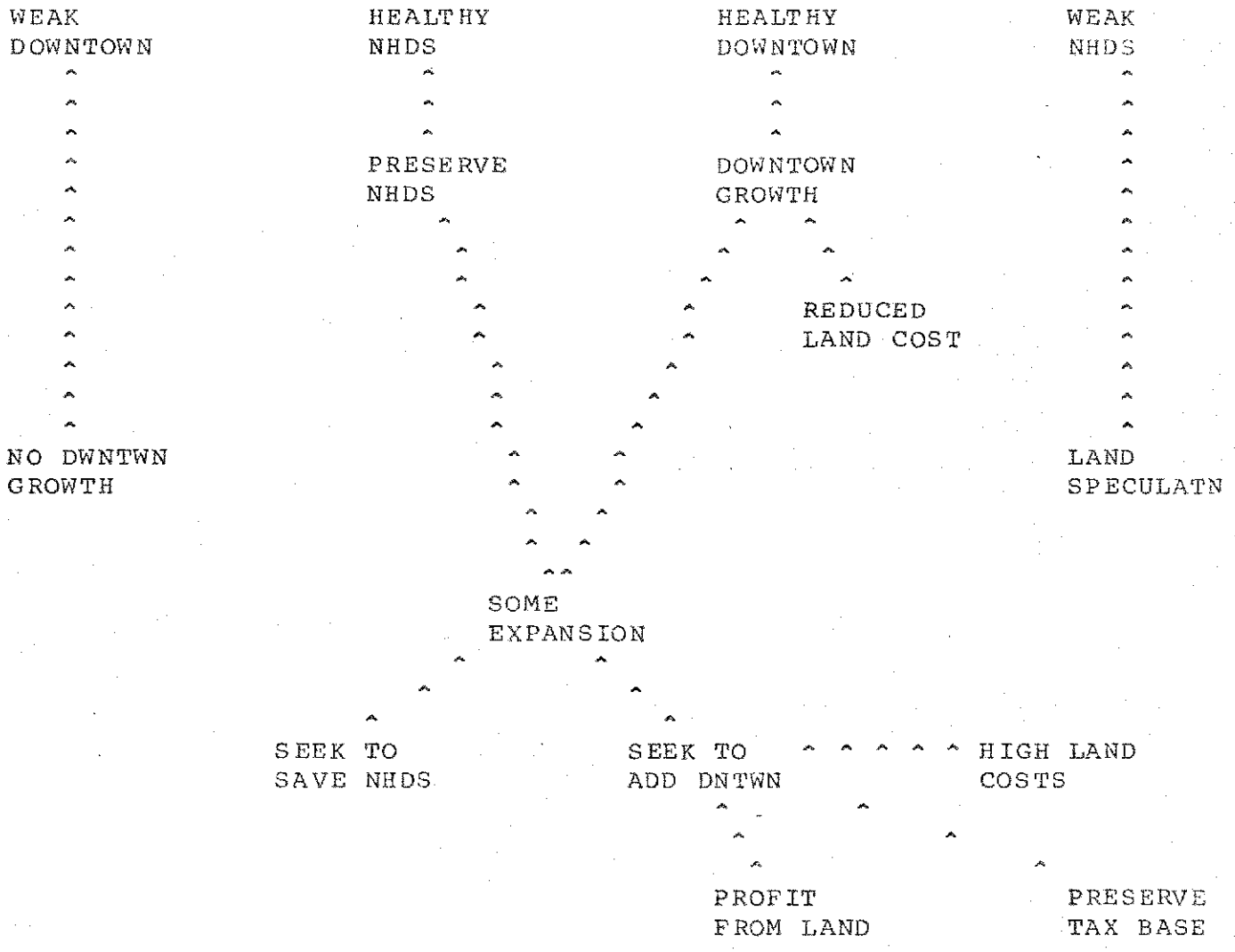
Creating Types

We use the ANALYZE command to give us a description of the types of people in the sample; that is, we ask for a list of which patterns of responses to the 17 questions occurred, and how many of each pattern there were. The computer sorts these patterns from most frequent to least frequent, and assigns to each pattern a number, before giving us the list.

This kind of analysis greatly simplifies the task of understanding the results of the balloting. Instead of 732 people answering 17 questions, we now have 9 types of people, where all people in each type responded in exactly the same way. The computer pattern recognition program has simplified the data into 9 concepts or types of people that we can now begin to describe in greater detail. The following pages

show computer output response patterns, graphs, and maps for each of the 9 types of people. The zeroes and ones in the patterns indicate the no and yes responses particular to each type. Note how each question determines the presence or absence of a certain element in the personal subgraph of each type of person. The digraph and pattern are followed by a geographic map showing where people with that particular issue model live. These pages give us a very clear, communicable way to understand and discuss the issue; how people feel about it, why they feel that way, where they live, and how many people there are who hold various points of view.

DIGRAPH 1



TYPE 1 , WITH 132 MEMBERS, HAS THIS PATTERN:

TRAFFIC	= 0	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 1
NEIGHBORHOOD	= 1	DOWNTOWN	= 1	POPGROWTH	= 0	EXTRALAND	= 1
TRAFFICHURTS	= 0	GROW	= 1	PRESERVE	= 1	BOUNDARY	= 0
SPECULATION	= 1	DECLINE	= 1	NONE	= 0	SOME	= 1
MAJOR	= 0						

GEOMAP 1

KEY TO MAP

^ = 3 TO 4 PERSONS
\+ = 6 TO 7 PERSONS
* = 8 TO 8 PERSONS
# = 10 TO 10 PERSONS

Map of the geographic distribution of respondents in Type 1 -- raw counts

SCALE=1

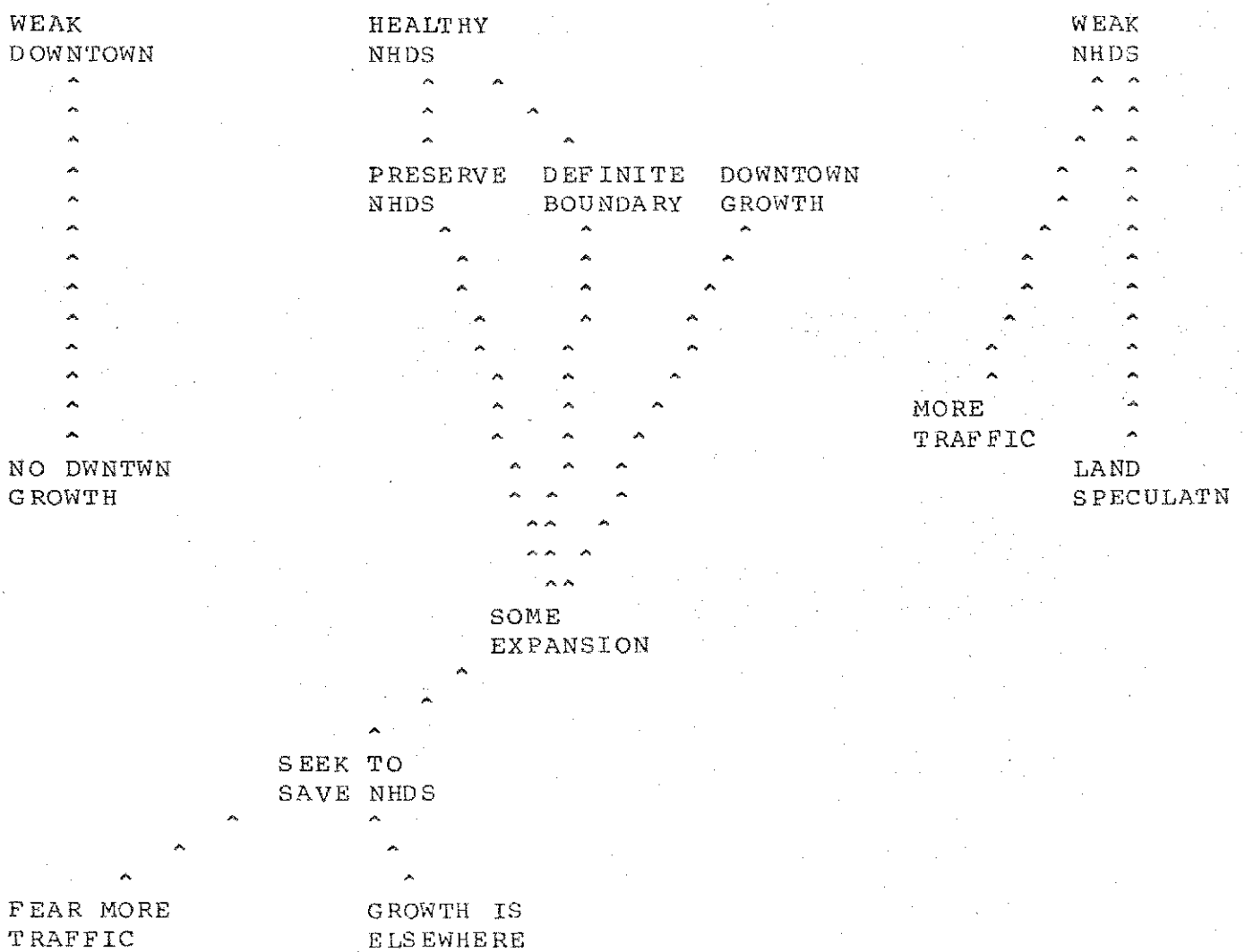
GEOMAP 1

KEY TO MAP

. = 1 TO 14 % OF PERSONS IN ZIP
- = 15 TO 28 % OF PERSONS IN ZIP
^ = 29 TO 42 % OF PERSONS IN ZIP
= = 43 TO 57 % OF PERSONS IN ZIP
+ = 58 TO 71 % OF PERSONS IN ZIP
* = 72 TO 85 % OF PERSONS IN ZIP
# = 86 TO 100 % OF PERSONS IN ZIP

Map of the geographic distribution of respondents in Type 1 -- percentages

DIGRAPH 2



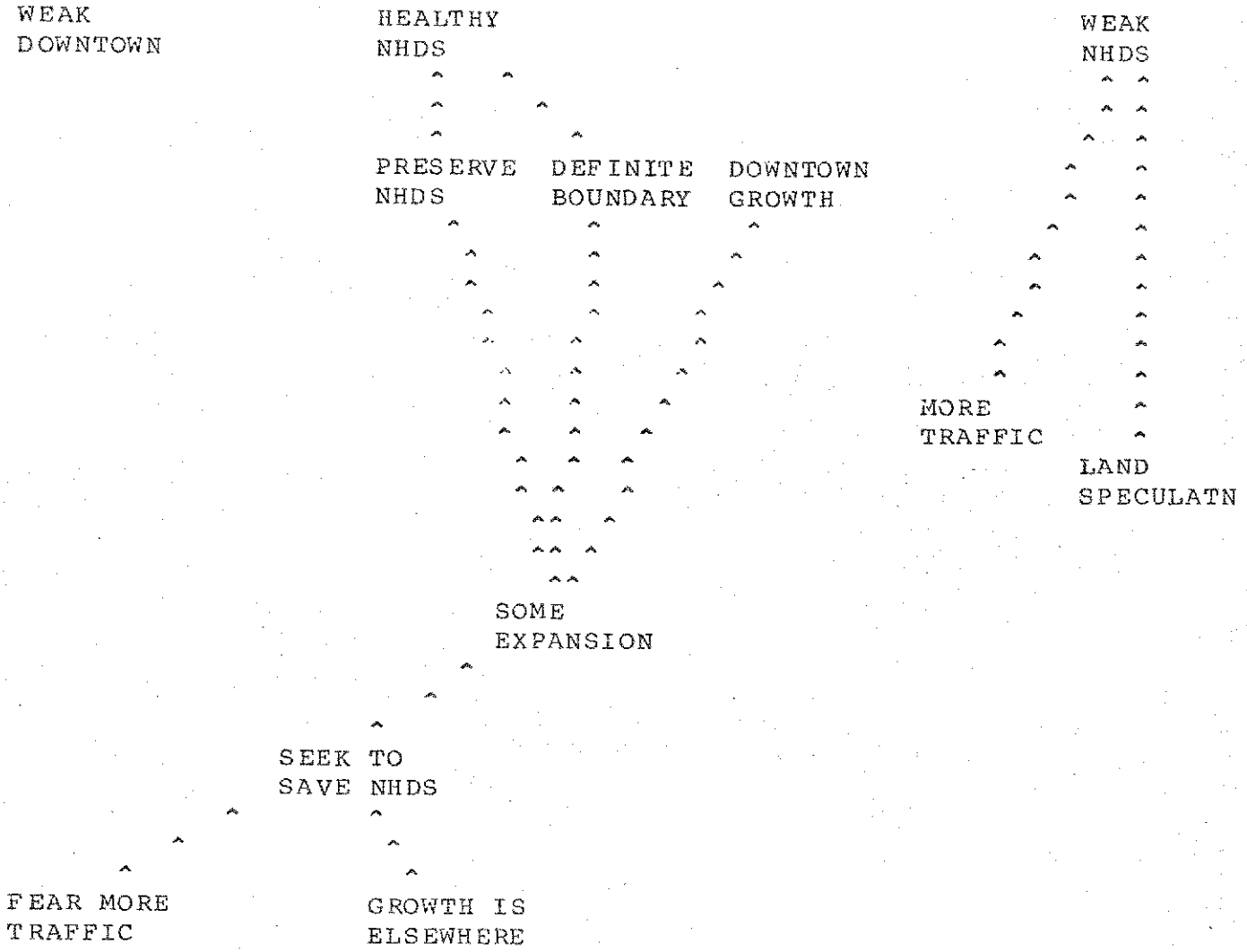
TYPE 2 , WITH 118 MEMBERS, HAS THIS PATTERN:

TRAFFIC	= 1	TAXBASE	= 0	INVESTMENT	= 0	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 0	POPGROWTH	= 1	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 0	PRESERVE	= 1	BOUNDARY	= 1
SPECULATION	= 1	DECLINE	= 1	NONE	= 0	SOME	= 1
MAJOR	= 0						

GEOMAP 2

KEY TO MAP

. = 0 TO 0 PERSONS
+ = 11 TO 13 PERSONS
* = 15 TO 16 PERSONS
# = 17 TO 19 PERSONS



TYPE 3 , WITH 110 MEMBERS, HAS THIS PATTERN:

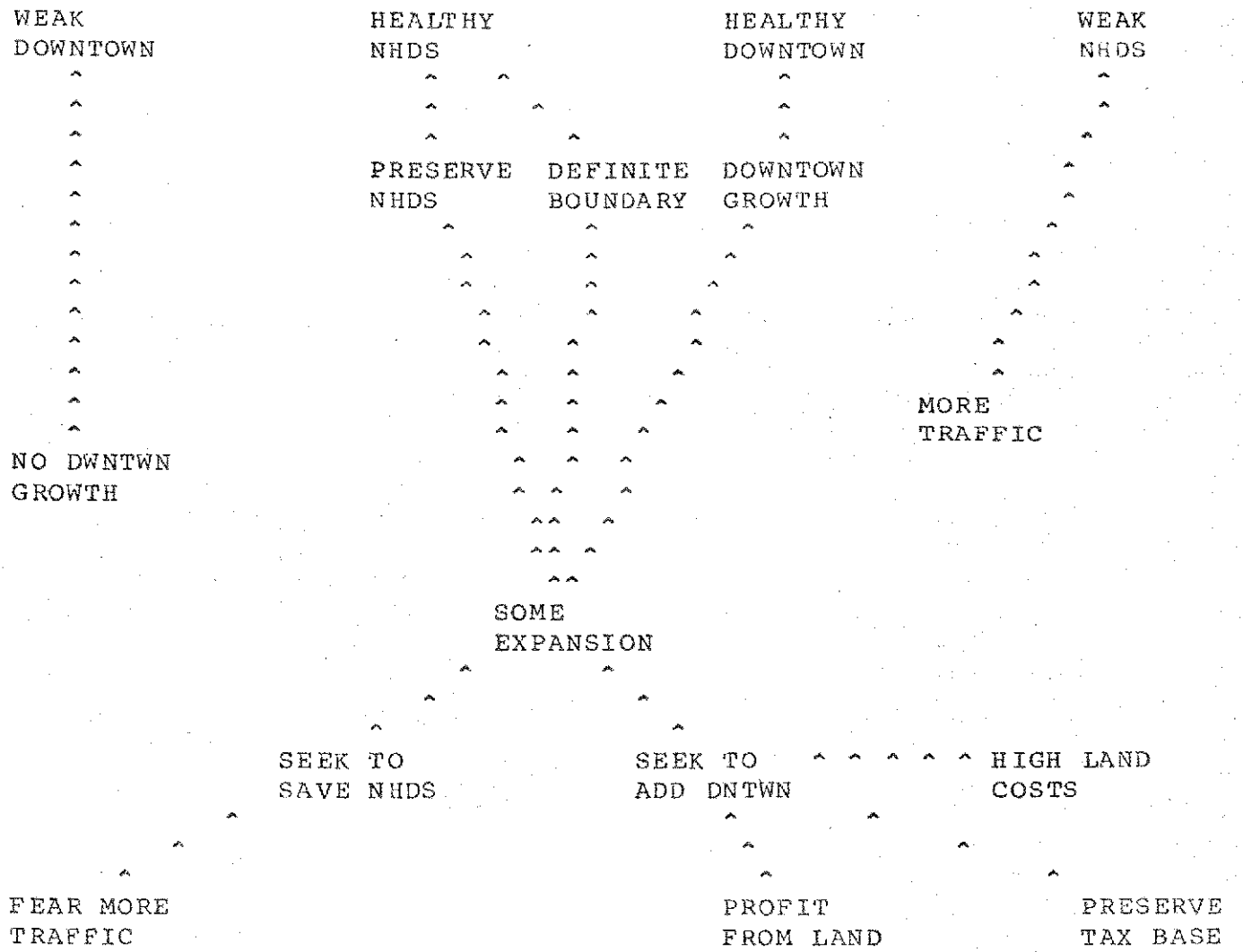
TRAFFIC	= 1	TAXBASE	= 0	INVESTMENT	= 0	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 0	POPGROWTH	= 1	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 0	PRESERVE	= 1	BOUNDARY	= 1
SPECULATION	= 1	DECLINE	= 0	NONE	= 0	SOME	= 1
MAJOR	= 0						

GEOMAP 3

KEY TO MAP

. = 0 TO 0 PERSONS
= = 8 TO 8 PERSONS
+ = 11 TO 11 PERSONS
* = 14 TO 14 PERSONS
# = 15 TO 17 PERSONS

DIGRAPH 4



TYPE 4 , WITH 96 MEMBERS, HAS THIS PATTERN:

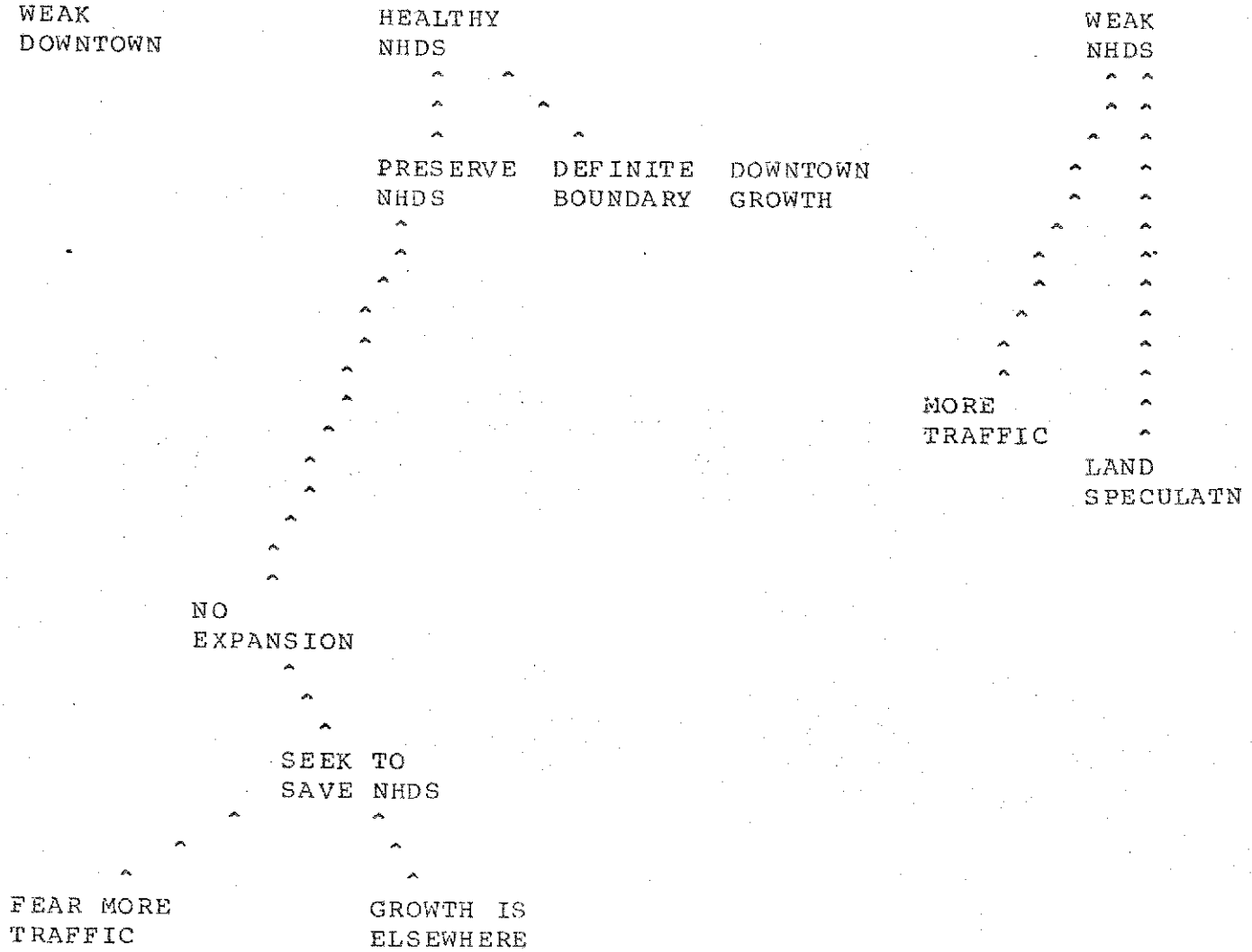
TRAFFIC	= 1	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 1
NEIGHBORHOOD	= 1	DOWNTOWN	= 1	POPGROWTH	= 0	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 1	PRESERVE	= 1	BOUNDARY	= 1
SPECULATION	= 0	DECLINE	= 1	NONE	= 0	SOME	= 1
MAJOR	= 0						

GEOMAP 4

KEY TO MAP

. = 0 TO 0 PERSONS
= = 8 TO 8 PERSONS
+ = 10 TO 10 PERSONS
* = 11 TO 11 PERSONS
# = 13 TO 14 PERSONS

DIGRAPH 5



TYPE 5 , WITH 88 MEMBERS, HAS THIS PATTERN:

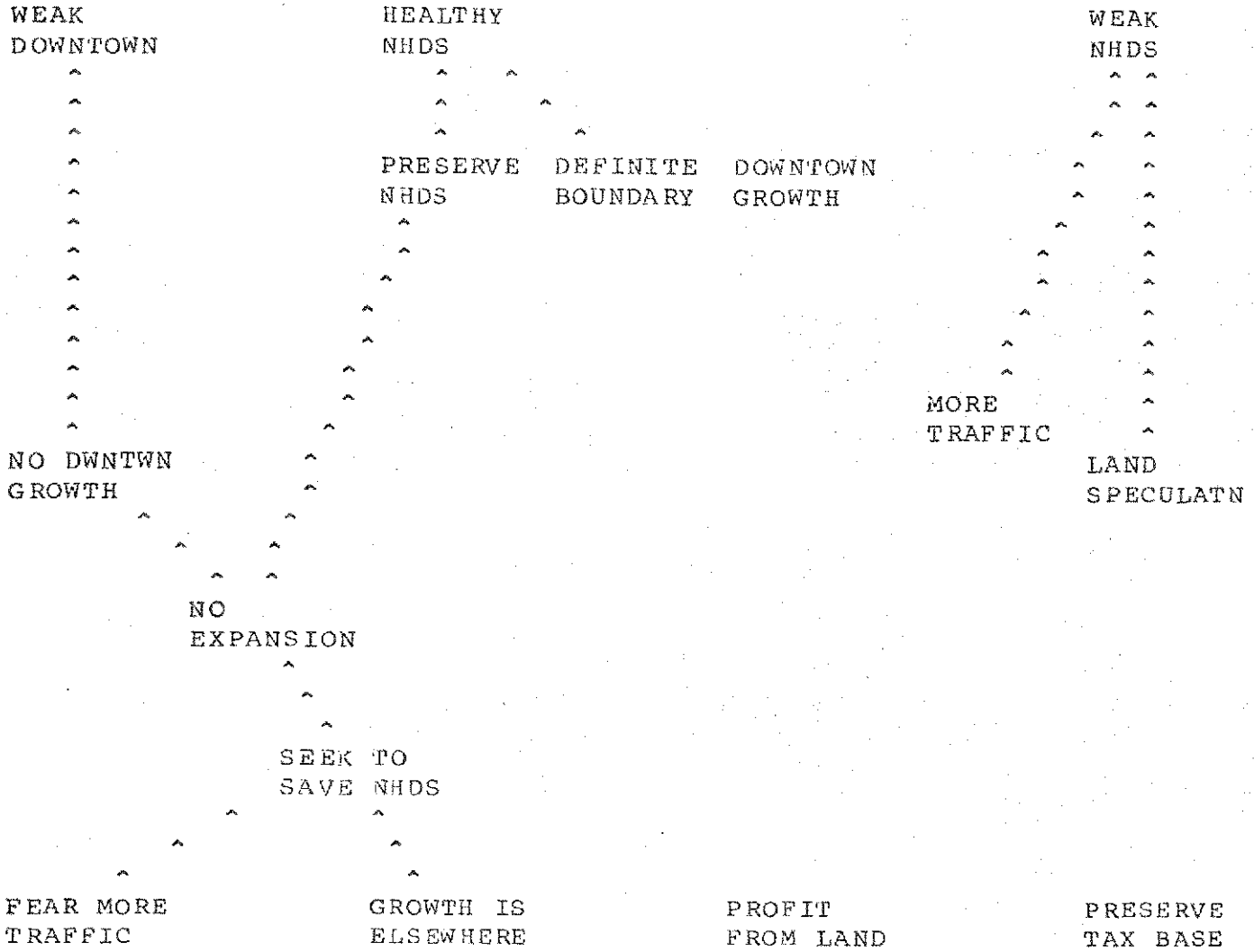
TRAFFIC	= 1	TAXBASE	= 0	INVESTMENT	= 0	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 0	POPGROWTH	= 1	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 0	PRESERVE	= 1	BOUNDARY	= 1
SPECULATION	= 1	DECLINE	= 0	NONE	= 1	SOME	= 0
MAJOR	= 0						

GEOMAP 5

KEY TO MAP

. = 0 TO 0 PERSONS
- = 4 TO 4 PERSONS
= = 9 TO 11 PERSONS
+ = 13 TO 13 PERSONS
* = 15 TO 16 PERSONS
# = 20 TO 20 PERSONS

DIGRAPH 6



TYPE 6 , WITH 74 MEMBERS, HAS THIS PATTERN:

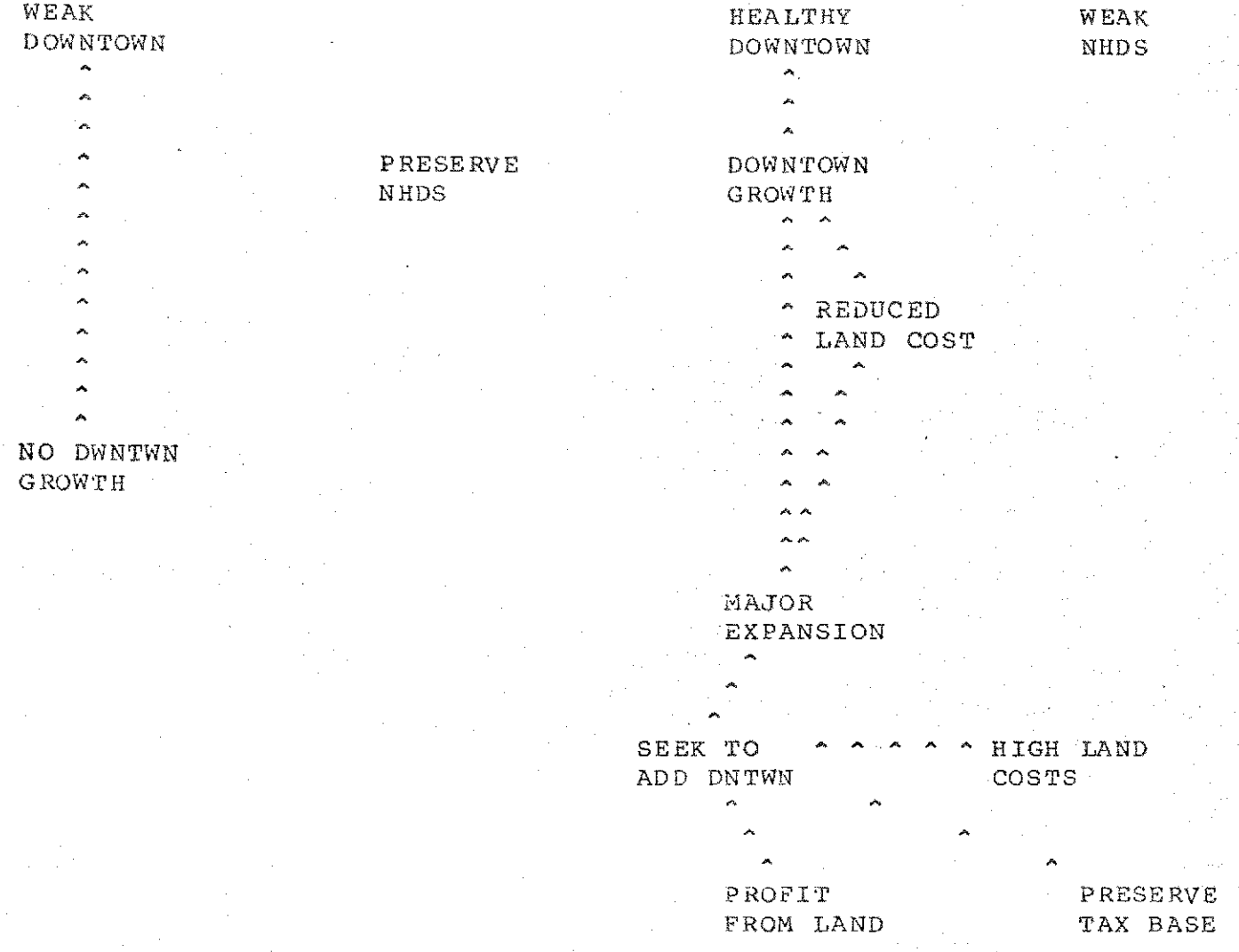
TRAFFIC	= 1	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 0	POPGROWTH	= 1	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 0	PRESERVE	= 1	BOUNDARY	= 1
SPECULATION	= 1	DECLINE	= 1	NONE	= 1	SOME	= 0
MAJOR	= 0						

GEOMAP 6

KEY TO MAP

. = 0 TO 0 PERSONS
= = 9 TO 9 PERSONS
* = 14 TO 15 PERSONS
# = 17 TO 19 PERSONS

DIGRAPH 7



TYPE 7 , WITH 59 MEMBERS, HAS THIS PATTERN:

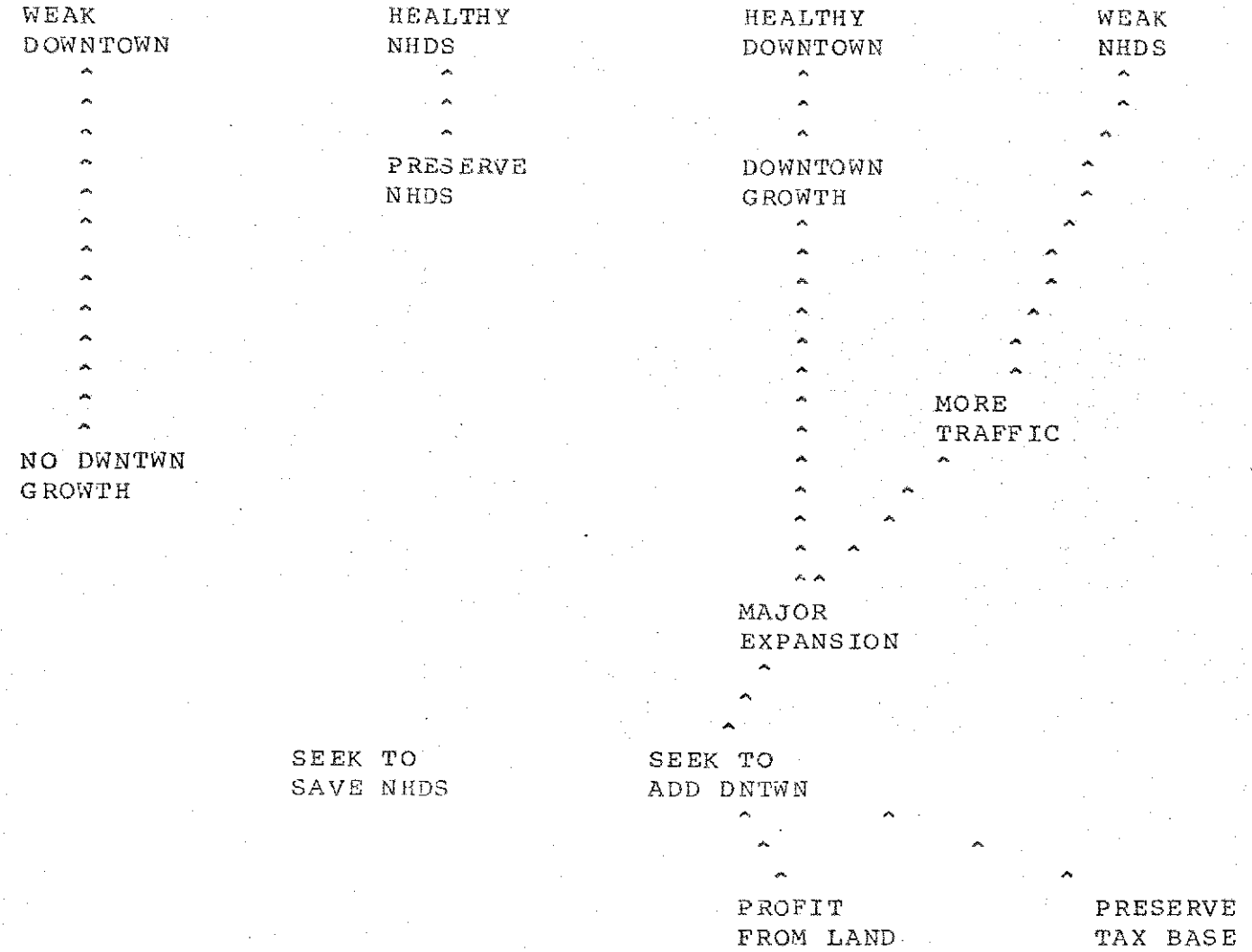
TRAFFIC	= 0	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 1
NEIGHBORHOOD	= 0	DOWNTOWN	= 1	POPGROWTH	= 0	EXTRALAND	= 1
TRAFFICHURTS	= 0	GROW	= 1	PRESERVE	= 0	BOUNDARY	= 0
SPECULATION	= 0	DECLINE	= 1	NONE	= 0	SOME	= 0
MAJOR	= 1						

GEOMAP 7

KEY TO MAP

. = 0 TO 0 PERSONS
^ = 3 TO 3 PERSONS
= = 4 TO 4 PERSONS
+ = 5 TO 5 PERSONS
* = 6 TO 6 PERSONS
# = 7 TO 8 PERSONS

DIGRAPH 8



TYPE 8 , WITH 37 MEMBERS, HAS THIS PATTERN:

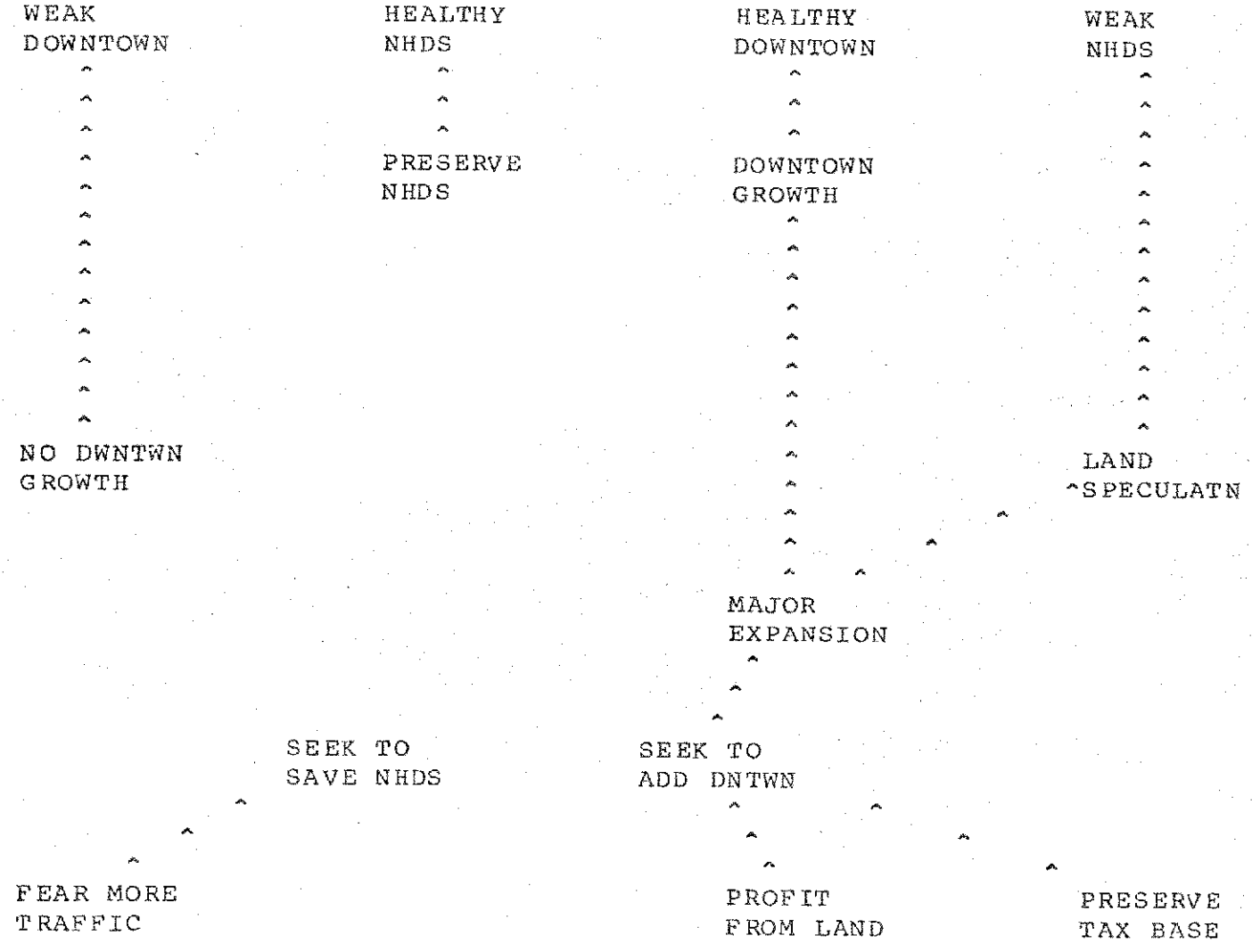
TRAFFIC	= 0	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 1	POPGROWTH	= 0	EXTRALAND	= 0
TRAFFICHURTS	= 1	GROW	= 1	PRESERVE	= 1	BOUNDARY	= 0
SPECULATION	= 0	DECLINE	= 1	NONE	= 0	SOME	= 0
MAJOR	= 1						

GEOMAP 8

KEY TO MAP

. = 0 TO 0 PERSONS
+ = 2 TO 2 PERSONS
# = 3 TO 3 PERSONS

DIGRAPH 9



TYPE 9 , WITH 18 MEMBERS, HAS THIS PATTERN:

TRAFFIC	= 1	TAXBASE	= 1	INVESTMENT	= 1	HIGHCOSTS	= 0
NEIGHBORHOOD	= 1	DOWNTOWN	= 1	POPGROWTH	= 0	EXTRALAND	= 0
TRAFFICHURTS	= 0	GROW	= 1	PRESERVE	= 1	BOUNDARY	= 0
SPECULATION	= 1	DECLINE	= 1	NONE	= 0	SOME	= 0
MAJOR	= 1						

GEOMAP 9

KEY TO MAP

. = 0 TO 0 PERSONS
= = 1 TO 1 PERSONS
= 2 TO 2 PERSONS

Further Analysis

We may wish to consider the ways in which people agree and disagree with each other more specifically. Such a consideration is requisite for any policy formulation, coalition-building, political action, or decision-making. The COMPARE command shows us which types of people are quite similar (and might be likely to cooperate) as well as which types of people are quite different (and might have the greatest potential for conflict).

```
    COMPARE

SIMILARITIES

TYPES 3 AND 2 DIFFER ONLY ON
     DECLINE

DIFFERENCES

TYPES 7 AND 3 DIFFER ON
     TRAFFIC       TAXBASE      INVESTMENT   HIGHCOSTS     NEIGHBORHOOD
     DOWNTOWN      POPGROWTH    EXTRALAND    TRAFFICHURTS  GROW
     PRESERVE      BOUNDARY     SPECULATION  DECLINE       SOME
     MAJOR
TYPES 7 AND 5 DIFFER ON
     TRAFFIC       TAXBASE      INVESTMENT   HIGHCOSTS     NEIGHBORHOOD
     DOWNTOWN      POPGROWTH    EXTRALAND    TRAFFICHURTS  GROW
     PRESERVE      BOUNDARY     SPECULATION  DECLINE       NONE
     MAJOR
```

Since the single similarity listed is not as much as we would like to study potential for coalition-building, we change the allowable number of differences to 3 and re-analyze.

```
    DIFFER=3
    COMPARE

SIMILARITIES

TYPES 3 AND 2 DIFFER ONLY ON
     DECLINE
TYPES 5 AND 2 DIFFER ONLY ON
     DECLINE       NONE         SOME
TYPES 5 AND 3 DIFFER ONLY ON
     NONE          SOME
TYPES 6 AND 5 DIFFER ONLY ON
     TAXBASE       INVESTMENT   DECLINE
TYPES 9 AND 8 DIFFER ONLY ON
     TRAFFIC       TRAFFICHURTS SPECULATION
```

DIFFERENCES

TYPES 7 AND 2 DIFFER ON

TRAFFIC	TAXBASE	INVESTMENT	HIGHCOSTS	NEIGHBORHOOD
DOWNTOWN	POPGROWTH	EXTRALAND	TRAFFICHURTS	GROW
PRESERVE	BOUNDARY	SPECULATION	SOME	MAJOR

TYPES 7 AND 3 DIFFER ON

TRAFFIC	TAXBASE	INVESTMENT	HIGHCOSTS	NEIGHBORHOOD
DOWNTOWN	POPGROWTH	EXTRALAND	TRAFFICHURTS	GROW
PRESERVE	BOUNDARY	SPECULATION	DECLINE	SOME
MAJOR				

TYPES 7 AND 5 DIFFER ON

TRAFFIC	TAXBASE	INVESTMENT	HIGHCOSTS	NEIGHBORHOOD
DOWNTOWN	POPGROWTH	EXTRALAND	TRAFFICHURTS	GROW
PRESERVE	BOUNDARY	SPECULATION	DECLINE	NONE
MAJOR				

Here we see the potential for a coalition between types 2, 3, 5 and 6. Also there is a second potential coalition between types 8 and 9. Furthermore, we see that type 7 is in strong disagreement with types in the first coalition, 2, 3 and 5.

To get a visual picture of the potential coalitions we use the SDGRAPH command. First, the SDGRAPH 1 shows us the strong, central relationship between types 2 and 3.

SDGRAPH 1

TYPE 1

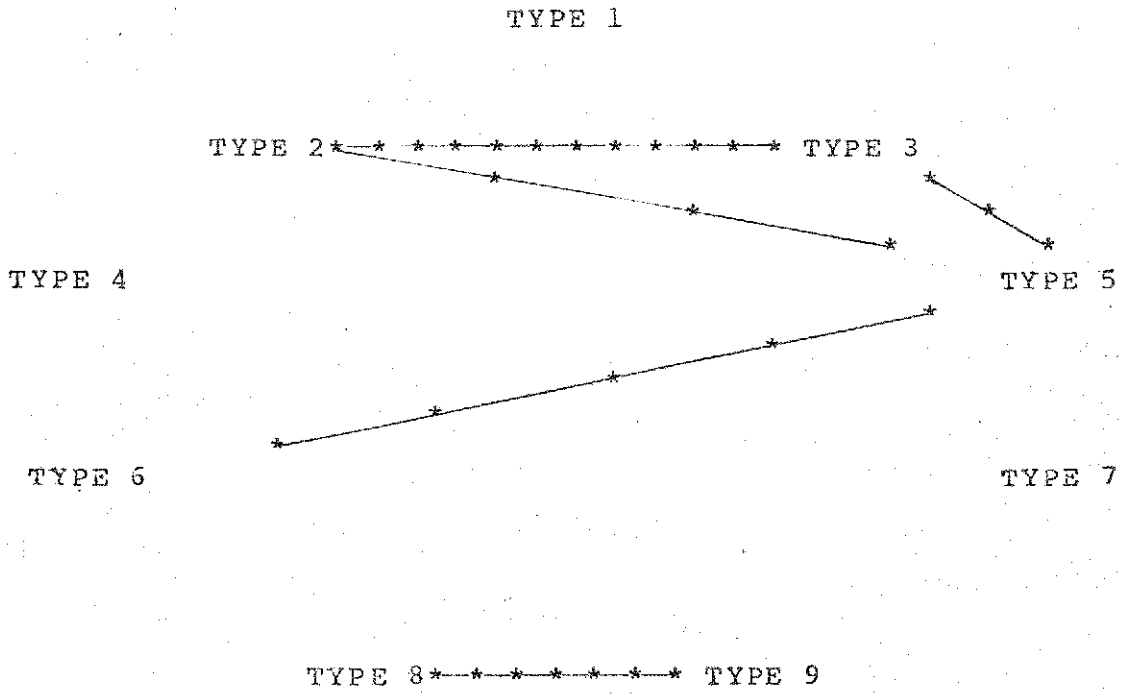
TYPE 2* * * * * * * * * * * * TYPE 3

TYPE 4 TYPE 5

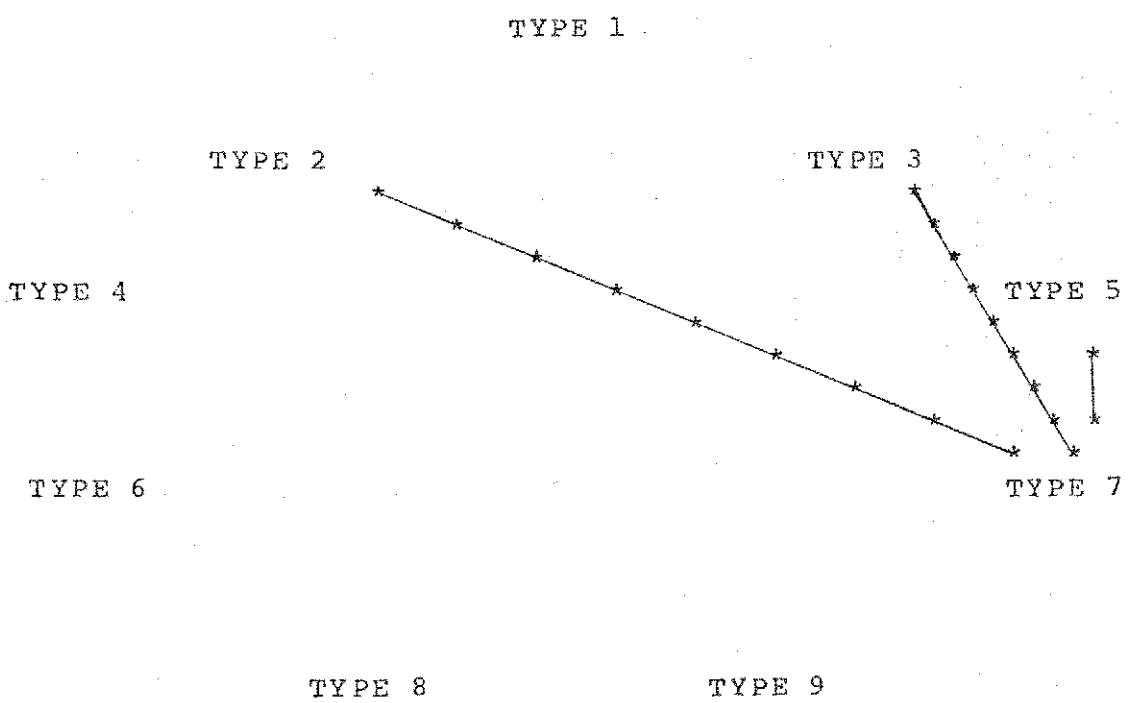
TYPE 6 TYPE 7

TYPE 8 TYPE 9

Then the SDGRAPH 1 2 3 shows us all the relationships considering up to 3 differences. Here the basic coalition between types 2, 3, 5 and 6 emerges.



Finally, an SDGRAPH 15 16 17 shows us the disagreement on at least 15 questions between most of the coalition and type 7.

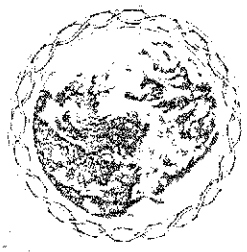


(The lines on these graphs have been inked in to make them clearer.)

Depending on our purpose, many other kinds of tabulations and graphs can be generated using the computer. A few are shown here, just to hint at the potential for variety to match a community's perceived need for computer assistance.

* * *

The techniques described in this paper for making explicit various points of view within a community are just tools. Like all tools, they may be used in the service of people, or they may be used against people, to manipulate public opinion. It is beyond the scope of this paper to describe a social/political context in which graphic representations of various attitudes might be used to create understanding, dialogue, and public resolution of issues. It is our intent to take relatively sophisticated techniques, make them somewhat more simple to use, and then participate in teaching interested people how to use them. We consider it more healthy for community groups to ask questions of an entire community and then mirror the results in easily understood ways, than for "experts" to use these techniques out of public view. It is time for communities to observe themselves and take responsibility for what they see.



May 28, 1976

AN INTRODUCTION TO A NEIGHBORHOOD INFORMATION SYSTEM

This introduction describes a computer system that people without prior computer experience can use to organize and process information about a small community, neighborhood, or organization. Neighborhood residents have already used the system to enter information into the computer and to perform simple searches and processing. The system is simple to learn, easy to use, and relatively inexpensive. In addition, it has been designed to be powerful and flexible, so it can be used for complicated cross-referencing, sorting, searching, reporting, and statistical analysis, where those kinds of processing are appropriate.

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

This neighborhood information system has been designed so that many different kinds of neighborhood information processing needs can be met within a single systematic structure. This paper describes some of the kinds of tasks the system can do. This is not a user's manual, and no attempt is made here to teach the basic commands of the system. Rather, situations in which the neighborhood information system would be useful are discussed. Each neighborhood or organization has different needs, and the system is flexible enough to accommodate many possibilities.

DIRECTORIES

The computer can generate lists of neighbors sorted in a variety of ways: in alphabetic order by name, in street address order, or in any other order based on information stored in the computer, such as age of neighbors, degree of interest in some neighborhood problem, or whatever. These lists can also contain descriptive paragraphs about the entries in the list, if such descriptions have been included in the data file. The lists can also contain keywords and values associated with them, such as skills described by keywords and levels of ability indicated by the values.

The computer can generate lists of particular groups of neighbors, such as a list of block representatives by block, or a list of the neighborhood council in alphabetical order. The following command would produce a list of those neighbors in the garden club, in alphabetical order:

```
LIST NAMESORT ALL GARDENCLUB
```

And the following would produce a list of all garden club members sorted by address:

```
LIST ADDSORT ALL GARDENCLUB
```

An organization, like a neighborhood association, could produce a directory with alphabetic lists, geographic lists, and special group lists (like clubs, standing committees, task forces, etc.) all in one booklet. The computer lists can be used directly in a layout for offset printing.

SKILLS AND SERVICE EXCHANGES

The names, addresses, and telephone numbers of neighbors, along with a descriptive paragraph about each neighbor's skills, needs, and interests, can be stored in the computer. Each neighbor's entry may be further described by a few keywords chosen from a set of master keywords that have been put together by the group using the system. The keywords are used to retrieve the names, addresses, phone numbers, and descriptive paragraphs of neighbors with certain desired skills. For example, to obtain a list of all those in the neighborhood who need help with home repairs, the person doing the search would select the keyword HOMEREPAIR and then execute the following command:

```
LIST ALL HOMEREPAIR
```

The computer would answer with a list of the names, addresses, and phone numbers of all neighbors who indicated they needed home repair help.

Logical combinations of keywords can also be used. For example, the following command would result in a list of all gardeners who specialize in vegetables and would use organic methods:

```
LIST ALL GARDENERS&VEGETABLES&ORGANIC
```

Furthermore, keywords can also be used to characterize needs and offers of help and the conditions under which a trade might be made, as well as the type of skill. For example, if plumbing skills have been coded into 5 levels (0 for no skill, 1 for needs help, 2 for has experience and will trade, 3 for has experience and will trade or charge, 4 for has experience and will charge only, and 5 for has experience and will teach), then the following command would produce a list of those who will trade plumbing work for something else:

```
LIST ALL PLUMBING.EQ2
```

Because the information is instantly available, telephone requests for skills, services, or trades can be answered by conducting a simple computer search while the person making the request is still on the telephone.

SURVEYS

The computer can assist in surveying neighbors in the following ways. First, it can ask a predetermined set of questions, one at a time, and wait for someone to enter the answers. This facility can be used

(1) to aid in the entry of printed or form survey information that has already been collected;
(2) to prompt a telephone interviewer by asking each question for the interviewer to ask the respondent, and waiting for the answer to be entered by the interviewer; and
(3) to conduct an interview directly by asking questions and waiting for the interviewed neighbor to enter the answer directly.

An example of a brief interview is shown below. The underlined parts represent the answer entered into the computer by the neighbor:

```
WHAT IS YOUR NAME?  PETER JOHNSON-LENZ
WHERE DO YOU LIVE?  695 5TH, LAKE OSWEGO, OREGON 97034
HOW MANY PERSONS LIVE IN YOUR HOUSEHOLD (INCLUDING YOURSELF)?  2
WOULD YOU LIKE TO JOIN THE NEIGHBORHOOD ASSOCIATION (1=YES, 0=NO)?  1
```

The system can compute simple statistics and print bar graphs of the results of the survey as soon as the last interview has been entered into the computer. In fact, it can even be used to compute the intermediate results before the survey is complete. The following shows a count and bar graph of people who answered the question above about joining the neighborhood association:

```
GRAPH JOIN

CODE   COUNT   PERCENT
  0      153     12.42 XXXXXX
  1     1078     87.58 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 TOT    1231
```

The code of this question is 0 = no and 1 = yes. This shows that 153 or 12.42% of the people said they did not want to join the neighborhood association, and 1078 people, or 87.58%, said they did. Altogether, 1231 people were surveyed. The strings of X's represent the percentages as a bar graph.

Statistics can also be computed on certain sub-groups of the information. For example, the following command would compute how many teenagers are members:

```
GRAPH ((AGE<20)&(AGE>12))/MEMBER
```

Following a survey, the computer can also be used to produce lists of neighbors with common interests or concerns as found in the survey. These lists can be used to get people with similar interests together for projects, discussions, task forces, or whatever. This is quite similar to the skill bank and directory lists mentioned previously.

RESOURCE INVENTORIES

The computer can record resources and organize them by location, by people providing them, by people needing them, or by almost any other system that seems useful. Statistics can be computed on these inventories to provide more complete information about what resources the neighborhood has. Lists can be generated showing who has these resources and where they can be found. The inventories can be updated easily. The following command would be used to produce a list of all the vacant lots, for example:

```
LIST ALL VACANT
```

Then, the average command might be used to show the average square footage of those vacant lots:

```
AVERAGE VACANT/SQFOOTAGE
```

MAILING LISTS

The computer can maintain and update mailing lists. Records in the file can be added, deleted, and edited with ease. They can be described by keywords or numeric data, such as age, block, interest, skills, or whatever. The computer can be used to print the mailing labels directly. It can also be used to keep track of who is a member, who has paid dues or subscriptions, and when their renewal dates are coming up. The following example shows how Peter Johnson-Lenz's record can be found in the file, and then edited to reflect a change of address and phone:

```
    FIND 'JOHNSON-LENZ, PETER'                    (The FIND command is used.)

RECORD  = 92                                      (The computer responds
NAME    = JOHNSON-LENZ, PETER W.                  with the full identification
ADDRESS = 2222 SE NEHALEM, PORTLAND, OR 97202     information for the record.)
PHONE   = 232-8976

    EDIT
WHAT DO YOU WANT TO EDIT? ADDRESS                 (Here the editor
THE OLD ADDRESS WAS 2222 SE NEHALEM, PORTLAND, OR 97202   is used to change
ENTER NEW ADDRESS 695 5TH, LAKE OSWEGO, OR 97034          the address and
WHAT DO YOU WANT TO EDIT? PHONE                           phone. The under-
THE OLD PHONE WAS 232-8976                                lined parts are
ENTER NEW PHONE 635-2615                                  those entered by
                                                          the person making
                                                          the corrections.)
```

SUPPORT FOR BEGINNERS

The computer is programmed to teach anyone without prior experience how to use the system. There is a general teacher, called the GUIDE (also known as CLYDE THE GUIDE), that can be invoked whenever help is needed. Potentially, the guide could give directions for all types of neighborhood information applications. It is currently programmed to teach basic data entry, simple keyword searching, and checking to see if someone is already in the computer. The following is an example of part of the guide's instructions for checking to see if someone is already in the computer. This example involves the FIND command used in the previous example. Note that the messages from the guide are marked by a G followed by a colon (G:) at the beginning of each message.

```
G: TO CHECK TO SEE IF A PARTICULAR PERSON IS ALREADY INCLUDED IN
THE DATA FILE, USE THE FIND COMMAND.  FOR EXAMPLE, TO CHECK TO
SEE IF CLYDE T. GUIDE IS INCLUDED YOU WOULD SAY:

    FIND 'GUIDE, CLYDE T.'

NOTICE THE SINGLE QUOTES AROUND THE NAME.  USE THE LAST NAME
FIRST, AND TRY TO FIGURE OUT WHETHER THE PERSON YOU'RE CHECKING
FOR WOULD BE LISTED WITH A SHORT OR LONG FORM OF A NAME (JIM
INSTEAD OF JAMES), SINCE THE COMPUTER MATCHES NAMES LETTER FOR
LETTER.  IF THAT PERSON IS INCLUDED, THE COMPUTER WILL DISPLAY
THAT RECORD FOR YOU.  IF NOT, YOU'LL GET A "NO RECORD IN FILE"
MESSAGE.  NOW TRY THE FIND COMMAND WITH THE PARTICULAR NAME YOU
HAVE IN MIND.

    FIND 'JOHNSON-LENZ, PETER'                    (At this point, the neighbor
                                                  enters the FIND command asking
RECORD  = 92                                      for Peter Johnson-Lenz, and
NAME    = JOHNSON-LENZ, PETER W.                  the computer responds with a
ADDRESS = 695 5TH, LAKE OSWEGO, OR 97034          display of the information
PHONE   = 635-2615                                about that record.)

G: GREAT.  YOU'VE GOT THE HANG OF IT.  LET'S TRY SOME MORE.
```

COMBINATIONS OF TECHNIQUES

Complex projects with direct computer support are possible, such as:

--Print a list of gardening resources (like surplus food, tools, etc.), sort them by address to facilitate pick up, print a list of volunteers to pick them up, and keep track of which resources are picked up and used.

--Interview people over the telephone about skills they have to offer, compile a directory of skills by keywords and by people, and publish the directory.

--Conduct a workshop and record people's interests and areas of concern. By the time the workshop is over, provide everyone there with a list of the names, addresses, and phone numbers of everyone else interested in similar areas. Follow up the workshop by mailing everyone a printed directory of all the participants indexed by name, address, and interest.

HARDWARE

The neighborhood information system is designed to operate on a central computer, accessed and controlled through a telephone-coupled terminal. A neighborhood or other commmunity group wishing to use the system must first get access to such a terminal. These can be leased for about $50 a month, or can be purchased for about $1500. Some people have made their own terminals for less than $200.

These terminals have typewriter-like keyboards for communicating with the computer and for entering data. Many also have printers for printing information coming from the computer. Some terminals have video screens on which information from the computer is displayed. Some of these video terminals also have video output cables that can be connected to a bank of video monitors, so that computer displays can be seen simultaneously by many people. Terminals of this sort also sell for about $1500 or can be made for considerably less. Terminals can be carried to wherever they are needed--to meetings, conferences, and places where people are working. All that is required for operation is a 110 volt wall plug and a telephone.

In addition to the terminal, a neighborhood or other organization wishing to use the system must obtain access to a central computer facility that will sell time by the hour, or in larger blocks. Commercial computer time is generally still too expensive--at least $10 per hour and often more. However, small amounts of time, particularly during the evening hours, might be available on city or county computers where local governments are interested in facilitating citizen involvement.

The neighborhood information system was developed and tested with assistance from the Oregon Museum of Science and Industry to the First Addition Neighbors, a neighborhood association in Lake Oswego, Oregon. The OMSI PDP 11/45 computer was used for the work. Not-for-profit time is available, upon negotiation, from OMSI, at an approximate rate of $2.00 to $4.00 per hour for this type of work during the day, and for $0.50 to $2.00 per hour in the evenings and weekends.

As microcomputers become more available and less expensive during the next

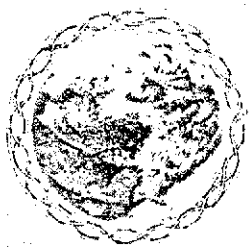
few years, systems like this can be quickly implemented on them. Microcomputers are as portable as the keyboard terminals currently being used, and they are completely self-contained. The advantage of a stand-alone microcomputer is that there is no need for a central computer to store and process the information. It also frees the neighborhood from dependence on services from a central computer facility. Currently, one can purchase a microcomputer board called the LSI-11, which is a microcomputer version of the PDP-11 computer used to develop this particular system. Someone with considerable electronic skills could use the board as the central building block of an owner-built computer system. Stand-alone portable microcomputers can also be purchased ready-made from many commercial companies, and in do-it-yourself kit form from others. In the near future, the cost of microcomputers is expected to go down dramatically, just as it has for pocket calculators (although not to that level).

SOFTWARE

The neighborhood information system is based on a general information system called IS (for Information System). This system is written in a computer language called APL (for A Programming Language). APL is getting to be a popular language, spoken by an ever-increasing variety of computers (and programmers). The concepts of the IS system can be programmed in a few days on any computer speaking APL. APL is such a powerful language that the programming of a system like IS can now be done in a few days, where it used to take several weeks or even months in a language like FORTRAN or BASIC. APL was chosen for this development because of this amazing power and flexibility, making it relatively easy to change, modify, or expand the system as it is used, without requiring redesign of the system. This means that as a neighborhood's computer needs evolve over the years, reprogramming time and cost is reduced to a minimum, and new ideas and ways of using information can be quickly realized.

LIMITATIONS

The major limitation of the system is the number of records (one record per person) that can be managed in a single file. Using the current system at OMSI, up to 1000 records can be processed at once, and even up to 2000 records can be processed simultaneously if care is taken in the use of certain commands. The basic factor that limits the number of records in the file is the size of the APL workspace available on the computer being used. In the future, the OMSI computer may be capable of supporting a workspace of twice the current size, thus supporting files of up to 5000 records. On another computer with an even larger workspace, correspondingly larger files can be processed.



May 28, 1976

AN INTRODUCTION TO A NEIGHBORHOOD INFORMATION SYSTEM

This introduction describes a computer system that people without prior computer experience can use to organize and process information about a small community, neighborhood, or organization. Neighborhood residents have already used the system to enter information into the computer and to perform simple searches and processing. The system is simple to learn, easy to use, and relatively inexpensive. In addition, it has been designed to be powerful and flexible, so it can be used for complicated cross-referencing, sorting, searching, reporting, and statistical analysis, where those kinds of processing are appropriate.

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

This neighborhood information system has been designed so that many different kinds of neighborhood information processing needs can be met within a single systematic structure. This paper describes some of the kinds of tasks the system can do. This is not a user's manual, and no attempt is made here to teach the basic commands of the system. Rather, situations in which the neighborhood information system would be useful are discussed. Each neighborhood or organization has different needs, and the system is flexible enough to accommodate many possibilities.

DIRECTORIES

The computer can generate lists of neighbors sorted in a variety of ways: in alphabetic order by name, in street address order, or in any other order based on information stored in the computer, such as age of neighbors, degree of interest in some neighborhood problem, or whatever. These lists can also contain descriptive paragraphs about the entries in the list, if such descriptions have been included in the data file. The lists can also contain keywords and values associated with them, such as skills described by keywords and levels of ability indicated by the values.

The computer can generate lists of particular groups of neighbors, such as a list of block representatives by block, or a list of the neighborhood council in alphabetical order. The following command would produce a list of those neighbors in the garden club, in alphabetical order:

```
LIST NAMESORT ALL GARDENCLUB
```

And the following would produce a list of all garden club members sorted by address:

```
LIST ADDSORT ALL GARDENCLUB
```

An organization, like a neighborhood association, could produce a directory with alphabetic lists, geographic lists, and special group lists (like clubs, standing committees, task forces, etc.) all in one booklet. The computer lists can be used directly in a layout for offset printing.

SKILLS AND SERVICE EXCHANGES

The names, addresses, and telephone numbers of neighbors, along with a descriptive paragraph about each neighbor's skills, needs, and interests, can be stored in the computer. Each neighbor's entry may be further described by a few keywords chosen from a set of master keywords that have been put together by the group using the system. The keywords are used to retrieve the names, addresses, phone numbers, and descriptive paragraphs of neighbors with certain desired skills. For example, to obtain a list of all those in the neighborhood who need help with home repairs, the person doing the search would select the keyword HOMEREPAIR and then execute the following command:

```
LIST ALL HOMEREPAIR
```

The computer would answer with a list of the names, addresses, and phone numbers of all neighbors who indicated they needed home repair help.

Logical combinations of keywords can also be used. For example, the following command would result in a list of all gardeners who specialize in vegetables and would use organic methods:

```
LIST ALL GARDENERS&VEGETABLES&ORGANIC
```

Furthermore, keywords can also be used to characterize needs and offers of help and the conditions under which a trade might be made, as well as the type of skill. For example, if plumbing skills have been coded into 5 levels (0 for no skill, 1 for needs help, 2 for has experience and will trade, 3 for has experience and will trade or charge, 4 for has experience and will charge only, and 5 for has experience and will teach), then the following command would produce a list of those who will trade plumbing work for something else:

```
LIST ALL PLUMBING.EQ2
```

Because the information is instantly available, telephone requests for skills, services, or trades can be answered by conducting a simple computer search while the person making the request is still on the telephone.

SURVEYS

The computer can assist in surveying neighbors in the following ways. First, it can ask a predetermined set of questions, one at a time, and wait for someone to enter the answers. This facility can be used

(1) to aid in the entry of printed or form survey information that has already been collected;
(2) to prompt a telephone interviewer by asking each question for the interviewer to ask the respondent, and waiting for the answer to be entered by the interviewer; and
(3) to conduct an interview directly by asking questions and waiting for the interviewed neighbor to enter the answer directly.

An example of a brief interview is shown below. The underlined parts represent the answer entered into the computer by the neighbor:

```
WHAT IS YOUR NAME? PETER JOHNSON-LENZ
WHERE DO YOU LIVE? 695 5TH, LAKE OSWEGO, OREGON 97034
HOW MANY PERSONS LIVE IN YOUR HOUSEHOLD (INCLUDING YOURSELF)? 2
WOULD YOU LIKE TO JOIN THE NEIGHBORHOOD ASSOCIATION (1=YES, 0=NO)? 1
```

The system can compute simple statistics and print bar graphs of the results of the survey as soon as the last interview has been entered into the computer. In fact, it can even be used to compute the intermediate results before the survey is complete. The following shows a count and bar graph of people who answered the question above about joining the neighborhood association:

GRAPH JOIN

CODE	COUNT	PERCENT	
0	153	12.42	XXXXXX
1	1078	87.58	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOT	1231		

The code of this question is 0 = no and 1 = yes. This shows that 153 or 12.42% of the people said they did not want to join the neighborhood association, and 1078 people, or 87.58%, said they did. Altogether, 1231 people were surveyed. The strings of X's represent the percentages as a bar graph.

Statistics can also be computed on certain sub-groups of the information. For example, the following command would compute how many teenagers are members:

GRAPH ((AGE<20)&(AGE>12))/MEMBER

Following a survey, the computer can also be used to produce lists of neighbors with common interests or concerns as found in the survey. These lists can be used to get people with similar interests together for projects, discussions, task forces, or whatever. This is quite similar to the skill bank and directory lists mentioned previously.

RESOURCE INVENTORIES

The computer can record resources and organize them by location, by people providing them, by people needing them, or by almost any other system that seems useful. Statistics can be computed on these inventories to provide more complete information about what resources the neighborhood has. Lists can be generated showing who has these resources and where they can be found. The inventories can be updated easily. The following command would be used to produce a list of all the vacant lots, for example:

LIST ALL VACANT

Then, the average command might be used to show the average square footage of those vacant lots:

AVERAGE VACANT/SQFOOTAGE

MAILING LISTS

The computer can maintain and update mailing lists. Records in the file can be added, deleted, and edited with ease. They can be described by keywords or numeric data, such as age, block, interest, skills, or whatever. The computer can be used to print the mailing labels directly. It can also be used to keep track of who is a member, who has paid dues or subscriptions, and when their renewal dates are coming up. The following example shows how Peter Johnson-Lenz's record can be found in the file, and then edited to reflect a change of address and phone:

```
    FIND 'JOHNSON-LENZ, PETER'                    (The FIND command is used.)

RECORD  = 92                                      (The computer responds
NAME    = JOHNSON-LENZ, PETER W.                  with the full identification
ADDRESS = 2222 SE NEHALEM, PORTLAND, OR 97202     information for the record.)
PHONE   = 232-8976

    EDIT
WHAT DO YOU WANT TO EDIT? ADDRESS                 (Here the editor
THE OLD ADDRESS WAS 2222 SE NEHALEM, PORTLAND, OR 97202   is used to change
ENTER NEW ADDRESS 695 5TH, LAKE OSWEGO, OR 97034          the address and
WHAT DO YOU WANT TO EDIT? PHONE                           phone. The under-
THE OLD PHONE WAS 232-8976                                lined parts are
ENTER NEW PHONE 635-2615                                  those entered by
                                                          the person making
                                                          the corrections.)
```

SUPPORT FOR BEGINNERS

The computer is programmed to teach anyone without prior experience how to use the system. There is a general teacher, called the GUIDE (also known as CLYDE THE GUIDE), that can be invoked whenever help is needed. Potentially, the guide could give directions for all types of neighborhood information applications. It is currently programmed to teach basic data entry, simple keyword searching, and checking to see if someone is already in the computer. The following is an example of part of the guide's instructions for checking to see if someone is already in the computer. This example involves the FIND command used in the previous example. Note that the messages from the guide are marked by a G followed by a colon (G:) at the beginning of each message.

G: TO CHECK TO SEE IF A PARTICULAR PERSON IS ALREADY INCLUDED IN THE DATA FILE, USE THE FIND COMMAND. FOR EXAMPLE, TO CHECK TO SEE IF CLYDE T. GUIDE IS INCLUDED YOU WOULD SAY:

```
    FIND 'GUIDE, CLYDE T.'
```

NOTICE THE SINGLE QUOTES AROUND THE NAME. USE THE LAST NAME FIRST, AND TRY TO FIGURE OUT WHETHER THE PERSON YOU'RE CHECKING FOR WOULD BE LISTED WITH A SHORT OR LONG FORM OF A NAME (JIM INSTEAD OF JAMES), SINCE THE COMPUTER MATCHES NAMES LETTER FOR LETTER. IF THAT PERSON IS INCLUDED, THE COMPUTER WILL DISPLAY THAT RECORD FOR YOU. IF NOT, YOU'LL GET A "NO RECORD IN FILE" MESSAGE. NOW TRY THE FIND COMMAND WITH THE PARTICULAR NAME YOU HAVE IN MIND.

```
    FIND 'JOHNSON-LENZ, PETER'                    (At this point, the neighbor
                                                  enters the FIND command asking
RECORD  = 92                                      for Peter Johnson-Lenz, and
NAME    = JOHNSON-LENZ, PETER W.                  the computer responds with a
ADDRESS = 695 5TH, LAKE OSWEGO, OR 97034          display of the information
PHONE   = 635-2615                                about that record.)
```

G: GREAT. YOU'VE GOT THE HANG OF IT. LET'S TRY SOME MORE.

COMBINATIONS OF TECHNIQUES

Complex projects with direct computer support are possible, such as:

--Print a list of gardening resources (like surplus food, tools, etc.), sort them by address to facilitate pick up, print a list of volunteers to pick them up, and keep track of which resources are picked up and used.

--Interview people over the telephone about skills they have to offer, compile a directory of skills by keywords and by people, and publish the directory.

--Conduct a workshop and record people's interests and areas of concern. By the time the workshop is over, provide everyone there with a list of the names, addresses, and phone numbers of everyone else interested in similar areas. Follow up the workshop by mailing everyone a printed directory of all the participants indexed by name, address, and interest.

HARDWARE

The neighborhood information system is designed to operate on a central computer, accessed and controlled through a telephone-coupled terminal. A neighborhood or other commmunity group wishing to use the system must first get access to such a terminal. These can be leased for about $50 a month, or can be purchased for about $1500. Some people have made their own terminals for less than $200.

These terminals have typewriter-like keyboards for communicating with the computer and for entering data. Many also have printers for printing information coming from the computer. Some terminals have video screens on which information from the computer is displayed. Some of these video terminals also have video output cables that can be connected to a bank of video monitors, so that computer displays can be seen simultaneously by many people. Terminals of this sort also sell for about $1500 or can be made for considerably less. Terminals can be carried to wherever they are needed--to meetings, conferences, and places where people are working. All that is required for operation is a 110 volt wall plug and a telephone.

In addition to the terminal, a neighborhood or other organization wishing to use the system must obtain access to a central computer facility that will sell time by the hour, or in larger blocks. Commercial computer time is generally still too expensive--at least $10 per hour and often more. However, small amounts of time, particularly during the evening hours, might be available on city or county computers where local governments are interested in facilitating citizen involvement.

The neighborhood information system was developed and tested under a grant from the Oregon Museum of Science and Industry to the First Addition Neighbors, a neighborhood association in Lake Oswego, Oregon. The OMSI PDP 11/45 computer was used for the work. Not-for-profit time is available, upon negotiation, from OMSI, at an approximate rate of $2.00 to $4.00 per hour for this type of work during the day, and for $0.50 to $2.00 per hour in the evenings and weekends.

As microcomputers become more available and less expensive during the next

few years, systems like this can be quickly implemented on them. Microcomputers are as portable as the keyboard terminals currently being used, and they are completely self-contained. The advantage of a stand-alone microcomputer is that there is no need for a central computer to store and process the information. It also frees the neighborhood from dependence on services from a central computer facility. Currently, one can purchase a microcomputer board called the LSI-11, which is a microcomputer version of the PDP-11 computer used to develop this particular system. Someone with considerable electronic skills could use the board as the central building block of an owner-built computer system. Stand-alone portable microcomputers can also be purchased ready-made from many commercial companies, and in do-it-yourself kit form from others. In the near future, the cost of microcomputers is expected to go down dramatically, just as it has for pocket calculators (although not to that level).

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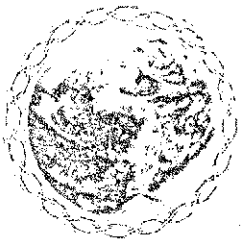

May 28, 1976

SAMPLE OUTPUT FROM A NEIGHBORHOOD INFORMATION SYSTEM

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

SAMPLE KEYWORDS AND CODES FOR A NEIGHBORHOOD INFORMATION SYSTEM

Basic information about each household

BLOCK (coded 1-50 to indicate block number)
ZONE (coded 1 = residential, 2 = multi-family, 3 = commercial)
VALUE (coded 10-25 to indicate the assessed value of the house in thousands of dollars; that is, 10 means an assessed value of $10,000)
PEOPLE (coded 1-6 to indicate the number of people in the household)
HEATING (coded 1 = oil, 2 = gas, 3 = electric, 4 = wood)

Skills needed or offered

All these skill keywords are coded 0-5, where 0 = no interest, 1 = need help, 2 = have skill and will trade, 3 = have skill and will trade or charge, 4 = have skill and will charge money for it, and 5 = have skill and will teach it.

AUTOREPAIR	GARDENING	MUSIC
BIKEREPAIR	ACCOUNTING	VIDEO
HOMEREPAIR	HEALTHCARE	FILM
CARPENTRY	SEWING	TVREPAIR
WIRING	CHILDCARE	ART
PLUMBING	LEGAL	SPORTS
FOOD	TYPING	INFORMATION

Neighborhood groups

All these neighborhood groups and committees are coded 0-1, where 0 = not a member and 1 = is a member.

BLOCKREP (block representative)
COUNCIL (neighborhood council)
MONEYCOM (finance committee)
TELEPHONER (telephone tree)
NEWSCOM (newsletter committee)
PUBLICITY (publicity committee)
INFOCOM (information committee)
WOMENSGROUP (women's group)
MENSGROUP (men's group)
GARDENCLUB (garden club)
PLANNING (planning task force)

Telephone survey questions

The sample telephone survey questions included here are coded 1-5, as indicated.

FOODCOOP
CREDITUNION
CENTER
TOOLPOOL
PARK

(These are coded by the respondent, where 1 = has little or no appeal, and 5 = meets a need or has great appeal.)

CHOICE (coded 1-5, where 1 = chose FOODCOOP, 2 = chose CREDITUNION, 3 = chose neighborhood resource CENTER, 4 = chose TOOLPOOL, 5 = chose PARK)

GARDENCLUB MEMBERS--ALPHABETICAL LIST
5/27/76

SUPPOSE THE GARDEN CLUB WANTED TO PRODUCE A DIRECTORY OF ITS MEMBERS. AN ALPHABETICAL LIST IS THE HEART OF SUCH A DIRECTORY.

NAME	ADDRESS	PHONE	RECORD NUMBER
BALDWIN, WILLIAM G.	720 G	936-0280	7
BARON, HAROLD	122 5TH	453-7407	11
BECK, THELMA	825 9TH	460-2555	14
BROWN, CAL	568 7TH	611-5830	28
BULLOCK, RHODA	776 C	760-3462	31
BUMP, DONALD	683 9TH	320-8303	32
BUTLER, DOREEN E.	837 9TH	208-1014	37
CHAMBERS, JAMES E.	200 9TH	864-1506	43
DIETZ, RUSS	222 8TH	620-4765	71
EMMETT, PETER	671 7TH	062-0003	76
GARNIER, CATHERINE	326 G	851-3280	86
GARNIER, NATALIA	612 2ND	411-5481	87
HILDEBRANDT, MR. WILLIAM	858 4TH	160-8610	111
HUGHES, MARK	287 8TH	UNKNOWN	119
JOHNSON, TERRY	867 4TH	877-5760	131
JOHNSON,	687 3RD	566-7714	133
KELLY, M.E.	752 8TH	460-6271	138
KENNEDY, H.H.	755 4TH	358-4870	139
KIND, VON	312 C	183-5754	141
LAPIDUS, J.C.	442 2ND	770-0444	153
LAUNDER, WARREN L.	314 G	342-6856	156
LA LARRY	181 6TH	344-2340	159
LEISSE, JOSEPH F. JR.	285 E	843-4631	162
MASARIK, JACK	754 7TH	604-7067	173
MCDONALD, HELEN	184 2ND	116-6480	179
MCINTIRE, GEORGE H.	235 4TH	UNKNOWN	183
MEAD, LANA	200 7TH	413-1330	185
SCHAEFER, CAROLINE PAULINE	575 4TH	250-0430	256
SERVEN, MR. TERRY	775 G	143-0164	259
SHELBY, ANN M.	735 3RD	810-6733	261
STRAVENS, MARVIN	604 4TH	UNKNOWN	271
SZEIMIES, PETER	534 8TH	453-2220	275
URQUHART, BECKIE	340 2ND	010-4355	282
WALLACE, GERALD	300 3RD	UNKNOWN	286
WRIGHT, JUNE	246 9TH	770-3561	304
ZOLA, FREDERICK	634 2ND	245-0003	310

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINCIDENTAL.

GARDENCLUB MEMBERS--ADDRESS LIST
5/27/76

SUPPOSE THE GARDEN CLUB WANTED TO PRODUCE A DIRECTORY OF ITS MEMBERS. IN ADDITION TO AN ALPHABETICAL LIST, A LIST IN ADDRESS ORDER MIGHT BE USEFUL. MEMBERS LIVING ON THE SAME BLOCK OR STREET MIGHT SHARE RIDES TO MEETINGS, TOOLS, FOOD SUPLUSES, OR WHATEVER.

NAME	ADDRESS	PHONE	RECORD NUMBER
MCDONALD, HELEN	184 2ND	116-6488	179
URQUHART, BECKIE	340 2ND	810-4355	282
LAPIDUS, J.C.	442 2ND	778-0444	153
GARNIER, NATALIA	612 2ND	411-5481	87
ZOLA, FREDERICK	634 2ND	245-0883	310
WALLACE, GERALD	380 3RD	UNKNOWN	286
JOHNSON,	687 3RD	566-7714	133
SHELBY, ANN M.	735 3RD	810-6733	261
MCINTIRE, GEORGE H.	235 4TH	UNKNOWN	183
SCHAEFER, CAROLINE PAULINE	575 4TH	250-0430	256
STRAYENS, MARVIN	604 4TH	UNKNOWN	271
KENNEDY, H.H.	755 4TH	358-4878	139
HILDEBRANDT, MR. WILLIAM	858 4TH	160-8610	111
JOHNSON, TERRY	867 4TH	877-5768	131
BARON, HAROLD	122 5TH	453-7407	11
LA LARRY	181 6TH	344-2340	159
MEAD, LANA	208 7TH	413-1330	185
BROWN, CAL	568 7TH	611-5630	20
EMMETT, PETER	671 7TH	862-0003	76
MASARIK, JACK	754 7TH	604-7067	173
DIETZ, RUSS	222 8TH	620-4765	71
HUGHES, MARK	287 8TH	UNKNOWN	119
SZEIMIES, PETER	534 8TH	453-2228	275
KELLY, M.E.	752 8TH	468-6271	138
BUTLER, DOREEN E.	837 9TH	208-1014	37
CHAMBERS, JAMES E.	206 9TH	864-1506	43
WRIGHT, JUNE	246 9TH	778-3561	304
BUMP, DONALD	683 9TH	328-8303	32
BECK, THELMA	825 9TH	460-2555	14
KIND, VON	312 C	183-5754	141
BULLOCK, RHODA	776 C	768-3462	31
LEISSE, JOSEPH F. JR.	285 E	843-4631	162
LAUNDER, WARREN L.	314 G	342-6856	156
GARNIER, CATHERINE	326 G	851-3280	86
BALDWIN, WILLIAM G.	720 G	836-0208	7
SERVEN, MR. TERRY	775 G	143-0164	259

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BLOCK REPRESENTATIVES
5/27/76

ONE WAY OF COMMUNICATING WITH EVERYONE IN A NEIGHBORHOOD IS THROUGH A SYSTEM OF BLOCK REPRESENTATIVES. THIS IS A LIST OF BLOCK REPS FOR THE FIRST 20 BLOCKS IN THE NEIGHBORHOOD. NOTE THERE IS NO BLOCK REP FOR BLOCK NUMBER 1.

NAME	ADDRESS	PHONE	RECORD NUMBER
BROWN, CAL	568 7TH	611-5830	28
BLOCK = 2			
FIELDING, ELLEN	228 8TH	434-3818	81
BLOCK = 3			
ASPY, L.R.	572 1ST	710-6424	2
BLOCK = 4			
CHAMBERS, JAMES E.	208 9TH	864-1506	43
BLOCK = 5			
BAKER, MR. E. EDWARD	576 D	883-7581	6
BLOCK = 6			
BUROW, MRS. R.	344 A	720-8208	35
BLOCK = 7			
CLOW, JEAN	886 6TH	646-6127	54
BLOCK = 8			
BOCCI, W.L.	843 4TH	561-3507	21
BLOCK = 9			
RINELLA, MRS. RALPH	255 10TH	780-7814	240
BLOCK = 10			
HANSON, GERALD D.	181 2ND	118-4740	101
BLOCK = 11			
BOCCI, MRS. WALTER	385 4TH	875-7247	20
BLOCK = 12			
CALDWELL, JACK B.	381 10TH	475-5867	39
BLOCK = 13			
BRANDT, JAMES E.	413 D	811-6122	24
BLOCK = 14			
GREENE, CHAD	124 10TH	718-2164	95
BLOCK = 15			
BODE, JIM	806 1ST	541-6676	22
BLOCK = 16			
BALDWIN, WILLIAM G.	720 G	836-8200	7
BLOCK = 17			
ANDRICK, RICHARD	372 2ND #2	501-4227	1
BLOCK = 18			
CLARK, MRS. PAT	457 7TH	807-3432	48
BLOCK = 19			
DYKE, ADRIENNE	458 A	574-3074	75
BLOCK = 20			
BECKNER, VIOLA	640 1ST	388-8281	15
BLOCK = 21			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINDIDENTAL.

PEOPLE WHO NEED HELP WITH HOME REPAIRS
5/27/76

SUPPOSE THE NEIGHBORHOOD WERE STARTING A PROJECT TO HELP THOSE PEOPLE WHO NEEDED ASSISTANCE WITH SIMPLE HOME REPAIRS. THIS LIST SHOWS THESE PEOPLE AND THEIR OWN COMMENTS ABOUT THEIR SITUATION. PERHAPS SOME TRADES COULD BE WORKED OUT WITH PEOPLE WHO HAD HOME REPAIR SKILLS TO OFFER. THIS LIST HAS BEEN LIMITED TO 7 NAMES BECAUSE IT IS AN EXAMPLE.

NAME	ADDRESS	PHONE	RECORD NUMBER
AULT, JULES	246 2ND	207-4421	3
HOMEREPAIR = 1 WIRING = 3			
I'M A RETIRED ELECTRICIAN. I NEED HELP WITH YARDWORK BECAUSE OF RECENT HEART ATTACK. WILL PAY.			
BARON, MARTHA	258 6TH	351-1687	10
HOMEREPAIR = 1 ACCOUNTING = 4			
LICENSED TAX RETURN PREPARATION. NEED HELP PUTTING UP STORM WINDOWS, CLEANING GUTTERS, ETC.			
BELAIR, CLARENCE	175 2ND	285-7588	18
AUTOREPAIR = 1 HOMEREPAIR = 1 ART = 4			
ON LIMITED INCOME. NEED INEXPENSIVE AUTO REPAIR AND HOME MAINTENANCE. WOULD ALSO LIKE TO SELL ORIGINAL OIL PAINTINGS. THANKS.			
BOCCI, MRS. WALTER	305 4TH	875-7247	20
HOMEREPAIR = 1 CHILDCARE = 4			
WILL BABYSIT YOUR CHILD IN YOUR HOME. REASONABLE RATES, RELIABLE, REFERENCES. "PROFESSIONAL GRANDMOTHER." NEED SOMEONE TO FIX BROKEN WINDOW FOR ME.			
BULLOCK, RHODA	776 C	768-3462	31
HOMEREPAIR = 1 GARDENING = 5 CHILDCARE = 3 TYPING = 1			
INFORMATION = 1			
I'VE BEEN OR ORGANIC GARDENER ALL MY LIFE AND WANT TO TEACH OTHERS THE ORGANIC WAY. I NEED HELP IN PREPARING A BOOKLET ABOUT ORGANIC GARDENING IN THIS AREA. WILL BABYSIT IN EXCHANGE FOR TYPING AND ORGANIZATION HELP ON MY BOOK.			
BUMP, HELEN	258 5TH	415-5588	33
HOMEREPAIR = 1 HEALTHCARE = 1 CHILDCARE = 1			
NEED WEEKLY BLOOD PRESSURE CHECKS AND HELP WITH SIMPLE HOME REPAIRS. ALSO NEED BABYSITTING ON WEEKENDS.			
CAMPBELL, MRS. WILLIAM	422 9TH	118-6870	40
HOMEREPAIR = 1 HEALTHCARE = 1			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINCIDENTAL.

PEOPLE IN HOMES VALUED AT LESS THAN $16,000 WHO NEED HELP WITH HOME REPAIRS
5/27/76

SUPPOSE SOME MONEY WERE AVAILABLE TO ASSIST THOSE NEEDING HOME REPAIRS IF THEY LIVE IN LOW-COST HOUSING. THIS IS A LIST OF THOSE WHO NEED THIS HELP AND WHO LIVE IN HOUSES WITH AN ASSESSED VALUE OF UNDER $16,000.

NAME	ADDRESS	PHONE	RECORD NUMBER
BUMP, HELEN	258 5TH	415-5500	33
VALUE = 10			
AULT, JULES	246 2ND	207-4421	3
VALUE = 11			
CAMPBELL, MRS. WILLIAM	422 9TH	110-8070	40
VALUE = 11			
CAMPBELL, WILLIAM	542 9TH	601-1365	41
VALUE = 11			
RUHL, SARAH	537 6TH	163-8837	248
VALUE = 11			
CRUDEN, D.M.	478 2ND	808-2773	62
VALUE = 13			
GASSNER, NORMAN	163 4TH	121-2234	89
VALUE = 13			
HAIST, DORIS	314 7TH	257-7302	99
VALUE = 13			
PAPEZ, MICHAEL	347 2ND	826-6843	214
VALUE = 13			
CLARK, MRS	171 6TH	378-8102	49
VALUE = 15			
KNOUFF, PATRICK	714 8TH	426-8164	147
VALUE = 15			
WIDMAN, COLLEEN	315 8TH	UNKNOWN	299
VALUE = 15			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINCIDENTAL.

PEOPLE 60 AND OVER WHO NEED HELP WITH HOME REPAIRS
5/27/76

SUPPOSE SOME MONEY OR LABOR WERE AVAILABLE TO ASSIST THOSE NEEDING HOME REPAIRS IF THEY ARE SENIOR CITIZENS. THIS IS A LIST OF THOSE WHO NEED THIS HELP AND WHO ARE AT LEAST 60 YEARS OLD.

NAME	ADDRESS	PHONE	RECORD NUMBER
WIDMAN, COLLEEN	315 8TH	UNKNOWN	299
AGE = 61			
BELAIR, CLARENCE	175 2ND	285-7500	18
AGE = 62			
WILSON, FRIEDA	262 6TH	821-6871	301
AGE = 62			
HAIST, DORIS	314 7TH	257-7302	99
AGE = 64			
KNOUFF, PATRICK	714 8TH	426-8164	147
AGE = 68			
WHITNEY, PETER	403 C	801-7276	295
AGE = 68			
BULLOCK, RHODA	776 C	768-3462	31
AGE = 71			
BARON, MARTHA	250 6TH	351-1687	10
AGE = 72			
LESELLON, VELLE	112 7TH	255-5541	164
AGE = 72			
AULT, JULES	246 2ND	207-4421	3
AGE = 74			
CRUDEN, D.M.	478 2ND	808-2773	62
AGE = 79			
BOCCI, MRS. WALTER	305 4TH	875-7247	28
AGE = 83			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINDIDENTAL.

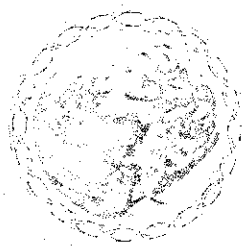
```
      INTERVIEW
 NAME    =CLOW, JEAN
 ADDRESS=866 6TH
 PHONE   =646-6127
          (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

      THIS IS THE NEIGHBORHOOD ASSOCIATION TELEPHONE SURVEY.  YOU HAVE
BEEN CHOSEN AT RANDOM TO BE PART OF OUR SAMPLE TODAY.  THE NEIGHBORHOOD
COUNCIL WOULD APPRECIATE KNOWING YOUR OPINIONS ABOUT THE DIRECTION THE
NEIGHBORHOOD SHOULD GO IN THE NEXT YEAR.
      THERE ARE SEVERAL NEIGHBORHOOD SERVICES WE MIGHT START IN THE NEXT
YEAR.  I'LL READ THEM TO YOU.  FOR EACH ONE, I'D LIKE YOU TO TELL ME
HOW MUCH IT APPEALS TO YOU ON A SCALE OF 1-5.  A 5 MEANS THIS SERVICE
MEETS A NEED YOU HAVE OR REALLY APPEALS TO YOU, AND 1 MEANS YOU'RE NOT
INTERESTED IN IT AT ALL.  READY?
          (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

1.    FOOD BUYING CO-OPS WORK BY HAVING A GROUP OF PEOPLE POOL THEIR
GROCERY ORDERS SO FOOD CAN BE BOUGHT IN LARGE QUANTITIES AT LOWER
PRICES.  ON A SCALE OF 1-5, HOW MUCH WOULD A NEIGHBORHOOD FOOD
BUYING CO-OP APPEAL TO YOU?    (ENTER 1, 2, 3, 4, OR 5.)  3
2.    CREDIT UNIONS HAVE BEEN A PART OF AMERICAN LIFE SINCE 1908.
IF THE NEIGHBORHOOD CAN GET A CHARTER FOR A CREDIT UNION, NEIGHBORS
COULD INVEST AND BORROW MONEY AT GOOD RATES OF INTEREST AND KEEP THE
MONEY IN THE NEIGHBORHOOD.  ON A SCALE OF 1-5, HOW MUCH DOES THE
NEIGHBORHOOD CREDIT UNION APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  2
3.    SOME NEIGHBORS HAVE TALKED ABOUT THE NEED FOR A NEIGHBORHOOD
RESOURCE CENTER WHERE THE SKILLS EXCHANGE WOULD BE LOCATED, AS WELL
AS ALL SORTS OF INFORMATION ABOUT THE NEIGHBORHOOD AND COMMUNITY
RESOURCES.  ON A SCALE OF 1-5, HOW MUCH DOES A NEIGHBORHOOD RESOURCE
CENTER APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  5
4.    A NEIGHBORHOOD TOOL POOL WOULD PROVIDE A COLLECTION OF TOOLS
OWNED BY THE NEIGHBORHOOD THAT COULD BE CHECKED OUT ON A ROTATING BASIS,
LIKE LIBRARY BOOKS.  THERE MIGHT BE A SMALL MAINTENANCE FEE.  ON A SCALE
OF 1-5, HOW MUCH DOES A NEIGHBORHOOD TOOL POOL APPEAL TO YOU?  (ENTER 1,
2, 3, 4, OR 5.)  4
5.    THE LARGE FIELD ON CEDAR STREET MIGHT BECOME AVAILABLE FOR A SMALL
NEIGHBORHOOD PARK AND PLAYGROUND, IF THE NEIGHBORHOOD IS WILLING TO
PLAN THE PARK AND BUILD WHATEVER EQUIPMENT AND STRUCTURES WE WANT.
THE CITY WILL MAINTAIN IT.  ON A SCALE OF 1-5, HOW MUCH DOES A NEIGHBOR-
HOOD PARK AND PLAYGROUND APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  2
6.    IF THE NEIGHBORHOOD CAN ONLY UNDERTAKE ONE NEW PROJECT THIS YEAR,
WHICH OF THE ONES MENTIONED WOULD YOU CHOOSE--FOOD COOP (1), CREDIT UNION
(2), RESOURCE CENTER (3), TOOL POOL (4), OR PARK (5)?  (ENTER 1, 2, 3, 4,
OR 5.)  3
THANK YOU VERY MUCH FOR PARTICIPATING IN THIS NEIGHBORHOOD SURVEY.
          (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

      GETITEM 'CHOICE'

      GRAPH CHOICE
CODE   COUNT   PERCENT
  1        9     17.29   XXXXXXXXX
  2        9     17.29   XXXXXXXXX
  3       14     26.92   XXXXXXXXXXXXXX
  4       14     26.92   XXXXXXXXXXXXXX
  5        6     11.53   XXXXXX
TOTL      52
```



May 28, 1976

SAMPLE OUTPUT FROM A NEIGHBORHOOD INFORMATION SYSTEM

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

SAMPLE KEYWORDS AND CODES FOR A NEIGHBORHOOD INFORMATION SYSTEM

Basic information about each household

BLOCK (coded 1-50 to indicate block number)
ZONE (coded 1 = residential, 2 = multi-family, 3 = commercial)
VALUE (coded 10-25 to indicate the assessed value of the house in thousands of dollars; that is, 10 means an assessed value of $10,000)
PEOPLE (coded 1-6 to indicate the number of people in the household)
HEATING (coded 1 = oil, 2 = gas, 3 = electric, 4 = wood)

Skills needed or offered

All these skill keywords are coded 0-5, where 0 = no interest, 1 = need help, 2 = have skill and will trade, 3 = have skill and will trade or charge, 4 = have skill and will charge money for it, and 5 = have skill and will teach it.

AUTOREPAIR	GARDENING	MUSIC
BIKEREPAIR	ACCOUNTING	VIDEO
HOMEREPAIR	HEALTHCARE	FILM
CARPENTRY	SEWING	TVREPAIR
WIRING	CHILDCARE	ART
PLUMBING	LEGAL	SPORTS
FOOD	TYPING	INFORMATION

Neighborhood groups

All these neighborhood groups and committees are coded 0-1, where 0 = not a member and 1 = is a member.

BLOCKREP (block representative)
COUNCIL (neighborhood council)
MONEYCOM (finance committee)
TELEPHONER (telephone tree)
NEWSCOM (newsletter committee)
PUBLICITY (publicity committee)
INFOCOM (information committee)
WOMENSGROUP (women's group)
MENSGROUP (men's group)
GARDENCLUB (garden club)
PLANNING (planning task force)

Telephone survey questions

The sample telephone survey questions included here are coded 1-5, as indicated.

FOODCOOP
CREDITUNION
CENTER
TOOLPOOL
PARK

(These are coded by the respondent, where 1 = has little or no appeal, and 5 = meets a need or has great appeal.)

CHOICE (coded 1-5, where 1 = chose FOODCOOP, 2 = chose CREDITUNION, 3 = chose neighborhood resource CENTER, 4 = chose TOOLPOOL, 5 = chose PARK)

GARDENCLUB MEMBERS--ALPHABETICAL LIST
5/27/76

SUPPOSE THE GARDEN CLUB WANTED TO PRODUCE A DIRECTORY OF ITS MEMBERS. AN ALPHABETICAL LIST IS THE HEART OF SUCH A DIRECTORY.

NAME	ADDRESS	PHONE	RECORD NUMBER
BALDWIN, WILLIAM G.	720 G	836-8260	7
BARON, HAROLD	122 5TH	453-7407	11
BECK, THELMA	825 9TH	468-2555	14
BROWN, CAL	568 7TH	611-5630	28
BULLOCK, RHODA	776 C	768-3462	31
BUMP, DONALD	683 9TH	328-8383	32
BUTLER, DOREEN E.	837 9TH	288-1814	37
CHAMBERS, JAMES E.	208 9TH	864-1586	43
DIETZ, RUSS	222 8TH	620-4765	71
EMMETT, PETER	671 7TH	862-8883	76
GARNIER, CATHERINE	326 G	851-3280	86
GARNIER, NATALIA	612 2ND	411-5481	87
HILDEBRANDT, MR. WILLIAM	858 4TH	160-8618	111
HUGHES, MARK	297 8TH	UNKNOWN	119
JOHNSON, TERRY	867 4TH	877-5768	131
JOHNSON,	687 3RD	566-7714	133
KELLY, M.E.	752 8TH	468-6271	138
KENNEDY, H.H.	755 4TH	358-4878	139
KIND, VON	312 C	183-5754	141
LAPIDUS, J.C.	442 2ND	778-8444	153
LAUNDER, WARREN L.	314 G	342-6856	156
LA LARRY	181 6TH	344-2340	159
LEISSE, JOSEPH F. JR.	285 E	843-4631	162
NASARIK, JACK	754 7TH	684-7867	173
MCDONALD, HELEN	184 2ND	116-6488	179
MCINTIRE, GEORGE H.	235 4TH	UNKNOWN	183
MEAD, LANA	288 7TH	413-1330	185
SCHAEFER, CAROLINE PAULINE	575 4TH	258-8438	256
SERVEN, MR. TERRY	775 G	143-8164	259
SHELBY, ANN M.	735 3RD	818-6733	261
STRAVENS, MARVIN	684 4TH	UNKNOWN	271
SZEIMIES, PETER	534 8TH	453-2228	275
URQUHART, BECKIE	340 2ND	818-4355	282
WALLACE, GERALD	388 3RD	UNKNOWN	286
WRIGHT, JUNE	246 9TH	778-3561	304
ZOLA, FREDERICK	634 2ND	245-8883	318

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINCIDENTAL.

GARDENCLUB MEMBERS--ADDRESS LIST
5/27/76

SUPPOSE THE GARDEN CLUB WANTED TO PRODUCE A DIRECTORY OF ITS MEMBERS. IN ADDITION TO AN ALPHABETICAL LIST, A LIST IN ADDRESS ORDER MIGHT BE USEFUL. MEMBERS LIVING ON THE SAME BLOCK OR STREET MIGHT SHARE RIDES TO MEETINGS, TOOLS, FOOD SUPLUSES, OR WHATEVER.

NAME	ADDRESS	PHONE	RECORD NUMBER
MCDONALD, HELEN	184 2ND	116-6488	179
URQUHART, BECKIE	340 2ND	810-4355	282
LAPIDUS, J.C.	442 2ND	778-0444	153
GARNIER, NATALIA	612 2ND	411-5481	87
ZOLA, FREDERICK	634 2ND	245-0883	310
WALLACE, GERALD	380 3RD	UNKNOWN	296
JOHNSON,	687 3RD	566-7714	133
SHELBY, ANN N.	735 3RD	810-6733	261
MCINTIRE, GEORGE H.	235 4TH	UNKNOWN	183
SCHAEFER, CAROLINE PAULINE	575 4TH	258-0438	256
STRAVENS, MARVIN	604 4TH	UNKNOWN	271
KENNEDY, H.H.	755 4TH	358-4878	139
HILDEBRANDT, MR. WILLIAM	856 4TH	168-8618	111
JOHNSON, TERRY	867 4TH	877-5769	131
BARON, HAROLD	122 5TH	453-7407	11
LA LARRY	181 6TH	344-2340	159
MEAD, LANA	253 7TH	413-1338	185
BROWN, CAL	569 7TH	611-5838	28
EMMETT, PETER	671 7TH	862-0883	76
MASARIK, JACK	754 7TH	604-7867	173
DIETZ, RUSS	222 8TH	628-4765	71
HUGHES, MARK	287 8TH	UNKNOWN	119
SZEIMIES, PETER	534 8TH	453-2228	275
KELLY, M.E.	752 8TH	468-6271	138
BUTLER, DOREEN E.	837 9TH	288-1814	37
CHAMBERS, JAMES E	228 9TH	864-1586	43
WRIGHT, JUNE	246 9TH	778-3561	304
BUMP, DONALD	683 9TH	328-8383	32
BECK, THELMA	825 9TH	468-2555	14
KING, VON	312 C	183-5754	141
BULLOCK, RHODA	776 C	768-3462	31
LEISSE, JOSEPH P. JR.	286 E	843-4631	162
LAUNDER, WARREN L.	314 G	342-6356	156
GARNIER, CATHERINE	326 G	851-3260	86
BALDWIN, WILLIAM G.	728 G	836-8283	7
SERVEN, MR. TERRY	775 G	143-8164	259

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BLOCK REPRESENTATIVES
5/27/76

ONE WAY OF COMMUNICATING WITH EVERYONE IN A NEIGHBORHOOD IS THROUGH A SYSTEM OF BLOCK REPRESENTATIVES. THIS IS A LIST OF BLOCK REPS FOR THE FIRST 20 BLOCKS IN THE NEIGHBORHOOD. NOTE THERE IS NO BLOCK REP FOR BLOCK NUMBER 1.

NAME	ADDRESS	PHONE	RECORD NUMBER
BROWN, CAL	568 7TH	611-5938	28
BLOCK = 2			
FIELDING, ELLEN	228 8TH	434-3818	81
BLOCK = 3			
ASPY, L.R.	572 1ST	718-6424	2
BLOCK = 4			
CHAMBERS, JAMES E.	288 9TH	864-1536	43
BLOCK = 5			
BAKER, MR. E. EDWARD	576 D	883-7581	6
BLOCK = 6			
BUROW, MRS. R.	344 A	728-8288	35
BLOCK = 7			
CLOW, JEAN	886 6TH	646-6127	54
BLOCK = 8			
BOCCI, W.L.	843 4TH	561-3587	21
BLOCK = 9			
RINELLA, MRS. RALPH	255 10TH	788-7814	248
BLOCK = 10			
HANSON, GERALD D.	181 2ND	116-4748	101
BLOCK = 11			
BOCCI, MRS. WALTER	385 4TH	875-7247	29
BLOCK = 12			
CALDWELL, JACK B.	381 10TH	475-5847	39
BLOCK = 13			
BRANDT, JAMES E.	413 D	311-6122	24
BLOCK = 14			
GREENE, CHAD	124 10TH	718-2164	95
BLOCK = 15			
BODE, JIM	886 1ST	541-6676	22
BLOCK = 16			
BALDWIN, WILLIAM G.	728 G	836-8288	7
BLOCK = 17			
ANDRICK, RICHARD	372 2ND #2	581-4227	1
BLOCK = 18			
CLARK, MRS. PAT	457 7TH	887-3432	48
BLOCK = 19			
DYKE, ADRIENNE	458 A	574-3874	75
BLOCK = 20			
BECKNER, VIOLA	648 1ST	388-8281	15
BLOCK = 21			

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PEOPLE WHO NEED HELP WITH HOME REPAIRS
5/27/76

SUPPOSE THE NEIGHBORHOOD WERE STARTING A PROJECT TO HELP THOSE PEOPLE WHO NEEDED ASSISTANCE WITH SIMPLE HOME REPAIRS. THIS LIST SHOWS THESE PEOPLE AND THEIR OWN COMMENTS ABOUT THEIR SITUATION. PERHAPS SOME TRADES COULD BE WORKED OUT WITH PEOPLE WHO HAD HOME REPAIR SKILLS TO OFFER. THIS LIST HAS BEEN LIMITED TO 7 NAMES BECAUSE IT IS AN EXAMPLE.

NAME	ADDRESS	PHONE	RECORD NUMBER
AULT, JULES	246 2ND	287-4421	3
HOMEREPAIR = 1 WIRING = 5			
I'M A RETIRED ELECTRICIAN. I NEED HELP WITH YARDWORK BECAUSE OF RECENT HEART ATTACK. WILL PAY.			
BARON, MARTHA	250 6TH	351-1687	10
HOMEREPAIR = 1 ACCOUNTING = 4			
LICENSED TAX RETURN PREPARATION. NEED HELP PUTTING UP STORM WINDOWS, CLEANING GUTTERS, ETC.			
BELAIR, CLARENCE	175 2ND	285-7588	18
AUTOREPAIR = 1 HOMEREPAIR = 1 ART = 4			
ON LIMITED INCOME. NEED INEXPENSIVE AUTO REPAIR AND HOME MAINTENANCE. WOULD ALSO LIKE TO SELL ORIGINAL OIL PAINTINGS. THANKS.			
BOCCI, MRS. WALTER	385 4TH	879-7247	29
HOMEREPAIR = 1 CHILDCARE = 4			
WILL BABYSIT YOUR CHILD IN YOUR HOME. REASONABLE RATES. RELIABLE, REFERENCES. "PROFESSIONAL GRANDMOTHER." NEED SOMEONE TO FIX BROKEN WINDOW FOR ME.			
BULLOCK, RHONA	776 C	768-3462	31
HOMEREPAIR = 1 GARDENING = 2 CHILDCARE = 3 TYPING = 1			
INFORMATION = 1			
I'VE BEEN AN ORGANIC GARDENER ALL MY LIFE AND WANT TO TEACH OTHERS THE ORGANIC WAY. I NEED HELP IN PREPARING A BOOKLET ABOUT ORGANIC GARDENING IN THIS AREA. WILL BABYSIT IN EXCHANGE FOR TYPING AND ORGANIZATION HELP ON MY BOOK.			
BUMP, HELEN	258 5TH	415-5588	33
HOMEREPAIR = 1 HEALTHCARE = 1 CHILDCARE = 1			
NEED WEEKLY BLOOD PRESSURE CHECKS AND HELP WITH SIMPLE HOME REPAIRS. ALSO NEED BABYSITTING ON WEEKENDS.			
CAMPBELL, MRS. WILLIAM	422 9TH	110-9078	48
HOMEREPAIR = 1 HEALTHCARE = 1			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINCIDENTAL.

PEOPLE IN HOMES VALUED AT LESS THAN $16,000 WHO NEED HELP WITH HOME REPAIRS
5/27/76.

SUPPOSE SOME MONEY WERE AVAILABLE TO ASSIST THOSE NEEDING HOME REPAIRS IF THEY LIVE IN LOW-COST HOUSING. THIS IS A LIST OF THOSE WHO NEED THIS HELP AND WHO LIVE IN HOUSES WITH AN ASSESSED VALUE OF UNDER $16,000.

NAME	ADDRESS	PHONE	RECORD NUMBER
BUMP, HELEN	250 5TH	415-5500	33
VALUE = 10			
AULT, JULES	246 2ND	207-4421	3
VALUE = 11			
CAMPBELL, MRS. WILLIAM	422 9TH	118-8970	40
VALUE = 11			
CAMPBELL, WILLIAM	542 9TH	681-1365	41
VALUE = 11			
COHL, SARAH	537 6TH	163-8837	248
VALUE = 11			
CRUDEN, O.M.	470 2ND	888-2773	62
VALUE = 13			
GASSNER, NORMAN	163 4TH	121-2234	89
VALUE = 13			
HAIST, DORIS	314 7TH	257-7382	99
VALUE = 13			
PAPEZ, MICHAEL	347 2ND	826-6843	214
VALUE = 13			
CLARK, MRS	171 6TH	378-8182	49
VALUE = 15			
KNOLFF, PATRICK	714 9TH	426-8164	147
VALUE = 15			
WIDMAN, COLLEEN	315 8TH	UNKNOWN	299
VALUE = 15			

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PEOPLE 60 AND OVER WHO NEED HELP WITH HOME REPAIRS
5/27/76

SUPPOSE SOME MONEY OR LABOR WERE AVAILABLE TO ASSIST THOSE NEEDING HOME REPAIRS IF THEY ARE SENIOR CITIZENS. THIS IS A LIST OF THOSE WHO NEED THIS HELP AND WHO ARE AT LEAST 60 YEARS OLD.

NAME	ADDRESS	PHONE	RECORD NUMBER
WIDMAN, COLLEEN	315 9TH	UNKNOWN	299
AGE = 61			
BELAIR, CLARENCE	175 2ND	285-7500	18
AGE = 62			
WILSON, FRIEDA	262 6TH	821-6871	301
AGE = 62			
HAIST, DORIS	314 7TH	257-7382	99
AGE = 64			
KNOUFF, PATRICK	714 8TH	426-8164	147
AGE = 66			
WHITNEY, PETER	403 C	881-7276	295
AGE = 68			
BULLOCK, RHODA	776 C	768-3462	31
AGE = 71			
BARON, MARTHA	250 6TH	351-1607	10
AGE = 72			
LESELLON, VELLE	112 7TH	255-5541	164
AGE = 72			
AULT, JULES	246 2ND	207-4421	3
AGE = 74			
CRUDEN, D.M.	470 2ND	888-2773	62
AGE = 79			
BOCCI, MRS. WALTER	305 4TH	875-7247	20
AGE = 83			

THIS IS SAMPLE DATA ONLY. ANY RESEMBLANCE TO REAL PEOPLE IS PURELY COINDIDENTAL.

```
      INTERVIEW
NAME    =CLOW, JERR
ADDRESS=886 6TH
PHONE   =646-6127
            (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

      THIS IS THE NEIGHBORHOOD ASSOCIATION TELEPHONE SURVEY.  YOU HAVE
BEEN CHOSEN AT RANDOM TO BE PART OF OUR SAMPLE TODAY.  THE NEIGHBORHOOD
COUNCIL WOULD APPRECIATE KNOWING YOUR OPINIONS ABOUT THE DIRECTION THE
NEIGHBORHOOD SHOULD GO IN THE NEXT YEAR.
      THERE ARE SEVERAL NEIGHBORHOOD SERVICES WE MIGHT START IN THE NEXT
YEAR.  I'LL READ THEM TO YOU.  FOR EACH ONE, I'D LIKE YOU TO TELL ME
HOW MUCH IT APPEALS TO YOU ON A SCALE OF 1-5.  A 5 MEANS THIS SERVICE
MEETS A NEED YOU HAVE OR REALLY APPEALS TO YOU, AND 1 MEANS YOU'RE NOT
INTERESTED IN IT AT ALL.  READY?
            (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

1.    FOOD BUYING CO-OPS WORK BY HAVING A GROUP OF PEOPLE POOL THEIR
GROCERY ORDERS SO FOOD CAN BE BOUGHT IN LARGE QUANTITIES AT LOWER
PRICES.  ON A SCALE OF 1-5, HOW MUCH WOULD A NEIGHBORHOOD FOOD
BUYING CO-OP APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  3
2.    CREDIT UNIONS HAVE BEEN A PART OF AMERICAN LIFE SINCE 1908.
IF THE NEIGHBORHOOD CAN GET A CHARTER FOR A CREDIT UNION, NEIGHBORS
COULD INVEST AND BORROW MONEY AT GOOD RATES OF INTEREST AND KEEP THE
MONEY IN THE NEIGHBORHOOD.  ON A SCALE OF 1-5, HOW MUCH DOES THE
NEIGHBORHOOD CREDIT UNION APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  2
3.    SOME NEIGHBORS HAVE TALKED ABOUT THE NEED FOR A NEIGHBORHOOD
RESOURCE CENTER WHERE THE SKILLS EXCHANGE WOULD BE LOCATED, AS WELL
AS ALL SORTS OF INFORMATION ABOUT THE NEIGHBORHOOD AND COMMUNITY
RESOURCES.  ON A SCALE OF 1-5, HOW MUCH DOES A NEIGHBORHOOD RESOURCE
CENTER APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  5
4.    A NEIGHBORHOOD TOOL POOL WOULD PROVIDE A COLLECTION OF TOOLS
OWNED BY THE NEIGHBORHOOD THAT COULD BE CHECKED OUT ON A ROTATING BASIS,
LIKE LIBRARY BOOKS.  THERE MIGHT BE A SMALL MAINTENANCE FEE.  ON A SCALE
OF 1-5, HOW MUCH DOES A NEIGHBORHOOD TOOL POOL APPEAL TO YOU?  (ENTER 1,
2, 3, 4, OR 5.)  4
5.    THE LARGE FIELD ON CEDAR STREET MIGHT BECOME AVAILABLE FOR A SMALL
NEIGHBORHOOD PARK AND PLAYGROUND, IF THE NEIGHBORHOOD IS WILLING TO
PLAN THE PARK AND BUILD WHATEVER EQUIPMENT AND STRUCTURES WE WANT.
THE CITY WILL MAINTAIN IT.  ON A SCALE OF 1-5, HOW MUCH DOES A NEIGHBOR-
HOOD PARK AND PLAYGROUND APPEAL TO YOU?  (ENTER 1, 2, 3, 4, OR 5.)  2
6.    IF THE NEIGHBORHOOD CAN ONLY UNDERTAKE ONE NEW PROJECT THIS YEAR,
WHICH OF THE ONES MENTIONED WOULD YOU CHOOSE--FOOD COOP (1), CREDIT UNION
(2), RESOURCE CENTER (3), TOOL POOL (4), OR PARK (5)?  (ENTER 1, 2, 3, 4,
OR 5.)  3
THANK YOU VERY MUCH FOR PARTICIPATING IN THIS NEIGHBORHOOD SURVEY.
            (HIT THE CARRIAGE RETURN KEY (CR) TO CONTINUE.)

      GETITEM 'CHOICE'

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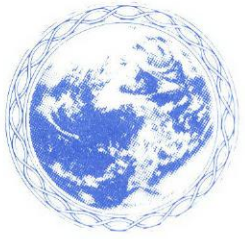

ON FACILITATING NETWORKS FOR SOCIAL CHANGE

by Peter and Trudy Johnson-Lenz

ABSTRACT

The problem of increasing societal variety is described. A suggestion is made that social networks might serve as decentralized regulators of this variety. Examples of social networks serving in this capacity are given. Methods are outlined for facilitating these networks by sharing information about the network and its members. Facilitation at various levels of recursion is discussed. Computerized conferencing is cited as a means for enhancing communication within geographically dispersed networks. Decentralized computer processing networks are mentioned as the logical hardware counterpart to support these social networks.

December, 1977

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OUR PROBLEM

We are living in times of incredible change. Scientific knowledge is doubling every ten years, individuals have increasing personal freedom in lifestyle, our technology brings us new advances and new side-effects, and rapid communications media show us problems and possibilities faster than we can assimilate them.

The increasing variety of problems and options is a blessing and a curse. The variety of new information available makes it more likely that we can find solutions to given problems--if we can find the right piece of information when we need it. The variety of personal options leads to increased freedom, but there is no strong trend toward increased responsibility to go with it. Often the governance and education systems seem to be out of phase with the changes, so their responses are not always appropriate to current situations. How can we cope with this variety?

A CYBERNETIC PRINCIPLE

One of the fundamental principles of cybernetics, Ashby's Law of Requisite Variety, states that the regulator or governor of a system must match the variety of that system in order to control it [1]. Either the variety must be reduced or the regulator expanded until there is a balance.

What Ashby's Law says is that we have a choice. We can reduce the social variety by increasing government surveillance and control, by centralizing our decision-making processes even further, by limiting our personal and collective lives, and by restricting information and research. Many would resist such increased control and limitation, and force would be necessary to maintain it. On the other hand, we can increase the variety in our regulatory system by facilitating the free exchange of information, by involving more people in the decisions which affect them and in which they have an interest, by decentralizing institutions, by encouraging localism, and so on. Although more acceptable to most people, this approach must rely on distributed power and governance, and it requires more individual responsibility (instead of dependence on government) for it to work. The political problems and implications of such decentralization are not discussed here.

SPROUTS FROM THE GRASSROOTS

One promising trend toward increasing the variety of our regulatory systems is grassroots involvement. In many places, people are coming together in loosely organized groups to make sense of and help direct the course of change in their personal and community lives. There is a resurgence of neighborhood feeling and concern in many parts of the United States. Neighborhood associations are forming to participate in planning, to deliver services to residents, to provide social support, and to participate in local governance. There are also coalitions and alliances of neighborhood associations and other community self-help groups [2]-[7]. Citizen participation and involvement is becoming more prevalent, and is even mandated

in some places. Interdisciplinary "invisible colleges" of scientists and professionals are forming to share ideas. There are many public interest and environmental groups which focus on issues they believe important and that goverment seems to ignore. There are also groups devoted to interpersonal support and personal growth [8].

The network concept is central to this trend. Many people devoted to alternatives and social change use the term network to describe their group and the relationships and flow of information within it. To them, it means a decentralized network with low centrality, where information passes quite freely among the members and is available to all within the network. Furthermore, in this context the term generally includes the idea that power is shared, that decisions are made by all those affected, that economic and physical energy is available to all. In groups with a more collective orientation, there is a notable absence of hierarchical structure, and authority is often split to assure that the ideas of any one person do not dominate. Many people involved in social change and innovation proudly call themselves "networkers." They are well practiced in the network arts: sharing information and leads to other people, helping bring people together who can mutually benefit, helping people find what they need [9].

Decentralized social change networks based in the grassroots constitute a promising beginning for a change in our governance system that has the potential for matching the variety of our time. They are especially powerful because they are grounded in people's personal lives and the friendship networks that make up our social fabric. They can begin to match the variety of problems, needs, resources, and conditions as their memberships and purposes change in response to the changing times. Being flexibly structured, they can respond more quickly than the more rigid social institutions of today [10]. If necessary, an entirely new network can emerge from the pieces of an old one. These networks can also target their responses to the appropriate places, with the appropriate levels of help. They can bring to bear many diverse talents. Being rooted in the people, they can bring local understanding to local problems which bureaucrats don't always share.

FACILITATING NETWORKS

Because of limited communications channels within and among themselves, these networks cannot always respond quickly and easily to problems and issues. Communication is often limited to sharing information through the mail, printed newsletters, and occasional telephone calls, whenever face-to-face meetings are not possible. This is a serious problem in geographically dispersed networks, such as the loosely organized Northwest Net. It includes perhaps a thousand people who are working on local food production and distribution, alternative and public access media, holistic health, land trusts, communications, and more in various subnetworks in Oregon, Washington, and Idaho. These networks are further hampered by the slowness of the natural word-of-mouth process by which people come into a network and find others with common interests. Such limitations make it difficult for these networks to evolve into a meta-network of issue-specific ad hoc groups emerging in response to issues and then fading away as the problems are solved.

If these networks are to develop further in the direction of regulating

life on the planet, they must be facilitated. Their capacity to link members and to communicate with other networks must be enhanced. This is the motivation for our work, as well as the work of others interested in the birthing of new planetary regulatory systems. Our own work consists in using the tools of the communications era (computers, telecommunications, mathematical models and methods, etc.) to increase the ability of these networks to perceive problems, to link up into adhocracies for action, and to interconnect with other networks.

Facilitating networks involves distributing information about the network to all its members. This information includes facts about members' skills, resources, needs, availability, attitudes, interests, and perceptions. It may also include information about the structure of the network. By sharing as much "access" information as possible within a network, individual members are empowered to form their own links with others, without having to rely on a central leader. By sharing information about members' perceptions, or "mental models," it becomes easier for subgroups (or subnets) to form for discussion or action. The purpose of network facilitation is to increase the number of links among members and to decrease the degree of centrality of the network.

FACILITATION THROUGH SHARING INFORMATION ABOUT PEOPLE

Many of our projects have been based on building a file of information about people in the network, containing the names, addresses, telephone numbers, and some additional information about concerns and interests. This additional information may include both keyword descriptors and free-form textual material.

The International Network for Social Network Analysis (INSNA) directory we prepared is a good example of such a file [11]. Even in print form, this information allows INSNA members access to everyone else in the network. The keyword indices provide a way to locate others in the same discipline or geographic area, or those with similar interests. The INSNA directory is now available on a computer at the University of Toronto. The on-line file can also support more complex searches; for example, for people in Canada who are sociologists, and who are interested in support networks and methods for investigating them.

By adding more descriptors for each person, more refined searches become possible, including searches based on "profiles" or sets of characteristics. The development of keyword descriptors for people in a network should be done with the advice and consent of network members. There are serious problems with an open-ended list of keywords. First, if participants make up their own descriptors, duplicate keywords with slight variations often occur. For example, one might use "gardener," while another would say "gardening." Second, synonyms or closely associated terms often appear as separate keywords, such as "women's studies," "women's movement," "feminist movement," and so on. An initial keyword list may be developed by a network organizer or facilitator, but network members should be asked if those keywords describe them adequately and what changes should be made. There should also be provisions for adding or modifying descriptors as the network changes.

Another way to bring people together in a network is to share information

about members' points of view about given topics. Recent developments in modeling theory (including Interpretive Structural Modeling) have produced techniques for structuring the elements and relationships that make up a person's view of a topic into an integrated mental model [12]. Using directed graphs, a person's mental model can be expressed as a network of concepts. Rather than using ISM techniques which produce a single group model, we have chosen to ask each person questions about the elements and relationships he or she perceives and then to "cluster" the responses into patterns (using n-way tabulations to find exact pattern matches). Then the most frequent patterns of responses (that is, the most frequent "mental models") are shared with network members. Not only does this tell members what points of view they and others hold, but it also provides an explicit opportunity for discussing points of difference. We generate the initial list of elements and the possible relationships among them with a small, diverse group of people familiar with the area or issue.

We recently used such techniques at the Oregon Information and Referral Idea Fair and Workshops. Before the Idea Fair, we generated some initial models of information and referral (I&R) and conducted a pilot test with a diverse group of people involved in community and social service I&R. Then, at the Fair, following registration, we surveyed the participants, entered their responses into the computer, analyzed the results, and later shared with the participants the most frequent mental models of information and referral, showing not only what they felt about I&R, but why [13]. By using such techniques we are sharing not only a specific interest or attitude, but we are also beginning to make explicit in broad terms the entire constellation of what a person thinks about a given area, so that everyone has a contexted picture of what others in the network think about a topic.

FACILITATION THROUGH SHARING INFORMATION ABOUT NETWORKS

Another kind of information that can help people in a network is information about the network structure--who knows whom, who has worked with whom, etc. This sort of information is common to most social network analysts, but it is relatively new to social network practitioners. We believe that such data can be used to modify and extend existing social networks. For example, if one joins a network and knows a few people, he or she can use portions of the whole network data to find friends to introduce him or her to other interesting people in the network. Brokering can also be done more formally by people in the network who enjoy match-making. Information about other networks to which one belongs can also be shared in this manner, thus providing linkages among networks through node individuals. In our experience, most changes in social networks are accomplished through existing links; we have been introduced to most of our friends by other friends. Access to whole network data of this type can facilitate the natural process of network growth.

We are also participating in network communication and facilitation on EIES (Electronic Information Exchange System), a computerized conferencing system designed by Murray Turoff. This winter, some members of INSNA will be using EIES to participate in a network of social networkers convened by Linton Freeman. This network will share ideas and work as a geographically decentralized "invisible college," combining several academic disciplines in the discussion of social network analysis [14]-[15]. Whole network data has

been collected on INSNA, and plans are being made to analyze this data to give a better picture of who its members are and how they interrelate. Similar plans are being made for studying the network structure of the social networks network on EIES, as well as of other EIES networks. What are the effects on the network structure of making that structure explicit to all the members? Will it stay the same or change, and how?

LEVELS OF FACILITATION

Facilitation must take place at several different levels of networks. First, it must happen at the level of each neighborhood and local community. We have designed and used a computer-based community information system to help organize our neighborhood for participation in a comprehensive land-use planning process. We began with a survey of our neighbors. From the survey results we developed the neighborhood's agenda for action and prepared lists of neighbors with similar concerns to serve on task forces and committees. The system was also used to form a telephone tree for communicating and responding to surprise moves from City Hall. The entire effort had a significant impact on political directions in the city [16]. In addition, the system could have been used to bring people together for social purposes, in common interest groups (e.g., gardening club, play reading group, etc.), or to exchange goods and/or services. However, the neighborhood association chose to emphasize political and planning issues rather than social organization.

We also helped a project get started in Portland, Oregon, where a neighborhood association is using a micro-computer in someone's basement to facilitate the exchange of skills and resources among neighbors [17]. Micro-computer hardware is becoming inexpensive enough ($600 and up) to enable interested neighborhoods and community groups to handle their own information needs without outside assistance. To make this happen, a variety of software packages and people willing to maintain and manage such projects are needed.

Second, facilitation must happen at larger levels of perspective--at the county, state, regional, and eventually national and global levels. At these levels there are several problems: providing communications channels for large numbers of geographically separate people, interlinking and interconnecting more local networks for large-scale action, and organizing large-scale complex problems so that the problem components and the relationships among them can be readily understood.

At these larger levels of perspective, many networks and "networking" projects exist. Harry Stevens has been designing and testing techniques for "involvement through networking" for fifteen years. He is currently developing a Science Resource Network for the Massachusetts Legislature [18] and planning a legislative exchange experiment among state legislatures via notebooks and computerized conferencing. Last winter we participated in the design and development of a social process and computer system to support city- and state-wide issue dialogues in Washington State [19]-[20]. Issues were formulated and analyzed by citizen groups, who accessed the results through an interactive computer at meetings. These issue dialogues clarified not only who felt which ways about issues, but also why they felt those ways. This can be the basis for organizing into action groups and forming political coalitions. In Hawaii, the Hawaii Health Net links people interested in holistic health

[21]. There is a state-wide technical skills bank in North Carolina, and a national skills bank is being developed by Patrick Saccomandi of the Independent Foundation [22]-[23]. On a global scale, Anthony Judge has used the network paradigm to express and interrelate perceived problems, the international organizations concerned with them, the disciplines focusing on them, and the values which make them visible [24]-[25].

IMPROVED COMMUNICATION

Networks of people also share information about topics of common interest, goals, purposes, etc. Local networks can often do this in face-to-face meetings, but geographically dispersed networks must circulate textual and graphic material through the mail. This is slow and expensive, and truly "interactive" communication is impossible. One solution to this problem is computerized conferencing, which allows groups to communicate ideas, "meet," and make decisions, without the cost of travel and the inconvenience of bringing people to a central location at a given time [26]. Such conferencing is asynchronous, since material may be entered into or retrieved from the computer at different times, thus making rapid communication within a network possible at the convenience of each individual. We are aware of several groups of scientists, social scientists, and others interested in social change who are exploring some means of bringing together geographically dispersed people into networks to share ideas, make friendships, and work together. We are helping several of these groups find appropriate state-of-the-art communications systems to support their networking activities. At present, full computerized conferencing systems are not widely available to most networks, but they will be in the future. We feel that the potential for computerized communications systems to link people in dynamic, ever-changing, decentralized networks is virtually unlimited.

In a few more years, people at home will be able to have computer terminals hooked up to their family TV sets for a few hundred dollars. Already, experiments are being conducted with systems in England that will deliver textual information to subscribers' TV screens [27]. In Columbus, Ohio 100,000 homes are now wired for two-way cable TV, which began programming in December, 1977 [28]. Such communications systems begin to support the variety in society, but they also need to be structured so that the variety is regulated, rather than expanded into chaos.

NEXT: DECENTRALIZED COMPUTER NETWORKS

Most of the current experiments in social network facilitation using computers have been limited to using a central computer to store the directory for the network, to analyze the structure of a network, and to support computerized conferencing. Even though a single, central computer may be accessed through geographically distributed computer terminals, the current state-of-the-art involves centralizing the data in one place. This centralization has the same shortcoming we mentioned before: it tends to limit variety.

Recently, computer scientists have begun experimenting with "distributed processing networks." Such a network is made up of many computers, themselves

geographically distributed. The major advantages of such networks are that local processing can be done by a local computer, sensitive data can be kept in a local computer and thus protected, other computers can "help" in a problem when needed, and the activity of the entire network can be dynamically allocated to the current set of problems. Such a decentralized network has no central data base. The data is kept in bits and pieces in the distributed computers. A distributed processing network is the logical hardware counterpart to the social networks discussed above. Loving Grace Cybernetics is currently developing a distributed processing network that will serve as a "community memory" in the San Francisco area, containing information about community needs, services, resources, and so on [29].

SUMMARY

Given the increasing variety in our society, it is necessary to find new mechanisms for coping with it and with rapid change. Either the regulatory systems need to be amplified, or the variety needs to be reduced. Networks of people coming together out of common interest and concern may serve as an adjunct to current regulatory systems to match the exploding variety. Such networks need to be organized and facilitated at various levels of recursion, beginning at the local level. Information about people's interests, mental models, abilities, concerns, values, and so forth needs to be shared within and among networks. Information about the network's structure can also be used to facilitate the development of new relationships within the network. Geographically dispersed networks of people can be facilitated through new communications technologies, including computerized conferencing. In the future, decentralized computer networks will also play a part. These trends suggest new governance and educational structures that may help us preserve our freedoms, while bringing more individual responsibility to bear on new problems.

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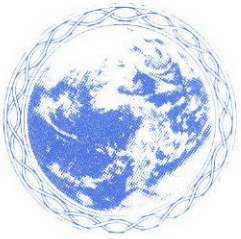

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LEVELS OF FACILITATION

Facilitation must take place at several different levels of networks. First, it must happen at the level of each neighborhood and local community. We have designed and used a computer-based community information system to help organize our neighborhood for participation in a comprehensive land-use planning process. We began with a survey of our neighbors. From the survey results we developed the neighborhood's agenda for action and prepared lists of neighbors with similar concerns to serve on task forces and committees. The system was also used to form a telephone tree for communicating and responding to surprise moves from City Hall. The entire effort had a significant impact on political directions in the city [16]. In addition, the system could have been used to bring people together for social purposes, in common interest groups (e.g., gardening club, play reading group, etc.), or to exchange goods and/or services. However, the neighborhood association chose to emphasize political and planning issues rather than social organization.

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At these larger levels of perspective, many networks and "networking" projects exist. Harry Stevens has been designing and testing techniques for "involvement through networking" for fifteen years. He is currently developing a Science Resource Network for the Massachusetts Legislature [18] and planning a legislative exchange experiment among state legislatures via notebooks and computerized conferencing. Last winter we participated in the design and development of a social process and computer system to support city- and state-wide issue dialogues in Washington State [19]-[20]. Issues were formulated and analyzed by citizen groups, who accessed the results through an interactive computer at meetings. These issue dialogues clarified not only who felt which ways about issues, but also why they felt those ways. This can be the basis for organizing into action groups and forming political coalitions. In Hawaii, the Hawaii Health Net links people interested in holistic health

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IMPROVED COMMUNICATION

Networks of people also share information about topics of common interest, goals, purposes, etc. Local networks can often do this in face-to-face meetings, but geographically dispersed networks must circulate textual and graphic material through the mail. This is slow and expensive, and truly "interactive" communication is impossible. One solution to this problem is computerized conferencing, which allows groups to communicate ideas, "meet," and make decisions, without the cost of travel and the inconvenience of bringing people to a central location at a given time [26]. Such conferencing is asynchronous, since material may be entered into or retrieved from the computer at different times, thus making rapid communication within a network possible at the convenience of each individual. We are aware of several groups of scientists, social scientists, and others interested in social change who are exploring some means of bringing together geographically dispersed people into networks to share ideas, make friendships, and work together. We are helping several of these groups find appropriate state-of-the-art communications systems to support their networking activities. At present, full computerized conferencing systems are not widely available to most networks, but they will be in the future. We feel that the potential for computerized communications systems to link people in dynamic, ever-changing, decentralized networks is virtually unlimited.

In a few more years, people at home will be able to have computer terminals hooked up to their family TV sets for a few hundred dollars. Already, experiments are being conducted with systems in England that will deliver textual information to subscribers' TV screens [27]. In Columbus, Ohio 100,000 homes are now wired for two-way cable TV, which began programming in December, 1977 [28]. Such communications systems begin to support the variety in society, but they also need to be structured so that the variety is regulated, rather than expanded into chaos.

NEXT: DECENTRALIZED COMPUTER NETWORKS

Most of the current experiments in social network facilitation using computers have been limited to using a central computer to store the directory for the network, to analyze the structure of a network, and to support computerized conferencing. Even though a single, central computer may be accessed through geographically distributed computer terminals, the current state-of-the-art involves centralizing the data in one place. This centralization has the same shortcoming we mentioned before: it tends to limit variety.

Recently, computer scientists have begun experimenting with "distributed processing networks." Such a network is made up of many computers, themselves

geographically distributed. The major advantages of such networks are that local processing can be done by a local computer, sensitive data can be kept in a local computer and thus protected, other computers can "help" in a problem when needed, and the activity of the entire network can be dynamically allocated to the current set of problems. Such a decentralized network has no central data base. The data is kept in bits and pieces in the distributed computers. A distributed processing network is the logical hardware counterpart to the social networks discussed above. Loving Grace Cybernetics is currently developing a distributed processing network that will serve as a "community memory" in the San Francisco area, containing information about community needs, services, resources, and so on [29].

SUMMARY

Given the increasing variety in our society, it is necessary to find new mechanisms for coping with it and with rapid change. Either the regulatory systems need to be amplified, or the variety needs to be reduced. Networks of people coming together out of common interest and concern may serve as an adjunct to current regulatory systems to match the exploding variety. Such networks need to be organized and facilitated at various levels of recursion, beginning at the local level. Information about people's interests, mental models, abilities, concerns, values, and so forth needs to be shared within and among networks. Information about the network's structure can also be used to facilitate the development of new relationships within the network. Geographically dispersed networks of people can be facilitated through new communications technologies, including computerized conferencing. In the future, decentralized computer networks will also play a part. These trends suggest new governance and educational structures that may help us preserve our freedoms, while bringing more individual responsibility to bear on new problems.

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ON FACILITATING NETWORKS FOR SOCIAL CHANGE

by Peter and Trudy Johnson-Lenz

ABSTRACT

The problem of increasing societal variety is described. A suggestion is made that social networks might serve as decentralized regulators of this variety. Examples of social networks serving in this capacity are given. Methods are outlined for facilitating these networks by sharing information about the network and its members. Facilitation at various levels of recursion is discussed. Computerized conferencing is cited as a means for enhancing communication within geographically dispersed networks. Decentralized computer processing networks are mentioned as the logical hardware counterpart to support these social networks.

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OUR PROBLEM

We are living in times of incredible change. Scientific knowledge is doubling every ten years, individuals have increasing personal freedom in lifestyle, our technology brings us new advances and new side-effects, and rapid communications media show us problems and possibilities faster than we can assimilate them.

The increasing variety of problems and options is a blessing and a curse. The variety of new information available makes it more likely that we can find solutions to given problems--if we can find the right piece of information when we need it. The variety of personal options leads to increased freedom, but there is no strong trend toward increased responsibility to go with it. Often the governance and education systems seem to be out of phase with the changes, so their responses are not always appropriate to current situations. How can we cope with this variety?

A CYBERNETIC PRINCIPLE

One of the fundamental principles of cybernetics, Ashby's Law of Requisite Variety, states that the regulator or governor of a system must match the variety of that system in order to control it [1]. Either the variety must be reduced or the regulator expanded until there is a balance.

What Ashby's Law says is that we have a choice. We can reduce the social variety by increasing government surveillance and control, by centralizing our decision-making processes even further, by limiting our personal and collective lives, and by restricting information and research. Many would resist such increased control and limitation, and force would be necessary to maintain it. On the other hand, we can increase the variety in our regulatory system by facilitating the free exchange of information, by involving more people in the decisions which affect them and in which they have an interest, by decentralizing institutions, by encouraging localism, and so on. Although more acceptable to most people, this approach must rely on distributed power and governance, and it requires more individual responsibility (instead of dependence on government) for it to work. The political problems and implications of such decentralization are not discussed here.

SPROUTS FROM THE GRASSROOTS

One promising trend toward increasing the variety of our regulatory systems is grassroots involvement. In many places, people are coming together in loosely organized groups to make sense of and help direct the course of change in their personal and community lives. There is a resurgence of neighborhood feeling and concern in many parts of the United States. Neighborhood associations are forming to participate in planning, to deliver services to residents, to provide social support, and to participate in local governance. There are also coalitions and alliances of neighborhood associations and other community self-help groups [2]-[7]. Citizen participation and involvement is becoming more prevalent, and is even mandated

in some places. Interdisciplinary "invisible colleges" of scientists and professionals are forming to share ideas. There are many public interest and environmental groups which focus on issues they believe important and that goverment seems to ignore. There are also groups devoted to interpersonal support and personal growth [8].

The network concept is central to this trend. Many people devoted to alternatives and social change use the term network to describe their group and the relationships and flow of information within it. To them, it means a decentralized network with low centrality, where information passes quite freely among the members and is available to all within the network. Furthermore, in this context the term generally includes the idea that power is shared, that decisions are made by all those affected, that economic and physical energy is available to all. In groups with a more collective orientation, there is a notable absence of hierarchical structure, and authority is often split to assure that the ideas of any one person do not dominate. Many people involved in social change and innovation proudly call themselves "networkers." They are well practiced in the network arts: sharing information and leads to other people, helping bring people together who can mutually benefit, helping people find what they need [9].

Decentralized social change networks based in the grassroots constitute a promising beginning for a change in our governance system that has the potential for matching the variety of our time. They are especially powerful because they are grounded in people's personal lives and the friendship networks that make up our social fabric. They can begin to match the variety of problems, needs, resources, and conditions as their memberships and purposes change in response to the changing times. Being flexibly structured, they can respond more quickly than the more rigid social institutions of today [10]. If necessary, an entirely new network can emerge from the pieces of an old one. These networks can also target their responses to the appropriate places, with the appropriate levels of help. They can bring to bear many diverse talents. Being rooted in the people, they can bring local understanding to local problems which bureaucrats don't always share.

FACILITATING NETWORKS

Because of limited communications channels within and among themselves, these networks cannot always respond quickly and easily to problems and issues. Communication is often limited to sharing information through the mail, printed newsletters, and occasional telephone calls, whenever face-to-face meetings are not possible. This is a serious problem in geographically dispersed networks, such as the loosely organized Northwest Net. It includes perhaps a thousand people who are working on local food production and distribution, alternative and public access media, holistic health, land trusts, communications, and more in various subnetworks in Oregon, Washington, and Idaho. These networks are further hampered by the slowness of the natural word-of-mouth process by which people come into a network and find others with common interests. Such limitations make it difficult for these networks to evolve into a meta-network of issue-specific ad hoc groups emerging in response to issues and then fading away as the problems are solved.

If these networks are to develop further in the direction of regulating

life on the planet, they must be facilitated. Their capacity to link members and to communicate with other networks must be enhanced. This is the motivation for our work, as well as the work of others interested in the birthing of new planetary regulatory systems. Our own work consists in using the tools of the communications era (computers, telecommunications, mathematical models and methods, etc.) to increase the ability of these networks to perceive problems, to link up into adhocracies for action, and to interconnect with other networks.

Facilitating networks involves distributing information about the network to all its members. This information includes facts about members' skills, resources, needs, availability, attitudes, interests, and perceptions. It may also include information about the structure of the network. By sharing as much "access" information as possible within a network, individual members are empowered to form their own links with others, without having to rely on a central leader. By sharing information about members' perceptions, or "mental models," it becomes easier for subgroups (or subnets) to form for discussion or action. The purpose of network facilitation is to increase the number of links among members and to decrease the degree of centrality of the network.

FACILITATION THROUGH SHARING INFORMATION ABOUT PEOPLE

Many of our projects have been based on building a file of information about people in the network, containing the names, addresses, telephone numbers, and some additional information about concerns and interests. This additional information may include both keyword descriptors and free-form textual material.

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SUMMARY

Given the increasing variety in our society, it is necessary to find new mechanisms for coping with it and with rapid change. Either the regulatory systems need to be amplified, or the variety needs to be reduced. Networks of people coming together out of common interest and concern may serve as an adjunct to current regulatory systems to match the exploding variety. Such networks need to be organized and facilitated at various levels of recursion, beginning at the local level. Information about people's interests, mental models, abilities, concerns, values, and so forth needs to be shared within and among networks. Information about the network's structure can also be used to facilitate the development of new relationships within the network. Geographically dispersed networks of people can be facilitated through new communications technologies, including computerized conferencing. In the future, decentralized computer networks will also play a part. These trends suggest new governance and educational structures that may help us preserve our freedoms, while bringing more individual responsibility to bear on new problems.

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Michael,

Think this will interest you.

Yours

ON FACILITATING NETWORKS FOR SOCIAL CHANGE

by Peter and Trudy Johnson-Lenz

ABSTRACT

The problem of increasing societal variety is described. A suggestion is made that social networks might serve as decentralized regulators of this variety. Examples of social networks serving in this capacity are given. Methods are outlined for facilitating these networks by sharing information about the network and its members. Facilitation at various levels of recursion is discussed. Computerized conferencing is cited as a means for enhancing communication within geographically dispersed networks. Decentralized computer processing networks are mentioned as the logical hardware counterpart to support these social networks.

December, 1977

JOHNSON-LENZ * 605 Fifth Street * Lake Oswego Oregon 97034 * (503) 635-2615

OUR PROBLEM

We are living in times of incredible change. Scientific knowledge is doubling every ten years, individuals have increasing personal freedom in lifestyle, our technology brings us new advances and new side-effects, and rapid communications media show us problems and possibilities faster than we can assimilate them.

The increasing variety of problems and options is a blessing and a curse. The variety of new information available makes it more likely that we can find solutions to given problems--if we can find the right piece of information when we need it. The variety of personal options leads to increased freedom, but there is no strong trend toward increased responsibility to go with it. Often the governance and education systems seem to be out of phase with the changes, so their responses are not always appropriate to current situations. How can we cope with this variety?

A CYBERNETIC PRINCIPLE

One of the fundamental principles of cybernetics, Ashby's Law of Requisite Variety, states that the regulator or governor of a system must match the variety of that system in order to control it [1]. Either the variety must be reduced or the regulator expanded until there is a balance.

What Ashby's Law says is that we have a choice. We can reduce the social variety by increasing government surveillance and control, by centralizing our decision-making processes even further, by limiting our personal and collective lives, and by restricting information and research. Many would resist such increased control and limitation, and force would be necessary to maintain it. On the other hand, we can increase the variety in our regulatory system by facilitating the free exchange of information, by involving more people in the decisions which affect them and in which they have an interest, by decentralizing institutions, by encouraging localism, and so on. Although more acceptable to most people, this approach must rely on distributed power and governance, and it requires more individual responsibility (instead of dependence on government) for it to work. The political problems and implications of such decentralization are not discussed here.

SPROUTS FROM THE GRASSROOTS

One promising trend toward increasing the variety of our regulatory systems is grassroots involvement. In many places, people are coming together in loosely organized groups to make sense of and help direct the course of change in their personal and community lives. There is a resurgence of neighborhood feeling and concern in many parts of the United States. Neighborhood associations are forming to participate in planning, to deliver services to residents, to provide social support, and to participate in local governance. There are also coalitions and alliances of neighborhood associations and other community self-help groups [2]-[7]. Citizen participation and involvement is becoming more prevalent, and is even mandated

in some places. Interdisciplinary "invisible colleges" of scientists and professionals are forming to share ideas. There are many public interest and environmental groups which focus on issues they believe important and that goverment seems to ignore. There are also groups devoted to interpersonal support and personal growth [8].

The network concept is central to this trend. Many people devoted to alternatives and social change use the term network to describe their group and the relationships and flow of information within it. To them, it means a decentralized network with low centrality, where information passes quite freely among the members and is available to all within the network. Furthermore, in this context the term generally includes the idea that power is shared, that decisions are made by all those affected, that economic and physical energy is available to all. In groups with a more collective orientation, there is a notable absence of hierarchical structure, and authority is often split to assure that the ideas of any one person do not dominate. Many people involved in social change and innovation proudly call themselves "networkers." They are well practiced in the network arts: sharing information and leads to other people, helping bring people together who can mutually benefit, helping people find what they need [9].

Decentralized social change networks based in the grassroots constitute a promising beginning for a change in our governance system that has the potential for matching the variety of our time. They are especially powerful because they are grounded in people's personal lives and the friendship networks that make up our social fabric. They can begin to match the variety of problems, needs, resources, and conditions as their memberships and purposes change in response to the changing times. Being flexibly structured, they can respond more quickly than the more rigid social institutions of today [10]. If necessary, an entirely new network can emerge from the pieces of an old one. These networks can also target their responses to the appropriate places, with the appropriate levels of help. They can bring to bear many diverse talents. Being rooted in the people, they can bring local understanding to local problems which bureaucrats don't always share.

FACILITATING NETWORKS

Because of limited communications channels within and among themselves, these networks cannot always respond quickly and easily to problems and issues. Communication is often limited to sharing information through the mail, printed newsletters, and occasional telephone calls, whenever face-to-face meetings are not possible. This is a serious problem in geographically dispersed networks, such as the loosely organized Northwest Net. It includes perhaps a thousand people who are working on local food production and distribution, alternative and public access media, holistic health, land trusts, communications, and more in various subnetworks in Oregon, Washington, and Idaho. These networks are further hampered by the slowness of the natural word-of-mouth process by which people come into a network and find others with common interests. Such limitations make it difficult for these networks to evolve into a meta-network of issue-specific ad hoc groups emerging in response to issues and then fading away as the problems are solved.

If these networks are to develop further in the direction of regulating

life on the planet, they must be facilitated. Their capacity to link members and to communicate with other networks must be enhanced. This is the motivation for our work, as well as the work of others interested in the birthing of new planetary regulatory systems. Our own work consists in using the tools of the communications era (computers, telecommunications, mathematical models and methods, etc.) to increase the ability of these networks to perceive problems, to link up into adhocracies for action, and to interconnect with other networks.

Facilitating networks involves distributing information about the network to all its members. This information includes facts about members' skills, resources, needs, availability, attitudes, interests, and perceptions. It may also include information about the structure of the network. By sharing as much "access" information as possible within a network, individual members are empowered to form their own links with others, without having to rely on a central leader. By sharing information about members' perceptions, or "mental models," it becomes easier for subgroups (or subnets) to form for discussion or action. The purpose of network facilitation is to increase the number of links among members and to decrease the degree of centrality of the network.

FACILITATION THROUGH SHARING INFORMATION ABOUT PEOPLE

Many of our projects have been based on building a file of information about people in the network, containing the names, addresses, telephone numbers, and some additional information about concerns and interests. This additional information may include both keyword descriptors and free-form textual material.

The International Network for Social Network Analysis (INSNA) directory we prepared is a good example of such a file [11]. Even in print form, this information allows INSNA members access to everyone else in the network. The keyword indices provide a way to locate others in the same discipline or geographic area, or those with similar interests. The INSNA directory is now available on a computer at the University of Toronto. The on-line file can also support more complex searches; for example, for people in Canada who are sociologists, and who are interested in support networks and methods for investigating them.

By adding more descriptors for each person, more refined searches become possible, including searches based on "profiles" or sets of characteristics. The development of keyword descriptors for people in a network should be done with the advice and consent of network members. There are serious problems with an open-ended list of keywords. First, if participants make up their own descriptors, duplicate keywords with slight variations often occur. For example, one might use "gardener," while another would say "gardening." Second, synonyms or closely associated terms often appear as separate keywords, such as "women's studies," "women's movement," "feminist movement," and so on. An initial keyword list may be developed by a network organizer or facilitator, but network members should be asked if those keywords describe them adequately and what changes should be made. There should also be provisions for adding or modifying descriptors as the network changes.

Another way to bring people together in a network is to share information

about members' points of view about given topics. Recent developments in modeling theory (including Interpretive Structural Modeling) have produced techniques for structuring the elements and relationships that make up a person's view of a topic into an integrated mental model [12]. Using directed graphs, a person's mental model can be expressed as a network of concepts. Rather than using ISM techniques which produce a single group model, we have chosen to ask each person questions about the elements and relationships he or she perceives and then to "cluster" the responses into patterns (using n-way tabulations to find exact pattern matches). Then the most frequent patterns of responses (that is, the most frequent "mental models") are shared with network members. Not only does this tell members what points of view they and others hold, but it also provides an explicit opportunity for discussing points of difference. We generate the initial list of elements and the possible relationships among them with a small, diverse group of people familiar with the area or issue.

We recently used such techniques at the Oregon Information and Referral Idea Fair and Workshops. Before the Idea Fair, we generated some initial models of information and referral (I&R) and conducted a pilot test with a diverse group of people involved in community and social service I&R. Then, at the Fair, following registration, we surveyed the participants, entered their responses into the computer, analyzed the results, and later shared with the participants the most frequent mental models of information and referral, showing not only what they felt about I&R, but why [13]. By using such techniques we are sharing not only a specific interest or attitude, but we are also beginning to make explicit in broad terms the entire constellation of what a person thinks about a given area, so that everyone has a contexted picture of what others in the network think about a topic.

FACILITATION THROUGH SHARING INFORMATION ABOUT NETWORKS

Another kind of information that can help people in a network is information about the network structure--who knows whom, who has worked with whom, etc. This sort of information is common to most social network analysts, but it is relatively new to social network practitioners. We believe that such data can be used to modify and extend existing social networks. For example, if one joins a network and knows a few people, he or she can use portions of the whole network data to find friends to introduce him or her to other interesting people in the network. Brokering can also be done more formally by people in the network who enjoy match-making. Information about other networks to which one belongs can also be shared in this manner, thus providing linkages among networks through node individuals. In our experience, most changes in social networks are accomplished through existing links; we have been introduced to most of our friends by other friends. Access to whole network data of this type can facilitate the natural process of network growth.

We are also participating in network communication and facilitation on EIES (Electronic Information Exchange System), a computerized conferencing system designed by Murray Turoff. This winter, some members of INSNA will be using EIES to participate in a network of social networkers convened by Linton Freeman. This network will share ideas and work as a geographically decentralized "invisible college," combining several academic disciplines in the discussion of social network analysis [14]-[15]. Whole network data has

been collected on INSNA, and plans are being made to analyze this data to give a better picture of who its members are and how they interrelate. Similar plans are being made for studying the network structure of the social networks network on EIES, as well as of other EIES networks. What are the effects on the network structure of making that structure explicit to all the members? Will it stay the same or change, and how?

LEVELS OF FACILITATION

Facilitation must take place at several different levels of networks. First, it must happen at the level of each neighborhood and local community. We have designed and used a computer-based community information system to help organize our neighborhood for participation in a comprehensive land-use planning process. We began with a survey of our neighbors. From the survey results we developed the neighborhood's agenda for action and prepared lists of neighbors with similar concerns to serve on task forces and committees. The system was also used to form a telephone tree for communicating and responding to surprise moves from City Hall. The entire effort had a significant impact on political directions in the city [16]. In addition, the system could have been used to bring people together for social purposes, in common interest groups (e.g., gardening club, play reading group, etc.), or to exchange goods and/or services. However, the neighborhood association chose to emphasize political and planning issues rather than social organization.

We also helped a project get started in Portland, Oregon, where a neighborhood association is using a micro-computer in someone's basement to facilitate the exchange of skills and resources among neighbors [17]. Micro-computer hardware is becoming inexpensive enough ($600 and up) to enable interested neighborhoods and community groups to handle their own information needs without outside assistance. To make this happen, a variety of software packages and people willing to maintain and manage such projects are needed.

Second, facilitation must happen at larger levels of perspective--at the county, state, regional, and eventually national and global levels. At these levels there are several problems: providing communications channels for large numbers of geographically separate people, interlinking and interconnecting more local networks for large-scale action, and organizing large-scale complex problems so that the problem components and the relationships among them can be readily understood.

At these larger levels of perspective, many networks and "networking" projects exist. Harry Stevens has been designing and testing techniques for "involvement through networking" for fifteen years. He is currently developing a Science Resource Network for the Massachusetts Legislature [18] and planning a legislative exchange experiment among state legislatures via notebooks and computerized conferencing. Last winter we participated in the design and development of a social process and computer system to support city- and state-wide issue dialogues in Washington State [19]-[20]. Issues were formulated and analyzed by citizen groups, who accessed the results through an interactive computer at meetings. These issue dialogues clarified not only who felt which ways about issues, but also why they felt those ways. This can be the basis for organizing into action groups and forming political coalitions. In Hawaii, the Hawaii Health Net links people interested in holistic health

[21]. There is a state-wide technical skills bank in North Carolina, and a national skills bank is being developed by Patrick Saccomandi of the Independent Foundation [22]-[23]. On a global scale, Anthony Judge has used the network paradigm to express and interrelate perceived problems, the international organizations concerned with them, the disciplines focusing on them, and the values which make them visible [24]-[25].

IMPROVED COMMUNICATION

Networks of people also share information about topics of common interest, goals, purposes, etc. Local networks can often do this in face-to-face meetings, but geographically dispersed networks must circulate textual and graphic material through the mail. This is slow and expensive, and truly "interactive" communication is impossible. One solution to this problem is computerized conferencing, which allows groups to communicate ideas, "meet," and make decisions, without the cost of travel and the inconvenience of bringing people to a central location at a given time [26]. Such conferencing is asynchronous, since material may be entered into or retrieved from the computer at different times, thus making rapid communication within a network possible at the convenience of each individual. We are aware of several groups of scientists, social scientists, and others interested in social change who are exploring some means of bringing together geographically dispersed people into networks to share ideas, make friendships, and work together. We are helping several of these groups find appropriate state-of-the-art communications systems to support their networking activities. At present, full computerized conferencing systems are not widely available to most networks, but they will be in the future. We feel that the potential for computerized communications systems to link people in dynamic, ever-changing, decentralized networks is virtually unlimited.

In a few more years, people at home will be able to have computer terminals hooked up to their family TV sets for a few hundred dollars. Already, experiments are being conducted with systems in England that will deliver textual information to subscribers' TV screens [27]. In Columbus, Ohio 100,000 homes are now wired for two-way cable TV, which began programming in December, 1977 [28]. Such communications systems begin to support the variety in society, but they also need to be structured so that the variety is regulated, rather than expanded into chaos.

NEXT: DECENTRALIZED COMPUTER NETWORKS

Most of the current experiments in social network facilitation using computers have been limited to using a central computer to store the directory for the network, to analyze the structure of a network, and to support computerized conferencing. Even though a single, central computer may be accessed through geographically distributed computer terminals, the current state-of-the-art involves centralizing the data in one place. This centralization has the same shortcoming we mentioned before: it tends to limit variety.

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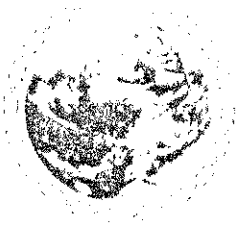


August 13, 1977

Dear John Ballard and Bill Hill,

Enclosed you will find copies of several of our recent papers describing some of the work we have been doing.

We are also enclosing materials from two other groups you might like to know about:

CAREL (see enclosed copies of pages from the CASCADE journal)
The Cascadian Regional Library
PO Box 1492
Eugene, OR 97401

and

APPLE (see enclosed copies of brochure and sign-up forms)
A Person-to-Person Living Exchange
c/o Evan Solley
Life Support Systems Group, Ltd.
2432 NW Johnson
Portland, OR 97210

tele: (503) 226-3515 or 226-2553

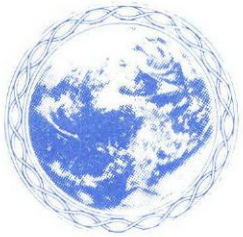
(Evan has a PDP 11/03 microcomputer in his basement and will be using that computer to support the APPLE exchange in a NW Portland neighborhood)

We recently received a copy of your PEOPLE INDEX brochure through some friends at Future Conditional. It looks interesting--quite like several other projects we have heard of. How are you coming along with getting computer hardware, software, etc? The brochure suggests that you are in need of such. We would appreciate being kept up to date on this work as it progresses.

Somewhere in the great network.....

P+T

Peter K. Reilly



LINKAGE SYSTEM

Members and Suggested Keywords

December 19, 1977

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * NOTE

The attached lists of keyword descriptors and members is just a beginning. It is not a final, carefully constructed taxonomy for describing everyone in the linkage system. Before it is used, each person in the system should have a chance to add to or otherwise modify the keywords that describe him or her. To develop an organic, grassroots taxonomy, we must involve everybody.

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The keywords are based on the words and concepts that are contained in members' 8½" by 11" sheets. In a few cases, we added keywords based on our personal acquaintance with a given member, but for the most part, assigning keys to members came directly from the sheets. Members may wish to include various keywords that describe them that aren't indicated by the material in their sheets.

These keywords reflect interest areas and skills only. It would probably be useful to keyword members geographically as well and to consider using some scales for levels of interest, etc. Also, institutional or affiliative ties, such as Earthrise, ACORN, Hawaii Health Net, and so forth might be included. Further areas to consider for the taxonomy are availability information (e.g., call in a.m.), whether visits are encouraged, and equipment available. We discuss including values information in WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED? It might also be useful to include scales of the sort suggested by Ken Davis to distinguish between degrees of interest and expertise. As the list of keywords grows, it should be organized into a hierarchical structure. For purposes of getting started, we didn't bother to do this.

MEMBERS SHOULD ASSIGN KEYWORDS TO THEMSELVES. It is very difficult for someone else to do this with any accuracy. Any misplaced words, omissions, or errors in the indexing are quite unintentional. Please consider this a first-cut attempt which needs to be criticized and further developed by everyone. Because it is neatly typed and because it looks complete, it is very easy to take this as a serious "directory" for the linkage system. Don't let appearances fool you. This taxonomic system still needs a lot of work. Everyone should participate in its development.

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* Suggested keywords -- for discussion only. Feedback/comments requested. *

Members by keywords

adult education: 44, 65, 68
advertising: 7, 49
alternative education: 3, 15, 17, 34, 38, 41, 44, 55, 67
alternative institutions: 38, 42, 43, 55, 58, 60
alternative lifestyles: 11, 36, 49, 66
alternative publishing: 42
analysis: 5, 6
anthropology: 54, 63
anticipatory democracy: 4, 16
appropriate technology: 36
archeology: 7
art: 34, 39
arts: 13, 67, 75
audio visual: 35

banking: 72
birthing: 13
business: 7, 9, 49, 72, 79

citizen participation: 18, 20, 22, 29, 33, 37, 51, 53, 58, 61, 66, 74
collective responsibility: 51, 52
collectives: 52, 70, 77
communications skills: 5, 9, 13, 16, 21, 25, 28, 29, 30, 35, 57, 62, 75
community action: 7, 38, 67
community development: 8, 20, 25, 29, 37, 53, 57, 58, 65, 74, 78
computerized conferencing: 10, 16, 29, 45, 75, 78
computer models: 23, 29
computer programming: 29, 30, 64
computers: 29, 30, 31, 45, 48, 53, 62, 64
consciousness: 69
consulting: 1, 2, 15, 16, 19, 20, 22, 26, 28, 29, 36, 38, 39, 40, 41, 50, 51, 53, 58, 61, 71, 74
consumer safety: 10
counseling: 40, 41, 51
cybernetics: 23, 29, 69

decision making: 11, 23, 66, 74
democratic learning: 51

East/West balance: 14, 59, 75
ecological ethic: 11
ecology: 11, 26
economics: 7, 9, 12
education: 3, 6, 8, 11, 13, 15, 17, 22, 33, 34, 35, 37, 38, 40, 41, 44, 45, 46, 48, 55, 56, 57, 60, 65, 67, 68, 70, 71, 72
energy: 1
engineering: 18
entrepreneur: 7, 45
environmental education: 11
exchanges: 13, 28, 29, 53
experimental community: 3, 32, 52, 67, 70, 75, 77

Members by keywords (continued)

film: 8, 58
futures: 4, 5, 6, 8, 9, 13, 16, 17, 20, 21, 24, 34, 36, 37, 45, 46, 60, 68, 75, 76, 77

gaming: 8, 13, 68
generalist: 2
general systems theory: 23, 26, 69, 78
gerontology: 71
governance: 4, 12, 14, 56, 61, 70, 73
grant writing: 37
graphics: 8, 35
group work: 9, 16, 22, 27, 38, 56, 78
guaranteed income: 7, 18, 61

healing: 59
health care: 46, 47, 54, 55, 59, 60, 61, 71
history: 6, 20, 21
holistic health: 41, 59, 60, 65, 71
human culture: 23, 43, 54
human development: 2, 3, 9, 15, 32, 33, 41, 57, 69, 78
humanism: 34, 41, 78
humor: 73
hunger: 55

Indians: 72
information: 21, 25, 28, 29, 30, 33, 37, 51, 58, 61, 62, 66, 76
innovation: 9, 14, 78
institutions: 12, 14, 66

language: 13, 14, 28, 76
languages: 5, 15, 22, 64, 65, 70
Latin America: 65
law: 4, 47, 72
leadership: 19, 38, 43, 66, 74
learning: 3, 6, 21, 33, 51, 56
libraries: 21, 28
literature: 13, 15, 20

management consulting: 1, 9
maps: 28
media: 42, 57, 62
media access: 42
mediation: 16, 18
mental health: 2, 10
meta-language: 14, 23
metaphor: 39
multi-media resource center: 35
multiple affiliations: 5, 7, 19, 70, 74
music: 25, 36, 40, 50, 67, 75, 78
mysticism: 15, 16
myths: 5, 13, 14, 16, 17, 22, 23, 54, 77

Members by keywords (continued)

networking: 6, 13, 14, 15, 16, 24, 25, 28, 29, 31, 36, 45, 53, 54, 58, 59, 60, 61, 62, 63, 64, 66, 78
noetics: 69, 78
nuclear arms race: 10, 24, 65

observation: 6

patents: 1, 10
people skills: 2, 8, 9, 21, 25, 27, 50
perception: 6, 11, 23
personal responsibility: 2, 11, 20, 48, 51, 56, 60
philosophy: 5, 20, 21
photography: 28, 30, 35
planning: 5, 9, 12, 17, 25, 30, 45, 56, 68, 75
poetry: 40, 50, 67
policy analysis: 12, 24
political campaigning: 4
political science: 36, 43, 56
preventive health care: 18, 46
prisons: 65
problem solving: 1, 28, 29, 68
process oriented: 2, 8, 51, 57
psychic/physical balance: 31, 59, 78
publications: 2, 4, 5, 6, 8, 9, 10, 15, 17, 19, 21, 24, 25, 26, 28, 29, 36, 38, 40, 41, 43, 49, 51, 52, 54, 61, 62, 63, 65, 70, 73, 74, 76, 78
public interest: 10, 18, 33, 47, 51
public interest research: 4
public satellites: 10, 62

reality: 23, 28
religion: 15, 40, 55, 66
right brain/left brain balance: 14, 75

self-reliance: 8, 18, 20
seminars: 2, 22, 27, 58
social cybernetics: 14, 29
social innovation: 22, 24
social networks: 14, 25, 29, 45
social policy: 70
social theory: 70
solar energy: 1
speaking: 2, 3, 9, 17, 19, 21, 36, 38, 39, 45, 49, 50, 61, 62, 63, 67, 75
structures: 13
surveys: 1, 29, 74
synergetic education: 3
synergetics: 3, 11, 14, 31, 35, 41, 62, 69, 77, 78
synthesis: 5, 6, 26, 56, 64
systems design: 1, 3, 29

Members by keywords (continued)

teaching: 6, 10, 13, 14, 15, 19, 21, 25, 36, 38, 41, 43, 50, 56, 63, 65, 70, 71
technology: 9, 16, 30, 43, 53, 62
technology assessment: 22, 60
training: 22, 74, 76
transitions: 2, 13, 17
transpersonal psychology: 29, 59, 69, 75

universal sharing: 77

values: 5, 11, 16, 27, 32, 43, 50, 61, 67, 69, 73, 77
video: 35, 58
visionary: 3, 32, 35, 39, 59, 61, 62, 77
voluntary simplicity: 13, 36, 67
volunteers: 38, 43, 53, 66

welfare: 7
women's movement: 79
workshops: 11, 17, 36, 40, 50, 67
writing: 5, 6, 8, 9, 10, 13, 21, 24, 25, 26, 28, 29, 30, 34, 35, 39, 40, 41, 43, 45, 48, 49, 51, 52, 54, 57, 61, 62, 63, 64, 65, 67, 70, 71, 73, 74, 75, 76, 78

yoga: 23

Members by member number

1. Tom P. Abeles
2. Ronald Barnes
3. Donald B. Benson
4. Clement Bezold
5. Philip J. Bossert
6. Robert W. Bradley
7. Cabell Brand
8. Thomas Carleton
9. William F. Christopher
10. Carl C. Clark
11. Edward T. Clark, Jr.
12. John P. Davey
13. Ken Davis
14. Christian de Laet
15. Reynold Feldman
16. Jerry Glenn
17. Don E. Glines
18. John P. Gnaedinger
19. Robert K. Greenleaf
20. Richard J. Greiwe
21. Agnes M. Griffen
22. Georges & Jeannine Gueron
23. Mel Gullikson
24. John R. Hadd
25. Elizabeth Hagens
26. Joe A. Hanson
27. W. W. (Wick) Hutchison
28. Steve Johnson
29. Peter & Trudy Johnson-Lenz
30. David L. Jones
31. Rick Kean
32. Michael Krueger
33. Joanne Kurfiss
34. Jacob Landau
35. Doren Kim Levitt
36. Dennis Livingston
37. Ray McBeth
38. John McClusky
39. David MacDermott
40. Noel McInnis
41. Elizabeth (Liz) Mahoney
42. Bob Maslow
43. Charles W. Merrifield
44. Mike Myers
45. William Neher
46. Bibiana C. Nowacki
47. Gerald G. Pyle
48. Edrice Reynolds
49. Bob Rimmer
50. Marshall Rosenberg

Members by member number (continued)

51. Michael Rossman
52. David J. Ruth
53. Patrick Saccomandi
54. Jeanne Mary Scott
55. Andy Smith
56. Robert W. Spencer
57. Stephen Silha
58. Robert L. Stilger
59. Nancy Strode
60. Walter Strode
61. Robert Theobald
62. Wes Thomas
63. Robert J. Welke
64. Clark H. Wilson
65. Roger W. Axford
66. Norman Edward Dewire (Ned)
67. Carla Eugster
68. Paul F. Fendt
69. Frank F. Fiore
70. David G. Gil
71. Frederick & Helen Huber
72. Paul Klores
73. Jerome D. (Jerry) Lang
74. W. Robert Lovan
75. Genevieve Marcus
76. Kent Myers
77. Ken Neunzig
78. Robert A. Smith, III
79. Madelene Van Arsdell

* Suggested keywords -- for discussion only. Feedback/comments requested. *

Keywords by member

1. TOM P. ABELES: consulting, energy, management consulting, patents, problem solving, solar energy, surveys, systems design
2. RONALD BARNES: consulting, generalist, human development, mental health, people skills, personal responsibility, process oriented, publications, seminars, speaking, transitions
3. DONALD B. BENSON: alternative education, education, experimental community, human development, learning, speaking, synergetic education, synergetics, systems design, visionary
4. CLEMENT BEZOLD: anticipatory democracy, futures, governance, law, political campaigning, publications, public interest research
5. PHILIP J. BOSSERT: analysis, futures, languages, multiple affiliations, myths, philosophy, planning, publications, synthesis, values, writing
6. ROBERT W. BRADLEY: analysis, education, futures, history, learning, networking, observation, perception, publications, synthesis, teaching, writing
7. CABELL BRAND: advertising, archeology, business, community action, economics, entrepreneur, guaranteed income, multiple affiliations, welfare
8. THOMAS CARLETON: communications skills, community development, education, film, futures, gaming, graphics, people skills, process oriented, publications, self-reliance, writing
9. WILLIAM F. CHRISTOPHER: business, communications skills, economics, futures, group work, human development, innovation, management consulting, people skills, planning, publications, speaking, technology, writing
10. CARL C. CLARK: computerized conferencing, consumer safety, mental health, nuclear arms race, patents, public interest, public satellites, publications, teaching, writing
11. EDWARD T. CLARK: alternative lifestyles, decision making, ecological ethic, ecology, education, environmental education, perception, personal responsibility, synergetics, values, workshops
12. JOHN P. DAVEY: economics, governance, institutions, planning, policy analysis
13. KEN DAVIS: arts, birthing, communications skills, education, exchanges, futures, gaming, language, literature, myths, networking, structures, teaching, transitions, voluntary simplicity, writing
14. CHRISTIAN DE LAET: East/West balance, governance, innovation, institutions, language, meta-language, myths, networking, right brain/left brain balance, social cybernetics, social networks, synergetics, teaching
15. REYNOLD FELDMAN: alternative education, consulting, education, human development, languages, literature, mysticism, networking, publications, religion, teaching
16. JERRY GLENN: anticipatory democracy, communications skills, computerized conferencing, consulting, futures, group work, mediation, mysticism, myths, networking, technology, values
17. DON E. GLINES: alternative education, education, futures, myths, planning, publications, speaking, transitions, workshops
18. JOHN P. GNAEDINGER: citizen participation, engineering, guaranteed income, mediation, preventive health care, public interest, self-reliance
19. ROBERT K. GREENLEAF: consulting, leadership, multiple affiliations, publications, speaking, teaching
20. RICHARD J. GREIWE: citizen participation, community development, consulting, futures, history, literature, personal responsibility, philosophy, self-reliance

Keywords by member (continued)

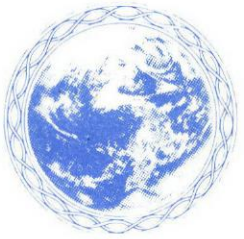
21. AGNES M. GRIFFEN: communications skills, futures, history, information, learning, libraries, networking, people skills, philosophy, publications, speaking, teaching, writing
22. GEORGES & JEANNINE GUERON: citizen participation, consulting, education, group work, languages, myths, seminars, social innovation, technology assessment, training
23. MEL GULLIKSON: computer models, cybernetics, decision making, general systems theory, human culture, meta-language, myths, perception, reality, yoga
24. JOHN R. HADD: futures, nuclear arms race, policy analysis, publications, social innovation, writing
25. ELIZABETH HAGENS: communications skills, community development, information, music, networking, people skills, planning, publications, social networks, teaching, writing
26. JOE A. HANSON: consulting, ecology, general systems theory, publications, synthesis, writing
27. W. W. (WICK) HUTCHISON: group work, people skills, seminars, values
28. STEVE JOHNSON: communications skills, consulting, exchanges, information, language, libraries, maps, networking, photography, problem solving, publications, reality, writing
29. PETER & TRUDY JOHNSON-LENZ: citizen participation, communications skills, community development, computerized conferencing, computer models, computer programming, computers, consulting, cybernetics, exchanges, information, networking, problem solving, publications, social cybernetics, social networks, surveys, systems design, transpersonal psychology
30. DAVID L. JONES: communications skills, computer programming, computers, information, photography, planning, technology, writing
31. RICK KEAN: computers, networking, psychic/physical balance, synergetics
32. MICHAEL KRUEGER: experimental community, human development, values, visionary
33. JOANNE KURFISS: citizen participation, education, human development, information, learning, public interest
34. JACOB LANDAU: alternative education, art, education, futures, humanism, writing
35. DOREN KIM LEVITT: audio-visual, communications skills, education, graphics, multi-media resource center, photography, synergetics, video, visionary, writing
36. DENNIS LIVINGSTON: alternative lifestyles, appropriate technology, consulting, futures, music, networking, political science, publications, speaking, teaching, voluntary simplicity, workshops
37. RAY MCBETH: citizen participation, community development, education, futures, grant writing, information
38. JOHN MCCLUSKY: alternative education, alternative institutions, community action, consulting, education, group work, leadership, publications, speaking, teaching, volunteers
39. DAVID MACDERMOTT: art, consulting, metaphor, speaking, visionary, writing
40. NOEL MCINNIS: consulting, counseling, education, music, poetry, publications, religion, workshops, writing
41. ELIZABETH (LIZ) MAHONEY: alternative education, consulting, counseling, education, holistic health, human development, humanism, publications, synergetics, teaching, writing

Keywords by member (continued)

42. BOB MASLOW: alternative institutions, alternative publishing, media, media access
43. CHARLES W. MERRIFIELD: alternative institutions, human culture, leadership, political science, publications, teaching, technology, values, volunteers, writing
44. MIKE MYERS: adult education, alternative education, education
45. WILLIAM NEHER: computerized conferencing, computers, education, entrepreneur, futures, networking, planning, social networks, speaking, writing
46. BIBIANA C. NOWACKI: education, futures, health care, preventive health care
47. GERALD G. PYLE: health care, law, public interest
48. EDRICE REYNOLDS: computers, education, personal responsibility, writing
49. BOB RIMMER: advertising, alternative lifestyles, business, publications, speaking, writing
50. MARSHALL ROSENBERG: consulting, music, people skills, poetry, speaking, teaching, values, workshops
51. MICHAEL ROSSMAN: citizen participation, collective responsibility, consulting, counseling, democratic learning, information, learning, personal responsibility, process oriented, publications, public interest, writing
52. DAVID J. RUTH: collective responsibility, collectives, experimental community, publications, writing
53. PATRICK SACCOMANDI: citizen participation, community development, computers, consulting, exchanges, networking, technology, volunteers
54. JEANNE MARY SCOTT: anthropology, health care, human culture, myths, networking, publications, writing
55. ANDY SMITH: alternative education, alternative institutions, education, health care, hunger, religion
56. ROBERT W. SPENCER: education, governance, group work, learning, personal responsibility, planning, political science, synthesis, teaching
57. STEPHEN SILHA: communications skills, community development, education, human development, media, process oriented, writing
58. ROBERT L. STILGER: alternative institutions, citizen participation, community development, consulting, film, information, networking, seminars, video
59. NANCY STRODE: East/West balance, healing, health care, holistic health, networking, psychic/physical balance, transpersonal psychology
60. WALTER STRODE: alternative institutions, education, futures, health care, holistic health, networking, personal responsibility, technology assessment
61. ROBERT THEOBALD: citizen participation, consulting, governance, guaranteed income, health care, information, networking, publications, speaking, values, visionary, writing
62. WES THOMAS: communications skills, computers, information, media, networking, publications, public satellites, speaking, synergetics, technology, visionary, writing
63. ROBERT J. WELKE: anthropology, networking, publications, speaking, teaching, writing
64. CLARK H. WILSON: computer programming, computers, languages, networking, synthesis, writing
65. ROGER W. AXFORD: adult education, community development, education, holistic health, languages, Latin America, nuclear arms race, prisons, publications, teaching, writing
66. NORMAN EDWARD DEWIRE (NED): alternative lifestyles, citizen participation, decision making, information, institutions, leadership, networking, religion, volunteers

Keywords by member (continued)

67. CARLA EUGSTER: alternative education, arts, community action, education, experimental community, music, poetry, speaking, values, voluntary simplicity, workshops, writing
68. PAUL F. FENDT: adult education, education, futures, gaming, planning, problem solving
69. FRANK F. FIORE: consciousness, cybernetics, general systems theory, human development, noetics, synergetics, transpersonal psychology, values
70. DAVID G. GIL: collectives, education, experimental community, governance, languages, multiple affiliations, publications, social policy, social theory, teaching, writing
71. FREDERICK R. & HELEN E. HUBER: consulting, education, gerontology, health care, holistic health, teaching, writing
72. PAUL KLORES: banking, business, education, Indians, law
73. JEROME D. (JERRY) LANG: governance, humor, publications, values, writing
74. W. ROBERT LOVAN: citizen participation, community development, consulting, decision making, leadership, multiple affiliations, publications, surveys, training, writing
75. GENEVIEVE MARCUS: arts, communications skills, computerized conferencing, East/West balance, experimental community, futures, music, planning, right brain/left brain balance, transpersonal psychology, speaking
76. KENT MYERS: futures, information, language, publications, training, writing
77. KEN NEUNZIG: collectives, experimental community, futures, myths, synergetics, universal sharing, values, visionary
78. ROBERT A. SMITH, III: community development, computerized conferencing, general systems theory, group work, human development, humanism, innovation, music, networking, noetics, psychic/physical balance, publications, synergetics, writing
79. MADELENE VAN ARSDELL: business, women's movement



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computer models: 23, 29
computer programming: 29, 30, 64
computers: 29, 30, 31, 45, 48, 53, 62, 64
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consulting: 1, 2, 15, 16, 19, 20, 22, 26, 28, 29, 36, 38, 39, 40, 41, 50, 51, 53, 58, 61, 71, 74
consumer safety: 10
counseling: 40, 41, 51
cybernetics: 23, 29, 69

decision making: 11, 23, 66, 74
democratic learning: 51

East/West balance: 14, 59, 75
ecological ethic: 11
ecology: 11, 26
economics: 7, 9, 12
education: 3, 6, 8, 11, 13, 15, 17, 22, 33, 34, 35, 37, 38, 40, 41, 44, 45, 46, 48, 55, 56, 57, 60, 65, 67, 68, 70, 71, 72
energy: 1
engineering: 18
entrepreneur: 7, 45
environmental education: 11
exchanges: 13, 28, 29, 53
experimental community: 3, 32, 52, 67, 70, 75, 77

Members by keywords (continued)

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gaming: 8, 13, 68
generalist: 2
general systems theory: 23, 26, 69, 78
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governance: 4, 12, 14, 56, 61, 70, 73
grant writing: 37
graphics: 8, 35
group work: 9, 16, 22, 27, 38, 56, 78
guaranteed income: 7, 18, 61

healing: 59
health care: 46, 47, 54, 55, 59, 60, 61, 71
history: 6, 20, 21
holistic health: 41, 59, 60, 65, 71
human culture: 23, 43, 54
human development: 2, 3, 9, 15, 32, 33, 41, 57, 69, 78
humanism: 34, 41, 78
humor: 73
hunger: 55

Indians: 72
information: 21, 25, 28, 29, 30, 33, 37, 51, 58, 61, 62, 66, 76
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institutions: 12, 14, 66

language: 13, 14, 28, 76
languages: 5, 15, 22, 64, 65, 70
Latin America: 65
law: 4, 47, 72
leadership: 19, 38, 43, 66, 74
learning: 3, 6, 21, 33, 51, 56
libraries: 21, 28
literature: 13, 15, 20

management consulting: 1, 9
maps: 28
media: 42, 57, 62
media access: 42
mediation: 16, 18
mental health: 2, 10
meta-language: 14, 23
metaphor: 39
multi-media resource center: 35
multiple affiliations: 5, 7, 19, 70, 74
music: 25, 36, 40, 50, 67, 75, 78
mysticism: 15, 16
myths: 5, 13, 14, 16, 17, 22, 23, 54, 77

Members by keywords (continued)

networking: 6, 13, 14, 15, 16, 24, 25, 28, 29, 31, 36, 45, 53, 54, 58, 59, 60, 61, 62, 63, 64, 66, 78
noetics: 69, 78
nuclear arms race: 10, 24, 65

observation: 6

patents: 1, 10
people skills: 2, 8, 9, 21, 25, 27, 50
perception: 6, 11, 23
personal responsibility: 2, 11, 20, 48, 51, 56, 60
philosophy: 5, 20, 21
photography: 28, 30, 35
planning: 5, 9, 12, 17, 25, 30, 45, 56, 68, 75
poetry: 40, 50, 67
policy analysis: 12, 24
political campaigning: 4
political science: 36, 43, 56
preventive health care: 18, 46
prisons: 65
problem solving: 1, 28, 29, 68
process oriented: 2, 8, 51, 57
psychic/physical balance: 31, 59, 78
publications: 2, 4, 5, 6, 8, 9, 10, 15, 17, 19, 21, 24, 25, 26, 28, 29, 36, 38, 40, 41, 43, 49, 51, 52, 54, 61, 62, 63, 65, 70, 73, 74, 76, 78
public interest: 10, 18, 33, 47, 51
public interest research: 4
public satellites: 10, 62

reality: 23, 28
religion: 15, 40, 55, 66
right brain/left brain balance: 14, 75

self-reliance: 8, 18, 20
seminars: 2, 22, 27, 58
social cybernetics: 14, 29
social innovation: 22, 24
social networks: 14, 25, 29, 45
social policy: 70
social theory: 70
solar energy: 1
speaking: 2, 3, 9, 17, 19, 21, 36, 38, 39, 45, 49, 50, 61, 62, 63, 67, 75
structures: 13
surveys: 1, 29, 74
synergetic education: 3
synergetics: 3, 11, 14, 31, 35, 41, 62, 69, 77, 78
synthesis: 5, 6, 26, 56, 64
systems design: 1, 3, 29

Members by keywords (continued)

teaching: 6, 10, 13, 14, 15, 19, 21, 25, 36, 38, 41, 43, 50, 56, 63, 65, 70, 71
technology: 9, 16, 30, 43, 53, 62
technology assessment: 22, 60
training: 22, 74, 76
transitions: 2, 13, 17
transpersonal psychology: 29, 59, 69, 75

universal sharing: 77

values: 5, 11, 16, 27, 32, 43, 50, 61, 67, 69, 73, 77
video: 35, 58
visionary: 3, 32, 35, 39, 59, 61, 62, 77
voluntary simplicity: 13, 36, 67
volunteers: 38, 43, 53, 66

welfare: 7
women's movement: 79
workshops: 11, 17, 36, 40, 50, 67
writing: 5, 6, 8, 9, 10, 13, 21, 24, 25, 26, 28, 29, 30, 34, 35, 39, 40, 41, 43, 45, 48, 49, 51, 52, 54, 57, 61, 62, 63, 64, 65, 67, 70, 71, 73, 74, 75, 76, 78

yoga: 23

Members by member number

1. Tom P. Abeles
2. Ronald Barnes
3. Donald B. Benson
4. Clement Bezold
5. Philip J. Bossert
6. Robert W. Bradley
7. Cabell Brand
8. Thomas Carleton
9. William F. Christopher
10. Carl C. Clark
11. Edward T. Clark, Jr.
12. John P. Davey
13. Ken Davis
14. Christian de Laet
15. Reynold Feldman
16. Jerry Glenn
17. Don E. Glines
18. John P. Gnaedinger
19. Robert K. Greenleaf
20. Richard J. Greiwe
21. Agnes M. Griffen
22. Georges & Jeannine Gueron
23. Mel Gullikson
24. John R. Hadd
25. Elizabeth Hagens
26. Joe A. Hanson
27. W. W. (Wick) Hutchison
28. Steve Johnson
29. Peter & Trudy Johnson-Lenz
30. David L. Jones
31. Rick Kean
32. Michael Krueger
33. Joanne Kurfiss
34. Jacob Landau
35. Doren Kim Levitt
36. Dennis Livingston
37. Ray McBeth
38. John McClusky
39. David MacDermott
40. Noel McInnis
41. Elizabeth (Liz) Mahoney
42. Bob Maslow
43. Charles W. Merrifield
44. Mike Myers
45. William Neher
46. Bibiana C. Nowacki
47. Gerald G. Pyle
48. Edrice Reynolds
49. Bob Rimmer
50. Marshall Rosenberg

Members by member number (continued)

51. Michael Rossman
52. David J. Ruth
53. Patrick Saccomandi
54. Jeanne Mary Scott
55. Andy Smith
56. Robert W. Spencer
57. Stephen Silha
58. Robert L. Stilger
59. Nancy Strode
60. Walter Strode
61. Robert Theobald
62. Wes Thomas
63. Robert J. Welke
64. Clark H. Wilson
65. Roger W. Axford
66. Norman Edward Dewire (Ned)
67. Carla Eugster
68. Paul F. Fendt
69. Frank F. Fiore
70. David G. Gil
71. Frederick & Helen Huber
72. Paul Klores
73. Jerome D. (Jerry) Lang
74. W. Robert Lovan
75. Genevieve Marcus
76. Kent Myers
77. Ken Neunzig
78. Robert A. Smith, III
79. Madelene Van Arsdell

Keywords by member

1. TOM P. ABELES: consulting, energy, management consulting, patents, problem solving, solar energy, surveys, systems design
2. RONALD BARNES: consulting, generalist, human development, mental health, people skills, personal responsibility, process oriented, publications, seminars, speaking, transitions
3. DONALD B. BENSON: alternative education, education, experimental community, human development, learning, speaking, synergetic education, synergetics, systems design, visionary
4. CLEMENT BEZOLD: anticipatory democracy, futures, governance, law, political campaigning, publications, public interest research
5. PHILIP J. BOSSERT: analysis, futures, languages, multiple affiliations, myths, philosophy, planning, publications, synthesis, values, writing
6. ROBERT W. BRADLEY: analysis, education, futures, history, learning, networking, observation, perception, publications, synthesis, teaching, writing
7. CABELL BRAND: advertising, archeology, business, community action, economics, entrepreneur, guaranteed income, multiple affiliations, welfare
8. THOMAS CARLETON: communications skills, community development, education, film, futures, gaming, graphics, people skills, process oriented, publications, self-reliance, writing
9. WILLIAM F. CHRISTOPHER: business, communications skills, economics, futures, group work, human development, innovation, management consulting, people skills, planning, publications, speaking, technology, writing
10. CARL C. CLARK: computerized conferencing, consumer safety, mental health, nuclear arms race, patents, public interest, public satellites, publications, teaching, writing
11. EDWARD T. CLARK: alternative lifestyles, decision making, ecological ethic, ecology, education, environmental education, perception, personal responsibility, synergetics, values, workshops
12. JOHN P. DAVEY: economics, governance, institutions, planning, policy analysis
13. KEN DAVIS: arts, birthing, communications skills, education, exchanges, futures, gaming, language, literature, myths, networking, structures, teaching, transitions, voluntary simplicity, writing
14. CHRISTIAN DE LAET: East/West balance, governance, innovation, institutions, language, meta-language, myths, networking, right brain/left brain balance, social cybernetics, social networks, synergetics, teaching
15. REYNOLD FELDMAN: alternative education, consulting, education, human development, languages, literature, mysticism, networking, publications, religion, teaching
16. JERRY GLENN: anticipatory democracy, communications skills, computerized conferencing, consulting, futures, group work, mediation, mysticism, myths, networking, technology, values
17. DON E. GLINES: alternative education, education, futures, myths, planning, publications, speaking, transitions, workshops
18. JOHN P. GNAEDINGER: citizen participation, engineering, guaranteed income, mediation, preventive health care, public interest, self-reliance
19. ROBERT K. GREENLEAF: consulting, leadership, multiple affiliations, publications, speaking, teaching
20. RICHARD J. GREIWE: citizen participation, community development, consulting, futures, history, literature, personal responsibility, philosophy, self-reliance

Keywords by member (continued)

21. AGNES M. GRIFFEN: communications skills, futures, history, information, learning, libraries, networking, people skills, philosophy, publications, speaking, teaching, writing
22. GEORGES & JEANNINE GUERON: citizen participation, consulting, education, group work, languages, myths, seminars, social innovation, technology assessment, training
23. MEL GULLIKSON: computer models, cybernetics, decision making, general systems theory, human culture, meta-language, myths, perception, reality, yoga
24. JOHN R. HADD: futures, nuclear arms race, policy analysis, publications, social innovation, writing
25. ELIZABETH HAGENS: communications skills, community development, information, music, networking, people skills, planning, publications, social networks, teaching, writing
26. JOE A. HANSON: consulting, ecology, general systems theory, publications, synthesis, writing
27. W. W. (WICK) HUTCHISON: group work, people skills, seminars, values
28. STEVE JOHNSON: communications skills, consulting, exchanges, information, language, libraries, maps, networking, photography, problem solving, publications, reality, writing
29. PETER & TRUDY JOHNSON-LENZ: citizen participation, communications skills, community development, computerized conferencing, computer models, computer programming, computers, consulting, cybernetics, exchanges, information, networking, problem solving, publications, social cybernetics, social networks, surveys, systems design, transpersonal psychology
30. DAVID L. JONES: communications skills, computer programming, computers, information, photography, planning, technology, writing
31. RICK KEAN: computers, networking, psychic/physical balance, synergetics
32. MICHAEL KRUEGER: experimental community, human development, values, visionary
33. JOANNE KURFISS: citizen participation, education, human development, information, learning, public interest
34. JACOB LANDAU: alternative education, art, education, futures, humanism, writing
35. DOREN KIM LEVITT: audio-visual, communications skills, education, graphics, multi-media resource center, photography, synergetics, video, visionary, writing
36. DENNIS LIVINGSTON: alternative lifestyles, appropriate technology, consulting, futures, music, networking, political science, publications, speaking, teaching, voluntary simplicity, workshops
37. RAY MCBETH: citizen participation, community development, education, futures, grant writing, information
38. JOHN MCCLUSKY: alternative education, alternative institutions, community action, consulting, education, group work, leadership, publications, speaking, teaching, volunteers
39. DAVID MACDERMOTT: art, consulting, metaphor, speaking, visionary, writing
40. NOEL MCINNIS: consulting, counseling, education, music, poetry, publications, religion, workshops, writing
41. ELIZABETH (LIZ) MAHONEY: alternative education, consulting, counseling, education, holistic health, human development, humanism, publications, synergetics, teaching, writing

Keywords by member (continued)

42. BOB MASLOW: alternative institutions, alternative publishing, media, media access
43. CHARLES W. MERRIFIELD: alternative institutions, human culture, leadership, political science, publications, teaching, technology, values, volunteers, writing
44. MIKE MYERS: adult education, alternative education, education
45. WILLIAM NEHER: computerized conferencing, computers, education, entrepreneur, futures, networking, planning, social networks, speaking, writing
46. BIBIANA C. NOWACKI: education, futures, health care, preventive health care
47. GERALD G. PYLE: health care, law, public interest
48. EDRICE REYNOLDS: computers, education, personal responsibility, writing
49. BOB RIMMER: advertising, alternative lifestyles, business, publications, speaking, writing
50. MARSHALL ROSENBERG: consulting, music, people skills, poetry, speaking, teaching, values, workshops
51. MICHAEL ROSSMAN: citizen participation, collective responsibility, consulting, counseling, democratic learning, information, learning, personal responsibility, process oriented, publications, public interest, writing
52. DAVID J. RUTH: collective responsibility, collectives, experimental community, publications, writing
53. PATRICK SACCOMANDI: citizen participation, community development, computers, consulting, exchanges, networking, technology, volunteers
54. JEANNE MARY SCOTT: anthropology, health care, human culture, myths, networking, publications, writing
55. ANDY SMITH: alternative education, alternative institutions, education, health care, hunger, religion
56. ROBERT W. SPENCER: education, governance, group work, learning, personal responsibility, planning, political science, synthesis, teaching
57. STEPHEN SILHA: communications skills, community development, education, human development, media, process oriented, writing
58. ROBERT L. STILGER: alternative institutions, citizen participation, community development, consulting, film, information, networking, seminars, video
59. NANCY STRODE: East/West balance, healing, health care, holistic health, networking, psychic/physical balance, transpersonal psychology
60. WALTER STRODE: alternative institutions, education, futures, health care, holistic health, networking, personal responsibility, technology assessment
61. ROBERT THEOBALD: citizen participation, consulting, governance, guaranteed income, health care, information, networking, publications, speaking, values, visionary, writing
62. WES THOMAS: communications skills, computers, information, media, networking, publications, public satellites, speaking, synergetics, technology, visionary, writing
63. ROBERT J. WELKE: anthropology, networking, publications, speaking, teaching, writing
64. CLARK H. WILSON: computer programming, computers, languages, networking, synthesis, writing
65. ROGER W. AXFORD: adult education, community development, education, holistic health, languages, Latin America, nuclear arms race, prisons, publications, teaching, writing
66. NORMAN EDWARD DEWIRE (NED): alternative lifestyles, citizen participation, decision making, information, institutions, leadership, networking, religion, volunteers

Keywords by member (continued)

67. CARLA EUGSTER: alternative education, arts, community action, education, experimental community, music, poetry, speaking, values, voluntary simplicity, workshops, writing
68. PAUL F. FENDT: adult education, education, futures, gaming, planning, problem solving
69. FRANK F. FIORE: consciousness, cybernetics, general systems theory, human development, noetics, synergetics, transpersonal psychology, values
70. DAVID G. GIL: collectives, education, experimental community, governance, languages, multiple affiliations, publications, social policy, social theory, teaching, writing
71. FREDERICK R. & HELEN E. HUBER: consulting, education, gerontology, health care, holistic health, teaching, writing
72. PAUL KLORES: banking, business, education, Indians, law
73. JEROME D. (JERRY) LANG: governance, humor, publications, values, writing
74. W. ROBERT LOVAN: citizen participation, community development, consulting, decision making, leadership, multiple affiliations, publications, surveys, training, writing
75. GENEVIEVE MARCUS: arts, communications skills, computerized conferencing, East/West balance, experimental community, futures, music, planning, right brain/left brain balance, transpersonal psychology, speaking
76. KENT MYERS: futures, information, language, publications, training, writing
77. KEN NEUNZIG: collectives, experimental community, futures, myths, synergetics, universal sharing, values, visionary
78. ROBERT A. SMITH, III: community development, computerized conferencing, general systems theory, group work, human development, humanism, innovation, music, networking, noetics, psychic/physical balance, publications, synergetics, writing
79. MADELENE VAN ARSDELL: business, women's movement

WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED?

We cannot imagine how a descriptive taxonomy and/or a computer-based networking system can be developed without first determining what the purpose and goals of the information system are. We feel as though we are stumbling about with partially articulated concepts of what we want out of this process. Some of us seek friends with whom we can communicate; others seek jobs, projects, and working situations; and still others seek other potentials. Almost all of these situations involve finding other people with similar interests, and cooperating with those people in some endeavor related to those interests.

We suggest that merely giving people a list of names and addresses of those who have similar interests (or other desired characteristics as determined by our chosen taxonomy of descriptors) is insufficient for our over-arching goal of creating sound, long-term relationships of trust. As Bob has said, we need to develop strong "chaining" among the more competent folks in our society who are committed to communications-era values. This on-going "invisible college" is what is needed to carry us through the rapids just around the bend. This network of people must be fostered now. When the crises manifest, we cannot rely on computer searches by geographic location, skills, and interests to put together the deep, trusting relationships through which we can cooperate as a network and bring to bear our collective intelligence to the problems at hand. This is the challenge before us--to bring these people together and to develop relationships. We agree with Edrice Reynolds that this linkage system is for bringing people together, and the role of computer is entirely secondary to that. If the taxonomy and the descriptors take our mental focus away from the humanity, we have not accomplished much at all.

Therefore, we propose that we carefully develop a taxonomy for describing ourselves, as well as a computer-based information/communications system that can distribute this information rapidly. We suspect that whatever taxonomy and computer system are developed initially will soon be changed as we begin to gain experience from our first attempts. Furthermore, the technology is developing rapidly, so that what seems too expensive or overly flashy this year may be a necessity in the near future.

This taxonomic/communications system--this linkage system--should always be grounded in its purpose of bringing people together to develop win-win relationships rather than to compete for turf. To accomplish this, we suggest four components to the design of the taxonomy.

1. building the taxonomy out of the realities of those involved

2. including human dimensions in the taxonomy

3. assuring maximal person-to-person contact and flow of information

4. increasing the power of the taxonomy as the system expands

BUILDING THE TAXONOMY OUT OF THE REALITIES OF THOSE INVOLVED

We think the taxonomy should be based on the ways that people think and verbalize their concerns, needs, and interests. We would rather develop an organic, grassroots taxonomy based on terms that make sense to all of us in the

system. We prefer this to the alternative of adopting a complete system such as the Propedia. As Ken Davis has said, the Propedia was not very effective in describing him as a "gardener," which is certainly a term more likely to be used by folks. Both Ken and Bob Spencer have agreed that any of their proposed systems would have to be extended to include new-age terms and alternative points of view. Rather than taking one of their systems and extending it, we would rather start from scratch and develop our own system. Since we are in fact designing a communications-era system, it seems essential that the system be firmly rooted in the phenomenology and epistemology of the new age, rather than based on earlier conceptualizations. We fully realize that we are suggesting something which involves a great deal of work, but we would much rather do this right than quickly.

There are some advantages to the Propedia approach that Ken has pointed out. It can describe people in great detail, at whatever level of specificity they like. It can be used for weighting and otherwise quantifiying approximations of an exact match. We believe that each of these advantages can also come out of a new-age taxonomy. Later on in this part of the package, we discuss some of the more sophisticated indexing, matching schemes we think might be of some use to our group eventually, when we have a need for more sophistication.

The major disadvantages of a pre-defined, sophisticated system like those proposed by Ken and Bob Spencer are (1) that such a system may well require more computer power than we can afford at this early stage in the game, (2) that any such system must be extended to include new-age concepts, (3) that there may be considerable computer systems development involved in getting the computer to work with such a taxonomy, (4) that it is difficult to use for someone not familiar with the taxonomy and not particularly interested in being guided through the taxonomy in order to find what they seek, and (5) that it might very well be more exacting than is required by the first-cut function of the computer search--that is, the computer search should produce a list of potentials, rather than a final list of people with whom the match is to be made.

On the other hand, a grassroots, tailored taxonomy based on what comes out of the system naturally makes more sense to us. We have spent some time attempting to keyword everyone in the system to date. We enclose in this package a numerically ordered list of members, as well as a list of keywords showing which members are categorized under these keywords. These words are descriptors of many different orders and levels. As time passes, we might very well wish to adopt some hierarchical scheme such as that used by the Propedia, but we feel than any hierarchy should be based on the naturally used new terms and concepts of our era. So, we must first start with the terms and then build a structure as our keywords become so various that we need a hierarchical index to access them without overload. If those of us in the core group could read over the sheets we now have and develop a very crude taxonomy, such as the one we have enclosed, we could then circulate this information to everyone in the system and get feedback about how well each person feels he or she is being described and whether there are other suggestions for modifications to the taxonomy. The key here is involving everyone in the linkage system in the process of developing the descriptors.

The system can be continually developed in this way and can be expanded as necessary. The current list of descriptors can be circulated to anyone who desires to do a search. During the development of the list, volunteers in the core group can check for synonyms to avoid /"women's studies"/"women's movement"/ "feminism"/ problems. Only those keywords finally included will be allowed as descriptors.

INCLUDING HUMAN DIMENSIONS IN THE TAXONOMY

We also feel that any taxonomy such as the Propedia, which is designed for the primary purpose of organizing all human knowledge, is not particularly well designed for bringing people together. There are many things about people that have practically nothing to do with what areas of knowledge they are interested or skilled in. The old question of "What do you do?" has always seemed a very narrow question for someone to ask when meeting. The more subtle dimensions of values and work styles and visions are something that may not be very well articulated through the taxonomies suggested so far.

At one level, we think it would be useful to include certain descriptors in the taxonomy that could be used to describe the varieties of values that people hold. We recognize that most of us in this system will have somewhat similar values. Yet we suspect that there will be significant variations in how we all feel about anything from triage to God, or whether we like to work on visionary projects to how we feel about working against a deadline. All of these matters are values dimensions, and this would be useful information to those attempting to find likely partners for trust relationships.

At another level, we think it would be useful to include certain simple descriptors about generalizable and transferable skills, irregardless of the topic or area to which those skills have been put. For example, a few years ago we were involved in the design of a job-matching taxonomy that involved a total of 16 dimensions, each of which was measured by a set of 10-15 questions. The final dimensions included items such as works well with machines, works well without supervision, works well with verbal concepts, and likes to solve problems with people. This system was devised to replace standard government job-matching approaches involving the traditional job taxonomies which are extremely complex and which do not generalize across job titles; if you hadn't ever been a sanitation engineer you could never be one, even if you had been a health worker somewhere and did exactly the same kinds of tasks in a similar social situation. The new taxonomy completely avoided the necessity for using the old concepts and went directly to the actual tasks and skills involved. An additional advantage of the job-matching approach was that both the job and the person were described by the same 16 dimensions. In this way, a problem could be described in terms of what skills and tasks were involved and then a person could be found to match it. A surprising record of 95% job satisfaction came out of this work. We might be able to devise some such "interdisciplinary," task-oriented taxonomy for our group, using simple keyword descriptors at first, and developing more sophisticated structures if and when we needed them.

We might find it a lot easier to use something like a small set of 16 concepts to describe our skills and/or our needs than to have to wade through many pages of detailed taxonomic descriptors, at least for a first cut through the membership list. We suggest that we consider the use of such a taxonomy, at least in conjunction with a more verbally based approach as discussed in the previous section. In a later section, we briefly discuss some sophisticated ways of developing even more powerful and detailed systems based on this approach.

ASSURING MAXIMAL PERSON-TO-PERSON CONTACT AND FLOW OF INFORMATION

One thing that we have observed in several different ways recently is that most people's experience with networking involves other people. Most of the people with whom we have developed long-lasting trust relationships have been

people to whom we were introduced by another person. As for projects, most of them come through people with whom we have been developing a relationship for some time, rather than through a totally new person. We suspect that most of the world is this way; it's not what you know, it's whom you know.

Even in the confines of our computer conferencing world, virtually every person whom we have met and with whom we have made friends has been either introduced by or suggested by someone else. In fact, we got into the system itself through such means. Even though there is a wonderful keyword directory of everyone in the conferencing system, including a 5-line description of each person, we have never met anyone by perusing that index and then reaching out. A few people do use this approach in the conferencing system, but, as in "real" life, the majority of social contacts develop through known others. We believe the reason for this is that by having someone you trust assist in the extension of your own network, you are more inclined to trust the person so introduced. Trust begets trust. Thus, we must acknowledge this important fact in developing our linkage system. A system which just gives you a computer-printed list of people who fit your search pattern is no big deal. A system which helps you get in touch with people you can trust and resonate with--that's really something.

How can this be done? There are several ways we can think of right now. First, we can assure that most of the information flows through person-to-person contact. For example, we have several friends who are "watching" this linkage system through us. They are not in the set of 8½" by 11" sheets, but they have studied our copies. They have also read a lot of other documents that have been sent around. The result is that we have gotten into several conversations with each of them and have helped them get involved in this process.

Therefore, we suggest that we encourage linkage system members to share their information with their friends, who can choose to join themselves or who can simply participate once removed. This once-removed participation in itself constitutes a community of people who are thus linked into the overall system through a single individual. Furthermore, if this community has certain needs for services, contacts, or whatever, that could be negotiated easily through the single network member. It is quite likely that this is the pattern that will occur--contacts through existing trust relationships.

Beyond that, we can provide each member with information in a form or through a medium that enables an individual to assist someone he or she knows in using the linkage system. Any of us in this system who chose to should be able to do a search for someone and come up with a list of potentials. The 8½" by 11" sheets for these potential people should then be shown to the inquirer. Once an initial set of likely contacts has been determined through this process, the node person might begin making contacts or acting as a broker for this process, rather than having the inquirer call or write directly to the potential linkage system members.

If there were information in the computer about who in the linkage system knew whom, had worked with whom, etc., it would be easy to find brokers or introducers between an outside inquirer and a potential contact. This would personalize the matching process and increase the chances of finding and putting people together who are highly compatible.

By using our own intuitions and sensitivities we can improve the matching process a great deal. Remember, we are not just solving current problems. The

purpose of this system, as we see it, is to develop long-term stable relationships of deep trust and cooperation which will be used later to form action groups of people who know they can trust one another for work on emerging problems.

INCREASING THE POWER OF THE TAXONOMY AS THE SYSTEM EXPANDS

At the beginning we will not need particularly powerful methods for organizing and describing our membership. However, as the system evolves and begins to involve many thousands of people, we will need ever-more sophisticated methods to handle the mass of information and to prevent an inquirer from being totally overloaded by it. Therefore, we would like to briefly mention some possibilities for increasing the power of the taxonomy. We don't need these now; but we will sooner or later.

Ken mentioned one of the potential advantages of the Propedia as including the ability to weight various descriptors as to their importance. Another related problem is that you will almost never find an exact match to any particular pattern you search on, particularly if it is very complex. As a result, we need to consider some methods for searching in approximate spaces for what we need. The computer could be programmed to respond by computing some "distance" from each potential match to the desired ideal match and then give you printouts of those whose distances from the ideal were the least. The weighting approach can be used to determine which descriptors or dimensions are the most important in computing this distance. A long distance would be assigned to differences along critical dimensions, whereas a shorter distance would be assigned to differences along non-critical dimensions. In order to be able to do this well, the descriptive system needs some quantified mathematical model. There are a variety of ways this can be constructed.

One of the most interesting is to "cluster" the entries in the file into clusters or groups of relatively similar profiles. This approach was used in the 16-dimension job-matching process we mentioned earlier. This clustering allowed us to store in the computer index the cluster profiles, which were much more compact and quicker to search than the actual profiles of all the jobs. Once the search has led you to a cluster, you could then look at that cluster in detail. Such clusters are not only defined by the recurrent patterns in the descriptors themselves, but also in the recurrence of search patterns. That is, if several different people use certain search patterns to find the same groups of people, it is likely that their search patterns, although different, belong to the same cluster. If the computer can be programmed to remember these things, it can use them later on to speed up and improve the accuracy of the search.

We recognize that all of these kinds of sophisticated improvements will take more computer power, more time to develop, and in general more time and energy from our network. We believe, however, that there is little value in considering these methods until we have a system with 10,000 or more members in it. At such a time, the additional investment of energy will be needed to keep the system rolling. We mention them here as a complement to the simpler approaches we discuss elsewhere.

SUMMARY

To respond to Bob's December 3 questions more specifically:

(1) Yes, we definitely think that both the geographic- and the interest-matching aspects of the system should be made apparent to people in the document 4 invitation to participate.

(2) We definitely agree with Bob that a system like this cannot be supported by anything less than an on-line system. If we are to bring about the communications era we must be willing to work with communications-era tools. Furthermore, these are the only tools with sufficient power and speed to accomplish the linkage we seek. We simply cannot do it with a computer file accessible in one city only. The next section of this package discusses the on-line system in greater detail.

(3) We prefer an organic, grassroots, evolving taxonomy, as discussed in the previous pages. We hope we have been able to provide you with examples of how an organic system might be started, evolved, and how it might be made as sophisticated as anything else.

Peter & Trudy Johnson-Lenz
696 Fifth Street
Lake Oswego, Oregon 97034
December 19, 1977

LINKAGE SYSTEM

Members and Suggested Keywords

December 19, 1977

DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * NOTE

The attached lists of keyword descriptors and members is just a beginning. It is not a final, carefully constructed taxonomy for describing everyone in the linkage system. Before it is used, each person in the system should have a chance to add to or otherwise modify the keywords that describe him or her. To develop an organic, grassroots taxonomy, we must involve everybody.

Furthermore, this indexing scheme was developed manually, without the aid of a computer. The list of keywords evolved as we went through the sheets, adding new words when appropriate. Assigning keywords to members was done in a fairly intuitive way, based on first impressions. As the list of keywords grew, it became more difficult to remember all of them, so it is quite possible that important keywords were (accidentally) left out for various people.

The keywords are based on the words and concepts that are contained in members' 8½" by 11" sheets. In a few cases, we added keywords based on our personal acquaintance with a given member, but for the most part, assigning keys to members came directly from the sheets. Members may wish to include various keywords that describe them that aren't indicated by the material in their sheets.

These keywords reflect interest areas and skills only. It would probably be useful to keyword members geographically as well and to consider using some scales for levels of interest, etc. Also, institutional or affiliative ties, such as Earthrise, ACORN, Hawaii Health Net, and so forth might be included. Further areas to consider for the taxonomy are availability information (e.g., call in a.m.), whether visits are encouraged, and equipment available. We discuss including values information in WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED? It might also be useful to include scales of the sort suggested by Ken Davis to distinguish between degrees of interest and expertise. As the list of keywords grows, it should be organized into a hierarchical structure. For purposes of getting started, we didn't bother to do this.

MEMBERS SHOULD ASSIGN KEYWORDS TO THEMSELVES. It is very difficult for someone else to do this with any accuracy. Any misplaced words, omissions, or errors in the indexing are quite unintentional. Please consider this a first-cut attempt which needs to be criticized and further developed by everyone. Because it is neatly typed and because it looks complete, it is very easy to take this as a serious "directory" for the linkage system. Don't let appearances fool you. This taxonomic system still needs a lot of work. Everyone should participate in its development.

DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * NOTE

* Suggested keywords -- for discussion only. Feedback/comments requested. *

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Members by keywords

adult education: 44, 65, 68
advertising: 7, 49
alternative education: 3, 15, 17, 34, 38, 41, 44, 55, 67
alternative institutions: 38, 42, 43, 55, 58, 60
alternative lifestyles: 11, 36, 49, 66
alternative publishing: 42
analysis: 5, 6
anthropology: 54, 63
anticipatory democracy: 4, 16
appropriate technology: 36
archeology: 7
art: 34, 39
arts: 13, 67, 75
audio visual: 35

banking: 72
birthing: 13
business: 7, 9, 49, 72, 79

citizen participation: 18, 20, 22, 29, 33, 37, 51, 53, 58, 61, 66, 74
collective responsibility: 51, 52
collectives: 52, 70, 77
communications skills: 5, 9, 13, 16, 21, 25, 28, 29, 30, 35, 57, 62, 75
community action: 7, 38, 67
community development: 8, 20, 25, 29, 37, 53, 57, 58, 65, 74, 78
computerized conferencing: 10, 16, 29, 45, 75, 78
computer models: 23, 29
computer programming: 29, 30, 64
computers: 29, 30, 31, 45, 48, 53, 62, 64
consciousness: 69
consulting: 1, 2, 15, 16, 19, 20, 22, 26, 28, 29, 36, 38, 39, 40, 41, 50, 51, 53, 58, 61, 71, 74
consumer safety: 10
counseling: 40, 41, 51
cybernetics: 23, 29, 69

decision making: 11, 23, 66, 74
democratic learning: 51

East/West balance: 14, 59, 75
ecological ethic: 11
ecology: 11, 26
economics: 7, 9, 12
education: 3, 6, 8, 11, 13, 15, 17, 22, 33, 34, 35, 37, 38, 40, 41, 44, 45, 46, 48, 55, 56, 57, 60, 65, 67, 68, 70, 71, 72
energy: 1
engineering: 18
entrepreneur: 7, 45
environmental education: 11
exchanges: 13, 28, 29, 53
experimental community: 3, 32, 52, 67, 70, 75, 77

* Suggested keywords -- for discussion only. Feedback/comments requested. *

Members by keywords (continued)

film: 8, 58
futures: 4, 5, 6, 8, 9, 13, 16, 17, 20, 21, 24, 34, 36, 37, 45, 46, 60, 68, 75, 76, 77

gaming: 8, 13, 68
generalist: 2
general systems theory: 23, 26, 69, 78
gerontology: 71
governance: 4, 12, 14, 56, 61, 70, 73
grant writing: 37
graphics: 8, 35
group work: 9, 16, 22, 27, 38, 56, 78
guaranteed income: 7, 18, 61

healing: 59
health care: 46, 47, 54, 55, 59, 60, 61, 71
history: 6, 20, 21
holistic health: 41, 59, 60, 65, 71
human culture: 23, 43, 54
human development: 2, 3, 9, 15, 32, 33, 41, 57, 69, 78
humanism: 34, 41, 78
humor: 73
hunger: 55

Indians: 72
information: 21, 25, 28, 29, 30, 33, 37, 51, 58, 61, 62, 66, 76
innovation: 9, 14, 78
institutions: 12, 14, 66

language: 13, 14, 28, 76
languages: 5, 15, 22, 64, 65, 70
Latin America: 65
law: 4, 47, 72
leadership: 19, 38, 43, 66, 74
learning: 3, 6, 21, 33, 51, 56
libraries: 21, 28
literature: 13, 15, 20

management consulting: 1, 9
maps: 28
media: 42, 57, 62
media access: 42
mediation: 16, 18
mental health: 2, 10
meta-language: 14, 23
metaphor: 39
multi-media resource center: 35
multiple affiliations: 5, 7, 19, 70, 74
music: 25, 36, 40, 50, 67, 75, 78
mysticism: 15, 16
myths: 5, 13, 14, 16, 17, 22, 23, 54, 77

Members by keywords (continued)

networking: 6, 13, 14, 15, 16, 24, 25, 28, 29, 31, 36, 45, 53, 54, 58, 59, 60, 61, 62, 63, 64, 66, 78
noetics: 69, 78
nuclear arms race: 10, 24, 65

observation: 6

patents: 1, 10
people skills: 2, 8, 9, 21, 25, 27, 50
perception: 6, 11, 23
personal responsibility: 2, 11, 20, 48, 51, 56, 60
philosophy: 5, 20, 21
photography: 28, 30, 35
planning: 5, 9, 12, 17, 25, 30, 45, 56, 68, 75
poetry: 40, 50, 67
policy analysis: 12, 24
political campaigning: 4
political science: 36, 43, 56
preventive health care: 18, 46
prisons: 65
problem solving: 1, 28, 29, 68
process oriented: 2, 8, 51, 57
psychic/physical balance: 31, 59, 78
publications: 2, 4, 5, 6, 8, 9, 10, 15, 17, 19, 21, 24, 25, 26, 28, 29, 36, 38, 40, 41, 43, 49, 51, 52, 54, 61, 62, 63, 65, 70, 73, 74, 76, 78
public interest: 10, 18, 33, 47, 51
public interest research: 4
public satellites: 10, 62

reality: 23, 28
religion: 15, 40, 55, 66
right brain/left brain balance: 14, 75

self-reliance: 8, 18, 20
seminars: 2, 22, 27, 58
social cybernetics: 14, 29
social innovation: 22, 24
social networks: 14, 25, 29, 45
social policy: 70
social theory: 70
solar energy: 1
speaking: 2, 3, 9, 17, 19, 21, 36, 38, 39, 45, 49, 50, 61, 62, 63, 67, 75
structures: 13
surveys: 1, 29, 74
synergetic education: 3
synergetics: 3, 11, 14, 31, 35, 41, 62, 69, 77, 78
synthesis: 5, 6, 26, 56, 64
systems design: 1, 3, 29

Members by keywords (continued)

teaching: 6, 10, 13, 14, 15, 19, 21, 25, 36, 38, 41, 43, 50, 56, 63, 65, 70, 71
technology: 9, 16, 30, 43, 53, 62
technology assessment: 22, 60
training: 22, 74, 76
transitions: 2, 13, 17
transpersonal psychology: 29, 59, 69, 75

universal sharing: 77

values: 5, 11, 16, 27, 32, 43, 50, 61, 67, 69, 73, 77
video: 35, 58
visionary: 3, 32, 35, 39, 59, 61, 62, 77
voluntary simplicity: 13, 36, 67
volunteers: 38, 43, 53, 66

welfare: 7
women's movement: 79
workshops: 11, 17, 36, 40, 50, 67
writing: 5, 6, 8, 9, 10, 13, 21, 24, 25, 26, 28, 29, 30, 34, 35, 39, 40, 41, 43, 45, 48, 49, 51, 52, 54, 57, 61, 62, 63, 64, 65, 67, 70, 71, 73, 74, 75, 76, 78

yoga: 23

Members by member number

1. Tom P. Abeles
2. Ronald Barnes
3. Donald B. Benson
4. Clement Bezold
5. Philip J. Bossert
6. Robert W. Bradley
7. Cabell Brand
8. Thomas Carleton
9. William F. Christopher
10. Carl C. Clark
11. Edward T. Clark, Jr.
12. John P. Davey
13. Ken Davis
14. Christian de Laet
15. Reynold Feldman
16. Jerry Glenn
17. Don E. Glines
18. John P. Gnaedinger
19. Robert K. Greenleaf
20. Richard J. Greiwe
21. Agnes M. Griffen
22. Georges & Jeannine Gueron
23. Mel Gullikson
24. John R. Hadd
25. Elizabeth Hagens
26. Joe A. Hanson
27. W. W. (Wick) Hutchison
28. Steve Johnson
29. Peter & Trudy Johnson-Lenz
30. David L. Jones
31. Rick Kean
32. Michael Krueger
33. Joanne Kurfiss
34. Jacob Landau
35. Doren Kim Levitt
36. Dennis Livingston
37. Ray McBeth
38. John McClusky
39. David MacDermott
40. Noel McInnis
41. Elizabeth (Liz) Mahoney
42. Bob Maslow
43. Charles W. Merrifield
44. Mike Myers
45. William Neher
46. Bibiana C. Nowacki
47. Gerald G. Pyle
48. Edrice Reynolds
49. Bob Rimmer
50. Marshall Rosenberg

Members by member number (continued)

51. Michael Rossman
52. David J. Ruth
53. Patrick Saccomandi
54. Jeanne Mary Scott
55. Andy Smith
56. Robert W. Spencer
57. Stephen Silha
58. Robert L. Stilger
59. Nancy Strode
60. Walter Strode
61. Robert Theobald
62. Wes Thomas
63. Robert J. Welke
64. Clark H. Wilson
65. Roger W. Axford
66. Norman Edward Dewire (Ned)
67. Carla Eugster
68. Paul F. Fendt
69. Frank F. Fiore
70. David G. Gil
71. Frederick & Helen Huber
72. Paul Klores
73. Jerome D. (Jerry) Lang
74. W. Robert Lovan
75. Genevieve Marcus
76. Kent Myers
77. Ken Neunzig
78. Robert A. Smith, III
79. Madelene Van Arsdell

* Suggested keywords -- for discussion only. Feedback/comments requested. *

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Keywords by member

1. TOM P. ABELES: consulting, energy, management consulting, patents, problem solving, solar energy, surveys, systems design
2. RONALD BARNES: consulting, generalist, human development, mental health, people skills, personal responsibility, process oriented, publications, seminars, speaking, transitions
3. DONALD B. BENSON: alternative education, education, experimental community, human development, learning, speaking, synergetic education, synergetics, systems design, visionary
4. CLEMENT BEZOLD: anticipatory democracy, futures, governance, law, political campaigning, publications, public interest research
5. PHILIP J. BOSSERT: analysis, futures, languages, multiple affiliations, myths, philosophy, planning, publications, synthesis, values, writing
6. ROBERT W. BRADLEY: analysis, education, futures, history, learning, networking, observation, perception, publications, synthesis, teaching, writing
7. CABELL BRAND: advertising, archeology, business, community action, economics, entrepreneur, guaranteed income, multiple affiliations, welfare
8. THOMAS CARLETON: communications skills, community development, education, film, futures, gaming, graphics, people skills, process oriented, publications, self-reliance, writing
9. WILLIAM F. CHRISTOPHER: business, communications skills, economics, futures, group work, human development, innovation, management consulting, people skills, planning, publications, speaking, technology, writing
10. CARL C. CLARK: computerized conferencing, consumer safety, mental health, nuclear arms race, patents, public interest, public satellites, publications, teaching, writing
11. EDWARD T. CLARK: alternative lifestyles, decision making, ecological ethic, ecology, education, environmental education, perception, personal responsibility, synergetics, values, workshops
12. JOHN P. DAVEY: economics, governance, institutions, planning, policy analysis
13. KEN DAVIS: arts, birthing, communications skills, education, exchanges, futures, gaming, language, literature, myths, networking, structures, teaching, transitions, voluntary simplicity, writing
14. CHRISTIAN DE LAET: East/West balance, governance, innovation, institutions, language, meta-language, myths, networking, right brain/left brain balance, social cybernetics, social networks, synergetics, teaching
15. REYNOLD FELDMAN: alternative education, consulting, education, human development, languages, literature, mysticism, networking, publications, religion, teaching
16. JERRY GLENN: anticipatory democracy, communications skills, computerized conferencing, consulting, futures, group work, mediation, mysticism, myths, networking, technology, values
17. DON E. GLINES: alternative education, education, futures, myths, planning, publications, speaking, transitions, workshops
18. JOHN P. GNAEDINGER: citizen participation, engineering, guaranteed income, mediation, preventive health care, public interest, self-reliance
19. ROBERT K. GREENLEAF: consulting, leadership, multiple affiliations, publications, speaking, teaching
20. RICHARD J. GREIWE: citizen participation, community development, consulting, futures, history, literature, personal responsibility, philosophy, self-reliance

Keywords by member (continued)

21. AGNES M. GRIFFEN: communications skills, futures, history, information, learning, libraries, networking, people skills, philosophy, publications, speaking, teaching, writing
22. GEORGES & JEANNINE GUERON: citizen participation, consulting, education, group work, languages, myths, seminars, social innovation, technology assessment, training
23. MEL GULLIKSON: computer models, cybernetics, decision making, general systems theory, human culture, meta-language, myths, perception, reality, yoga
24. JOHN R. HADD: futures, nuclear arms race, policy analysis, publications, social innovation, writing
25. ELIZABETH HAGENS: communications skills, community development, information, music, networking, people skills, planning, publications, social networks, teaching, writing
26. JOE A. HANSON: consulting, ecology, general systems theory, publications, synthesis, writing
27. W. W. (WICK) HUTCHISON: group work, people skills, seminars, values
28. STEVE JOHNSON: communications skills, consulting, exchanges, information, language, libraries, maps, networking, photography, problem solving, publications, reality, writing
29. PETER & TRUDY JOHNSON-LENZ: citizen participation, communications skills, community development, computerized conferencing, computer models, computer programming, computers, consulting, cybernetics, exchanges, information, networking, problem solving, publications, social cybernetics, social networks, surveys, systems design, transpersonal psychology
30. DAVID L. JONES: communications skills, computer programming, computers, information, photography, planning, technology, writing
31. RICK KEAN: computers, networking, psychic/physical balance, synergetics
32. MICHAEL KRUEGER: experimental community, human development, values, visionary
33. JOANNE KURFISS: citizen participation, education, human development, information, learning, public interest
34. JACOB LANDAU: alternative education, art, education, futures, humanism, writing
35. DOREN KIM LEVITT: audio-visual, communications skills, education, graphics, multi-media resource center, photography, synergetics, video, visionary, writing
36. DENNIS LIVINGSTON: alternative lifestyles, appropriate technology, consulting, futures, music, networking, political science, publications, speaking, teaching, voluntary simplicity, workshops
37. RAY MCBETH: citizen participation, community development, education, futures, grant writing, information
38. JOHN MCCLUSKY: alternative education, alternative institutions, community action, consulting, education, group work, leadership, publications, speaking, teaching, volunteers
39. DAVID MACDERMOTT: art, consulting, metaphor, speaking, visionary, writing
40. NOEL MCINNIS: consulting, counseling, education, music, poetry, publications, religion, workshops, writing
41. ELIZABETH (LIZ) MAHONEY: alternative education, consulting, counseling, education, holistic health, human development, humanism, publications, synergetics, teaching, writing

Keywords by member (continued)

42. BOB MASLOW: alternative institutions, alternative publishing, media, media access
43. CHARLES W. MERRIFIELD: alternative institutions, human culture, leadership, political science, publications, teaching, technology, values, volunteers, writing
44. MIKE MYERS: adult education, alternative education, education
45. WILLIAM NEHER: computerized conferencing, computers, education, entrepreneur, futures, networking, planning, social networks, speaking, writing
46. BIBIANA C. NOWACKI: education, futures, health care, preventive health care
47. GERALD G. PYLE: health care, law, public interest
48. EDRICE REYNOLDS: computers, education, personal responsibility, writing
49. BOB RIMMER: advertising, alternative lifestyles, business, publications, speaking, writing
50. MARSHALL ROSENBERG: consulting, music, people skills, poetry, speaking, teaching, values, workshops
51. MICHAEL ROSSMAN: citizen participation, collective responsibility, consulting, counseling, democratic learning, information, learning, personal responsibility, process oriented, publications, public interest, writing
52. DAVID J. RUTH: collective responsibility, collectives, experimental community, publications, writing
53. PATRICK SACCOMANDI: citizen participation, community development, computers, consulting, exchanges, networking, technology, volunteers
54. JEANNE MARY SCOTT: anthropology, health care, human culture, myths, networking, publications, writing
55. ANDY SMITH: alternative education, alternative institutions, education, health care, hunger, religion
56. ROBERT W. SPENCER: education, governance, group work, learning, personal responsibility, planning, political science, synthesis, teaching
57. STEPHEN SILHA: communications skills; community development, education, human development, media, process oriented, writing
58. ROBERT L. STILGER: alternative institutions, citizen participation, community development, consulting, film, information, networking, seminars, video
59. NANCY STRODE: East/West balance, healing, health care, holistic health, networking, psychic/physical balance, transpersonal psychology
60. WALTER STRODE: alternative institutions, education, futures, health care, holistic health, networking, personal responsibility, technology assessment
61. ROBERT THEOBALD: citizen participation, consulting, governance, guaranteed income, health care, information, networking, publications, speaking, values, visionary, writing
62. WES THOMAS: communications skills, computers, information, media, networking, publications, public satellites, speaking, synergetics, technology, visionary, writing
63. ROBERT J. WELKE: anthropology, networking, publications, speaking, teaching, writing
64. CLARK H. WILSON: computer programming, computers, languages, networking, synthesis, writing
65. ROGER W. AXFORD: adult education, community development, education, holistic health, languages, Latin America, nuclear arms race, prisons, publications, teaching, writing
66. NORMAN EDWARD DEWIRE (NED): alternative lifestyles, citizen participation, decision making, information, institutions, leadership, networking, religion, volunteers

Keywords by member (continued)

67. CARLA EUGSTER: alternative education, arts, community action, education, experimental community, music, poetry, speaking, values, voluntary simplicity, workshops, writing
68. PAUL F. FENDT: adult education, education, futures, gaming, planning, problem solving
69. FRANK P. FIORE: consciousness, cybernetics, general systems theory, human development, noetics, synergetics, transpersonal psychology, values
70. DAVID G. GIL: collectives, education, experimental community, governance, languages, multiple affiliations, publications, social policy, social theory, teaching, writing
71. FREDERICK R. & HELEN E. HUBER: consulting, education, gerontology, health care, holistic health, teaching, writing
72. PAUL KLORES: banking, business, education, Indians, law
73. JEROME D. (JERRY) LANG: governance, humor, publications, values, writing
74. W. ROBERT LOVAN: citizen participation, community development, consulting, decision making, leadership, multiple affiliations, publications, surveys, training, writing
75. GENEVIEVE MARCUS: arts, communications skills, computerized conferencing, East/West balance, experimental community, futures, music, planning, right brain/left brain balance, transpersonal psychology, speaking
76. KENT MYERS: futures, information, language, publications, training, writing
77. KEN NEUNZIG: collectives, experimental community, futures, myths, synergetics, universal sharing, values, visionary
78. ROBERT A. SMITH, III: community development, computerized conferencing, general systems theory, group work, human development, humanism, innovation, music, networking, noetics, psychic/physical balance, publications, synergetics, writing
79. MADELENE VAN ARSDELL: business, women's movement

1) the term new-age is only for people who have not read their political history.

2) Prodadic?

WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED?

We cannot imagine how a descriptive taxonomy and/or a computer-based networking system can be developed without first determining what the purpose and goals of the information system are. We feel as though we are stumbling about with partially articulated concepts of what we want out of this process. Some of us seek friends with whom we can communicate; others seek jobs, projects, and working situations; and still others seek other potentials. Almost all of these situations involve finding other people with similar interests, and cooperating with those people in some endeavor related to those interests.

We suggest that merely giving people a list of names and addresses of those who have similar interests (or other desired characteristics as determined by our chosen taxonomy of descriptors) is insufficient for our over-arching goal of creating sound, long-term relationships of trust. As Bob has said, we need to develop strong "chaining" among the more competent folks in our society who are committed to communications-era values. This on-going "invisible college" is what is needed to carry us through the rapids just around the bend. This network of people must be fostered now. When the crises manifest, we cannot rely on computer searches by geographic location, skills, and interests to put together the deep, trusting relationships through which we can cooperate as a network and bring to bear our collective intelligence to the problems at hand. This is the challenge before us--to bring these people together and to develop relationships. We agree with Edrice Reynolds that this linkage system is for bringing people together, and the role of computer is entirely secondary to that. If the taxonomy and the descriptors take our mental focus away from the humanity, we have not accomplished much at all.

Therefore, we propose that we carefully develop a taxonomy for describing ourselves, as well as a computer-based information/communications system that can distribute this information rapidly. We suspect that whatever taxonomy and computer system are developed initially will soon be changed as we begin to gain experience from our first attempts. Furthermore, the technology is developing rapidly, so that what seems too expensive or overly flashy this year may be a necessity in the near future.

This taxonomic/communications system--this linkage system--should always be grounded in its purpose of bringing people together to develop win-win relationships rather than to compete for turf. To accomplish this, we suggest four components to the design of the taxonomy.

1. building the taxonomy out of the realities of those involved
2. including human dimensions in the taxonomy
3. assuring maximal person-to-person contact and flow of information
4. increasing the power of the taxonomy as the system expands

BUILDING THE TAXONOMY OUT OF THE REALITIES OF THOSE INVOLVED

We think the taxonomy should be based on the ways that people think and verbalize their concerns, needs, and interests. We would rather develop an organic, grassroots taxonomy based on terms that make sense to all of us in the

system. We prefer this to the alternative of adopting a complete system such as the Propedia. As Ken Davis has said, the Propedia was not very effective in describing him as a "gardener," which is certainly a term more likely to be used by folks. Both Ken and Bob Spencer have agreed that any of their proposed systems would have to be extended to include new-age terms and alternative points of view. Rather than taking one of their systems and extending it, we would rather start from scratch and develop our own system. Since we are in fact designing a communications-era system, it seems essential that the system be firmly rooted in the phenomenology and epistemology of the new age, rather than based on earlier conceptualizations. We fully realize that we are suggesting something which involves a great deal of work, but we would much rather do this right than quickly.

There are some advantages to the Propedia approach that Ken has pointed out. It can describe people in great detail, at whatever level of specificity they like. It can be used for weighting and otherwise quantifiying approximations of an exact match. We believe that each of these advantages can also come out of a new-age taxonomy. Later on in this part of the package, we discuss some of the more sophisticated indexing, matching schemes we think might be of some use to our group eventually, when we have a need for more sophistication.

The major disadvantages of a pre-defined, sophisticated system like those proposed by Ken and Bob Spencer are (1) that such a system may well require more computer power than we can afford at this early stage in the game, (2) that any such system must be extended to include new-age concepts, (3) that there may be considerable computer systems development involved in getting the computer to work with such a taxonomy, (4) that it is difficult to use for someone not familiar with the taxonomy and not particularly interested in being guided through the taxonomy in order to find what they seek, and (5) that it might very well be more exacting than is required by the first-cut function of the computer search--that is, the computer search should produce a list of potentials, rather than a final list of people with whom the match is to be made.

On the other hand, a grassroots, tailored taxonomy based on what comes out of the system naturally makes more sense to us. We have spent some time attempting to keyword everyone in the system to date. We enclose in this package a numerically ordered list of members, as well as a list of keywords showing which members are categorized under these keywords. These words are descriptors of many different orders and levels. As time passes, we might very well wish to adopt some hierarchical scheme such as that used by the Propedia, but we feel than any hierarchy should be based on the naturally used new terms and concepts of our era. So, we must first start with the terms and then build a structure as our keywords become so various that we need a hierarchical index to access them without overload. If those of us in the core group could read over the sheets we now have and develop a very crude taxonomy, such as the one we have enclosed, we could then circulate this information to everyone in the system and get feedback about how well each person feels he or she is being described and whether there are other suggestions for modifications to the taxonomy. The key here is involving everyone in the linkage system in the process of developing the descriptors.

The system can be continually developed in this way and can be expanded as necessary. The current list of descriptors can be circulated to anyone who desires to do a search. During the development of the list, volunteers in the core group can check for synonyms to avoid /"women's studies"/"women's movement"/ "feminism"/ problems. Only those keywords finally included will be allowed as descriptors.

INCLUDING HUMAN DIMENSIONS IN THE TAXONOMY

We also feel that any taxonomy such as the Propedia, which is designed for the primary purpose of organizing all human knowledge, is not particularly well designed for bringing people together. There are many things about people that have practically nothing to do with what areas of knowledge they are interested or skilled in. The old question of "What do you do?" has always seemed a very narrow question for someone to ask when meeting. The more subtle dimensions of values and work styles and visions are something that may not be very well articulated through the taxonomies suggested so far.

At one level, we think it would be useful to include certain descriptors in the taxonomy that could be used to describe the varieties of values that people hold. We recognize that most of us in this system will have somewhat similar values. Yet we suspect that there will be significant variations in how we all feel about anything from triage to God, or whether we like to work on visionary projects to how we feel about working against a deadline. All of these matters are values dimensions, and this would be useful information to those attempting to find likely partners for trust relationships.

At another level, we think it would be useful to include certain simple descriptors about generalizable and transferable skills, regardless of the topic or area to which those skills have been put. For example, a few years ago we were involved in the design of a job-matching taxonomy that involved a total of 16 dimensions, each of which was measured by a set of 10-15 questions. The final dimensions included items such as works well with machines, works well without supervision, works well with verbal concepts, and likes to solve problems with people. This system was devised to replace standard government job-matching approaches involving the traditional job taxonomies which are extremely complex and which do not generalize across job titles; if you hadn't ever been a sanitation engineer you could never be one, even if you had been a health worker somewhere and did exactly the same kinds of tasks in a similar social situation. The new taxonomy completely avoided the necessity for using the old concepts and went directly to the actual tasks and skills involved. An additional advantage of the job-matching approach was that both the job and the person were described by the same 16 dimensions. In this way, a problem could be described in terms of what skills and tasks were involved and then a person could be found to match it. A surprising record of 95% job satisfaction came out of this work. We might be able to devise some such "interdisciplinary," task-oriented taxonomy for our group, using simple keyword descriptors at first, and developing more sophisticated structures if and when we needed them.

We might find it a lot easier to use something like a small set of 16 concepts to describe our skills and/or our needs than to have to wade through many pages of detailed taxonomic descriptors, at least for a first cut through the membership list. We suggest that we consider the use of such a taxonomy, at least in conjunction with a more verbally based approach as discussed in the previous section. In a later section, we briefly discuss some sophisticated ways of developing even more powerful and detailed systems based on this approach.

ASSURING MAXIMAL PERSON-TO-PERSON CONTACT AND FLOW OF INFORMATION

One thing that we have observed in several different ways recently is that most people's experience with networking involves other people. Most of the people with whom we have developed long-lasting trust relationships have been

people to whom we were introduced by another person. As for projects, most of them come through people with whom we have been developing a relationship for some time, rather than through a totally new person. We suspect that most of the world is this way; it's not what you know, it's whom you know.

Even in the confines of our computer conferencing world, virtually every person whom we have met and with whom we have made friends has been either introduced by or suggested by someone else. In fact, we got into the system itself through such means. Even though there is a wonderful keyword directory of everyone in the conferencing system, including a 5-line description of each person, we have never met anyone by perusing that index and then reaching out. A few people do use this approach in the conferencing system, but, as in "real" life, the majority of social contacts develop through known others. We believe the reason for this is that by having someone you trust assist in the extension of your own network, you are more inclined to trust the person so introduced. Trust begets trust. Thus, we must acknowledge this important fact in developing our linkage system. A system which just gives you a computer-printed list of people who fit your search pattern is no big deal. A system which helps you get in touch with people you can trust and resonate with--that's really something.

How can this be done? There are several ways we can think of right now. First, we can assure that most of the information flows through person-to-person contact. For example, we have several friends who are "watching" this linkage system through us. They are not in the set of 8½" by 11" sheets, but they have studied our copies. They have also read a lot of other documents that have been sent around. The result is that we have gotten into several conversations with each of them and have helped them get involved in this process.

Therefore, we suggest that we encourage linkage system members to share their information with their friends, who can choose to join themselves or who can simply participate once removed. This once-removed participation in itself constitutes a community of people who are thus linked into the overall system through a single individual. Furthermore, if this community has certain needs for services, contacts, or whatever, that could be negotiated easily through the single network member. It is quite likely that this is the pattern that will occur--contacts through existing trust relationships.

Beyond that, we can provide each member with information in a form or through a medium that enables an individual to assist someone he or she knows in using the linkage system. Any of us in this system who chose to should be able to do a search for someone and come up with a list of potentials. The 8½" by 11" sheets for these potential people should then be shown to the inquirer. Once an initial set of likely contacts has been determined through this process, the node person might begin making contacts or acting as a broker for this process, rather than having the inquirer call or write directly to the potential linkage system members.

If there were information in the computer about who in the linkage system knew whom, had worked with whom, etc., it would be easy to find brokers or introducers between an outside inquirer and a potential contact. This would personalize the matching process and increase the chances of finding and putting people together who are highly compatible.

By using our own intuitions and sensitivities we can improve the matching process a great deal. Remember, we are not just solving current problems. The

purpose of this system, as we see it, is to develop long-term stable relationships of deep trust and cooperation which will be used later to form action groups of people who know they can trust one another for work on emerging problems.

INCREASING THE POWER OF THE TAXONOMY AS THE SYSTEM EXPANDS

At the beginning we will not need particularly powerful methods for organizing and describing our membership. However, as the system evolves and begins to involve many thousands of people, we will need ever-more sophisticated methods to handle the mass of information and to prevent an inquirer from being totally overloaded by it. Therefore, we would like to briefly mention some possibilities for increasing the power of the taxonomy. We don't need these now, but we will sooner or later.

Ken mentioned one of the potential advantages of the Propedia as including the ability to weight various descriptors as to their importance. Another related problem is that you will almost never find an exact match to any particular pattern you search on, particularly if it is very complex. As a result, we need to consider some methods for searching in approximate spaces for what we need. The computer could be programmed to respond by computing some "distance" from each potential match to the desired ideal match and then give you printouts of those whose distances from the ideal were the least. The weighting approach can be used to determine which descriptors or dimensions are the most important in computing this distance. A long distance would be assigned to differences along critical dimensions, whereas a shorter distance would be assigned to differences along non-critical dimensions. In order to be able to do this well, the descriptive system needs some quantified mathematical model. There are a variety of ways this can be constructed.

One of the most interesting is to "cluster" the entries in the file into clusters or groups of relatively similar profiles. This approach was used in the 16-dimension job-matching process we mentioned earlier. This clustering allowed us to store in the computer index the cluster profiles, which were much more compact and quicker to search than the actual profiles of all the jobs. Once the search has led you to a cluster, you could then look at that cluster in detail. Such clusters are not only defined by the recurrent patterns in the descriptors themselves, but also in the recurrence of search patterns. That is, if several different people use certain search patterns to find the same groups of people, it is likely that their search patterns, although different, belong to the same cluster. If the computer can be programmed to remember these things, it can use them later on to speed up and improve the accuracy of the search.

We recognize that all of these kinds of sophisticated improvements will take more computer power, more time to develop, and in general more time and energy from our network. We believe, however, that there is little value in considering these methods until we have a system with 10,000 or more members in it. At such a time, the additional investment of energy will be needed to keep the system rolling. We mention them here as a complement to the simpler approaches we discuss elsewhere.

SUMMARY

To respond to Bob's December 3 questions more specifically:

(1) Yes, we definitely think that both the geographic- and the interest-matching aspects of the system should be made apparent to people in the document 4 invitation to participate.

(2) We definitely agree with Bob that a system like this cannot be supported by anything less than an on-line system. If we are to bring about the communications era we must be willing to work with communications-era tools. Furthermore, these are the only tools with sufficient power and speed to accomplish the linkage we seek. We simply cannot do it with a computer file accessible in one city only. The next section of this package discusses the on-line system in greater detail.

(3) We prefer an organic, grassroots, evolving taxonomy, as discussed in the previous pages. We hope we have been able to provide you with examples of how an organic system might be started, evolved, and how it might be made as sophisticated as anything else.

Peter & Trudy Johnson-Lenz
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December 19, 1977

WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED?

We cannot imagine how a descriptive taxonomy and/or a computer-based networking system can be developed without first determining what the purpose and goals of the information system are. We feel as though we are stumbling about with partially articulated concepts of what we want out of this process. Some of us seek friends with whom we can communicate; others seek jobs, projects, and working situations; and still others seek other potentials. Almost all of these situations involve finding other people with similar interests, and cooperating with those people in some endeavor related to those interests.

We suggest that merely giving people a list of names and addresses of those who have similar interests (or other desired characteristics as determined by our chosen taxonomy of descriptors) is insufficient for our over-arching goal of creating sound, long-term relationships of trust. As Bob has said, we need to develop strong "chaining" among the more competent folks in our society who are committed to communications-era values. This on-going "invisible college" is what is needed to carry us through the rapids just around the bend. This network of people must be fostered now. When the crises manifest, we cannot rely on computer searches by geographic location, skills, and interests to put together the deep, trusting relationships through which we can cooperate as a network and bring to bear our collective intelligence to the problems at hand. This is the challenge before us--to bring these people together and to develop relationships. We agree with Edrice Reynolds that this linkage system is for bringing people together, and the role of computer is entirely secondary to that. If the taxonomy and the descriptors take our mental focus away from the humanity, we have not accomplished much at all.

Therefore, we propose that we carefully develop a taxonomy for describing ourselves, as well as a computer-based information/communications system that can distribute this information rapidly. We suspect that whatever taxonomy and computer system are developed initially will soon be changed as we begin to gain experience from our first attempts. Furthermore, the technology is developing rapidly, so that what seems too expensive or overly flashy this year may be a necessity in the near future.

This taxonomic/communications system--this linkage system--should always be grounded in its purpose of bringing people together to develop win-win relationships rather than to compete for turf. To accomplish this, we suggest four components to the design of the taxonomy.

1. building the taxonomy out of the realities of those involved

2. including human dimensions in the taxonomy

3. assuring maximal person-to-person contact and flow of information

4. increasing the power of the taxonomy as the system expands

BUILDING THE TAXONOMY OUT OF THE REALITIES OF THOSE INVOLVED

We think the taxonomy should be based on the ways that people think and verbalize their concerns, needs, and interests. We would rather develop an organic, grassroots taxonomy based on terms that make sense to all of us in the

system. We prefer this to the alternative of adopting a complete system such as the Propedia. As Ken Davis has said, the Propedia was not very effective in describing him as a "gardener," which is certainly a term more likely to be used by folks. Both Ken and Bob Spencer have agreed that any of their proposed systems would have to be extended to include new-age terms and alternative points of view. Rather than taking one of their systems and extending it, we would rather start from scratch and develop our own system. Since we are in fact designing a communications-era system, it seems essential that the system be firmly rooted in the phenomenology and epistemology of the new age, rather than based on earlier conceptualizations. We fully realize that we are suggesting something which involves a great deal of work, but we would much rather do this right than quickly.

There are some advantages to the Propedia approach that Ken has pointed out. It can describe people in great detail, at whatever level of specificity they like. It can be used for weighting and otherwise quantifiying approximations of an exact match. We believe that each of these advantages can also come out of a new-age taxonomy. Later on in this part of the package, we discuss some of the more sophisticated indexing, matching schemes we think might be of some use to our group eventually, when we have a need for more sophistication.

The major disadvantages of a pre-defined, sophisticated system like those proposed by Ken and Bob Spencer are (1) that such a system may well require more computer power than we can afford at this early stage in the game, (2) that any such system must be extended to include new-age concepts, (3) that there may be considerable computer systems development involved in getting the computer to work with such a taxonomy, (4) that it is difficult to use for someone not familiar with the taxonomy and not particularly interested in being guided through the taxonomy in order to find what they seek, and (5) that it might very well be more exacting than is required by the first-cut function of the computer search--that is, the computer search should produce a list of potentials, rather than a final list of people with whom the match is to be made.

On the other hand, a grassroots, tailored taxonomy based on what comes out of the system naturally makes more sense to us. We have spent some time attempting to keyword everyone in the system to date. We enclose in this package a numerically ordered list of members, as well as a list of keywords showing which members are categorized under these keywords. These words are descriptors of many different orders and levels. As time passes, we might very well wish to adopt some hierarchical scheme such as that used by the Propedia, but we feel than any hierarchy should be based on the naturally used new terms and concepts of our era. So, we must first start with the terms and then build a structure as our keywords become so various that we need a hierarchical index to access them without overload. If those of us in the core group could read over the sheets we now have and develop a very crude taxonomy, such as the one we have enclosed, we could then circulate this information to everyone in the system and get feedback about how well each person feels he or she is being described and whether there are other suggestions for modifications to the taxonomy. The key here is involving everyone in the linkage system in the process of developing the descriptors.

The system can be continually developed in this way and can be expanded as necessary. The current list of descriptors can be circulated to anyone who desires to do a search. During the development of the list, volunteers in the core group can check for synonyms to avoid /"women's studies"/"women's movement"/ "feminism"/ problems. Only those keywords finally included will be allowed as descriptors.

INCLUDING HUMAN DIMENSIONS IN THE TAXONOMY

We also feel that any taxonomy such as the Propedia, which is designed for the primary purpose of organizing all human knowledge, is not particularly well designed for bringing people together. There are many things about people that have practically nothing to do with what areas of knowledge they are interested or skilled in. The old question of "What do you do?" has always seemed a very narrow question for someone to ask when meeting. The more subtle dimensions of values and work styles and visions are something that may not be very well articulated through the taxonomies suggested so far.

At one level, we think it would be useful to include certain descriptors in the taxonomy that could be used to describe the varieties of values that people hold. We recognize that most of us in this system will have somewhat similar values. Yet we suspect that there will be significant variations in how we all feel about anything from triage to God, or whether we like to work on visionary projects to how we feel about working against a deadline. All of these matters are values dimensions, and this would be useful information to those attempting to find likely partners for trust relationships.

At another level, we think it would be useful to include certain simple descriptors about generalizable and transferable skills, irregardless of the topic or area to which those skills have been put. For example, a few years ago we were involved in the design of a job-matching taxonomy that involved a total of 16 dimensions, each of which was measured by a set of 10-15 questions. The final dimensions included items such as works well with machines, works well without supervision, works well with verbal concepts, and likes to solve problems with people. This system was devised to replace standard government job-matching approaches involving the traditional job taxonomies which are extremely complex and which do not generalize across job titles; if you hadn't ever been a sanitation engineer you could never be one, even if you had been a health worker somewhere and did exactly the same kinds of tasks in a similar social situation. The new taxonomy completely avoided the necessity for using the old concepts and went directly to the actual tasks and skills involved. An additional advantage of the job-matching approach was that both the job and the person were described by the same 16 dimensions. In this way, a problem could be described in terms of what skills and tasks were involved and then a person could be found to match it. A surprising record of 95% job satisfaction came out of this work. We might be able to devise some such "interdisciplinary," task-oriented taxonomy for our group, using simple keyword descriptors at first, and developing more sophisticated structures if and when we needed them.

We might find it a lot easier to use something like a small set of 16 concepts to describe our skills and/or our needs than to have to wade through many pages of detailed taxonomic descriptors, at least for a first cut through the membership list. We suggest that we consider the use of such a taxonomy, at least in conjunction with a more verbally based approach as discussed in the previous section. In a later section, we briefly discuss some sophisticated ways of developing even more powerful and detailed systems based on this approach.

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Peter & Trudy Johnson-Lenz
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December 19, 1977

LINKAGE SYSTEM

Members and Suggested Keywords

December 19, 1977

DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * NOTE

The attached lists of keyword descriptors and members is just a beginning. It is not a final, carefully constructed taxonomy for describing everyone in the linkage system. Before it is used, each person in the system should have a chance to add to or otherwise modify the keywords that describe him or her. To develop an organic, grassroots taxonomy, we must involve everybody.

Furthermore, this indexing scheme was developed manually, without the aid of a computer. The list of keywords evolved as we went through the sheets, adding new words when appropriate. Assigning keywords to members was done in a fairly intuitive way, based on first impressions. As the list of keywords grew, it became more difficult to remember all of them, so it is quite possible that important keywords were (accidentally) left out for various people.

The keywords are based on the words and concepts that are contained in members' 8½" by 11" sheets. In a few cases, we added keywords based on our personal acquaintance with a given member, but for the most part, assigning keys to members came directly from the sheets. Members may wish to include various keywords that describe them that aren't indicated by the material in their sheets.

These keywords reflect interest areas and skills only. It would probably be useful to keyword members geographically as well and to consider using some scales for levels of interest, etc. Also, institutional or affiliative ties, such as Earthrise, ACORN, Hawaii Health Net, and so forth might be included. Further areas to consider for the taxonomy are availability information (e.g., call in a.m.), whether visits are encouraged, and equipment available. We discuss including values information in WHAT KIND OF DESCRIPTIVE SYSTEM DO WE NEED? It might also be useful to include scales of the sort suggested by Ken Davis to distinguish between degrees of interest and expertise. As the list of keywords grows, it should be organized into a hierarchical structure. For purposes of getting started, we didn't bother to do this.

MEMBERS SHOULD ASSIGN KEYWORDS TO THEMSELVES. It is very difficult for someone else to do this with any accuracy. Any misplaced words, omissions, or errors in the indexing are quite unintentional. Please consider this a first-cut attempt which needs to be criticized and further developed by everyone. Because it is neatly typed and because it looks complete, it is very easy to take this as a serious "directory" for the linkage system. Don't let appearances fool you. This taxonomic system still needs a lot of work. Everyone should participate in its development.

DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * IMPORTANT NOTE * DISCLAIMER * NOTE

* Suggested keywords -- for discussion only. Feedback/comments requested. *

Members by keywords

adult education: 44, 65, 68
advertising: 7, 49
alternative education: 3, 15, 17, 34, 38, 41, 44, 55, 67
alternative institutions: 38, 42, 43, 55, 58, 60
alternative lifestyles: 11, 36, 49, 66
alternative publishing: 42
analysis: 5, 6
anthropology: 54, 63
anticipatory democracy: 4, 16
appropriate technology: 36
archeology: 7
art: 34, 39
arts: 13, 67, 75
audio visual: 35

banking: 72
birthing: 13
business: 7, 9, 49, 72, 79

citizen participation: 18, 20, 22, 29, 33, 37, 51, 53, 58, 61, 66, 74
collective responsibility: 51, 52
collectives: 52, 70, 77
communications skills: 5, 9, 13, 16, 21, 25, 28, 29, 30, 35, 57, 62, 75
community action: 7, 38, 67
community development: 8, 20, 25, 29, 37, 53, 57, 58, 65, 74, 78
computerized conferencing: 10, 16, 29, 45, 75, 78
computer models: 23, 29
computer programming: 29, 30, 64
computers: 29, 30, 31, 45, 48, 53, 62, 64
consciousness: 69
consulting: 1, 2, 15, 16, 19, 20, 22, 26, 28, 29, 36, 38, 39, 40, 41, 50, 51, 53, 58, 61, 71, 74
consumer safety: 10
counseling: 40, 41, 51
cybernetics: 23, 29, 69

decision making: 11, 23, 66, 74
democratic learning: 51

East/West balance: 14, 59, 75
ecological ethic: 11
ecology: 11, 26
economics: 7, 9, 12
education: 3, 6, 8, 11, 13, 15, 17, 22, 33, 34, 35, 37, 38, 40, 41, 44, 45, 46, 48, 55, 56, 57, 60, 65, 67, 68, 70, 71, 72
energy: 1
engineering: 18
entrepreneur: 7, 45
environmental education: 11
exchanges: 13, 26, 29, 53
experimental community: 3, 32, 52, 67, 70, 75, 77

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Members by keywords (continued)

film: 8, 58
futures: 4, 5, 6, 8, 9, 13, 16, 17, 20, 21, 24, 34, 36, 37, 45, 46, 60, 68, 75, 76, 77

gaming: 8, 13, 68
generalist: 2
general systems theory: 23, 26, 69, 78
gerontology: 71
governance: 4, 12, 14, 56, 61, 70, 73
grant writing: 37
graphics: 8, 35
group work: 9, 16, 22, 27, 38, 56, 78
guaranteed income: 7, 18, 61

healing: 59
health care: 46, 47, 54, 55, 59, 60, 61, 71
history: 6, 20, 21
holistic health: 41, 59, 60, 65, 71
human culture: 23, 43, 54
human development: 2, 3, 9, 15, 32, 33, 41, 57, 69, 78
humanism: 34, 41, 78
humor: 73
hunger: 55

Indians: 72
information: 21, 25, 28, 29, 30, 33, 37, 51, 58, 61, 62, 66, 76
innovation: 9, 14, 78
institutions: 12, 14, 66

language: 13, 14, 28, 76
languages: 5, 15, 22, 64, 65, 70
Latin America: 65
law: 4, 47, 72
leadership: 19, 38, 43, 66, 74
learning: 3, 6, 21, 33, 51, 56
libraries: 21, 28
literature: 13, 15, 20

management consulting: 1, 9
maps: 28
media: 42, 57, 62
media access: 42
mediation: 16, 18
mental health: 2, 10
meta-language: 14, 23
metaphor: 39
multi-media resource center: 35
multiple affiliations: 5, 7, 19, 70, 74
music: 25, 36, 40, 50, 67, 75, 78
mysticism: 15, 16
myths: 5, 13, 14, 16, 17, 22, 23, 54, 77

Members by keywords (continued)

networking: 6, 13, 14, 15, 16, 24, 25, 28, 29, 31, 36, 45, 53, 54, 58, 59, 60, 61, 62, 63, 64, 66, 78
noetics: 69, 78
nuclear arms race: 10, 24, 65

observation: 6

patents: 1, 10
people skills: 2, 8, 9, 21, 25, 27, 50
perception: 6, 11, 23
personal responsibility: 2, 11, 20, 48, 51, 56, 60
philosophy: 5, 20, 21
photography: 28, 30, 35
planning: 5, 9, 12, 17, 25, 30, 45, 56, 68, 75
poetry: 40, 50, 67
policy analysis: 12, 24
political campaigning: 4
political science: 36, 43, 56
preventive health care: 18, 46
prisons: 65
problem solving: 1, 28, 29, 68
process oriented: 2, 8, 51, 57
psychic/physical balance: 31, 59, 78
publications: 2, 4, 5, 6, 8, 9, 10, 15, 17, 19, 21, 24, 25, 26, 28, 29, 36, 38, 40, 41, 43, 49, 51, 52, 54, 61, 62, 63, 65, 70, 73, 74, 76, 78
public interest: 10, 18, 33, 47, 51
public interest research: 4
public satellites: 10, 62

reality: 23, 28
religion: 15, 40, 55, 66
right brain/left brain balance: 14, 75

self-reliance: 8, 18, 20
seminars: 2, 22, 27, 58
social cybernetics: 14, 29
social innovation: 22, 24
social networks: 14, 25, 29, 45
social policy: 70
social theory: 70
solar energy: 1
speaking: 2, 3, 9, 17, 19, 21, 36, 38, 39, 45, 49, 50, 61, 62, 63, 67, 75
structures: 13
surveys: 1, 29, 74
synergetic education: 3
synergetics: 3, 11, 14, 31, 35, 41, 62, 69, 77, 78
synthesis: 5, 6, 26, 56, 64
systems design: 1, 3, 29

Members by keywords (continued)

teaching: 6, 10, 13, 14, 15, 19, 21, 25, 36, 38, 41, 43, 50, 56, 63, 65, 70, 71
technology: 9, 16, 30, 43, 53, 62
technology assessment: 22, 60
training: 22, 74, 76
transitions: 2, 13, 17
transpersonal psychology: 29, 59, 69, 75

universal sharing: 77

values: 5, 11, 16, 27, 32, 43, 50, 61, 67, 69, 73, 77
video: 35, 58
visionary: 3, 32, 35, 39, 59, 61, 62, 77
voluntary simplicity: 13, 36, 67
volunteers: 38, 43, 53, 66

welfare: 7
women's movement: 79
workshops: 11, 17, 36, 40, 50, 67
writing: 5, 6, 8, 9, 10, 13, 21, 24, 25, 26, 28, 29, 30, 34, 35, 39, 40, 41, 43, 45, 48, 49, 51, 52, 54, 57, 61, 62, 63, 64, 65, 67, 70, 71, 73, 74, 75, 76, 78

yoga: 23

* Suggested keywords -- for discussion only. Feedback/comments requested. *

Members by member number

1. Tom P. Abeles
2. Ronald Barnes
3. Donald B. Benson
4. Clement Bezold
5. Philip J. Bossert
6. Robert W. Bradley
7. Cabell Brand
8. Thomas Carleton
9. William F. Christopher
10. Carl C. Clark
11. Edward T. Clark, Jr.
12. John P. Davey
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14. Christian de Laet
15. Reynold Feldman
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17. Don E. Glines
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19. Robert K. Greenleaf
20. Richard J. Greiwe
21. Agnes M. Griffen
22. Georges & Jeannine Gueron
23. Mel Gullikson
24. John R. Hadd
25. Elizabeth Hagens
26. Joe A. Hanson
27. W. W. (Wick) Hutchison
28. Steve Johnson
29. Peter & Trudy Johnson-Lenz
30. David L. Jones
31. Rick Kean
32. Michael Krueger
33. Joanne Kurfiss
34. Jacob Landau
35. Doren Kim Levitt
36. Dennis Livingston
37. Ray McBeth
38. John McClusky
39. David MacDermott
40. Noel McInnis
41. Elizabeth (Liz) Mahoney
42. Bob Maslow
43. Charles W. Merrifield
44. Mike Myers
45. William Neher
46. Bibiana C. Nowacki
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48. Edrice Reynolds
49. Bob Rimmer
50. Marshall Rosenberg

Members by member number (continued)

51. Michael Rossman
52. David J. Ruth
53. Patrick Saccomandi
54. Jeanne Mary Scott
55. Andy Smith
56. Robert W. Spencer
57. Stephen Silha
58. Robert L. Stilger
59. Nancy Strode
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64. Clark H. Wilson
65. Roger W. Axford
66. Norman Edward Dewire (Ned)
67. Carla Eugster
68. Paul F. Fendt
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70. David G. Gil
71. Frederick & Helen Huber
72. Paul Klores
73. Jerome D. (Jerry) Lang
74. W. Robert Lovan
75. Genevieve Marcus
76. Kent Myers
77. Ken Neunzig
78. Robert A. Smith, III
79. Madelene Van Arsdell

* Suggested keywords -- for discussion only. Feedback/comments requested. *

Keywords by member

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17. DON E. GLINES: alternative education, education, futures, myths, planning, publications, speaking, transitions, workshops
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19. ROBERT K. GREENLEAF: consulting, leadership, multiple affiliations, publications, speaking, teaching
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23. MEL GULLIKSON: computer models, cybernetics, decision making, general systems theory, human culture, meta-language, myths, perception, reality, yoga
24. JOHN R. HADD: futures, nuclear arms race, policy analysis, publications, social innovation, writing
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30. DAVID L. JONES: communications skills, computer programming, computers, information, photography, planning, technology, writing
31. RICK KEAN: computers, networking, psychic/physical balance, synergetics
32. MICHAEL KRUEGER: experimental community, human development, values, visionary
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37. RAY MCBETH: citizen participation, community development, education, futures, grant writing, information
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Keywords by member (continued)

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68. PAUL F. FENDT: adult education, education, futures, gaming, planning, problem solving
69. FRANK F. FIORE: consciousness, cybernetics, general systems theory, human development, noetics, synergetics, transpersonal psychology, values
70. DAVID G. GIL: collectives, education, experimental community, governance, languages, multiple affiliations, publications, social policy, social theory, teaching, writing
71. FREDERICK R. & HELEN E. HUBER: consulting, education, gerontology, health care, holistic health, teaching, writing
72. PAUL KLORES: banking, business, education, Indians, law
73. JEROME D. (JERRY) LANG: governance, humor, publications, values, writing
74. W. ROBERT LOVAN: citizen participation, community development, consulting, decision making, leadership, multiple affiliations, publications, surveys, training, writing
75. GENEVIEVE MARCUS: arts, communications skills, computerized conferencing, East/West balance, experimental community, futures, music, planning, right brain/left brain balance, transpersonal psychology, speaking
76. KENT MYERS: futures, information, language, publications, training, writing
77. KEN NEUNZIG: collectives, experimental community, futures, myths, synergetics, universal sharing, values, visionary
78. ROBERT A. SMITH, III: community development, computerized conferencing, general systems theory, group work, human development, humanism, innovation, music, networking, noetics, psychic/physical balance, publications, synergetics, writing
79. MADELENE VAN ARSDELL: business, women's movement

the magic offset press!

WHAT KIND OF COMPUTER SYSTEM DO WE NEED?

Prior to receiving Bob's letter of December 3 to the Communication and Computer group, we had been trying to develop some complete discussions of the entire range of computer-based systems that we might wish to consider. This went all the way from using a computer with punched cards to maintain a file which was used to create printed directories (an off-line system), through a full-blown computerized conferencing system. We felt that the discussion in the core group had contained so little information about the potentials and costs of computer usage that the only alternative seemed to be to provide everybody with some sort of primer on the topic. We were quite relieved to read in Bob's latest letter that he is now deeply convinced that we need an on-line system. We, too, agree with this and would like to dispense with lengthy discussions of other less useful applications of the computer.

The fundamental advantage of an on-line system as we see if is that it is a communications system. The computer is being used primarily to communicate linkage information from one location to another. This is really what we need in our group. Certainly, the computer can and should be used for filing, organizing, and retrieving this linkage information according to the taxonomy we choose to use. However, this is only the beginning. Our real need is to quickly, effectively bring people together who might not otherwise be brought together. Furthermore, as this process grows, we will want to be able to do this rapidly over great distances. From one part of the country, we should be able to access information that was entered in another area just a few hours before. Only an on-line system can accomplish this. As Bob has said, the only disadvantage is that those who do not have terminals will have degraded access.

WHAT WILL IT COST?

The major cost factors in a decentralized on-line system include:

(1) the cost of terminals used by individuals to access the system;

(2) the telecommunications cost of transmitting the information from one place to another, from the terminal to the computer and back;

(3) the cost of a computer used to store and process the data.

For purposes of discussion, we will assume here that individual members will somehow absorb the cost of a terminal. For what it's worth, there are various video and hardcopy terminals now available for purchase in the $800 to $1000 range. Anyone interested should contact us. It would also be helpful to know how many people in the linkage system currently have access to terminals.

The cost of telecommunications can be borne in three ways:

(1) We can simply use long distance telephone lines to call up our computer. This costs at most $24/hour, and reduced rates can be realized on evenings and weekends. The simplest approach would be for the person calling the computer to pay for the call.

(2) If we use a nationally available computer service for our work, the long distance charges are generally included in the hourly "connect" rate for being plugged into the system, regardless of where you are calling from, if you are calling from one of the many cities with local dial-up lines. At worst, if no local dial-up number is available, these rates are about $15/hour in addition to the "connect" rate. Connect rates are discussed in a later section of this memo.

(3) If we use a computer that has proper access, or if we purchase our own computer, we can use a digital packet-switching network such as Telenet. The hourly connect rates for such transmissions can be as little as $3.50/hour if we use the system enough. The more you use it the less you pay per unit. not true !

One possible source of computer power would be to use a commercial service. Such commercial vendors provide local dial-up facilities in most major cities in the U.S. Computer services are generally sold according to how much is used. On some systems, computer time can be purchased in blocks for a fixed price. Unless a block of time is purchased, the more you use, the more you pay. At pay-as-you-go prices, a typical charge would be about $10-$20/hour (that is time that you use the terminal, not an hour of the computer's time; the computer will be waiting for you most of the time). A typical charge for storing one person's page or record in the computer would be approximately $3/year on a random-access disk from which it could be instantly retrieved at a moment's notice. These charges are typical for commercial systems. Some shopping around might find us cheaper rates. University or private systems might also be cheaper. At block time rates, time can be purchased for about $1000/month at commercial rates. This allows you to call up the computer whenever you want, 24 hours a day, and to store possibly 1000 members' data without any additional charge beyond the $1000/month. Curiously, this comes to about $1/member/month or $12/member/year, if there are 1000 people in the linkage system.

The other most likely source of a computer would be the linkage system's own computer. For approximately $10,000, we could purchase new equipment which would handle our needs quite well. We could build portions of the system ourselves to reduce that cost. In addition to the computer, we would need to pay a one-time fee of approximately $500 to connect up to a digital network like Telenet. After that, we would have to pay the maintenance on the computer (or maintain it ourselves) and pay $3-4/hour for each hour someone was using a terminal to communicate over the system. much too low for a packet machine

We have also been communicating with Loving Grace Cybernetics in Berkeley. Bob mentioned them in his December 3 letter. They are busy developing low-cost computer hardware systems for groups like ours. We are enclosing in this package a copy of a recent paper from them describing their work. We are including LGC in our mailing list for this round. We would appreciate hearing from them about what they might be able to offer us in terms of a low-cost computer system at some point in this process.

Even if we can get very inexpensive computer access, through donated time or through our own system, possibly with some help from LGC, we must still be prepared to pay the costs of terminals and telecommunications. There is no way of avoiding these expenses to our knowledge, particularly if we desire an on-line system which can facilitate nation-wide-and-beyond communication.

A NOTE OF CAUTION WITH REGARD TO COSTS

Please note that all the costs we have mentioned here are just the costs of using an existing computer system or of purchasing and/or making one for our own use. There are two other very significant costs not discussed here: (1) the cost of paying someone to maintain the hardware and keep the dust off the computer (this cost is part of the commercial system charging structure, but is not automatically covered if we run our own system), and (2) the cost of programming the system to do what we want (this involves both the computer and people-time cost). As of today, we know of no computer programs which will do exactly what we need. We are in the midst of creative work here, evolving a new-age system that does not exist. This means that we will need someone to do the extensive programming of this system. It may be that Loving Grace Cybernetics would be able to provide some of this energy. We ourselves might lend a hand. There may be others in our group who can help. But we need to remember that this is no small task.

POSSIBILITY OF AN INTERIM SYSTEM

Given that Loving Grace Cybernetics is not yet ready to deliver off-the-shelf systems, and given that we are not going to be reaching a membership of 1000 immediately, we might wish to consider the possibility of using a commercial or university-based system as a temporary, interim approach. This would allow us to pay for what we used and avoid a considerable investment of time and money in hardware until we are clearer about our needs. It would also provide an opportunity for us to test our various approaches to see how well we liked them. Finally, it would provide us an opportunity to develop our taxonomy through actual use in some simple national-scope matching experiments to see what worked and what we wanted to develop further.

Then, when we had a clearer idea of what kind of hardware we wanted, what kind of computer programs we wanted, and after we had given the technology a little time to develop further, we could move directly into our own systems development with greater clarity than we now possess.

WHAT COULD BE DONE WITH A DECENTRALIZED, ON-LINE SYSTEM

Such a system would clearly permit anyone with a terminal to call up and either enter or retrieve information from the system. Beyond that, the same system could also be used (after proper programming) to send messages from one node in the linkage system to another. Furthermore, such a system could be used to do simple computer conferencing--actual on-line discussions of topics of mutual interest. For example, such a conferencing system would greatly simplify the cooperative design effort for our on-line system and/or our taxonomy, by rapidly exchanging ideas and possibilities among the members of our group. We are enclosing a paper by Murray Turoff and Roxanne Hiltz, "Meeting Through Your Computer," which should give you some idea of the potential for computer facilitated communications. We are also enclosing a recent paper of ours.

SOME CONSEQUENCES OF AN ON-LINE SYSTEM:

If we are going to use an on-line system, we must be aware of several important consequences. First, such a system would allow anyone anywhere in the country to enter and retrieve information. In order for this to be done

without complete chaos, we must program the computer to be fairly easily operated by a person in a regional or local node. This process involves several significant tasks:

(1) careful design of a language that can be easily understood by non-computer folks;

(2) consideration in this design of what we really want to be able to do in terms of searching, messaging, conferencing, etc.;

(3) writing the program and testing it with actual data and people to see if it does what we hoped it would do;

(4) writing clear, complete computer documentation to tell people how to use the system; and

(5) helping people learn how to use the computer system--even the best computer documentation leaves many things unsaid. The only way to really learn how to use a computer is to begin using one, preferably with someone who understands standing by.

Beyond that, we will have to think very carefully about the protocols for accessing this information. Who can enter something? Who can edit something? How can we protect the system from fools and from devils? These questions are just the tip of the design iceberg that more than one of us will have to take on as a labor of love. The only alternative to this developmental, participatory design approach is to abdicate these design responsibilities to an "expert" in the field of computer science. We think that would be inconsistent with our overall purposes and approaches in this linkage system.

What do you think?

Peter & Trudy Johnson-Lenz
695 Fifth Street
Lake Oswego, Oregon 97034
December 19, 1977

April 14, 1977

DESCRIPTION OF A NEIGHBORHOOD INFORMATION SYSTEM

This packet contains three papers describing the Neighborhood Information System, NIS, developed by Peter and Trudy Johnson-Lenz for use by the First Addition Neighborhood organization in Lake Oswego, Oregon. The system was developed with assistance from the Oregon Museum of Science and Industry to the First Addition Neighbors.

The system was developed both to satisfy local neighborhood needs for information during the comprehensive planning process in Lake Oswego, and to develop a model of a neighborhood information system that could serve as a starting point for further developments in this area. As the system is essentially experimental in nature, neither Johnson-Lenz nor the First Addition Neighbors feels the system to be sufficiently well developed to be distributed as a ready-to-go system for other communities to use. Instead, these papers have been written to provide you with some idea of how the system worked, what it did for the neighborhood, and what additional possibilities it suggests.

Johnson-Lenz is continuing to develop communications/computer systems and methods that can be used by communities to help themselves. We hope to be able to provide ready-to-go systems available through the Oregon Museum of Science and Industry later on as our developments proceed.

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

F.A.N. Computer Report -- August 4, 1976

On February 4, 1976, First Addition Neighbors requested computer time support through September 1, 1976 from the computer center at the Oregon Museum of Science and Industry. Up to $1,000 of computer time was to be used to help F.A.N. analyze the November planning survey and to support other organizational efforts.

As of August 4, 1976, approximately $450 in computer time and services has been spent. The F.A.N. file (or data base) consists of identification information (name, address, phone), about 80 items from the November survey, and a few items of F.A.N. organizational information, such as block reps, Coordinating Committee members, and F.A.N. members. There are about 920 neighbors in the file, and about 400 of these filled out November surveys.

The information was entered into the computer by 15 neighbors, nearly all of whom had no previous experience working with a computer. Eight of them came back several times; one person helped with the data entry six different times.

The information from the F.A.N. file has been used:

(1) to find neighbors interested in specific issues to join existing task forces or to form new committees
(2) to find neighbors interested in being block reps.
(3) to find neighbors interested in telephoning for F.A.N.
(4) to find neighbors interested in social events for F.A.N.FAIR planning
(5) to generate lists of block reps. and Coordinating Committee members for the block rep. information kits
(6) to generate individual block lists for block reps., including one updated list
(7) to generate a list of F.A.N. members to present to the city, as part of the recognition process, and for telephoning
(8) to provide counts of households per block for newsletter distribution
(9) to provide statistical support for F.A.N. reports to city task forces, especially to the CASC (Commercial Areas Study Committee)
(10) to provide interesting facts about the neighborhood to share through the newsletter

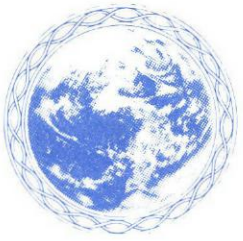
At present, there are alphabetical lists of members and non-members already printed by the computer. Before the OMSI support runs out on September 1st, F.A.N. may want to consider getting an alphabetic and an address-sorted list for the neighborhood for a temporary F.A.N. directory. In addition, the counts, bar graphs, and lists of people are available for all the questions in the November survey. Any other desired information should be requested before September 1st.

The neighborhood information system developed for F.A.N. on the OMSI computer by Peter and Trudy Johnson-Lenz is serving as a model for other community groups. It has been written up in RAIN magazine, and pictures of Helen Brecht using the computer were included in a slide show about information sharing in the Northwest. Two Portland neighborhoods, NW and N, have received a small grant to develop skills, services, and information exchanges, and the neighborhood information system has served as an important example in the planning and design for this project. The Service Exchange in Portland is also computerizing its files, and the example of the neighborhood information system has helped them clarify their needs. The system (without the F.A.N. data) was also demonstrated at COM/PLEX, the fourth annual regional communications conference in Bellingham, Washington.

The Johnson-Lenzes have written a simple introduction to the neighborhood information system with examples of how neighborhood or community groups might use information to help themselves. This introduction is available to anyone in F.A.N. who is interested. In addition, this material has been circulated to such diverse groups as the Tri-County Commission on Local Government; the Portland Volunteer Bureau; the Community Information Centre, Vancouver, B.C.; the Dallas, Texas Public Library; the

Northwest Regional Foundation; and Harper's Weekly.

F.A.N.'s experimental use of the computer for planning and organizational purposes has been on the cutting edge of using technology in the service of people. Even though the neighborhood itself has not fully realized the potential, this project has had far-ranging impact in helping other neighborhoods and community groups learn to deal with the increasing variety of information relevant to them.



GROUP DECISION MAKING AND PROBLEM SOLVING THROUGH COMPUTERIZED CONFERENCING

by

Peter & Trudy Johnson-Lenz and Julian Scher

to appear in:

the Bulletin of
the American Society for Information Systems
June, 1978

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GROUP DECISION MAKING AND PROBLEM SOLVING THROUGH COMPUTERIZED CONFERENCING

by
Peter & Trudy Johnson-Lenz and Julian Scher

Group communication through the medium of computerized conferencing can be enhanced by using various structuring tools to clarify and "shape" the course of the discussion. People using a computerized conferencing system enter messages, conference comments, or other responses into the system at their own convenience, at different times or locations. Without some guidance or other structuring mechanisms, it is quite possible for a group's conversation to become disorganized. Research indicates that strong leadership is essential to a successful computerized conference, to keep the discussion focused, to call for votes or other kinds of feedback exercises, to mediate disputes, and so on [1]. Computer software tools included in the conferencing system can further augment group problem-solving and decision-making activities by making explicit the convergent and divergent points of view within the group.

A basic computerized conferencing system includes facilities for sending and receiving messages, conducting on-going conferences, and text editing. To provide structures for group communication beyond free-form, asynchronous conferencing (adding and retrieving items to an on-going conference transcript at times of the participants' choosing), two additional features are desirable: (1) a high level programming language in which tailored control programs can be easily and rapidly written, and (2) direct interfaces with other computer systems and networks for access to remote data bases and computing power. The capacity for writing control programs in such a multi-computer environment allows users to create independent software "entities" in the conferencing system to perform a wide variety of tasks automatically, such as searching a remote data base, interviewing other conferees and processing the answers, managing a voting exercise with feedback of the results, or otherwise structuring a group's communication.

Think of an enhanced, flexible conferencing system as a computer-based resource center where individuals can come and go for meetings at their convenience, and where many kinds of information, group process aids, or feedback processes are available to the group at the touch of the terminal keyboard. Such a rich information environment provides the group with an unparalleled opportunity to work together to solve problems and make decisions--with the added advantage of a complete written transcript always available for reference. Computerized conferencing can be used by on-going task groups as well as by groups meeting for a short period of time without a specific problem to solve. Different structuring tools are appropriate for different kinds of groups and provide varying degrees of management. Eventually computerized conferencing systems should provide users with a library of structuring tools, just as mathematical and statistical packages are included in many general data processing systems.

GROUP PROCESS AIDS

Group process aids designed for use in face-to-face settings can be

adapted for a computerized conferencing environment. For example, the Nominal Group Process technique can be used to help a group generate creative ideas and then decide on their priorities. As developed by Delbecq and Van de Ven [2], the Nominal Group Process technique involves participants brainstorming silently and then sharing and discussing the ideas with the group one at a time. Each participant then selects and ranks those ideas he or she thinks most important, again silently, and shares the selection and ranking with the group. The technique is easily transferred from face-to-face meetings to computerized conferencing, since each participant works alone at the terminal where he or she can brainstorm, select, and rank ideas "silently" and then enter ideas and rankings for discussion as individual conference comments. A group of people on-line simultaneously could use this technique, or it could be used asynchronously, with individuals entering, reading, and responding to comments whenever they like.

A structure similar to Robert's Rules of Order could also be included in a conferencing system to provide the benefits of parliamentary procedure.

GROUP COMMUNICATIONS EXERCISES

Similarly, group exercises, such as SYNCON-like processes, role playing, and simulation games, are relatively easy to implement through computerized conferencing. In a face-to-face SYNCON, as conducted by the Committee for the Future, small groups are arranged in sections of a wheel, where they discuss specific problems in terms of goals, needs, and resources. Then the small groups gradually merge into larger and larger groupings, until they become one group. The physical "taking down of the walls" at a face-to-face SYNCON can be achieved in computerized conferencing by combining conferences of people; the electronic "walls" just disappear. By sending private messages, observers may also comment and ask questions of participants, without disturbing the main dialogue. In addition, a complete written record is kept in a computerized conference, and this would allow participants in an on-line SYNCON to combine and build upon the recorded information discussed in each group. Furthermore, all this information would be available after the SYNCON exercise for final reports or other follow-up activities.

Through the use of pennames, computerized conferencing participants can assume various roles for role playing or simulation games and can negotiate privately with other players through private messages or publicly through the conference itself. Game briefing and debriefing may be done in a separate conference. Simulation games requiring complex analysis of votes, strategies, and outcomes, or interaction with computer models or other information are also possible through computerized conferencing, especially in systems with a microprocessor interface to remote processors.

The intensity of a face-to-face simulation game can also be provided in a computerized conferencing environment. During a recent experiment in playing "Spinoff," a simulation game about choosing among teleconferencing alternatives (video, audio, and computer) developed by the Institute for the Future [3], eight participants on the EIES (Electronic Information Exchange System) computerized conferencing system at the New Jersey Institute of Technology were on-line at the same time. They argued for various points of view and tried to persuade others, generating some sixty comments and a number of private messages in three hours to complete the game. Players were scattered over three time zones, but they felt as if they were in the same "space" playing the game. Such exercises are useful for creating understanding and empathy for

other points of view in planning exercises and problem solving.

Clearly, many group exercises that are currently used in face-to-face settings can be adapted for use in computerized conferencing. In addition, new tools can be developed to take advantage of this new medium. For example, any kind of exercise that includes events or actions which occur only if certain things happen would work well in a computerized conferencing environment. These might include models with which participants interact, questionnaires which have branches (e.g., if the answer is "yes," go to question 15), or a simulation game with "surprise" events. As groups gain more experience in using this communications medium for decision making and problem solving, many new structuring tools unique to computerized conferencing will be designed, developed, tested, and improved.

GROUP VOTING AND FEEDBACK PROCESSES

Furthermore, computerized conferencing can support various kinds of feedback processes for groups. For example, a simple voting procedure is included in the EIES computerized conferencing system to allow participants to vote on conference comments on a number of different scales: importance, desirability, agreement, pertinence, probability, feasibility, and so on. In addition, voting routines also could be used to help a group direct its own agenda; come to consensus on an issue, problem, or solution; identify divergent points of view; or to collect other types of opinions from participants and display the results. By answering questions about the flow of the discussion, the group can express its preferences ("continue on this topic," "switch to something else," "call for the question," etc.) and keep the conference on track. It is often difficult to give feedback to a face-to-face group about its discussion or the flow of its decision-making process. The interactive quality and computing power of computerized conferencing make such feedback processes easy.

ON-LINE QUESTIONNAIRES

On-line interactive questionnaires provide a convenient method of data collection. Individuals may respond to the questionnaire at their convenience, rather than having to schedule an interview, and the information collected may be processed by the computer immediately and/or at some future time, so no coding or keypunching is necessary. On-line questionnaires can be used to collect opinion data, which can then be analyzed to give the group feedback about various points of view within the group and the differences among them. Data about the participants and their relationships to each other ("who-knows-whom" social network data) can also be collected. This data on the structure of the group may be used by a facilitator or the group itself to understand and increase the flow of communication and information within the group. Such on-line interviews reduce the problems of interviewer error and allow for complex questioning strategies that include branches or "nested" questions. Furthermore, the answers can be checked and verified during the interview. Johnson-Lenz has developed an interactive questionnaire and a special voting routine for EIES participants, using the flexible EIES procedure language provided for writing such control programs.

MENTAL MODELING METHODS

Various "mental modeling" techniques and cognitive aids can also be used easily in a computerized conferencing environment. These techniques take individuals' preferences or opinions and aggregate them by various mathematical methods to provide participants with information about differing points of view or mental models within the group. For example, the Kemeny-Snell ranking distance procedure [4] could be used for Iterative Group Preference Aggregator exercises, as proposed for a future experiment at the Computerized Conferencing and Communication Center at the New Jersey Institute of Technology. Individuals' preferences would be aggregated and the distance between each individual's preference and the group "median" would be fed back to the group. Through iteration (going through the process over and over, as many times as desired), the participants could focus on those areas of greatest discrepancy between individuals and the group, discuss them, and reduce the disparity to its minimum, or else determine that certain opinions are so divergent that no consensus can be reached.

Policy capturing, developed by Hammond and colleagues [5], can be used to find out participants' preferences in trade-off situations by asking their responses to various alternative scenarios presented as a series of bar graphs. The preferred policies of each individual are then computed and fed back to participants for discussion. This technique makes explicit the policies of each person, which is of considerable help in conflict resolution and negotiation.

Interpretive Structural Modeling (ISM) exercises [6], can also be used to help clarify participants' mental models of issues and to give them graphic feedback about the relationships among the elements in their models. Participants are asked to make a series of judgments about how elements in a topic or issue are related to each other. Their aggregate judgments are displayed graphically with elements and relational arrows between them to show the hierarchical structure of the group's "mental model." As discussed by Baltrush and Scher [7], conducting ISM exercises through computerized conferencing allows dispersed groups to construct and work with their model over a period of time. For example, a group representing the mayors of twenty cities could develop their model of an ideal urban policy, without having to travel to a central location for a meeting. This same advantage extends to conducting Delphi exercises via computerized conferencing.

All of these techniques are helpful in a computerized conferencing environment for taking the opinions of a group of people and showing the group how those opinions promote consensus or disagreement. In small, task-oriented groups, such techniques can be used effectively at various stages of the group process to focus on the discussion and the points of contention within the group. In large groups, such as citizens participating in a public involvement program, such techniques are essential for aggregating group opinion into some easily communicated concepts so that the variety of points of view can be understood and managed effectively.

INTERACTING WITH INFORMATION TOOLS

Other kinds of modeling activities are also possible through computerized conferencing. Groups can build and interact with cross-impact, system dynamic, econometric, and other models. Such interactive access to computer models is also useful in certain simulation gaming exercises.

Through interfaces to other computers or intelligent terminals, many information resources become available to those meeting through computerized conferencing. Interactive computer graphics become available when intelligent and/or graphics terminals are used by participants. On-line simulation games, collaborative design tasks, planning exercises, and other visual activities can be greatly enhanced by moving, color graphics and a common visual "space" within which participants can interact.

Data bases may be searched and the results entered into the conference. By including a microprocessor as part of the conferencing system, such searches can be undertaken automatically. The microprocessor can "dial up" another computer system, do the search, and deposit the results in a message or conference. Similarly, data collected about participants' points of view or preferences or about social network ties can be analyzed on another computer and the results entered into the conferencing system, again automatically. With these interfaces, the conferencing system can be linked to other conferencing systems, networks, or computer systems.

COMMUNITY ACCESS

Imagine a series of computerized conferencing systems that operate at various levels of recursion, starting with a "local" level (neighborhood; task force; committee; etc.), and going up to ever-larger or more complex groups (city, state, region; committee of committee leaders, committee of the whole; governing board; etc.). For example, a neighborhood group could have its own conference on relevant local issues and then relay its conclusions to an on-going conference of neighborhood leaders or city officials. The city level conclusions or policies could be entered into the county conference, and if there were any questions or further discussion needed about specific neighborhood issues, the neighborhood conference could be asked for clarification. Groups would be able to interact with other groups, as desired, before making any final decisions. And all this can take place without leaving one's home, office, or other place where he or she uses a terminal.

Community centers or other places where people congregate, equipped with terminals, could give citizens access to computerized conferencing and group decision-making tools, so that they could participate in more of the decisions which affect them--if the decision makers were willing to allow such participation.

CONCLUSION

There has been little experimentation to date with the design and evaluation of computerized conferencing software for problem solving and decision making, since the medium is still in its infancy. However, group process techniques based on information exchange which help groups work together more effectively can be included in computerized conferencing systems with the proper hardware and high-level software language interfaces. In conferencing, a group shares a rich, computer-based, conceptual "space," and members' interaction with each other can be greatly enhanced with structured problem-solving and decision-making aids. The flexibility of individual participation in the group decision-making process, coupled with the possibilities for extending that process to a broader-based constituency, suggests that computerized conferencing may become a particularly valuable tool

for group participation and interaction. Not only can existing group processes and techniques be adapted to this medium, but entirely new decision-support tools and systems will be developed. In an era of great social complexity, such tools and broad participation in decision making and problem solving may improve our governance, management, and other cooperative group activities, while respecting individual points of view.

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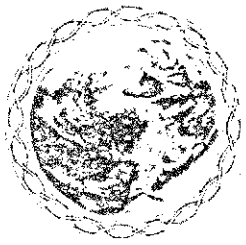


May 28, 1976

A TECHNICAL INTRODUCTION TO IS (AN INFORMATION SYSTEM)

written in OMSI APL

for execution on the
Oregon Museum of Science and Industry PDP 11/45 computer

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

IS (an Information System)

IS is an interactive information retrieval system written in OMSI APL. The system is organized around a standard data matrix of rows and columns (rows=records, columns=descriptors or items). The major design features which distinguish IS from most other information systems are:

1. It can read or write both the rows (records) and the columns (items or descriptors) of the data matrix.
2. It can read or write or process specific subsets of both the rows and the columns (specific submatrices) of the data matrix.
3. It reads and writes the records and items into and out of the APL workspace as legitimate APL variables. In this way IS is an extension of the unique input/output facility of OMSI APL. Once records and/or items have been read into the APL workspace, they may be processed in any of the ways that APL can manipulate scalars (individual items within a record), or vectors (an entire vector of values for an item).
4. It has a simple command language which can be learned easily by persons with no prior computer experience. (Members of a neighborhood association, ranging in age from 15 to 64, have used IS without difficulty, even with no previous computer experience. The system was written for them and debugged and improved through their experience with it, but its use is by no means limited to neighborhood groups.)
5. It contains a prompted data entry facility to simplify the data entry process. There is also prompted record editing, and, of course, records can be edited directly with pure APL.
6. It is written in approximately 200 lines of OMSI APL code that can readily be reconfigured to meet a wide variety of applications.

IS uses the powerful generalizations of the OMSI APL input/output system written by Steve Poulsen and is but one example of the potential for versatile interactive file manipulation made possible by this input/output system. It is exactly this facility of OMSI APL which makes possible random access to both the rows and the columns (the individual records of data, and the individual items or descriptors of data). Without this facility, it would be necessary to write fairly complex buffering routines in APL to access an individual byte within a record. Such additional code would be clumsy and most likely execute slowly.

Applications

IS was developed in the context of a neighborhood information system project sponsored by OMSI. In this regard the system was designed to be operated by unsophisticated neighborhood people. It has a command language that is easy to learn, and contains features for prompting and for easy diagnosis of errors in data entry and retrieval. The examples of system use shown in this document are taken from this developmental context and demonstrate the way in which IS can be used as a small community information system. The system is designed to be a general information system, and it can be used in a wide variety of applications.

The system as currently configured can be used for any of the following without additional programming:

1. remote, interactive data entry of individual records and/or entire descriptors or items, including editing of records and/or items
2. information retrieval by identification and/or items
3. inverted list processing for storage and retrieval
4. interactive survey and data analysis with simple statistics
5. development and management of data bases such as skills/resources, personnel directories, membership directories, inventory, general records management
6. key word information retrieval system
7. instantaneous telephone survey data entry and analysis

The Command Language

The command language includes the following commands for processing individual records (rows in the data matrix):

1. CLEAR -- blanks out the record currently in the APL workspace
2. GET -- reads a record from the disk file into the APL workspace
3. FILE -- writes a record from the APL workspace into the disk file
4. AID -- aids and prompts the user during data entry and editing
5. SHOW -- displays the record currently in the APL workspace
6. SELECT --- specifies which columns of the data matrix are to be transferred during GET/PUT operations

The command language includes the following commands for processing individual items or descriptors (columns in the data matrix):

1. GETITEM -- reads all the values (one from each record or row in the matrix) for a particular item or descriptor into the APL workspace, storing it as a legitimate APL vector
2. PUTITEM -- writes an item or descriptor from the APL workspace into a column of the disk file
3. ALL -- converts an item or descriptor vector into an inverted list of record numbers
4. OF -- generates an inverted list of record numbers with specific values for certain identifiers
5. LIST -- lists identifiers for specific records (such as those listed by the OF and ALL functions above)
6. PRINT -- lists identifiers and specified items for specific records
7. GRAPH -- generates a bar graph showing the frequency distribution of an item or descriptor
8. AVERAGE -- computes the average of an item or descriptor
9. CROSS -- generates the bivariate frequency distribution of two items or descriptors

The command language also includes commands for creating a data base from scratch (CREATE), for labeling the items/descriptors and identification fields (LABEL), and for opening and closing the data file (LOAD and SAVE).

Limitations

IS is an appropriate system for working with small to moderate data bases. It is not practical to use IS for data bases containing more than 2000 records, unless an APL workspace in excess of 16K is available. Using the current OMSI APL with single precision, and with all IS functions in the workspace, an item (column in the data matrix) of up to 2000 individual numbers can be processed. If the retrieval or other processing involves two items which must be simultaneously manipulated, then only 1000 records can be processed at once. However, this limitation is not absolute. If processing of only certain rows in the data matrix is appropriate, the GETITEM and PUTITEM commands can be operated on partial columns of the matrix. In this way the effective sample size of the data base is increased.

The number of columns in the data matrix is not limited to any particular number of items, but the APL symbol table can contain only so many items at one time. Therefore, it is necessary to work with only selected items during record-wise processing (data entry and editing) if the number of items exceeds 50 or so. The exact number of items that can be processed at once during data entry and editing is a function of the size of the APL symbol table and the number of characters used to identify each item. The system can also be configured so that all items for a record are kept in the workspace in a single vector. This supports an unlimited number of items at the expense of direct APL access to item/scalar values.

The APL Interface

Since IS reads and writes to and from the APL workspace, the user can execute data processing operations beyond the scope of the IS commands by using APL. The following examples demonstrate this:

1. Record-wise processing: The GET command reads in a record (a row in the data matrix) and stores each item in the record as an APL scalar and each identifier as a character vector. The numeric, scalar items of data for that record can then be manipulated using APL. For example:

```
PEOPLE=ADULTS+CHILDREN      (computes the number of people as the sum of
                             the number of adults and the number of children)

YEARLYRENT=12#RENT          (computes the yearly rent as the product of 12
                             and the monthly rent)
```

2. Item-wise processing: The GETITEM command reads in an item (a column in the data matrix) and stores that item as an APL vector of numbers which can be manipulated using APL. Such APL processing of items makes possible arithmetic and logical transformation of items, complex searches of the data base using record indices, easy sorting and reordering of items and records, and index/pointer interface through the APL workspace with other data bases. Consider the following:

```
PEOPLE=ADULTS+CHILDREN      (computes a vector of the number of people as the
                             sum of the corresponding numbers in the vectors
                             for adults and children)

+/PEOPLE                    (computes the total number of people)
```

```
      AGELIST=.GDAGE          (generates a vector of record indices called
                               AGELIST which sorts the records into order by
                               age from oldest to youngest)
```

The following example from the neighborhood association application demonstrates how IS operates as an extension of the OMSI APL input/output system:

```
WELCOME TO OMSI APL V01.07

      )READ IS                (the Information System is read into the workspace)
      LOAD 'FAN'              (the FAN data base file is opened)
FAN LOADED

      )VARS                   (the )VARS command reveals the IS system variables)
CHA CHI FILE IDENT IDLIST ILIST ITEMS LASTREC MAXID MAXREC RECORD

      ENTRY                   (the ENTRY command clears the workspace and creates
                               numeric scalars set to zero and identifiers set to
      )VARS                    all blanks; )VARS reveals these new APL variables)
ADDRESS ALLEYS ASSESSMENT BIKEWAYS BLOCK BUILDINGS CHA CHI COMMERCIAL CO
MMITTEE CRIME DOGS EMPTYLOTS EVENTS EXCHANGE FILE FORMSURVY IDENT IDLIST
 ILIST INCLUDED ITEMS LASTREC MAXID MAXREC MEETING MULTIFAM NAME NEIGHBO
R NOISE OLDHELP OTHERISSUE OTHERREPLY PARKING PHONE PHONESURVY POLLUTION
 PROPVALUES RAINCHECK RECORD RECREATION RECYCLING RENTUPKEEP RESQUALITY
SIDEWALKS SPACEPARKS STREETS TASKFORCE TRAFFICCTL TRAFFICPAT TREECUT TVR
EPLY VARIANCES YARDUPKEEP ZONING

      ADDRESS                 (the current value of ADDRESS is a blank string)

      ALLEYS                  (the current value of ALLEYS is a scalar zero)
0
      .ROALLEYS               (the shape of ALLEYS is 1)
1
      GETITEM 'ALLEYS'        (the GETITEM command reads the entire column of
                               ALLEYS into the workspace)
      .ROALLEYS               (the shape of ALLEYS is now 361)
361
```

Examples of Use (including time and cost figures)

The following examples show use of the system on the OMSI computer. These examples involve an actual neighborhood data base containing 385 records of 80 numeric items and 64 characters of identification including name, address, and telephone number. Most of the identification information was modified for neighborhood privacy.

Each example was generated in a separate session, with a login and logout to provide cost and time figures. The logoff data is shown with each example. The costs shown were computed at OMSI not-for-profit billing rates.

Example 1: Entering a record

```
     ENTRY                          (set the record pointer to the next free
                                     record)
     AID                            (begin the prompting process)
RECORD = 92                         (the system responds with the record number
NAME     = JOHNSON-LENZ, PETER W.    followed by a request for the first field
ADDRESS = 695 5TH                    of identification, NAME.  The user enters
PHONE    = 635-2615                  the name, and the system responds with a
BLOCK      = 26                      request for the address, and so on through
INCLUDED   = 2                       all the identifiers and numeric items.
COMMERCIAL = 1                       Note that only the underlined information
TRAFFICPAT = 1                       is typed by the user, the rest is a prompt
MULTIFAM   =                         from the computer.  Note also that the user
STREETS    = 1                       entered only a (CR) for the item MULTIFAM
   .                                 which does not appear in the list of items
   .                                 generated by the SHOW command below.)
   .
TVREPLY    = 1

     SHOW                           (the SHOW command lists the record as
RECORD = 92                          entered for visual checking before
NAME     = JOHNSON-LENZ, PETER W.    permanent entry into the disk file)
ADDRESS = 695 5TH
PHONE    = 635-2615
BLOCK       = 26  INCLUDED   =  2  COMMERCIAL=  1  TRAFFICPAT=  1
STREETS     = 1   TRAFFICCTL=  1  NOISE      =  1  DOGS       =  1
SPACEPARKS  = 1   RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS      = 1   SIDEWALKS =  1  PARKING    =  1  EMPTYLOTS  =  1
ZONING      = 1   VARIANCES =  1  EVENTS     =  1  BUILDINGS  =  1
TREECUT     = 1   RECYCLING =  1  OLDHELP    =  1  EXCHANGE   =  1
PHONESURVY  = 1   FORMSURVY =  1  MEETING    =  1  TVREPLY    =  1

     FILE                           (put the record into the disk file)

     SAVE                           (close the FAN data base file)
FAN SAVED

     )OFF

READY

BYE
CONFIRM: Y
SESSION 103 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 10:23 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 8.3 SECONDS
ELAPSED TIME WAS 3 MINUTES
COST WAS $0.21
```

Example 2: Editing a record for which the record number is known

```
      GET 92    (get record number 92)

      SHOW      (display the contents of the record)
RECORD = 92
NAME    =JOHNSON-LENZ, PETER W
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  NOISE      =  1
SPACEPARKS=  1  RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS     =  1  SIDEWALKS =  1  PARKING   =  1  EMPTYLOTS =  1
ZONING     =  1  VARIANCES =  1  EVENTS    =  1  BUILDINGS =  1
TREECUT    =  1  RECYCLING =  1  OLDHELP   =  1  EXCHANGE  =  1
PHONESURVY=  1  FORMSURVY =  1  MEETING   =  1  TVREPLY   =  1

      NAME='JOHNSON-LENZ, PETER W.'   (edit the name to include a
      NOISE=0                          period after the initial,
      SHOW                             and edit item NOISE from 1
RECORD = 92                            to 0, and display the
NAME    =JOHNSON-LENZ, PETER W.        edited record)
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  SPACEPARKS=  1
RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1  ALLEYS     =  1
SIDEWALKS  =  1  PARKING   =  1  EMPTYLOTS  =  1  ZONING    =  1
VARIANCES  =  1  EVENTS    =  1  BUILDINGS  =  1  TREECUT   =  1
RECYCLING  =  1  OLDHELP   =  1  EXCHANGE   =  1  PHONESURVY=  1
FORMSURVY  =  1  MEETING   =  1  TVREPLY    =  1
      FILE        (put the edited record back into the data base)

      SAVE        (close the FAN data base file)
FAN SAVED

      )OFF

READY

BYE
CONFIRM: Y
SESSION 99 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 09:38 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 11.3 SECONDS
ELAPSED TIME WAS 2 MINUTES
COST WAS  $0.27
```

Example 3: Editing a record for which only the name is known

```
     GET 'NAME' OF 'JOHNSON-LENZ, TRUDY'     (get the record with the
                                              name of JOHNSON-LENZ,
     SHOW  (display the contents of the record) TRUDY.  This involves a
RECORD = 93                                   search of the disk file
NAME    =JOHNSON-LENZ, TRUDY M                of names.)
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  NOISE      =  1
SPACEPARKS=  1  RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS     =  1  SIDEWALKS =  1  PARKING    =  1  EMPTYLOTS  =  1
ZONING     =  1  VARIANCES =  1  EVENTS     =  1  BUILDINGS  =  1
TREECUT    =  1  RECYCLING =  1  OLDHELP    =  1  EXCHANGE   =  1
PHONESURVY=  1  FORMSURVY =  1  MEETING    =  1  TVREPLY    =  1

     NAME='JOHNSON-LENZ, TRUDY M.'    (edit the name by adding a period
     FILE                              after the middle initial and put
                                       the record back.)
     SAVE                             (close the FAN data base file.)
FAN SAVED

     )OFF

READY

BYE
CONFIRM: Y
SESSION 102 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 10:16 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 23.9 SECONDS
ELAPSED TIME WAS 2 MINUTES
COST WAS  $0.54
```

Example 4: A session of working with entire items

```
     GETITEM 'BLOCK BIKEWAYS HOWLONG'
```
(get items BLOCK, BIKEWAYS, and HOWLONG and store them in the workspace as APL vectors)

```
     GRAPH BIKEWAYS
CODE  COUNT  PERCENT
  Ø    3Ø8    8Ø.ØØ XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  1     68    17.66 XXXXXXXXX
  2      9     2.33 X
TOTL   385
```
(generate a bar-graph of the frequency distribution of item BIKEWAYS)

(the graph reveals that 308 people, or 80 percent of the people in the data base, were not interested in the issue BIKEWAYS --a code of zero was used to indicate no interest, where 1 and 2 indicate greater degrees of interest)

```
     LIST ALL BLOCK.EQ 25
```
(list the record number and identification information for persons in BLOCK 25)

```
129 TORRENS-SPENCE, MRS. ROY      534 C      636-1234
130 DORNEY, MS. C. JEAN           618-A D    636-8903
131 DORNEY, MIKE                  618-A D    636-8903
132 FRANZWA, SUE                  644 5TH    636-2367
133 FRANZWA, ALBERT               644 5TH    636-2367
134 DEBELLIS, MRS. N.H.           680 5TH    635-7864
135 O'NEIL, FRANK                 696 5TH    636-3248
136 O'NEIL, ETHEL                 696 5TH    636-3248
137 WHITNEY, GLADYS               627 6TH    635-3455
138 MITZEL, PATTY                 633 6TH    636-4598
139 ROSENTRETER, DENNIS           661 6TH    636-0586
140 FISHER, BARBARA               641 6TH    635-7845
141 LAGERSTROM, JULIE             683 6TH    636-8769
142 GARNIER, PAUL                 693 6TH    635-7823
143 GARNIER, DIANA                693 6TH    635-7823
144 BEENEY, CAROLINA              627 6TH    636-1267
145 LINDBERG, MRS. BERNARD        677 6TH    636-2224
```

```
     AVERAGE HOWLONG
COUNT  AVERAGE
  385     9.28
```
(compute the average length of time people have lived in the FAN neighborhood)

```
     LIST 10.TA.GDHOWLONG
```
(list the record number and identification for the 10 people who have lived in the neighborhood the longest, in order from the longest on down)

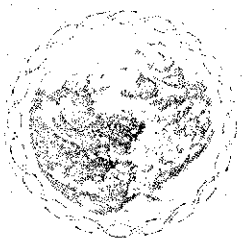
```
382 WARD, VON                     610 D      636-8511
180 CAREY, HELLMUTH               320 A      636-4387
184 KAUFMAN, MARGARET             788 6TH    636-6749
163 BRUCE, MADELEINE A.           754 8TH    635-2512
252 WARNER, MR. HAROLD            696 5TH    636-7309
253 WARNER, MRS. HAROLD           696 5TH    636-7309
291 WANDEL, FRANK                 683 4TH    636-0505
 65 BAKER, JOHN W.                677 9TH    635-8787
 66 BAKER, MAGGIE                 677 9TH    635-8787
341 O'NEIL, JOE                   818 8TH    636-9845
```

```
      SAVE                                (close the FAN data base file)

      )OFF

READY

BYE
CONFIRM: Y
SESSION 141 - JOB 6 USER 5,4 LOGGED OFF KB6 AT 27-FEB-76 Ø9:31 PM
SAVED 364 DISK BLOCKS, 136 FREE
RUN TIME WAS 9.1 SECONDS
ELAPSED TIME WAS 3 MINUTES
COST WAS  $Ø.29
```



May 28, 1976

A TECHNICAL INTRODUCTION TO IS (AN INFORMATION SYSTEM)

written in OMSI APL

for execution on the
Oregon Museum of Science and Industry PDP 11/45 computer

JOHNSON-LENZ * 695 Fifth Street * Lake Oswego, Oregon 97034 * (503) 635-2615

IS (an Information System)

IS is an interactive information retrieval system written in OMSI APL. The system is organized around a standard data matrix of rows and columns (rows=records, columns=descriptors or items). The major design features which distinguish IS from most other information systems are:

1. It can read or write both the rows (records) and the columns (items or descriptors) of the data matrix.
2. It can read or write or process specific subsets of both the rows and the columns (specific submatrices) of the data matrix.
3. It reads and writes the records and items into and out of the APL workspace as legitimate APL variables. In this way IS is an extension of the unique input/output facility of OMSI APL. Once records and/or items have been read into the APL workspace, they may be processed in any of the ways that APL can manipulate scalars (individual items within a record), or vectors (an entire vector of values for an item).
4. It has a simple command language which can be learned easily by persons with no prior computer experience. (Members of a neighborhood association, ranging in age from 15 to 64, have used IS without difficulty, even with no previous computer experience. The system was written for them and debugged and improved through their experience with it, but its use is by no means limited to neighborhood groups.)
5. It contains a prompted data entry facility to simplify the data entry process. There is also prompted record editing, and, of course, records can be edited directly with pure APL.
6. It is written in approximately 200 lines of OMSI APL code that can readily be reconfigured to meet a wide variety of applications.

IS uses the powerful generalizations of the OMSI APL input/output system written by Steve Poulsen and is but one example of the potential for versatile interactive file manipulation made possible by this input/output system. It is exactly this facility of OMSI APL which makes possible random access to both the rows and the columns (the individual records of data, and the individual items or descriptors of data). Without this facility, it would be necessary to write fairly complex buffering routines in APL to access an individual byte within a record. Such additional code would be clumsy and most likely execute slowly.

Applications

IS was developed in the context of a neighborhood information system project sponsored by OMSI. In this regard the system was designed to be operated by unsophisticated neighborhood people. It has a command language that is easy to learn, and contains features for prompting and for easy diagnosis of errors in data entry and retrieval. The examples of system use shown in this document are taken from this developmental context and demonstrate the way in which IS can be used as a small community information system. The system is designed to be a general information system, and it can be used in a wide variety of applications.

The system as currently configured can be used for any of the following without additional programming:

1. remote, interactive data entry of individual records and/or entire descriptors or items, including editing of records and/or items
2. information retrieval by identification and/or items
3. inverted list processing for storage and retrieval
4. interactive survey and data analysis with simple statistics
5. development and management of data bases such as skills/resources, personnel directories, membership directories, inventory, general records management
6. key word information retrieval system
7. instantaneous telephone survey data entry and analysis

The Command Language

The command language includes the following commands for processing individual records (rows in the data matrix):

1. CLEAR -- blanks out the record currently in the APL workspace
2. GET -- reads a record from the disk file into the APL workspace
3. FILE -- writes a record from the APL workspace into the disk file
4. AID -- aids and prompts the user during data entry and editing
5. SHOW -- displays the record currently in the APL workspace
6. SELECT --- specifies which columns of the data matrix are to be transferred during GET/PUT operations

The command language includes the following commands for processing individual items or descriptors (columns in the data matrix):

1. GETITEM -- reads all the values (one from each record or row in the matrix) for a particular item or descriptor into the APL workspace, storing it as a legitimate APL vector
2. PUTITEM -- writes an item or descriptor from the APL workspace into a column of the disk file
3. ALL -- converts an item or descriptor vector into an inverted list of record numbers
4. OF -- generates an inverted list of record numbers with specific values for certain identifiers
5. LIST -- lists identifiers for specific records (such as those listed by the OF and ALL functions above)
6. PRINT -- lists identifiers and specified items for specific records
7. GRAPH -- generates a bar graph showing the frequency distribution of an item or descriptor
8. AVERAGE -- computes the average of an item or descriptor
9. CROSS -- generates the bivariate frequency distribution of two items or descriptors

The command language also includes commands for creating a data base from scratch (CREATE), for labeling the items/descriptors and identification fields (LABEL), and for opening and closing the data file (LOAD and SAVE).

Limitations

IS is an appropriate system for working with small to moderate data bases. It is not practical to use IS for data bases containing more than 2000 records, unless an APL workspace in excess of 16K is available. Using the current OMSI APL with single precision, and with all IS functions in the workspace, an item (column in the data matrix) of up to 2000 individual numbers can be processed. If the retrieval or other processing involves two items which must be simultaneously manipulated, then only 1000 records can be processed at once. However, this limitation is not absolute. If processing of only certain rows in the data matrix is appropriate, the GETITEM and PUTITEM commands can be operated on partial columns of the matrix. In this way the effective sample size of the data base is increased.

The number of columns in the data matrix is not limited to any particular number of items, but the APL symbol table can contain only so many items at one time. Therefore, it is necessary to work with only selected items during record-wise processing (data entry and editing) if the number of items exceeds 50 or so. The exact number of items that can be processed at once during data entry and editing is a function of the size of the APL symbol table and the number of characters used to identify each item. The system can also be configured so that all items for a record are kept in the workspace in a single vector. This supports an unlimited number of items at the expense of direct APL access to item/scalar values.

The APL Interface

Since IS reads and writes to and from the APL workspace, the user can execute data processing operations beyond the scope of the IS commands by using APL. The following examples demonstrate this:

1. Record-wise processing: The GET command reads in a record (a row in the data matrix) and stores each item in the record as an APL scalar and each identifier as a character vector. The numeric, scalar items of data for that record can then be manipulated using APL. For example:

```
PEOPLE=ADULTS+CHILDREN    (computes the number of people as the sum of
                           the number of adults and the number of children)

YEARLYRENT=12#RENT        (computes the yearly rent as the product of 12
                           and the monthly rent)
```

2. Item-wise processing; The GETITEM command reads in an item (a column in the data matrix) and stores that item as an APL vector of numbers which can be manipulated using APL. Such APL processing of items makes possible arithmetic and logical transformation of items, complex searches of the data base using record indices, easy sorting and reordering of items and records, and index/pointer interface through the APL workspace with other data bases. Consider the following:

```
PEOPLE=ADULTS+CHILDREN    (computes a vector of the number of people as the
                           sum of the corresponding numbers in the vectors
                           for adults and children)

+/PEOPLE                  (computes the total number of people)
```

```
      AGELIST=.GDAGE          (generates a vector of record indices called
                               AGELIST which sorts the records into order by
                               age from oldest to youngest)
```

The following example from the neighborhood association application demonstrates how IS operates as an extension of the OMSI APL input/output system:

```
WELCOME TO OMSI APL V01.07

      )READ IS                (the Information System is read into the workspace)
      LOAD 'FAN'              (the FAN data base file is opened)
 FAN LOADED

      )VARS                   (the )VARS command reveals the IS system variables)
 CHA CHI FILE IDENT IDLIST ILIST ITEMS LASTREC MAXID MAXREC RECORD

      ENTRY                   (the ENTRY command clears the workspace and creates
                               numeric scalars set to zero and identifiers set to
      )VARS                    all blanks; )VARS reveals these new APL variables)
 ADDRESS ALLEYS ASSESSMENT BIKEWAYS BLOCK BUILDINGS CHA CHI COMMERCIAL CO
 MMITTEE CRIME DOGS EMPTYLOTS EVENTS EXCHANGE FILE FORMSURVY IDENT IDLIST
  ILIST INCLUDED ITEMS LASTREC MAXID MAXREC MEETING MULTIFAM NAME NEIGHBO
 R NOISE OLDHELP OTHERISSUE OTHERREPLY PARKING PHONE PHONESURVY POLLUTION
  PROPVALUES RAINCHECK RECORD RECREATION RECYCLING RENTUPKEEP RESQUALITY
 SIDEWALKS SPACEPARKS STREETS TASKFORCE TRAFFICCTL TRAFFICPAT TREECUT TVR
 EPLY VARIANCES YARDUPKEEP ZONING

      ADDRESS                 (the current value of ADDRESS is a blank string)

      ALLEYS                  (the current value of ALLEYS is a scalar zero)
  0
      .ROALLEYS               (the shape of ALLEYS is 1)
  1
      GETITEM 'ALLEYS'        (the GETITEM command reads the entire column of
                               ALLEYS into the workspace)
      .ROALLEYS               (the shape of ALLEYS is now 361)
  361
```

Examples of Use (including time and cost figures)

The following examples show use of the system on the OMSI computer. These examples involve an actual neighborhood data base containing 385 records of 80 numeric items and 64 characters of identification including name, address, and telephone number. Most of the identification information was modified for neighborhood privacy.

Each example was generated in a separate session, with a login and logout to provide cost and time figures. The logoff data is shown with each example. The costs shown were computed at OMSI not-for-profit billing rates.

Example 1: Entering a record

```
     ENTRY                              (set the record pointer to the next free
                                         record)
     AID                                (begin the prompting process)
RECORD = 92                             (the system responds with the record number
NAME     = JOHNSON-LENZ, PETER W.        followed by a request for the first field
ADDRESS = 695 5TH                       of identification, NAME.  The user enters
PHONE    = 635-2615                     the name, and the system responds with a
BLOCK      = 26                         request for the address, and so on through
INCLUDED   = 2                          all the identifiers and numeric items.
COMMERCIAL = 1                          Note that only the underlined information
TRAFFICPAT = 1                          is typed by the user, the rest is a prompt
MULTIFAM   =                            from the computer.  Note also that the user
STREETS    = 1                          entered only a (CR) for the item MULTIFAM
   .                                    which does not appear in the list of items
   .                                    generated by the SHOW command below.)
   .
TVREPLY    = 1

     SHOW                               (the SHOW command lists the record as
RECORD = 92                              entered for visual checking before
NAME     = JOHNSON-LENZ, PETER W.        permanent entry into the disk file)
ADDRESS = 695 5TH
PHONE    = 635-2615
BLOCK       = 26  INCLUDED   =  2  COMMERCIAL=  1  TRAFFICPAT=  1
STREETS     = 1   TRAFFICCTL=  1  NOISE      =  1  DOGS       =  1
SPACEPARKS  = 1   RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS      = 1   SIDEWALKS  =  1  PARKING    =  1  EMPTYLOTS  =  1
ZONING      = 1   VARIANCES  =  1  EVENTS     =  1  BUILDINGS  =  1
TREECUT     = 1   RECYCLING  =  1  OLDHELP    =  1  EXCHANGE   =  1
PHONESURVY  = 1   FORMSURVY  =  1  MEETING    =  1  TVREPLY    =  1

     FILE                               (put the record into the disk file)

     SAVE                               (close the FAN data base file)
FAN SAVED

     )OFF

READY

BYE
CONFIRM: Y
SESSION 103 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 10:23 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 8.3 SECONDS
ELAPSED TIME WAS 3 MINUTES
COST WAS $0.21
```

Example 2: Editing a record for which the record number is known

```
      GET 92    (get record number 92)

      SHOW      (display the contents of the record)
RECORD = 92
NAME    =JOHNSON-LENZ, PETER W
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  NOISE      =  1
SPACEPARKS=  1  RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS     =  1  SIDEWALKS =  1  PARKING   =  1  EMPTYLOTS =  1
ZONING     =  1  VARIANCES =  1  EVENTS    =  1  BUILDINGS =  1
TREECUT    =  1  RECYCLING =  1  OLDHELP   =  1  EXCHANGE  =  1
PHONESURVY=  1  FORMSURVY =  1  MEETING   =  1  TVREPLY   =  1

      NAME='JOHNSON-LENZ, PETER W.'   (edit the name to include a
      NOISE=0                          period after the initial,
      SHOW                             and edit item NOISE from 1
RECORD = 92                            to 0, and display the
NAME    =JOHNSON-LENZ, PETER W.        edited record)
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  SPACEPARKS=  1
RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1  ALLEYS     =  1
SIDEWALKS  =  1  PARKING   =  1  EMPTYLOTS  =  1  ZONING    =  1
VARIANCES  =  1  EVENTS    =  1  BUILDINGS  =  1  TREECUT   =  1
RECYCLING  =  1  OLDHELP   =  1  EXCHANGE   =  1  PHONESUPVY=  1
FORMSURVY  =  1  MEETING   =  1  TVREPLY    =  1
      FILE        (put the edited record back into the data base)

      SAVE        (close the FAN data base file)
FAN SAVED

      )OFF

READY

BYE
CONFIRM: Y
SESSION 99 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 09:38 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 11.3 SECONDS
ELAPSED TIME WAS 2 MINUTES
COST WAS  $0.27
```

Example 3: Editing a record for which only the name is known

```
      GET 'NAME' OF 'JOHNSON-LENZ, TRUDY'
```

(get the record with the name of JOHNSON-LENZ, TRUDY. This involves a search of the disk file of names.)

```
      SHOW   (display the contents of the record)
RECORD = 93
NAME    =JOHNSON-LENZ, TRUDY M
ADDRESS=695 5TH
PHONE   =635-2615
BLOCK      = 26  INCLUDED  =  2  COMMERCIAL=  1  TRAFFICPAT=  1
MULTIFAM   =  1  STREETS   =  1  TRAFFICCTL=  1  NOISE     =  1
SPACEPARKS=  1  RECREATION=  1  RESQUALITY=  1  RENTUPKEEP=  1
ALLEYS     =  1  SIDEWALKS =  1  PARKING   =  1  EMPTYLOTS =  1
ZONING     =  1  VARIANCES =  1  EVENTS    =  1  BUILDINGS =  1
TREECUT    =  1  RECYCLING =  1  OLDHELP   =  1  EXCHANGE  =  1
PHONESURVY=  1  FORMSURVY =  1  MEETING   =  1  TVREPLY   =  1

      NAME='JOHNSON-LENZ, TRUDY M.'
      FILE
```

(edit the name by adding a period after the middle initial and put the record back)

```
      SAVE
FAN SAVED
```

(close the FAN data base file)

```
      )OFF

READY

BYE
CONFIRM: Y
SESSION 102 - JOB 8 USER 5,4 LOGGED OFF KB9 AT 21-FEB-76 10:16 PM
SAVED 416 DISK BLOCKS, 84 FREE
RUN TIME WAS 23.9 SECONDS
ELAPSED TIME WAS 2 MINUTES
COST WAS  $0.54
```

Example 4: A session of working with entire items

```
     GETITEM 'BLOCK BIKEWAYS HOWLONG'   (get items BLOCK, BIKEWAYS, and HOWLONG
                                         and store them in the workspace as APL
                                         vectors)
     GRAPH BIKEWAYS                     (generate a bar-graph of the frequency
CODE  COUNT  PERCENT                     distribution of item BIKEWAYS)
  Ø     3Ø8    8Ø.ØØ XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
  1      68    17.66 XXXXXXXXX
  2       9     2.33 X                 (the graph reveals that 308 people, or
TOTL    385                             80 percent of the people in the data base,
                                        were not interested in the issue BIKEWAYS
                                        --a code of zero was used to indicate no
                                        interest, where 1 and 2 indicate greater
                                        degrees of interest)

     LIST ALL BLOCK.EQ 25               (list the record number and identification
                                         information for persons in BLOCK 25)
129 TORRENS-SPENCE, MRS. ROY      534 C          636-1234
130 DORNEY, MS. C. JEAN           618-A D        636-8903
131 DORNEY, MIKE                  618-A D        636-8903
132 FRANZWA, SUE                  644 5TH        636-2367
133 FRANZWA, ALBERT               644 5TH        636-2367
134 DEBELLIS, MRS. N.H.           680 5TH        635-7864
135 O'NEIL, FRANK                 696 5TH        636-3248
136 O'NEIL, ETHEL                 696 5TH        636-3248
137 WHITNEY, GLADYS               627 6TH        635-3455
138 MITZEL, PATTY                 633 6TH        636-4598
139 ROSENTRETER, DENNIS           661 6TH        636-0586
140 FISHER, BARBARA               641 6TH        635-7845
141 LAGERSTROM, JULIE             683 6TH        636-8769
142 GARNIER, PAUL                 693 6TH        635-7823
143 GARNIER, DIANA                693 6TH        635-7823
144 BEENEY, CAROLINA              627 6TH        636-1267
145 LINDBERG, MRS. BERNARD        677 6TH        636-2224

     AVERAGE HOWLONG                (compute the average length of time people
COUNT  AVERAGE                       have lived in the FAN neighborhood)
  385     9.28

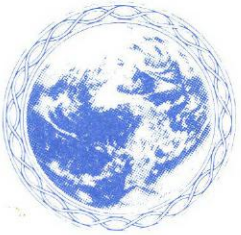
     LIST 10.TA.GDHOWLONG           (list the record number and identification
                                     for the 10 people who have lived in the
                                     neighborhood the longest, in order from the
                                     longest on down)
382 WARD, VON                     610 D          636-8511
180 CAREY, HELLMUTH               320 A          636-4387
184 KAUFMAN, MARGARET             788 6TH        636-6749
163 BRUCE, MADELEINE A.           754 8TH        635-2512
252 WARNER, MR. HAROLD            696 5TH        636-7309
253 WARNER, MRS. HAROLD           696 5TH        636-7309
291 WANDEL, FRANK                 683 4TH        636-0505
 65 BAKER, JOHN W.                677 9TH        635-8787
 66 BAKER, MAGGIE                 677 9TH        635-8787
341 O'NEIL, JOE                   818 8TH        636-9845
```

```
      SAVE                                (close the FAN data base file)

      )OFF

READY

BYE
CONFIRM: Y
SESSION 141 - JOB 6 USER 5,4 LOGGED OFF KB6 AT 27-FEB-76 Ø9:31 PM
SAVED 364 DISK BLOCKS, 136 FREE
RUN TIME WAS 9.1 SECONDS
ELAPSED TIME WAS 3 MINUTES
COST WAS  $Ø.29
```



January 1, 1978

COST/BENEFIT CONSIDERATIONS FOR AN INTERACTIVE CONFERENCE FACILITATION SYSTEM

Introduction

The purpose of almost any conference or festival is to help people meet each other, share ideas, and go home with new ideas and contacts. A face-to-face conference happens over such a short period of time that it is often difficult to find those few people at a conference with whom such exchanges would be most fruitful. In the past, printed conference directories have been used to circulate information about participants' names, addresses, and basic interests in an attempt to bring people together. But directories in themselves cannot facilitate people with common interests meeting face-to-face. More powerful methods are needed.

Background

To date, there has been considerable experimentation in using computers to bring people together who are geographically separated. A recent issue of Transnational Associations contains many articles on this form of computerized conferencing. However, very few projects have attempted to use the computer in a face-to-face setting. Simple systems have been developed to allow the exchange of messages at professional conferences, but these systems have been fairly limited in scope. A conferencing system was used as the ISTA conference held in Ann Arbor, Michigan in 1976 (as reported in the October, 1977 issue of Transnational Associations), but the primary purpose there was to facilitate discussions on various topics, rather than to facilitate the emergence and development of new social network connections between people who had not previously met. Johnson-Lenz has facilitated a conference (also reported in that same issue of Transnational Associations) in which an interactive computer was used to bring people together through the use of a keyword directory and a "mental model" exercise. Even this project lacked any specific means of helping people with similar interests find and meet each other. We only identified and published lists of those with similar interests. Conferees still had to find each other.

Current efforts

In September, 1977, Anthony Judge of the Union of International Associations in Brussels prepared a feasibility study entitled, "Computer Conferencing as a Means of Enhancing Communication at a Large Conference/Festival." Since that time, Anthony and we have been exchanging letters and messages with a variety of people who are interested in using an interactive computer system to facilitate such

face-to-face conferences. This paper is our attempt to outline the basic computer requirements for such a system, and to outline the costs of such an approach and suggest how these costs might be met.

In his feasibility study, Anthony cited three goals of such a system. We summarize them here:

1. To optimize the number of useful contacts--limited only by the number of links personally considered satisfactory.

2. To leave participants with the belief that the communication process facilitated the emergence of new joint activities/projects.

3. To help participants in the creation of a data base which facilitates their interaction and which can be used to follow up on these contacts further.

A design

We feel that these goals can be met with a system that supports two primary communications functions:

1. a directory of participants, including the name, address, and telephone number of each participant. Each entry would also include a number of keyword interest/skill descriptors which would facilitate searching for people with particular interests or patterns of interests, as well as up to 5 lines of free-form text.

2. a messaging system which would allow any participant to send a brief 5-line message to any other participant.

The first component, a directory, would facilitate identification of people with similar or complementary interests. However, this component would not actually help people meet each other. Once a person had obtained the names and addresses of several other participants with similar interests, he/she could write or call them at home, but how would he/she meet them at the conference where everybody is rushing about? This is the reason for the second component, which would allow each person to leave messages for those persons he/she found through the directory.

In order to support these two communications functions, a multi-terminal interactive computer system would be needed. Several communications booths with computer terminals would be situated around the conference. These terminals would be operated by conference staff people who were trained in their use, since open access to such terminals would significantly degrade the efficiency of the process. A person wishing to register in the directory would visit a booth and fill out a form, the information from which would then be entered into the system. A person wishing to search the directory would fill out another form, specifying the keywords he/she was interested in. The staff person would then perform the computer search and give the participant a printed list of those people who matched the search pattern. If a participant wished to send a message to those people found through the search, a third form for messages would be filled out, and the staff person would enter the message into the computer. Then, at any time during the conference, any of the people so messaged could go up to any communication booth and ask for any waiting messages. These would be printed out, and the

circle would be complete. People could use these messages to make appointments to get together, exchange ideas, or whatever.

This simple, limited systems design is the bare minimum we feel necessary to achieve Anthony's three goals. Both we and Anthony have additional design ideas which dramatically extend the power and scope of such systems, but these are not discussed here. Most of them involve actual conferencing, discussion, and dialogue using the computer. Such designs achieve additional goals not covered by this paper.

Information exchange at a face-to-face conference

A face-to-face conference is substantially different from a typical computer conference in two ways. First, a face-to-face conference is of such short duration that it is necessary to accomplish an enormous amount of information exchange in a very brief period. The demands on the computer system are far greater than in a more leisurely computer conference with participants located in different cities confering over many months. Second, since a face-to-face conference takes place for such a short time, the computer system will be used for only a short time. Some means for justifying the cost of such short-term computer use must be found. The first difference--rate of information exchange--is discussed below as a way of determining how much computer power is needed and what it might cost. The second difference--brief period of use--is discussed in a later section where a suggestion is made as to how such a system might be financed.

The amount of computer power needed depends on several factors:

1. the number of people at the conference, and
2. the expected number of relationships to be facilitated, which depends on the scope of the conference and on the length of time people attend.

Since we are not planning for any particular conference in this case, but rather attempting to study the problem in general, we have created two different scenarios that should block out the extremes.

A. A large conference (similar to the London Festival of the Mind and Body)

   1. number of participants: up to 100,000
   2. expected number of relationships: in a large conference it would be expected that people would never meet most of the participants; in fact most would remain strangers. With a large number of people, it would be reasonable to expect a lower number of exchanges per participant than with a smaller conference. There are two reasons for this. First, there will be more variety in a large conference, thus reducing the common interest overlap. Second, most people would visit for a brief period of time, like an exposition. For our example, we assume that each participant would wish to contact an <u>average</u> of one other participant.

B. A small conference

   1. number of participants: 1,000

2. expected number of relationships: since a small conference would more likely be attended by people with more convergent and limited interests, a larger number of information exchanges might be expected. Since a small conference would more likely involve participants staying for a longer period of time, more exchanges would be expected. For our example, we assume that each participant would wish to contact an average of ten other participants. Some would want to contact more, and most less.

How much directory exchange would take place?

We are assuming that an average directory entry, including name, address, phone, keywords, and description, would take about 500 characters or about 100 words. We estimate that a fast typist could enter such an entry into the computer system in an average of 3 minutes, including typing time, error correction, computer system commands, pauses for the computer, and the inevitable pauses and foibles of the person at the keyboard. We estimate that printing out such an entry would take an average of 1 minute, including printing time (at 30 characters per second), computer systems commands, and computer and human pauses.

Registration of conference participants (which could be done before the conference, if pre-registration information were available) would then take:

large conference = 5000 terminal-hours
small conference = 50 terminal-hours

If 32 terminals were available for this work, the number of 8-hour days required for registering all participants would be:

large conference = 20 days
small conference = .2 days

Searching through the directory (which would have to be done during the conference, after the directory was complete) would then take:

large conference = 1667 terminal-hours (1 contact per person)
small conference = 167 terminal-hours (10 contacts per person)

If 32 terminals were available for this work, the number of 8-hour days required for this searching would then be:

large conference = 6.5 days
small conference = .65 days

How much messaging exchange would take place?

We are assuming that an average message would take 500 characters, or 100 words. We estimate that a fast typist could enter an entry into the computer system in an average of 3 minutes, including typing time, error correction, computer system commands, and pauses for the computer and typist. We estimate that printing out such an entry would take an average of 1 minute.

Entry of all messages for all participants would then take:

large conference = 5000 terminal-hours (1 message average per person)
small conference = 500 terminal-hours (10 messages average per person)

If 32 terminals were available for this work, the number of 8-hour days required for entering all these messages would be:

large conference = 20 days
small conference = 2 days

Printing and delivery of all these messages would then take:

large conference = 1667 terminal-hours
small conference = 167 terminal-hours

If 32 terminals were available for this work the number of 8-hour days required for delivering all these messages would be:

large conference = 6.5 days
small conference = .65 days

How much information exchange would be involved?

The large conference would then require a total of 53 8-hour days of terminal access if 32 terminals were used. About half of this could be done before the conference, if pre-registration information were available. The other half, about 33 days, does not fit into the week or so that might be expected of such a conference. The problem might be solved by adding more terminals, but this would increase the cost (see section below). The estimates we have provided here might be too high; maybe fewer people would participate in the actual computer facilitation. The problem might also be reduced by having terminals available 16 hours a day, for example from 7 in the morning to 11 at night. Even then, most of the activity would take place during normal daylight hours. Clearly, the resources of the computer would be strained to the limit, even with this simple, limited design for information exchange.

The small conference would require a total of 3.5 8-hour days of terminal access if 32 terminals were used. This just barely fits into the typical 2-3 day schedule of such conferences. Even with the small conference, the resources of the computer system would be strained to the limit, unless the information exchange activity was substantially below our estimates.

The process we have used here should allow anyone to compute estimates of how many terminals would accomplish how much information exchange in how much time. These examples are included here just to map out some of the extremes. However, it is important to note that regardless of the exact values of the estimates, there is an enormous amount of information exchange potential at such conferences. Because of that a moderately large computer system is absolutely necessary to support such a volume of information exchange.

How much computer power is needed?

Clearly, there is a substantial amount of information exchange that could be expected at such conferences! It might be that our estimates are too large and that people would be less inclined to use the facilities than we have estimated here. This might be more likely at the first few conferences where this is done, but as such a service becomes more popular and people come to such conferences in order to meet more people, the exchange rate would approach our estimates. Even with less use, the figures are still enormous, and it would be a tragic error to provide so little computer power that people would not be able to optimize their desired number of contacts. The computer system must not be a demonstration--it must meet fully the 3 goals set forth by Anthony Judge. Hence, it seems appropriate to err in our estimates on the high end, rather than the low end.

In all our examples we have computed the number of hours needed to accomplish the desired information exchange on the basis of 32 terminals. If a different number of terminals is used, the number of hours will change. A smaller number of terminals would not be able to support the desired exchange. A larger number of terminals increases the cost significantly. Therefore, for purposes of cost estimations, we will continue to use this figure of 32 terminals. In his feasibility study, Anthony Judge also suggests using 32 terminals.

A computer system capable of supporting 32 terminals costs at least $100,000, including the central processor and the disks to contain the data. In addition to this, there is the cost of the terminals themselves--at least $1000 per terminal. This comes to an absolute minimal hardware cost of $132,000 for the entire system. For a variety of reasons, it may be appropriate to use a system that costs more. For example, the EIES computerized conferencing system (Electronic Information Exchange System being developed by Murray Turoff under NSF sponsorship) costs a minimum of $250,000 excluding the cost of terminals.

It should also be noted that this cost does not include the cost of programming the computer for this unique application. We know of no system which is ready to use at this moment. We would at least have to modify an existing system. Such modification is often as expensive as starting from scratch. Such modification or new programming would cost from $5,000 to $50,000, depending on the quality of the work and the details of the contractual arrangement with the systems programmers.

Furthermore, this cost does not include the cost of maintaining the computer, staffing the computer system, staffing the communications booths, paper, printing the forms, and such related costs. It is only the initial cost of the hardware and programming.

How can a conference afford such a system?

Clearly, the cost of such a system is utterly beyond the budget capacity of any conference, large or small. One solution proposed by Anthony Judge in his feasibility study is to ask for loans of hardware from companies that make computers and peripherals. This approach has several serious problems. First, even though it is often possible to obtain such loans in return for credit, it is unlikely that a hardware vendor would loan the hardware for more than a single conference. If we desire to develop a system that would be usable by more than

one conference, we need to solve this cost problem in a more direct way. Second, it is considerably less likely that the hardware vendor would loan the hardware for the longer time required to program, test, and otherwise develop the system. Third, if such a program were to be developed, it would then be worthless for future conferences without the hardware. Programs that are developed for one computer cannot be transferred to another without modification, which is often expensive. Such a loaner approach is obviously good only on a one-shot, one-conference basis. It would do little to really begin facilitating conferences on a large, replicable scale.

In a recent letter, Anthony says, "There is therefore a question of developing a form of 'intermediate CC' (computer conferencing) with low cost compromises wherever possible." We agree. These compromises have already been made in our designs. First, we have reduced the fanciness of the computer system down to simple directory exchange and messaging. We and Anthony have many wonderful ideas that go beyond this, but these are simply out of the question right now. Second, we have reduced to the absolute minimum the number of terminals and the size of the computer required to support such activity. The problem which cannot be circumvented is the volume of the information exchange required in a short face-to-face conference. Third, even though the costs of computer hardware are dropping by 20% a year, they are not going to be significantly less than our estimates herein for some time. The absolute rock bottom deal we know of on a computer capable of supporting 32 terminals is a Digital Equipment Corporation PDP-11/70 which has (in recent months) been reduced significantly in price. That is simply the best we can do for now.

Therefore, if we want to provide conferences with such facilitation, particularly in light of the fact that it is absurd to expect any conference to pay for the entire cost of a computer system they will use for only a few days, we have a modest proposal to make to anyone reading this. We suggest that we form a corporation, possibly not-for-profit, to purchase the hardware and develop the system. Such a corporation could then lease the system to a conference for a small fraction of the total cost of the system, thus amortizing the cost over many conferences.

There seems to be a current emergence of conferences that would be likely users of such a system. Anthony is well aware of many of them. If the total investment in such a system were $182,000 ($132,000 for hardware, plus $50,000 for computer programming), an average lease fee of $10,000 per conference would pay for the system in less than 20 conferences. We expect that the effective life of such a system, before it would be superceded by even more powerful systems, would be in the range of 2-4 years. Certainly this is sufficient time to recover and exceed the initial investment.

If the $10,000 fee per conference seems unreasonable, consider that the end product of using the system would be a complete directory of the participants, including names, addresses, interests, and descriptions. In itself, this is of considerable value. Furthermore, we have friends who have been negotiating with several conference organizers in the Pacific Northwest who are planning conferences of up to 30,000 participants. These organizers are willing to pay fees of $3-5000 to use a computer after the conference to prepare mailing lists of participants broken down into 10 or so different categories. We expect that they would be willing to pay twice that to get an instantaneous facilitation of participants at the conference, in addition to the substantially more flexible and detailed

directory and mailing list capabilities that we could provide them with through the system described here.

Finally, if the $10,000 is considered in terms of the cost per participant, it seems relatively small when compared to other costs. For example, in the large conference in the previous discussion, the $10,000 would become a cost of 10 cents per participant for the privilege of being able to find and link up with persons of similar interests. In the small conference previously discussed, the $10,000 would become a cost of $10 for access to a rich information exchange environment. Would participants be willing to pay for such services, particularly if they really understood the potency of such access to other people? This opens up an entirely new area discussed in some detail by Anthony in his feasibility study of charging each participant for each use of the system. In such a case, the cost of the computer system would not have to be borne by the conference at all.

We feel strongly that there is a market for systems of this type. We have certain design skills to bring to bear on these problems, but we do not have the financial resources to start such an endeavor. We leave that up to you, dear colleagues in the network. If you are interested by any of this, please let us know.

All read + comment.

SEP 14 1979

SPECULATIONS ON FACILITATING NETWORK STRUCTURES: BALANCING SOCIAL COHERENCE AND INDIVIDUAL LIBERTY

by

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August, 1979

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ABSTRACT

The network paradigm has been adopted in recent years by many groups interested in alternative social structures. This paper explores the values of these groups and shows how methods and concepts from social network analysis and cybernetics can be used to describe and facilitate the development of desirable network structures. It also explores manual and computer-based methods for the facilitation of ad hoc networks which balance self and societal interests in order to achieve social coherence without sacrificing individual liberty.

KEYWORDS: network facilitation, networking, computer-based networks, self-help networks, exchange networks, social change, social coherence

Networking is boring, and this seems self-serving and shallow to boot. I was unable to actually read it. I agree with the premise at analytic techniques might be useful for synthesis, but they'll have to be a bit realer than those presented.

-ef

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INTRODUCTION

These are times of rapid social change. Our concepts of self, family, and work are in flux; information doubles every ten years; and the microelectronics revolution is beginning to alter the ways we communicate, educate, govern, and ultimately think about ourselves. In the midst of this rapid change the network paradigm has emerged. In one manifestation hundreds of groups now use the term "network" to refer to their organizational alternative to traditional hierarchies. They suggest that "networking" constitutes an important alternative to a future dominated by an informed, electronically enabled and empowered elite. At the same time, the new academic field of social network analysis provides a novel perspective on social organization, emphasizing the role of the individual connections and interrelationships among people, not just their social classes or groupings. Is there any connection between these two manifestations? is "social network analysis" an explicit rebuttal to class analysis? ↑ no, it's an evasion ~~in a~~ could be late network analysis would become a class analysis.

In our own personal network, there are people who come from both of these groups. On one hand, those who are actively organizing and participating in "alternative" and social change networks (Johnson-Lenz 1978a) are coming to realize that the term "network" is generally being used too loosely, although they often hesitate to define the term with precision themselves. To this group "networking" is deliberately informal, ad hoc, and serendipitous, and as such would be done an injustice by being systematized. On the other hand, those actively developing the emerging science of social network analysis (Freeman 1977b; Wellman 1977) are often unaware of much of the grassroots networking activity. When they do see it, they are usually frustrated by the lack of clarity exhibited by (what appear to be) vague terminology and imprecise purpose.

Furthermore, in recent months several of the more reflective networkers have come to see that the lack of precision and explicitness is having negative impacts (Judge 1978), such as ineffectiveness and widespread co-optation of term "network," unanticipated in the attempt to avoid restrictive definitions. There is also an increased awareness of the need for open discussion of explicit network structures which would be most appropriate for realization of the social change objectives espoused, as well as heated debate on just what the best structures are (Arguelles 1978; Rossman 1979).

Meanwhile, during the past several years social network analysts have been developing precise definitions and measures of the centrality (or decentralism) of networks (Freeman 1977), models of roles and structural equivalence (Sailer 1979), methods for analyzing social dynamics and change (Doreian 1979b), applications of network theory and analysis to psychiatry and social work (Speck, 1974), and other work discussed below which may help resolve the debate over appropriate network structures.

It is our belief that specific, explicit social network structures can be found which, from the perspective of the network analysts, will provide a theoretical framework and measurable variables from which a scientific evaluation can be made of actual functioning networks. Furthermore, we believe these same structures may also provide network practitioners with an explicit, easily communicated model for the organization and facilitation of

alternative social networks which maximize individual freedom within a socially coherent structure, resilient in the face of massive social perturbation, and flexible enough to reconfigure in response to rapid change.

NETWORK FACILITATION FOR WHAT SORT OF SOCIAL CHANGE?

Society is beginning to change in ways that are only dimly perceived and understood. At the global level we are becoming more interconnected and more interdependent. At the individual level we now have more freedom than ever before in choosing our social arrangements (at least in post-industrial Western countries). The pervasiveness of these changes is bringing us to a point where our old models of society no longer tell us how to cope with most of what is going on. In order to determine what form our society should take to manage these changes, we must first consider some of the underlying trends which are bringing them about.

THE GLOBAL PERSPECTIVE: INTERCONNECTEDNESS AND INTERDEPENDENCE

The microelectronics revolution (Abelson and Hammond 1977; Noyce 1977) is beginning to alter our organizational and knowledge systems (Theobald 1979). In doing so it will simultaneously offer each of us increased access to vast stores of information (and its consequence, information overload), and the means to regulate the flow of information to whatever ends we decide. Suddenly, it is as if the long distances between us (in terms of space as well as language and point of view) are shrinking. It is beginning to be easy to connect with many other people directly via telephone, and soon via computer and other teleconferencing networks (Hiltz and Turoff, 1978). Our traditional means of organization will not be adequate to cope with these changes.

Simultaneously, we are discovering that we are living on a limited planet, and that in order to do so successfully, we must work within those limits and in cooperation with the natural life support systems and with other people as well. It seems that the emergence of this new interdependent awareness is occurring at the same time as the development of the microelectronics and telecommunications networks which support the communications and knowledge systems required to manage a highly complex and interdependent world. In one sense microelectronics technologies are evolving to meet the need for improved communication and organization, while on the other hand they are actually driving the dissemination and spread of this new awareness.

THE PERSONAL PERSPECTIVE: A CHANGING/DYNAMIC SOCIAL FABRIC

Traditional societies, even up to recent times, have changed very slowly. Furthermore the relationships among members of society were largely determined by circumstances of birth, rigid traditions, and social taboos. Much of this has changed in modern society, particularly during the last fifteen years. Now instead of fixed roles given to us at birth, we are moving into a time of multiple-career lives, new and varied family structures (Morgan 1978) and other novel forms of social organization (Freundlich, Collins and Wenig 1979). Where once we did not have to think much about what to do and whom to marry, we now have an overwhelming variety of options to choose from, and we are confronted with having to make more and more personal life decisions ourselves.

The combined impact of the "shrinking" globe and ever-increasing change in our interrelationships with others presents us with a challenge. How can society continue to function as a whole within such an incredible dynamic? In the past the rules for running society were relatively simple and fixed and everyone knew what s/he was supposed to do. Now, however, it is not only difficult to figure out what each individual should do, but the problem of trying to orchestrate the collectivity of individuals is staggering!

GRASSROOTS RESPONSE: THE NETWORK ALTERNATIVE

Curiously, just as this organizational problem is beginning to emerge into our awareness, potential solutions to it are being forged by a new breed of social change agent, the "networker" (Dosher 1976). Intensely aware of the need to offer people information and access to lifestyles that are positive alternatives and to other people who are living those new ways, networkers foster social change by linking and organizing people into networks which develop, evaluate, implement, and disseminate the alternatives. Some of these networks and networkers are interested in specific areas such as appropriate technology [1], holistic health [2], and neighborhood governance [3], as well as others interested in social change or the transformational process itself [4]. Recently some of them have begun to see how computer-based networking can enhance their effectiveness as well (Kleiner and Davis 1979; Johnson 1979).

INTEGRITY: THE BASIC VALUE

Our experience with these networkers (including ourselves) is that they are firmly rooted in one overarching value which guides their work and thinking: integrity. This includes integrity of the individual as well as integrity of the ecosystem/planet.

Traditional organizational hierarchies with power and authority at the top (e.g., armies, the Roman Catholic church, most corporations) enforce the integrity of the entire system, often at the expense of that of its members. On the other hand, if the integrity of individuals is assured by minimizing all authority structures, any social coherence that results will not destroy individual integrity, but rather being based on it will grow upwards from there with the full support of its participants. Networkers seem instinctively aware of this. They strongly resist any attempts by authority to control their efforts, or even in some cases to define and characterize them. They seem to know that as the old social fabric unravels in the wake of the massive changes we are beginning to witness, each of us must come to trust more than ever in our own personal integrity and capacity to choose for ourselves what our lives will be like.

One might ask in such a situation, how will anything get done? What is to keep society from getting so chaotic and disordered that nothing happens? What about societal integrity? These questions can be answered in several ways. First, if the networking is sufficiently well done, when people perceive a problem emerging, they can rapidly link with others and in that way orchestrate larger collective action. Second, whereas in the past there had been a frontier into which societal variety could expand without limit, this is no longer possible. Even though the limits of planet Earth do not in themselves assure integrity, they at least underline the ever-increasing need

to orchestrate our individual actions. Self-regulation and social cooperation must be fostered.

TOWARDS BALANCED INTEGRITY: SELF-RELIANCE AND INTERDEPENDENCE

Along with the notion of individual integrity we observe the following broad values at the heart of the networking movement:

> -- SELF-RELIANCE, both in terms of basic life support (food, shelter, energy, and health care), and in terms of organization (localism, neighborhood power, pluralism, democracy, and local ownership of tools and resources);
>
> -- INTERDEPENDENCE, both in a planetary/ecological sense and in the individual sense of favoring cooperation over competition, arbitration and conflict resolution rather than litigation, and participatory governance rather than inflexible dominance by a ruling elite;
>
> -- SELF-INTEREST, which assumes that people do their best when they are working in their own self-interest on things which they have chosen for themselves;
>
> -- COLLECTIVE INTEREST, which admits that there is a commons from which we must collectively allocate resources to the ultimate benefit of the greatest possible number of people.

At first glance, these values may seem to be in conflict: self-reliance with interdependence, and self-interest with collective interest. Yet from a broader perspective they can be seen as complementary opposites which when balanced together create a dynamic, workable whole. Any alone is an extreme. Excessive self-reliance and self-interest leads to isolationism and chaos. In order for society to work at all, there must be enough coherence among the parts of the social whole to allow enough interdependence to satisfy the collective interests as well. Excessive collective interest is damaging to the integrity and freedom of individuals. Society must be rooted in a respect for its members which then blossoms into healthy collective action among free people.

Collective interest & interdependence are seen as "necessary" but NOT really desirable for its own sake

CYBERNETICS: VARIETY MATCHING AND REGULATION

The ultimate purpose of network facilitation as we see it is to create a society which can manage the increasing flow of information and social choices while optimizing the balance among the above values. Ashby's Law of Requisite Variety (1961) states that the regulator of a system must be able to match the system's variety if it is to successfully regulate that system. Given that each of us as individuals has the capacity to process a limited amount of information, the only way we can imagine to match the emerging variety of society is to allow each of us to follow our amazingly diverse interests without intervention by others. In this way each of us can match a small piece of the variety which most interests us and with which we are most likely to work effectively. In this way self-interest and self-reliance may be the means whereby society matches its own variety.

Such variety matching is, however, only the preface to systemic regulation in Ashby's sense. If the entire system is to behave in an integrated way (even if only to support the self-interest, variety-matching mechanisms), there must be some coherence to the regulator. Thus, the purpose of network facilitation is also to manifest enough social coherence in purpose and behavior to assure integrity of the social system. The tendency for self-interest networks to become isolated from the larger societal context must be balanced. The overwhelming variety of society must be organized into small enough pieces for the human intellect to comprehend, and the larger context within which we find our collective selves must be made clear.

Therefore, from this cybernetic perspective, the purpose of network facilitation is first to regulate the increasing social variety by providing a mechanism for matching it with the variety of people's interests through tailored linkages. In doing so, people are given the opportunity to become more self-reliant and less dependent on some centralized authority for information and guidance. In addition, the purpose is to manifest a coherent social order in which the cumulative effect of these individual matchings and linkages creates an integrated regulation of the whole system. By increasing lateral linkages, society could become more decentralized and would be far more resilient and adaptive to rapid changes and reorganizations as well as to loss of parts of the network. Through coherence the integrity of the changing, adaptive system is maintained. Thus, the whole endures even while it changes.

SUMMARY OF PURPOSE

The purpose of network facilitation is to respond to the challenges of the future by creating a more dynamic and flexible social order in which people have the maximum opportunity to link and share with those with whom they desire to do so. As the traditional authority/hierarchy structures of society become more dysfunctional, there is a need to create alternative systems which are non-authoritarian and which provide unlimited access to potential linkages with others. In this sense all people are created equal and as such should have equal access to such opportunities.

At a societal level there is a need for dynamic structures which can rapidly facilitate the emergence of ad hoc groups (Toffler 1970) to identify and solve societal problems and which can ensure some measure of coherence and orchestration of all these individual ad hoc actions.

At the individual level, there is a need to provide people with access to information about alternative ways of living as well as access to people with whom they can link up to learn, share, work, solve problems, and support each other. The point is not necessarily to increase the sheer number of connections between people, but rather to make available a much wider range of potential associations to ensure a higher likelihood of developing the few actual associations which are vital and which meet perceived needs. Furthermore, the increased potential for association provides a resource which can support the rapid configuration of new links to meet new emergencies.

OBJECTIVES OF NETWORK FACILITATION

OBJECTIVES OF NETWORK FACILITATION AT THE INDIVIDUAL LEVEL

The basic objectives of network facilitation at the individual level are to increase individual liberty; to enhance self-reliance and self-esteem; to increase satisfaction with jobs, roles, and other matches and relationships; and to amplify the ability of individuals to link up into socially coherent organizations in order to take effective collective action.

The simplest way of characterizing the primary objective of such facilitation is to say that we seek to increase individual access to resources: people, information, tools, raw materials. At a finer level of detail this would include increased numbers of potential lateral links in an individual's network (lateral links connect equals and thus transcend traditional hierarchical limits). It does not necessarily mean that more links are desired, but rather that people can have a greater POTENTIAL variety of links to choose from. In fact, as the overall quality of links increases due to successful matching, the actual number of links might go down in some cases.

Traditionally individuals have had to maintain diffuse networks themselves if they wished to have increased POTENTIALS for linkage when needed. Mark Granovetter has shown that prospects for obtaining jobs are greatly improved if a person has a diverse network of people to whom s/he is only weakly tied -- not just close friends, relatives, or close business associates (Granovetter 1974). The objective is to provide people with such diffuse potential without their having to constantly maintain such weak ties or connections themselves. Even directories of people and resources would make this possible. Furthermore, it is not enough to give people such a potential for access and linkage just once. After they have established some relations with others, the potential must be kept available, thus providing a continued, dynamic, constantly changing networking process which can adapt to changing needs of whatever sort.

OBJECTIVES AT THE WHOLE NETWORK/WHOLE SYSTEM LEVEL

The basic objectives of network facilitation at the global level are to regulate society, manage change and adaptation to new circumstances, assure resilience of the structure, support the spread of innovations, and in all of these ensure the liberty and integrity of individuals.

CENTRALITY AND DECENTRALISM

In most discussions of alternative social structures the matter of hierarchical versus decentralized networks emerges as a key issue. In a way it is an important aspect since a hierarchical or centralized network is clearly not maximally open to the flow of information. However, the debate is misleading in that it leads one to conclude that the best alternative to a hierarchy is a completely decentralized network in which everyone is connected

directly to everyone else. In network terms this means there exists a 1-path (a path of one step in length) from every person to every other person. Clearly, particularly at a global level, this is absurd! To prevent total information overload some intermediaries must be added to the network to modulate the information flow. It is precisely this problem which may have engendered the evolution of hierarchies in the first place.

What seems to be needed is some balance between hierarchy at one extreme and complete interconnection at the other. In order to find some explicit expression of the point of balance some means for measuring the degree of centrality of networks is useful. Linton Freeman has written an excellent analysis of measures of the centrality of networks and has noted that there are at least two ways to look at centrality (1979a, 1979b). First, a person is considered to be central if s/he is as close to everyone as possible -- this is distance-based centrality. A central person has better access to more people than others in the network, since the distance between the central person and others is smaller. In this sense a network is decentralized if the distance between people is about the same, thus making everyone equally central. Second, a person is considered to be central if s/he controls the flow of information between others -- this is betweenness-based centrality. In this sense a network is maximally decentralized if the number of people controlling communication between others is minimized. Freeman goes on to show that both of these bases for centrality are rooted in a more general concept from which these may be derived, which he calls "local dependency" (1979c). This is the degree to which a person depends on another for communication with specific others (hence the use of the term "local").

In one form of hierarchical structure, a "star" network, everyone is connected to everyone else through one central node who controls all communication. In such a case the centrality (either by distance or betweenness) would be very high and the local dependency of each individual on that central node person would be maximized. In fact, in some cases the local dependency would be infinitely large since in some hierarchies access to certain others is impossible regardless of the number of intervening steps on the path. Another example of a hierarchical network is a "tree" or typical chain of command structure. On the other hand, a network which is totally decentralized would have a local dependency of zero in all cases since no one is dependent on anyone else for communication. In practice, the desired network structure would have a POTENTIAL local dependency of zero while having an ACTUAL local dependency of something greater than zero but less than that for a hierarchical structure.

It would seem that rather than having a situation in which we want to reduce centrality to close to zero, we actually have one in which we seek to find the optimal balance between centralism (and dependence) and decentralism (and liberty). Given that local dependency is not a characteristic of the network as a whole, but rather of the relationship of A to B via C (thus involving at least three people), there may well be some properties of the entire matrix of these values which may reflect the desired balance. Certain dependencies would be zero where direct linkages were currently needed to specific others. Other dependencies would be higher, representing "filters" and diversions of the information flow. Furthermore, as new, ad hoc sub-networks emerge these dependency values would change to reflect new network configurations.

Stafford Beer speaks of a similar problem and says, "There ought to be a computable function setting the degree of centralization consistent with

effectiveness and with freedom at every level of recursion." (1975). In spite of the mechanistic sound of this idea, we find intriguing Beer's feeling that there ought to be a specific way of defining and computing the exact balance point between information overload (and chaos) on one hand, and loss of freedom on the other.

What seems most desirable is a dynamic social structure in which there is no fixed center or set of centers controlling information exchange, but rather a constantly changing set of temporary central nodes which perform a variety of functions such as aggregating and disseminating information, switching, linking, and gatekeeping. The network can rapidly rearrange into a new configuration which continues to filter information to prevent overload and yet which optimizes the effective functioning of the network at any time. If the temporary centers become fixed, freedom AND adaptibility are lost in the resulting institutionalization. What gives it dynamism is the POTENTIAL for establishing direct links (1-paths) very quickly which did not exist before.

TENSEGRITY STRUCTURES

We have discussed the need for balance between self-reliance and interdependence as well as balance between liberty and effectiveness. Another way in which our desired social structure needs to be balanced is in terms of the forces moving through it. Anthony Judge notes that the "extremes of 'hierarchy' and 'network' organization are ... a complementarity pointing the way to an intermediary form of 'tensegrity organization.'" Judge bases his thinking on the work of Buckminster Fuller, whose concept of an architectural tensegrity is a structure which combines both compression members (columns, walls -- which contribute to the structure by resisting compression forces) and tension members (wires, cables -- which resist forces which tend to pull the structure apart) in a balanced and integrated design remarkably resistent to perturbation because it distributes the forces over the entire structure (Fuller 1975). Judge notes the "flabbiness" of most emerging social change networks and suggests that this is due to an overbalance of "tension" members -- linking up only with those who agree with one's point of view. He proposes facilitating networks to foster more integrated and holistic behavior and hence increased effectiveness by adding links which cut across lines of interest. In a recent paper, Judge proposes the design of "configurations of challenge and harmony" in which exchanges would be balanced between those with harmony (like interests and thus "tension" links in tensegrity jargon) and those with challenge (unlike perspectives which challenge thinking -- "compression" links) (Judge 1979). Unfortunately, the terms "tension" and "compression" have other connotations which make their use confusing, but the concepts are sound.

Judge's work suggests another explicit model for social organization in which the perspectives of different individuals are linked into a coherent whole. The whole is carefully balanced so that the forces which lead individuals to seek and work along preferred lines are complemented with challenges which invite individuals to perceive the larger context in which they are acting. Judge suggests that each individual perspective is characterized by a particular language or sub-language. He goes on to suggest that "it may even prove to be the case that a given TENSEGRITY is an isomorphic representation of a particular LATTICE of sub-linguistic systems which could characterize a particular pattern of functionally differentiated organization." (1979)

BLOCKMODELS

Another relatively recent development in social network theory and analysis is the concept of a blockmodel (White, Boorman and Breiger 1976). A blockmodel of a network is an analytic simplification of the network in which people are combined into blocks such that all people within a given block relate in highly similar ways to people in all other blocks. Thus, a blockmodel of a network reduces the network first to blocks of people with equivalent positions (structural equivalence) in the network and then shows the interconnections between those blocks. From the perspective of the network facilitator, one advantage in using a blockmodel of a network is that it does not describe the network in terms of individual ties but rather in terms of the interconnections among blocks of people, leaving the one-to-one connections between individuals up to random chance or personal choice. Thus, not all brokers communicate with all potential clients, but rather the brokers and clients can find partners with whom they feel comfortable without going outside the constraints of the blockmodel which says that brokers communicate with clients. Thus, from an entirely descriptive point of view the blockmodel provides a means of modeling social structure in terms of roles or positions without needing to describe the behavior of individuals. We imagine that tensegrity structures and computed balances of local dependency relationships would make more sense at a blockmodel level of aggregation than at the level of individual ties.

The work on blockmodels goes further than this, however. If a variety of ties are included in a blockmodel of a network, an algebra of the social structure can be developed which not only describes the blocks or roles, but also defines patterns of complex chains of these relationships. Consistent with classical sociological balance theory (Abelson and Rosenberg 1958) chains of paths from one block to another and to still others can be found which conform to the principle of balance in social organization (Boorman and White 1976).

For example, consider a network with two types of relationships: liking and antagonism. For purposes of discussion let us abbreviate these as L and A. Now, in the algebra of social roles, if person 1 likes person 2 who in turn likes person 3, we call that a L-L chain, or simply LL. Similarly, LA would represent a chain of 3 people with a liking bond followed by an antagonism bond. The algebra of roles (which is supported by analysis of networks using blockmodeling) suggests that the relationship between the first and third persons in such a 2-path chain can often be determined by knowing the bonds that make up each step on the 2-path. For example, if person 1 likes 2 who dislikes 3, we can assume (with common sense as well) that 1 would probably dislike 3 also. Thus, in mathematical terms LA = A (like-antagonism = antagonism). The principle of balance continues further to say that LL = L, that AA = L, and that AL = A. Thus, the symmetry (and balance) of the structure is revealed by the facts that two consecutively similar relations (LL or AA) yield a liking, whereas two different relations (LA or AL) yield an antagonism. Thus, the structure is balanced and the likes and dislikes propogate themselves throughout the social structure. Furthermore, through use of blockmodels, the interlocking and balancing of those relationships can be made explicit. The use of an analytic method such as blockmodeling may not capture some of the subtleties of relationships among people, but it can help make explicit some of the basic structure within a network.

Here we are beginning to address the richness of the social fabric which

includes many different types of relationships, all of which must somehow be integrated into a coherent whole. It may well be that specific blockmodel structures specifying challenge and harmony relationships in the proper balance can be proposed for network facilitation efforts, which nevertheless leave people free to pursue their own interests within that structure.

In the context of networking for social change, the roles of problem finders, problem solvers, brokers, linkers, (clients,) information resources, etc. are essential. It may be that the tools for defining explicit network structures can assist in the clarification of specific networking patterns. Recent work in the area of blockmodels has extended the thinking about roles and the algebra of social structure into the development of local role structures which may further clarify the matter. Since a broker may be a client as well, it would seem useful to have an explicit way of modeling such roles which are defined in a "local" sense with regard to specific others in the network.

but emphasis is on the actors?

or, transient

AGGREGATION I: LEVELS OF DECISION-MAKING

No matter how flexible the structure, the overwhelming variety of the many perspectives and problems of the entire world is simply too much to contain within a single decision-making system. Furthermore, for purposes of self-reliance and local control it is most appropriate to have most problems dealt with at the local level. Yet, some problems must be dealt with at larger levels of aggregation such as state, region, nation, or even planet. Another approach to this same problem comes from the fact that direct democratic participation breaks down if enough people are included. To have effective governance a representative process must be initiated simply to deal with the variety of points of view.

they need delegate / representative distinction

Athens?? ≠5,000

Johan Galtung has characterized this problem by referring to two kinds of social structures or networks (1979). In Galtung's lexicon an "alpha" structure is a traditional hierarchy where the authority makes the decisions. This is contrasted with the "beta" structure which is participatory and in which decisions are made by the entire group. Galtung thinks that the upper limit on the number of people in an effective "beta" structure is 500. His solution to the problem of including more than 500 people is what he calls a "beta of betas" in which representatives of the original "betas" come together in a "beta" of their own in which decisions are made for the entire system of "betas" while any decisions which can be made at the lower levels are handled there to avoid overloading the "beta of betas." It is interesting to note the extremely effective organization of the emerging anti-nuclear networks in the United States (e.g., the Clamshell Alliance, the Abalone Alliance, etc.) in which small "affinity groups" make their decisions by consensus. Each group has specific roles for which members volunteer or are elected, such as medic, peacemaker, or "spoke" (spokesperson), and there are "back-ups" for each role. Every three to four affinity groups elect one of their spokes to act as "DMB," representing them in the main Decision-Making Body -- a "beta of betas" process (Riegal and MacDonald 1977:18). This reflects both the principle of levels of aggregation and the notion of temporary, changing leadership or centers.

Stafford Beer coined the term "hierarchically recursive" to refer to a system with many levels of aggregation, all of which use the same repeated (or recursed) structure (1974). In Beer's thinking the problems which CAN be solved at a local level ARE solved there unless some aspects of the problem

exceed the capacity of that level, at which point the problem is brought to the attention of the next level up.

There is one final way in which the matter of levels of aggregation is relevant here. According to hierarchy theory (Pattee 1972, 1973; Galbraith 1973) a system can evolve more rapidly if linkages are made at sub-levels first by linking nodes together into sub-networks which are coherent themselves and then by linking these coherent sub-networks into a larger system, thus linking all elements together much more rapidly than linking them one by one. It would seem that such levels of aggregation do indeed constitute a type of hierarchy in the network. Again we see forces moving us away from the extreme situation of a totally decentralized network into one in which the relative centers are carefully organized so that they are supported by the individual integrities around them in order to create a more coherent whole. As long as the "representatives" in such a system are temporary and not entrenched there appears to be little danger of the hierarchy calcifying into a permanent, rigid one.

AGGREGATION II: LEVELS OF PROBLEM DEFINITION

In much the same way that levels of aggregation in a geographic sense are essential for the realization of social coherence, aggregation across levels of problems is also needed. Anthony Judge (1979) notes "that individuals exposed to a complex structure, whether existing or proposed, will tend to comprehend it in different ways and to different degrees." This is inevitable due to the natural variations among individuals. Not only that, but different people will be interested in different problems and at different levels -- some wanting to touch only lightly on a matter, while others want to study it in great depth. Thus, a social order must simultaneously provide people with opportunities to participate in the topic of interest and at the level of intensity they desire while also providing a means for making all this coherent.

The solution to this is based in part on the realization that an individual's perspective can be made explicit through the use of mental modeling techniques (Johnson-Lenz 1976). By analyzing and using these mental models, a facilitator can organize people into networks which connect them with people with whom they largely agree, while also challenging them with different perspectives on particular issues. Imagine the entire problem/issue space as a large network (Judge 1976) in which each person has a particular "place" which slightly overlaps that of his or her neighbor but does not touch at all the "places" of those who are far away in the problem network (far away in the sense of not sharing any interest or concerns). Rather than having discrete and unrelated nodes of people, what emerges is a rich overlay of overlapping realities which together cover the entire problem network, if all perspectives are represented by the participants. One can "travel" through this problem space by beginning with any specific personal perspective and then journeying on to one of its neighbors and from there on to another. "Travel" is thus possible in any direction and to any desired depth of detail (level of aggregation) without sacrificing continuity.

Here again we find the notion of chains of interconnected people and perspectives emerging to create a coherent whole. It is easy to imagine a tensegrity of harmony and challenge making up the surface of an imaginary problem sphere. It is also easy to begin thinking about chains of balanced relationships which form a whole: creators to editors to abstracters to

indexers to mappers to brokers to linkers to just plain folks for one; problem finders to linkers to resource people to linkers to problem solvers to action people to documenters and archivists for another. Now imagine a chain of interconnected people and perspectives, beginning with your own "place" and "traveling" in some interesting direction!

SUMMARY OF NETWORK FACILITATION OBJECTIVES

Before going on to specific methods of network facilitation, we would like to summarize the objectives of the facilitation of networks for social change as discussed above.

-- proper balance between complete interconnection (potential?) (decentralized network) and hierarchy (centralized network) as expressed in terms of the local dependency a node has with regard to its communications with specific others;

-- proper balance between harmony of perspective and challenge by different points of view as expressed in the notion of a tensegrity or the balanced roles of an algebra based on blockmodels;

-- proper balance between local control and global problem solving as expressed by the notion of a hierarchy of levels of aggregation;

-- proper balance between limited, individual perspectives and the need for a global perspective on problems.

In a word, it could all be summarized as balance.

METHODS FOR NETWORK FACILITATION

METHODS FOR NETWORK FACILITATION: VARIETY/INTEREST MATCHING

The simplest method for linking people with others with whom they can usefully exchange is keyword interest matching. During the last decade or so a wide variety of projects have used this technique to bring together people with common interests, skills to share, and needs to be satisfied. The method proceeds in several ways. The first approach is to ask people to describe themselves, their skills, needs, interests, or whatever by using keywords. Then lists are compiled of those using the same words. The lists may be given back to participants as lists or further organized into a resources or skills directory. A major problem with this approach is that people often use slightly different words for the same interest area. To avoid this problem, the networker may take a second approach and compile a list of keywords first, often in conjunction with a limited group of participants to assure the appropriateness of the list. The list is then given to participants in the form of a questionnaire on which they can indicate the words which express their interests. Often it is wise to include an option for people to specify their own keywords if the list is inadequate to describe their interests. A third approach which mixes the two is to allow people to use any words they like and then let a networker peruse the lists to combine words which express similar or compatible interests. More sophisticated variations of this approach include gathering additional information from participants beyond simple interests/skills/needs categories.

Keywords are just the beginning. Experienced networkers realize that finding two people who express interest in a given topic does not necessarily mean that these people will get along. Once the lists of those with similar interests have been compiled the real work begins. What is needed at this juncture is some way for those on the list to find out more about each other in order to determine if they want to pursue the potential relationship any further -- to see if there is any "resonance" between them. One approach we have used in our neighborhood was to invite those interested in similar things to a "get together" where informal discussions over coffee and cookies allowed people to meet and see if they wanted to do things together (Johnson-Lenz 1978b). Another approach used by several emerging networks is to use brokers or "weavers" (Smith 1979) to search the network files, find potential links, and help arrange the meeting of such strangers. Still another approach which is possible within a computer-based communications system is for people to enter messages under certain keywords and then exchange additional messages with others interested in the same area to become better acquainted (Emerson 1978).

Beyond simple keyword matching are a host of more complex matching processes. First, of course, patterns or combinations of keywords can be used in suggesting matches. Patterns can be selected to provide completely harmonious matches or a certain amount of challenge and contrast. People can indicate in which areas they seek harmony and in which they are willing to be challenged. Another similar approach is one we used in making explicit the variety of mental models about a particular topic of a group of people at a conference (Johnson-Lenz 1977b). Participants filled out questionnaires,

indicating their argreement or disagreement with statements about the relationships among various elements in a particular topic area. After analysis, the most common mental models were represented graphically and shown to participants for discussion and verification. We only went so far as to provide the group with feedback about the more common points of view on the issue at hand, but it would be easy to begin creating coalitions based on similar perspectives in essential areas (Johnson-Lenz 1976).

METHODS FOR VARIETY REGULATION AND FACILITATION OF SOCIAL COHERENCE

The methods for facilitating social coherence are more complex and varied than those for simple matching. The methods begin with linking individuals into larger network structures during the matching process. The linkage act itself lends structure (or at least suggests it) to the network. Matching by patterns also works with larger pieces than single interests alone and so possesses the potential for facilitating the perception of larger wholes.

In general anything which increases participants' perceptions of the shape and potential of the network within which they find themselves will facilitate coherence. According to recent work in cybernetics (Conant and Ashby 1970:89) the regulator of a system must contain a model of the system being regulated, if it is to be effective. Since society is appropriately modeled as a network of many interconnected regulators or "brains" (von Foerster 1972:1), each of which participates in the overall flow of information and each of which is dependent on the quality of information received in order to be effective, EACH MEMBER of a network must contain at least some meaningful, relevant portion of a model of the ENTIRE network if s/he is to participate in and amplify the regulatory capacity of the overall network.

A simple index of people by keywords which shows which interest categories exist and possibly how they might be interrelated (e.g., more general than, more specific than, equivalent to) gives people a chance to see more of what is available. This in turn leads to the exploration (following lines of natural interest) of new areas. If these areas are not just simple interest keywords but rather complexes and patterns of such interests they are in fact perspectives (or at least a meaningful portion of a person's perspective). If these perspectives are arranged to lead from one to another in an interesting, challenging, but not overly frustrating or meaningless way, then people may be encouraged to broaden their perspectives to include those of others. In this way understanding between people can begin to broaden out to an understanding of society as a whole; as society is understood by more and more people the behavior of people may become more coherent and effective. As Anthony Judge (1979) says, "It is the number [of perspectives] so mastered which is a truer measure of comprehension of the whole, not the apparent sophistication of the stage or level reached from some entry point dictated by circumstances."

TOOLS FOR NETWORK FACILITATION: MICROELECTRONICS AND TELECOMMUNICATIONS

Network facilitation, or networking, can be done with very simple tools available to most people, such as a card file, a telephone, and the mails. These are the tools used by most networkers. The next step up in sophistication is the use of keysort card systems, which mechanize the retrieval of cards for people with specific interests, and a regular

communications channel such as a newsletter.

However, as networks evolve and grow, these simpler methods tend to break down. Furthermore, what is really needed is a single information system which will support participant specification of keyword interests, an index of keywords, participant retrieval of lists of potential links, communication with others with whom one might link as well as with brokers and weavers, and some overarching processes to facilitate the emergence of social coherence. Computer-based networking is one answer. Some networking activities can be supported and facilitated by using a computer for storage and retrieval of information only. However, adding the communications facility, as in computerized conferencing or community memory or community bulletin board systems, makes much more possible.

Such computer-based networking consists of three basic elements: (1) a computer (with its files of interests, other information, and messages); (2) computer terminals in homes, offices, and community centers near participants; and (3) a telecommunications network to interconnect the terminals and the computer.

TELECOMMUNICATIONS NETWORKS

If the computer is in the same town as those using it via terminals, local telephone lines provide the interconnecting medium at virtually no cost. However, if the computer is in a different city (which is common with national and international networks), using the telephone system to connect to the computer is prohibitively expensive. The most common alternative in use today is a packet-switching telecommunications network. The Electronic Information Exchange System (EIES), a computerized conferencing system discussed below, uses the Telenet commercial packet-switching network to interconnect conferees in North America and Europe. Within the continental United States the cost of such a connection is only $3.75 per hour, which is considerably less expensive than the approximate $24 per hour cost of a transcontinental telephone call during the day. In a packet-switching network, packets (or individual lines) of data or text are sent between each terminal and the computer. Each line (packet) is sent by the best route, which may involve microwave or satellite transmission. Thus, a five-line message sent through the network would be transmitted one line at a time, with each line (potentially) going by a different route.

It is interesting to note that packet switching was originally designed as a telecommunications network able to withstand nuclear attack. Paul Baran, designer of the first such network, ARPANET, designed that network to be "robust" and to survive the destruction of some sections of it by making it redundant -- any particular message is sent several ways through several different channels at once. If the hardware at one node fails, the traffic will be automatically rerouted through an alternative path (Baran 1979). Such a design also provides the basis for a decentralized network in which messages are sent every which way rather than through some organized central processing facility.

A packet-switching network such as ARPANET or Telenet can also serve to interconnect a wide variety of computers and terminals in a network so rich as to defy government regulation. This is particularly true when individuals begin to link up their personal computers into networks which are truly beyond the reach of government comprehension. This is already beginning to happen

among computer hobbyists (Caulkins 1976; Wilber 1978). Baran suggests that such networks may be the base for a new transnational person-to-person exchange process. He says that "by undercutting the existing tariff structures for record traffic by bypassing government controls, we may be able to do more to create effective and international cooperation at the person-to-person level than all the grandiose institutions that have been tried in the past." (1979) Of course government regulation and intervention can affect the direction of the development of these networks by giving large corporations the legal advantage such as is happening in Japan and Europe (Toth and Mahn 1979). In the United States the Communications Act of 1934 is being rewritten to cope with the emergence of these and other new technologies. Much has been written about the negative impacts of premature regulation of an as yet only partially understood technology (Turoff and Hiltz 1977b). In any event, however, the age of computer networks is upon us and the emerging richness of this decentralized medium will most likely continue to defy anyone's description, understanding or effective regulation.

MICROCOMPUTERS AND MINICOMPUTERS

Having briefly touched on the matter of the interconnecting telecommunications networks, let us now turn our attention to the computers themselves. At one extreme are microcomputers which sell for anywhere from $500 to $10,000 and can be made from parts for much less [5]. A microcomputer can be used for networking in several ways. First it can contain a resource file with the names, addresses, phone numbers, keywords, self-descriptions, and other information from a network of people. Many groups are now using microcomputers for this purpose, including a large alternatives group in West Germany (the movement in truly international). Several times during the past three years we have used a computer to organize such information for our neighborhood association, including issues, problems, and lists of volunteers for everything from telephoning to starting a wood-buying co-op to baking cakes for the annual neighborhood fair (Johnson-Lenz 1977a, 1978b).

The second way that a microcomputer can be used is as a simple message system. In the last year, more than 30 Community Bulletin Board Systems (CBBS) have sprung up (Caulkins 1979). Each system is based on an inexpensive microcomputer to which one can be connected via telephone and computer terminal so that messages can be entered and retrieved. This is the beginning of a locally owned and controlled networking system that meets many of the needs outlined at the beginning of this section. Ultimately these microcomputer-based network nodes can be interconnected themselves through a packet-switching or other telecommunications network into a decentralized information exchange system totally owned by its users (Caulkins 1976; Wilber 1978).

The next step up from a microcomputer is a system based on a minicomputer or a cluster of microcomputers. A single microcomputer is not really powerful enough yet to support a full-blown computer conferencing system. The CBBS systems, for example, can only handle one person connected at a time, so the flow of information is limited in such a system. In order to realize the full potential of electronic messaging and computerized conferencing, a computer system capable of supporting many people on line at once is needed. Furthermore the kinds of perspective-stretching and mental-modeling processes described above need computing power and access to large databases, which is not possible on such small systems (Johnson-Lenz and Scher 1978).

obviously our explanations/publications are inadequate — we'll have to correct this. -SE

In late 1979, the Community Memory project (CM), will begin operation in San Francisco, providing low-cost community bulletin board and other exchange services to a particular neighborhood there. The design philosophy behind the Community Memory project is to make the system completely non-hierarchical and owned by its users (CM 1979). It is anticipated that a complete CM system with central computer (actually a cluster of microprocessors) and a dozen terminals will cost between $20,000 and $35,000 when fully developed. ($2,500 per terminal?)

The CM system will only use video terminals and will not support any activity beyond posting and retrieving messages by keyword. This simple design keeps costs down and assures a simple, easy-to-use exchange process in which people can enter messages under keywords and then exchange further messages with others interested in the same area. To provide an overview of the variety of messages in the system, keywords will be organized into a "word tree" which will put similar and related words into a more coherent structure. People will be allowed to use any keywords they choose, but "data shepherds" (to use a CM term) will come along to prune (shear?) and otherwise organize the keywords into the word tree for folks to use who are not aware of what is in the system.

many browsing features, including a "world tree"

I want a word tree, one specializing in verbs

COMPUTER CONFERENCING

To go beyond this simple interest-matching networking process into more varied and rich kinds of networking and coherence facilitation, a more powerful computer system is needed. At the moment there are a variety of computer conferencing systems supporting many different kinds of exchange processes. The one with which we are most familiar is EIES, the Electronic Information Exchange System, designed by Murray Turoff and located at the New Jersey Institute of Technology (Turoff and Hiltz 1977a). This system supports simple messaging (electronic mail) and conferencing (where a group exchanges messages on a particular topic and a full transcript of the discussion is kept). EIES also includes a directory of members with a special keyword interest feature for linking those with common interests. The computer hardware for EIES, capable of supporting from 600 to 900 users (up to 32 on line at once) costs about $100,000. Add to this the $35,000 needed for the software (computer programs to run it) and you have a system capable of linking a whole meta-network of neigborhood centers, community memories, and local microcomputers at a very low cost. In fact the largest cost of using such a system is for terminals, which range from $700 on up if purchased new. (The cost of terminals is not included in the $100,000 figure above.)

They seem to want to sell EIES systems.

The most powerful feature of EIES is that it is highly programmable. Using its high-level programming language, INTERACT, a programmer can rapidly create any of a wide variety of communications structures to meet the information exchange needs of a particular group. As we begin to experiment with the potentials of a system like EIES, we are finding that there are many different kinds of information exchange and networking processes which can be usefully automated. There is really no single system which will work in all situations and for all groups or networks. Different groups have different needs. In this regard we have coined the term "groupware" to refer to the integration of a group (its process, purpose, and mental model of the exchange system) with the computer software that supports its activities -- hence groupware (Johnson-Lenz 1979c). The term seems useful to remind us that the software is nothing without a group of motivated people who understand it and have a need to use it. Similarly, the group may have little coherence without an integrated process supported by the computer. This group coherence is a

form of collective intelligence in which the group can act synergetically -- better than the combined actions of the individuals. In discussing the design of computer conferencing systems and structured communications systems within them, Murray Turoff talks about the system becoming "intelligent and goal seeking" as it adapts to the needs of the user community and the users to it. He further states that "the ultimate goal [of such designs] is the creation of a life form." (Turoff 1979)

COMPUTER-BASED STRUCTURED COMMUNICATIONS: GROUPWARE

One interesting example of groupware is the LegiTech system which we designed (with C. H. Stevens) and implemented on EIES to help state legislative researchers exchange inquiries and responses on scientific and technical matters relating to pending legislation (Johnson-Lenz 1979a). This network also includes representatives from some federal agencies and other organizations acting as resource-reviewers. In LegiTech a researcher may pose a three-line question which is then sent to all participants. Upon receipt of the inquiry, each researcher has the option of selecting it or not. If the inquiry is selected, all subsequent responses and comments on that topic will be automatically delivered to the participant, whether they are entered into LegiTech immediately or several weeks later. If the inquiry is not selected, the participant will not be bothered again about that topic. In this way the LegiTech system protects its users from information overload by "filtering" the information flow to conform to their expressed tastes. Furthermore, members of the LegiTech network can find out who else has selected any given topics, and where more in-depth discussions are desired, spin-off conferences can be set up. For example, some LegiTech members are beginning a conference on EIES about hazardous waste management, in addition to their regular LegiTech activities. Thus, the LegiTech system provides tools for exchange and interest matching, all tailored to the specific needs and interests of its members.

From the point of view of tensegrity structures, the LegiTech system emphasizes "tension" members -- that is, there is a lot of linkage with those with similar interests and not very much challenge to one's perspective. In this sense LegiTech provides responses to specific questions, but the larger context in which the question is posed is seldom challenged. In contrast, the TOUR system, which we also designed (with Robert Theobald) and implemented on EIES, can be used in a way which emphasizes "compression" in the tensegrity sense -- challenges to one's point of view.

The first application of the TOUR system allows one to "tour" scenarios of alternative futures by interacting with a guide who asks what the "tourist" would like to do at each stop, after explaining the choices available. This automated futures tour also allows one to exchange comments with other tourists as well as participate in response and feedback exercises in which everyone who is interested may express opinions about a possible future. The group responses are updated and tallied and then displayed directly to each tourist who participates. This futures application of TOUR was developed to open up people's thinking about renewable resources issues and alternative futures and to provide them with ways of interacting with each other in order to learn and share perspectives (Johnson-Lenz 1979b). The futures tour is but one application of this system for arranging knowledge and information into a multi-dimensional, non-linear "hypertext" (Nelson 1967) network of intricately interrelated material. In the next few months we plan to extend its use into other areas. The key to the TOUR system is the arrangement of the material

into an interrelated and meaningful network where the text makes sense regardless of which paths are followed. The task of writing and arranging text in this way is still an art. The TOUR system also has the capacity for presenting challenges to participants at various stops. If one accepts a challenge, the tour is never the same!

The LegiTech system provides a communications structure for matching people with topics of concern, and the TOUR system can be used to present larger perspectives on a given issue. As more people using EIES have gained experience using these systems, the need has emerged for a structure which combines aspects of each of them. We are currently working on the design of a system which is very similar to LegiTech but does not contain some of its limitations. This new system, TOPICS, will allow for public, private, and by-invitation-only discussions. It will also provide a keyword index of topics, and members of any particular exchange within the system may choose to participate in as many topics as they wish. The first users of this system will be members of PoliTechs, a series of overlapping networks organized by Participation Systems Inc. (PSI), including LegiTech, ExecuTech, UrbanTech, and others. PSI also provides non-computer-based support to PoliTechs through Networkshops and a Networkbook (Stevens 1979).

In addition, TOPICS is being designed so that other structures like TOUR can be integrated into it. This later integration of tools for organizing the information which will be exchanged within TOPICS is very important. Without such organizing tools to provide coherence, the information in TOPICS would remain scattered and perhaps incomplete. The organizing tools make it possible to interrelate items into information or knowledge networks.

Furthermore, TOPICS is being designed to allow the creation of totally disjoint inquiry-response exchanges so that, consistent with hierarchy theory (Pattee 1972, 1973), self-contained sub-networks can evolve to maturity as network modules which can then be interlinked into a larger coherent system more effectively than if everyone were sharing a single exchange process.

COMPUTER-BASED NETWORKS: USING WHO-TO-WHOM DATA

Just as a computerized communications system is necessary to go beyond simple interest-matching networking processes, it is also very helpful for the collection and feedback of network data necessary for understanding and evaluating the network process. By collecting information about the relationships among people in a network and then sharing that information with network members, all those involved can begin to understand the shape and configuration of the network. Ideally such network information should go beyond data about who is related to whom to include measures of local dependency and other types of analysis so that network members can also see the power centers and information flows within the network. Two kinds of network data are commonly collected: who-to-whom data (e.g., who communicates/works/plays/etc. with whom) and person-by-interest data.

There are several examples of the collection and feedback of who-to-whom data via EIES. One group using the EIES computerized conferencing system has been social network analysts. The group was convened by Linton Freeman. As part of the evaluation of the social networks group's use of the system, Linton and Sue Freeman collected data about professional, friendship, and communications relationships among group members at several points during the project. The first round of data collection was conducted by means of an

on-line questionnaire. The second round was done by mail. Their analysis of the data showed that people really can communicate via computer and that such communication can be friendly and personal, too.

> "The results showed marked changes in linkage patterns between the first and second waves of data collection. More links were generated, participants got 'closer together' and initial patterns of stratification seemed to shift from less to more intimate relations. Not only did participants learn about one another and 'meet' via the computer, but they often developed affectual ties as well." (Freeman and Freeman 1979).

A version of the Freemans' paper was also made available on EIES, thus providing feedback to network members about changes in linkage patterns over time.

Another example of network data collection and feedback on EIES is the experiment conducted by H. Russell Bernard, Peter Killworth, and Lee Sailer to measure the accuracy of recall of who-to-whom communications. Previous experiments by Bernard and Killworth have suggested that people's answers to the question "with whom do you ----- ?" (e.g., communicate, work, etc.) are not particularly accurate when compared to their actual behavior (Bernard and Killworth 1977; Bernard, Killworth and Sailer 1979; Killworth and Bernard 1976, 1979). On EIES, participants in the experiment were asked to recall with whom they had exchanged messages during given periods of time. Their answers were then compared to the statistics on each participant's message traffic as kept by the system. The entire experiment on EIES was automated by use of procedures which we designed and implemented. The participants were also given access to feedback about their answers and their actual message statistics (which is one form of who-to-whom data) for all time periods about which they had already been interviewed. About half of them used this feedback feature to get information about their accuracy and to see with whom they had actually communicated.

This feedback feature has been redesigned and made generally available to EIES members. In its new form, any EIES member can get information about his or her message exchanges (to/from whom, how many messages, how many lines) during any specified period of time within the current message cycle. Such information gives each member a perspective on his or her communications network on EIES at any given time.

COMPUTER-BASED NETWORKS: USING PEOPLE-BY-INTERESTS DATA

While such who-to-whom information is very useful for understanding the structure of and information flows within a network, another kind of data is necessary for understanding interest matching and the development of issue or problem networks. People-by-interests or people-by-topics data shows who is interested in what and the degree of interest in or support for a given area. Within EIES, several routines are under development to collect such data. However, the purpose of the computer routines is not primarily for data collection; rather, the new interests index being added to the EIES membership directory is a simple interest-matching tool. Similarly, the TOPICS system described above is being developed to facilitate the exchange of information by topics.

To date there have not been any further uses made of this people-by-interests data for network facilitation on EIES, but such data has long been of interest to social network analysts who have developed a variety of techniques for analyzing this information to find larger patterns of interconnections and clusters of activity (Hubbell 1979; Doreian 1979a). These methods may provide the basis for feedback of network patterns to participants. Through mathematical manipulation of a people-by-interests matrix, it is possible to discover two kinds of groupings: (1) clusters of people who share a given interest or set of interests and (2) clusters of related interests. Providing information about people with common interests is helpful for starting projects, taking action, and getting people together as described earlier. Discovering interest clusters and working with those is a first step in developing information or knowledge coherence structures by noting closely related topics which may not be readily perceived as interconnected.

INTERCONNECTING KNOWLEDGE: AN IMAGINARY KNOWLEDGE SPHERE

Imagine a sphere. Now imagine all the world's knowledge arranged on the surface of the sphere, with highly similar areas or topics close together and with connections (lines) indicating relationships among areas of knowledge. (Of course knowledge is multi-dimensional and spherical geometry is limited, but this simple example is used because it is easy to visualize.) Each person's version of the knowledge sphere will be different, because each of us is aware of only some areas and connections while ignoring, rejecting, or being unaware of others.

Now imagine further that we begin with an empty sphere and then lay down on top of it the perceived "world view" of one person, then another, and so on until each person's limited model has been drawn on the sphere, showing what each is interested in and what connections are perceived by each person. The result would be a vast network of knowledge topics with the more popularly perceived interconnections highlighted within the fabric of all perceived relationships. However, this is only a snapshot -- a static view of the collectivity of people's perceptions and the relationships among them. The real process of perception, communication, and dissemination of information among people is dynamic. It is the people who impart the structure that exists at any particular moment.

As the amount of information and knowledge increases in society, it becomes essential -- for the sake of social coherence -- to arrange and distribute that information in such a way as to give people access at their own levels of interest and detail and yet to provide filtering mechanisms to avoid overload. Electronic storage, retrieval, indexing, arrangement, filtering, and manipulation of information will play a large part in this, but there are many heuristic, psychological, sociological, political, and technical problems yet to be solved.

People come and go in a knowledge or topic network as their interests and attitudes change. So, rather than developing tensegrity structures which balance harmony and challenge relationships among people, it may be more appropriate to balance such relationships among topics. Thus, people would be completely free to explore the knowledge sphere, following paths suggested by others or by self-interest. In this way it might be possible to orchestrate a coherent social structure by arranging the interconnections of knowledge topics into structures far greater in scope than any single person's mental

model, while still leaving people free to pursue their own interests.

SUMMARY OF NETWORK FACILITATION METHODS

The simplest form of network facilitation is keyword interest matching, which is used to link people with common or complementary interests. Since this method provides only an approximate, first-cut match, it is often helpful to use patterns or profiles of interests and other information. Furthermore, the interpersonal "chemistry" or "resonance" between people is very important in getting them to act together, and this aspect cannot be included easily in a network database. Some provision for face-to-face meetings or other methods of informal communication allows people to see if the proposed match is a good one.

Computer-based networking provides a network facilitator and network members with very useful tools for networking, all within one medium. The computer can be used to maintain lists and other information about people in the network. It can also serve as a communications medium for network members. With the addition of tools to analyze the network data and share it with network members, a computer-based networking system offers capabilities that are not available in any other form.

The variety that is emerging must be matched if we are to regulate it as a society. There is no single computer system, networking process, network group, or exchange system that will be equal to this overwhelming task. Rather, what we see are meta-networks of many networks, each using their own keywords and processes, each working toward their own purposes. These meta-networks will not use a single hardware network or computer system, but rather will emerge naturally out of the variety of Community Bulletin Board Systems, Community Memories, Electronic Information Exchange Systems, etc., and the host of interconnecting systems such as Telenet, PCNET, and others. They will gain their strength and resilience from the sheer variety, redundancy, and flexibility of all the sub-systems from which they arise. This is what we see as the only viable, liberating alternative to the large corporately owned and controlled systems which are now being designed and tested (Black 1978; Fedida 1977).

However, computer-based networking is NOT magic. It will not in and of itself bring about the social transformation we seek. Rather, it can help to facilitate the emergence of transformational networks, IF people are aware of the need for change and IF they are willing to participate. One of the central principles of groupware design is that the system can only satisfy the perceived needs that are articulated by the group. Any computer system must serve the group rather than the other way around.

CONCLUSION

We began with a discussion of why we and our fellow networkers think that social change is necessary, as well as with some idea of what that change should consist of: greater individual integrity and liberty balanced with a more coherent relationship with others and with the ecosystem of the planet. These values, rooted in individual and global integrity, are essential (1) if we are to negotiate our way through the social upheaval that began in the sixties and will extend well into the next century, and (2) if the network facilitation strategies are to work at all. This built-in limitation on the effectiveness of our strategies exists because there is no way, from our perspective, to facilitate people into greater liberty and cooperation unless they want to move in those directions. We simply cannot facilitate people into greater integrity by violating their personal integrity in the first place. This would clearly be a conflict of means and ends.

Within these safety limits then, there are definite strategies for network facilitation both at the individual level (variety and interest matching) and at the network level (balance, aggregation, feedback). Experiments over the last few years have shown that these methods do work, although there are no guarantees, since their effectiveness is limited by the perceived needs of the participants.

Computer-based networking offers great promise as a medium through which further research and experimentation in the development of network facilitation strategies can take place. First of all, computerized communications systems seem to be an ideal medium through which people can find new linkages as well as feedback about the networks within which they find themselves. Next the emergence of networking roles can be supported in such computer-based systems through the thoughtful design and implementation of groupware to meet perceived needs.

Furthermore, these systems by their very nature provide a medium in which action-oriented applied research can be conducted. By working in cooperation with consenting networks, network analysts and networkers can simultaneously facilitate and participate in network experiments, thus learning from functioning networks by applying the newly developed tools of network analysis as suggested above. Rather than the traditional experimental method with its practical limits and dependence on the objectivity of the observer, the inherent complexity of social networks demands a more participatory and dynamic collaboration of researchers, practitioners, and network members. This is consistent with the principle of second order cybernetics (Umpleby 1976) in social research and with the principles of integrity and equality espoused in this paper.

It is our hope that these seminal methods and approaches can be clarified and developed in the years to come, and that a mature, explicit, mathematically grounded theory of networks can be formulated, tested, and then used by varieties of formal and informal networks to enhance their action and interaction. We believe that these methods may help bring about increased personal liberty and social coherence in a rapidly changing world.

NOTES

[1] TRANET, Transnational Network for Appropriate/Alternative Technologies

[2] Hawaii Health Net; National Women's Health Network

[3] National Self-Help Resource Center's Community Resource Centers Network

[4] Linkage convened by Robert Theobald; The Evolutionary Network, coordinated by the Renascence Library; The Denver Open Network

[5] You might be interested to note that we are using a microcomputer in our home/office to compose and edit this paper and then transmit it via Telenet to EIES, where it will be available to friends and colleagues for comment and discussion.

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NEIGHBORHOOD ORGANIZATIONS AND RESOURCE DEPENDENCY: THE ESTABLISHMENT IN THE NEIGHBORHOOD

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One of the movements stimulated by the political and social environment that arose from Lyndon Johnson's "Great Society" was a nationwide drive by neighborhood activists for "community control" over the administration of government services and economic development at the sub-local level. This movement, according to Alan A. Altshuler, came about due to "demands by groups that traditionally had little power...in the shaping of policies that vitally affect their lives."[1] While Altshuler concerned himself primarily with blacks and hispanics, it should be pointed out that this movement spread far beyond minority communities.[2] In any event, this drive lead to responses by government, Corporate America, and the philanthropic community that resulted in the formation of a large number of neighborhood organizations and governmental units[3] designed to channel neighborhood participation into mainstream political processes.

However, we today find that many of the radical community organizations of the 1960s have long ceased to function. Others, while functioning, have not met the original expectations of the communities they serve; and now, feeling the full brunt of the Reagan administration's budget cuts, these groups face the prospect of closure or limping along until new funding sources[4] can be tapped. In short, community organization and decentralization of government services, proposed during the 1960s as a method of encouraging political participation, faces final extinction in the 1980s as it drops through the holes in the "safety net" to oblivion.

Yet, while the temptation exists to blame Reaganomics for the demise of the movement, doing so would be to give credit where credit is not due. Rather, "neighborhood government," "community control," "community development," or whatever you choose to call it was in its death throes long before January 20, 1981. It is my contention that the original spark behind this effort was snuffed out because despite the movement's impassioned rhetoric, it possessed little else. The resources needed to transform words into reality (money, technical expertise, political legitimacy and/

influence) were possessed not by the neighborhoods (if this had been the case there would have been little need to organize), but by powerful institutions and individuals outside the neighborhood. In choosing to obtain resources from these power centers (government, corporations, foundations, etc.), neighborhood activists placed themselves at the mercy of their benefactors. In retrospect, we can see that in those cases where the interests of the activists conflicted with those of the benefactors, the benefaction was often withdrawn. Therefore, to maintain the organization, the neighborhood leaders either chose to modify their agendas (or permitted their donors to do so) or go out of business--in both cases, leaving their original goals unfulfilled.

Before explaining this thesis fully, I wish to briefly discuss the metropolitan establishments that possessed the resources needed by neighborhood groups; a definition of neighborhoods and neighborhood control; the development of community organizations during the 1960s and 1970s; the resource needs of these groups, their access to these resources, and the consequences of their decisions to seek resources from the establishment. Finally, I will present some possible actions available to neighborhood activists seeking to rekindle their movement.

THE METROPOLITAN ESTABLISHMENT

According to Gross and Kraus, the metropolitan establishment "is a divided, multilevel, partly informal, highly complicated complex of complexes that debates, makes, adjusts, and carries out major decisions in America's metropolitan areas."[5] Though fragmented, Gross and Kraus contend that the control, by establishment factions, of politically critical resources has made it possible for these networks to function as "central guidance systems" within their metropolitan regions.

Members of these networks include public officials, corporate managers their super-rich bosses, and officials from the non-profit sector. On lo-

wer levels one finds union leaders, party machines, bureaucrats and technocrats. While all have different functions, status, and interests within the continuous conflict from which the decisions emerge, all found themselves targets of the "community control" movement. Police brutality, unfair welfare and taxation policies, urban renewal, and school operations were just a few of the establishment-oriented policies that served as focal points for anti-establishment actors during the 1960s.

Yet, though attacked, it is my contention that the elements of the networks decided that the best way to beat the neighborhood control movement was to support it. This strategy, as I will demonstrate, was more effective in neutralizing these anti-establishment efforts than any confrontational strategy could have possibly been. The groups were provided with enough rope to hang themselves. Once they obtained their resources from the establishment network, their original anti-establishment strategies became "non-productive." As a result, they adopted less militant objectives and methods, and therefore helped extend downward into the community the dominance of the metropolitan establishment networks.

NEIGHBORHOODS: WHAT THEY ARE AND WHO CONTROLS THEM?

There have been countless definitions of the term neighborhood. However, there are a number of common points that can be noted.

First, neighborhoods tend to be homogeneous in social class, i.e., poor, middle, and upper class people tend to cluster together. Indeed, social scientists have tended to dismiss neighborhoods where a comingling of classes is taking place--these areas are described as being in a state of "transition," i.e., changing in class make-up from one class to another.

Second, that neighborhoods are defined by municipal governments as service units for such city services as police and fire protection, recreation centers, neighborhood city halls; or through geography as the result of natural (rivers, hills, etc.) or artificial (freeways, highways, etc.)

boundaries. Other definers of neighborhoods include: voluntary citizens organizations (through their definition of their "service area" or area of interest); church bureaucracies (through the establishment of parishes); the news media (through their recognition of neighborhoods in news reports); and individuals who recall neighborhood "folklore" and/or the neighborhood's past as an independent city.[6]

Third, that neighborhoods do not exist in vacuums. They are part of the larger city and metropolis. Indeed, one must understand that neighborhoods are "open systems." That is, people, institutions, and resources are constantly being inserted and withdrawn from communities. Decisions concerning a neighborhood are often not made in those neighborhoods but in a corporate headquarters or government office "downtown" or perhaps even clear across the country. While communities may serve as psychological and/or sociological symbols for their inhabitants, they have served far more tangible purposes for governments and other factions within the metropolitan establishment.

Decentralization, demanded by activists for the purpose of dispersing power, has long been utilized as a centralizing force by the establishment. Some local services, such as police, library, and recreational programs, have traditionally been organized on a decentralized basis. In the private sector, such organization is also quite common.[7] However, this brand of decentralization has been undertaken largely for reasons of efficiency and convenience, with no input by neighborhoods visavis policy or personnel.[8] This administrative decentralization has worked to centralize power while ignoring community demands concerning the nature and level of services.

The decision-making decentralization advocated by the activists was of a far different nature. Their meaning of decentralization included control by community residents over decision-making (as well as participation

in implementation). As for the question of who these activists were, they were often community leaders (ministers, teachers, social workers) and organizations (notably churches) who "self-selected" themselves to speak and act for the community.[9] In seeking control, they attempted to confront external forces that they perceived as being "in control" of their neighborhoods.

NEIGHBORHOOD ORGANIZATION

According to John J. Harrigan, the urban decentralization movement has passed through three distinct stages: community action and model cities during the 1960s; community control movements during the late 1960s and early 1970s; and the neighborhood revitalization movement of the late 1970s.[10]

The Community Action Program (CAP) was created by the Economic Opportunity Act of 1964. Its' stated objectives were three-fold: improvement of public services to the poor; coordination of public and private resources in the "War on Poverty"; and involvement of the poor in the implementation of the anti-poverty programs. Later, the Federal Government would create a Model Cities Program,[11] to provide comprehensive service and planning coordination to targeted demonstration areas. This program differed from CAP in that Model Cities was limited to 150 cities (CAPs were operating in over 1,000) and that Model Cities, unlike CAP, was tied to local governments that, as we shall soon see, were not always pleased by the actions of the CAPs (or CAAs)[12] functioning in their jurisdictions.

The second phase, the community control period, emphasized efforts by community groups to gain political control over the delivery of services in their communities. In many cities, notably Boston,[13] New York, Houston, and Baltimore,[14] the response of the city administration to these demands for community control was to set up "Little City Halls" in local neighborhoods. These government outposts operated primarily as complaint centers--and were labeled, in some cases, as being nothing more

than political clubhouses employing supporters of the Mayor in efforts to mobilize popular support on behalf of his political ambitions.[15]

Only in the field of public education were some community activists able to make some headway in obtaining "community control." State Legislatures enacted legislation decentralizing the public school systems in Detroit and New York City. In both cases, decentralization had been advocated by minority activists seeking to improve their neighborhood schools which they believed were being ignored and neglected by unsympathetic central boards of education. However, in examining the outcomes of decentralization we find that the academic attainments of minority youth have not drastically improved;[16] and that the community boards, even in minority and working class areas, are dominated by middle-class professional, technical, and managerial class members.[17] In Harrigan's opinion, "local control...has not worked out to the advantage of blacks in either New York or Detroit."[18]

The third, and most recent phase in community organization has emphasized "Community Development." As defined by Peter DeSautoy, a writer on community development in underdeveloped nations, "Community development is improving the conditions of community life...through the organization of self-help" efforts.[19] The most common device for this has been the community development corporation(CDC).[20]

The stated objective of CDCs has usually been to expand the economic and educational opportunities of neighborhood residents.[21] While each community has special problems, common purposes of CDCs in poorer communities have been to increase property ownership by the poor, improving their health and living conditions, increasing their personal independence, expanding their opportunities for self-direction, and enhancing the economic development and stability of the neighborhood.[22]

This latter point was highlighted by Geoffrey Faux, who wrote that

> Individual entrepreneurs are not equipped to cope with the political nature of ghetto programs....A community organization with broad based political ties is in a much better position to overcome the political obstacles to development....Further, in contrast to individuals, community organizations are in a position to get the subsidies necessary for initial economic projects. [23]

However, while CDCs may have community orientations, they are often controlled by a small "leadership" corps, with professional managers wielding excessive amounts of control over neighborhood people working in subordinate positions. The result of this power concentration, according to Case and Hunnius, is "that workers on the job are effectively disenfranchised from controlling their own institution. The ideal of democracy is thus inevitably compromised."[24] In short, through this organizational form, attacks on the "power structures" can be sidetracked, discredited, and deflected as the corporation is transformed from a dynamic community oriented force into just another employer for the community residents who begin to regard the CDC as just another employer.

Other efforts to involve community people in government include the 1975 revisions to the New York City Charter that strengthened the Community Planning Boards. While it is still to early to determine the long-term direction of these boards, some strong and weak points are already apparent. On the plus side, the Boards have been able, in some instances, to use their advisory powers to modify or sidetrack bad policies.[25] In the negative, the Boards have tended towards parochialism and have often fought each other over crumbs while the meat of the pie was doled out

elsewhere. Only in a few cases have the Boards coalesced to defeat measures of city-wide importance.[26]

In short, the efforts described, were not entirely successful in bringing community groups into the political process. This was due not to a lack of effort but to the relative accessibility of politically critical resources.

RESOURCE AVAILABILITY

In every attempt at community organization, organizers find that they need certain resources to have any hope of success. For example, the leadership of the Bedford-Stuyvesant Restoration Corporation (a CDC) concluded that they key to many of the community's problems was the outflow of capital. Their goal became to attract capital into the community.[27]

Capital was not the only resource required by these grass-roots movements. Political legitimacy, technical expertise, media coverage, to name but a few of these resources, were all beyond their control. In their search for resources, community activists found that the most likely benefactors would be government agencies; foundations; corporations and wealthy individuals--all components of the aforementioned establishment networks that had also been the primary roadblocks to community determination and participation. The support offered by these donors came in the form of monetary grants; low and no-interest loans; free office space and equipment; statutory delegations of authority; and technical "assistance." Ostensibly, these resource grants were made available by donors to encourage community participation. In practice, one finds that the

donors could, if their interests were at stake, effectively control the participation of these new groups by modifying the terms of the benefaction.

The Community Action Program set the pattern for withdrawal or modification of resources available to maverick groups. Section 202 of the Economic Opportunity Act mandated that the local CAPs be "developed, conducted, and administered with the maximum feasible participation" of the community. Although this provision had been virtually overlooked throughout the legislative process,[28] its implementation did become a bone of contention between OEO, the poor and their allies within their communities, and the metropolitan establishment networks.

The Federal Office of Economic Opportunity (OEO) was initially given a great deal of latitude in defining what "maximum feasible participation" meant. At first, the agency offered a liberal (if not radical) interpretation, as illustrated by the first manual for local program administrators which noted that a "promising method" of implementieg maximum feasible participation was "to assist the poor in developing autonomous and self-managed organizations which are competent to exert political interest on behalf of their own self interest."[29] A companion program guide exhorted local administrators to involve the poor in all aspects of the program.[30]

Needless to say, big city mayors, who had viewed the program as a new source of Federal funds, were angered by first, being bypassed in the distribution process; and, as if to add salt to their wounds, find the money being used to mobilize the poor against city hall and its estab-

lishment allies. Testifying before the House Committee on Education and Labor, New York's Mayor, Robert F. Wagner, said that local governments "should have the ultimate authority... for the conduct and operation of the antipoverty program."[31]

Wagner was not alone. Pressure from other Mayors, local politicians, and members of Congress forced OEO to backpeddle on "maximum feasible participation." In October, 1965, less than a year after the publication of the controversial Workbook, OEO refused to renew the funding of a militant project in Syracuse, New York.[32] Later, the agency would redefine maximum feasible participation to mean the representation of the poor on policy boards--setting aside, at first, one-third, and then, one-fourth of the seats on the boards for the poor.[33] By early 1966, Agency head Sargent Shriver offered a new interpretation of maximum feasible participation, stating,

> There is no requirement in this statute that a person be too poor to serve on a Community Action Committee....You don't have to be poor to fulfill the statute and we are not trying to get poor people as such.[34]

Congess would later legislate to limit the power of the poor and CAPs. The "Green Amendment," enacted in 1967, curbed the authority of the local agencies and increased local government control over the heretofore autonomous organizations. As a result, the Community Action Programs, which had once mobilized the poor against the agents of the local established networks, were now diverted towards concentrating on the less politically-explosive issue of service delivery.[35] With the final withdrawal of Federal funds in 1974, CAPs grew more dependent on the local governments they had once battled, leading Harrigan to conclude that "CAAs now function more as an

arm of city hall rather than as an independent political organization for the poor."[36] Later Federal programs, such as "Model Cities" and the Housing and Community Development Act of 1974, did not contain provisions mandating maximum feasible participation.

Financial support from foundations has also been linked to "good behavior" on the part of the recipient.[37] For example, the Ford Foundation, during the 1960s, underwrote a small number of demonstration community school districts in New York City. However, when the boards went too far, challenging the Central Board of Education and the teacher's union, Ford pulled out. While perhaps the most controversial incident, the case of foundations withdrawing support when those they bankroll challenged the status quo was not uncommon.

The aforementioned school board controversy did result in the limited decentralization of the New York City public school system. Unfortunately, advocates of community control were to be disappointed by the results of this transfer of legitimacy from the Central Board to the neighborhood. Fantini and Gittell point out that the local boards, under the 1969 statutes, lacked effective control over budget, personnel, and programs.[38] Furthermore, in each of the school board elections held, turnout has been light and the boards have been dominated not by community activists opposed to the status quo, but by individuals affiliated with local political clubhouses, religious organizations, the teacher's union, and other municipal unions. Finally, it should be pointed out that the decentralization law permits the Citywide Schools Chancellor, under a number of circumstances, to suspend the

local boards--a power that the Chancellors have not overlooked.[39]

Technical expertise is another resource that most community groups have had to obtain from outside sources. Some of this help has come from corporations loaning personnel to the community group. On other ocassions, groups have been required to hire "experts" selected by their benefactors. For example, all prospective employees of one neighborhood community development corporation were required to report to Morgan Guaranty Trust where they were interviewed by bank staff and then fingerprinted. Why? Because the bank was underwriting the group and believed that they should select the administrative staff of the program.[40] From personal experience, I can say that when I was hired as the editor of a Merchant's Association newsletter in Brooklyn, I was hired not by the Association, but by a staff member of Citibank who, as "liasion" to the association, was also responsible for selecting the stories that would appear in the newsletter (By the way, in my time with this newsletter, I never met the President of the Association or any of the Board members).

Even when groups are permitted to select their staff, their hiring pool does not often include people from within the neighborhood. This is because many of the affected neighborhoods lack the administrators, lawyers, planners, and others needed to manage such groups. Cromwell and Merrill estimated that 550 to 775 thousand new black managers would be needed to give blacks ownership representative to their percentage of the population.[41] Even where there has been community-based management, Panarese points out that

> Top managers...had to reach out beyond the ghetto for technical assistance. The Watts area managers reached back to major established businesses where they had been previously employed or from where they had received financial assistance...The established businesses that made financial investments actually developed slight partnerships with GECs (In some instances, they even participated in the selection of those who would serve as founders of GECs). 42

Panarese then points out the obvious: that group managers are faced with conflicting pressures; such as "the demands of outside technical advisors and the more "political" demands arising from the community."[43] Case and Hunnius take this further, asking "Who controls the experts?"[44] In many cases, the experts end up running the show--with "community residents" working as hired hands (making them subservient to the managers and experts they supposedly employ) in community-sponsored projects.

The examples cited are not isolated but are symptomatic of a problem facing all community-based organizations. The lack of resources makes them dependent--upon governments, corporations, foundations, and technocrats, whose interests often clash with those of the community.

THE CONSEQUENCES OF DEPENDENCY

The resource dependency of most community groups is a concrete problem that had confronted virtually every neighborhood organization in its nascent stages. While agendas stressing "community control" or other values may be developed internally, obtaining the resources needed to make this agendas reality usually requires groups to go outside their community. Selznick finds that in such cases, groups may allow themselves to be co-opted since "individuals upon whom the group is dependent for funds or other resources may insist upon and receive

a share in the determination of policy." This is important since establishment agents, that do possess the needed resources, are not anxious to see these resources directed against their interests.

In short, dependency requires the modification of one's agenda to meet the requirements laid down by the benefactor. In the case of some community groups, it has meant scaling down their goals on their own, or allowing their donors to do it for them. In a study of neighborhood organizations, Stephen Weissman found that, "In general, neighborhood mobilization strategies for social change fail to reckon with the overwhelming constraints imposed by the external urban environment."[46] This environment contains the donors, and the resources, that these groups depend upon.

So, to maintain their resources, groups moderated their objectives. If not, they could meet a fate similar to OEO programs in Syracuse, San Francisco, and Mississippi--programs that mobilized the poor against government and business interests. In each case, termination was threatened if these radical activities did not cease. The choice became clear: modify the agenda or face destruction. In any event, the original thrust of many groups was blunted. Demands for control were transformed into requests for "input" into the decision-making process; program management was transformed into program monitoring; and maximum feasible participation became the receipt of benefits--benefits that could be turned on and off by the powers that be.

CONCLUSIONS

The community control movement that began in the 1960s

was handicapped from the very beginning. This was because th resources needed to make the movement's goals a reality were beyond the control of the neighborhood activists. By turning, in many cases, to the established powers--those who had caused the inequity in the first place--community activists either lost control (as in the case of the New York school boards, where activists were defeated by better organized groups), gave up control (as in the aforementioned cases of personnel selection by Morgan Bank and Citibank), or moderated their agenda (for example, OEO and the CAAs) in order to maintain resources. In any event, many of the original objectives of the militant groups of the 1960s were not fulfilled--either through outright failure (as a result of a lack of resources) or due to moderation (to obtain and maintain resources).

The real winners in the war for community control were the elements of the metropolitan power structures: governments at the local level, corporations, foundations, and non-profit organizations. These power centers were not only responsible for many of the ills cited by the community activists, but as a result of their control over critical resources, were able to regulate (and win) many of the battles waged against them. In the end, community control, maximum feasible participation, and decentralization were carried out not according to the plans of the neighborhoods, but implemented under the direction of the members of the metropolitan establishment. By the late 1970s, Norman and Susan Fainstein were able to write that events had validated "the criticisms by radicals that it (community control) is a moderate--a cooptive strategy."[47]

What can be learned from the attempts at neighborhood organization during the 'sixties?

First, that the activists' need to obtain resources to attain their objectives forced them to seek assistance from outside their communities. Often, they sought aid from government; the private-sector; and/or from the not-for-profit sector--the very factions that were often the targets of the neighborhood groups.

Second, that the establishment response to community control efforts was not one of confrontation. Rather, by choosing to support these community efforts, the donors were able, eventually, to control their direction and intensity; thereby preventing these groups from becoming serious threats to the status quo.

Third, that the neighborhood movements not only lacked resources,[48] but due to the social fragmentation of urban America, they were isolated from each other. Therefore, groups could not unite and/or pool resources and, eventually, fight each other for the crumbs offered by the establishment network.

The question then becomes, "How can neighborhood groups succeed during the eighties after many of the derailments of the sixties and seventies?"

First, for these movements to be successful, neighborhoods must be willing to draw on the extensive resources already available <u>within</u> their communities.[49] Granted, some sort of external aid may always be needed, but it should be of a supplemental nature. The inability to utilize internal resources resulted in the resource dependency that led to the destruction of many of the more radical groups of the 1960s and 1970s; and now, with substantial reductions in Federal social programming, many of the more moderate groups have bit the dust.[50] The mistake of these groups has been to regard "external aid" (whether it be money, technical expertise, managers, or political leaders) as the primary source

of aid. Maximization of internal resources could make groups less dependent and permit them to withstand attacks by external forces-something they cannot now do very well.

Another task facing the new community leaders is to forge l links with similar movements in their cities and across the country. These groups must understand that the parochialism (often encouraged by the establishment network)usually associated with community movements is not in their best interests. Neighborhoods are "open systems;" resources move in and are withdrawn and policies affecting neighborhoods can be made hundred (if not thousands) of miles away. It is in such an environment that communities can be played off against one another as elements of the establishment seek to divide and conquer. To avoid this scenario, community groups should form "networks" with like groups. This not only helps them avoid the pitfalls of parochialism, but sets the stage for resource pooling and coalition building--both of which must take place to give the movement any chance of succeeding . This will not be easy. Many communities still lack resources (or the ability to pool what they have). They will also be confronted by a hostile "external" environment--government, corporations, foundations, and others who will see these new organizations (especially those who reject co-optation) as threats to the status quo. While these power centers can throw tremendous obstacles in the path of any new movement, the cause is by no means hopeless.

Finally, if neighborhood activists are to have any real impact they must enter two fields they have heretofore avoided: communications and partisan politics.

Much is being written about the demise of large metropolitan newspapers and the resultant effect on the public's ability to

know. While the major dailies have never done a good job of covering "communities," Television does even less. While demonstrations may get the community group some "film at eleven," the kind of basic "news media" that neighborhoods need just to know what is going on in their community is one venture that local groups should develop. One example, a number of citizens groups in Western Queens have formed their own community newspaper that is distributed free throughout the neighborhood. In addition to the standard "bulletin board" type of material that is featured in all local weeklies, this paper has already published a number of articles on the growing "gentrification" movement that promises to make Long Island City and Astoria the Park Slope and Brooklyn Heights of the 1980s. The paper is already self-supporting and should be a model for other groups.

Partisan politics is another virgin territory for local groups. Traditionally, neighborhood activists have claimed to be "apolitical" since partisan activity would lead to divisiveness. In the long run, this has meant that groups, to preserve unity, have ignored the candidate selection and election processes entirely. The unity they have achieved is at the expense of making substantial impact in the political process. Only by running their own candidates (and throwing their support behind friendly candidates in citywide elections) do community groups have any real hope of increasing influence in the polity. The current "non-partisan" stance has foreclosed activity in what is potentially the most promising sphere of influence.

In short, community groups can succeed in the 1980s. However, to do so, will require them to become "masters of their own resources"-taking control, and maximizing, what they have.

Only when this maximization occurs, can "Community Control" have the potential to become more than a faded, spray-painted sign on the walls of urban political history.

1. Alan A. Altshuler, Community Control; The Black Demand for Participation in Large American Cities (New York: Pegasus, 1970), p. 13.

2. Many of the Alinsky organizations (which do undertake radical action) are centered in white communities.

3. These government entities include community school boards; community planning boards; Offices of Neighborhood Government/Little City Halls, and the Community Action Agencies, to name a few.

4. One possible source of funding is a new Ford Foundation backed Local Initiatives Finance Consortium which is designed to channel corporate donations to neighborhood community development efforts.

5. Bertram M. Gross and Jeffrey F. Kraus, "The Political Machine is Alive and Well," Social Policy, vol. 12, no. 3 (Winter, 1982) pp. 38-46.

6. Mark O. Hatfield, "Bringing Political Power Back Home: The Case for Neighborhood Government," Ripon Forum (Summer, 1974): 19-26.

7. For example, retail chains and banks are often organized along geographically-decentralized lines.

8. for one such example see Michael Parenti, Democracy for the Few, 3rd ed. (New York: St. Martin's Press, 1980), pp. 56-61.

9

Charles Gueli, "Lessons to Be Learned from Early Experiences In The Establishment of Urban Community Development and Improvement Programs and Organizations, 1950-1970," in Allan Easton, ed., Poverty, Self-Help and the Community Development Corporation (Hempstead, NY: Hofstra University, 1976), p. 329.

10

John J. Harrigan, Political Change in the Metropolis, 2nd ed.(Boston:.Little, Brown and Co., 1981), p. 180.

11

Public Law 89-754, "The Demonstration Cities and Metropolitan Development Act of 1966."

12

local organizations were commonly known either as Community Action Programs (CAPs) or Community Action Agencies (CAAs).

13

see Eric Nordlinger, Decentralizing the City: A Study of Boston's Little City Halls (Cambridge: M.I.T. Press, 1972).

14

see George J. Washnis, Municipal Decentralization and Neighborhood Resources: Case Studies of Twelve Cities (New York: Praeger, 1973), and John Mudd, "Beyond Community Control: A Neighborhood Strategy for City Government," Publius 6 (Fall, 1976): 113-136.

15

It should be pointed out that in Boston and New York, the two cities in which this charge was most prevalent, the Mayors of the period (White and Lindsay) did have aspirations for higher political office. White made no secret of his desire to be the Vice Presidential nominee of the Democratic party in 1972; and Lindsay, a recent convert to the party, had unsuccessfully sought the Democrat's presidential nomination in the same year.

16

in New York City the scores on standardized reading tests, while improving slightly in the past few years, are still significantly below the National average in heavily black and hispanic school districts.

17

Mario Fantini and Marilyn Gittell, Decentralization: Achieving Reform (New York: Praeger, 1973), pp. 53-55.

18

Harrigan, p. 186.

19

in W.H. Ferry, "Whitetown and Blacktown: A Case for a New Federalism," The Saturday Review (June 15, 1968), p. 15.

20

Gueli, p. 308.

21

ibid., p. 309.

22

C.F. Grosser, New Directions in Community Organization (New York: Praeger, 1973), p. 203.

23

Geoffrey Faux, CDCs: A Strategy for Depressed Urban and Rural Areas (New York: Ford Foundation Office of Reports, 1973), p. 9.

24

John Case and Gerry Hunnius, Workers and the Community; Self-management in the CDC (Cambridge: Center for Community Economic Development, 1971), pp. 1-2

25

One indicator of the ability of the Community Boards to "frustrate" policy decisions is that both the Mayor and the Real Estate industry are on record as favoring the modification of the Uniform Land Use Review Procedure (ULURP)- modifications that would reduce the CB's influence in land-use policy.

One noted example of such a success was the failure of the Riker's Island Takeover Plan. Residents in Jackson Heights and Astoria, concerned that a state prison would be operating in their "back yard", joined with community groups throughout the city (especially groups in areas where new city jails were proposed) to defeat the City's plan to turn the Riker's Island Correctional Complex to the state for use as a maximum security prison. The key here was not the intensity of opposition from the affected community, but that community's ability to form coalitions with other communities to oppose a policy backed by the Mayor, the Governor, and many other prominent officials.

27

for a discussion of the Bedford-Stuyvesant Restoration Corporation (BSRC) see Harold Nash, "Three CDC Programs in the New York Metropolitan Area," in Easton.

28

Robert Kennedy was the only individual who even mentioned this provision in either the legislative hearings or in the debates in Congress.

29

U.S. Office of Economic Opportunity, Community Action Workbook, part 1 (Washington, DC: U.S. Government Printing Office, 1965), p. 18.

30

see OEO's Community Action Program Guide (Washington, DC: U.S. Government Printing Office, 1965).

31

U.S. Congress, House of Representatives, Committee on Education and Labor, Examination of the War on Poverty Program, Hearings before the Committee on Education and Labor, House of Representatives, 89th Congress, 1st session, 1965, p. 483.

32

Dennis R. Judd, The Politics of American Cities; Private Power and Public Policy (Boston: Little, Brown and Co., 1979), p. 304.

33 Ibid.

ibid.

34

ibid.

35

Harrigan, p. 180.

36

ibid, p. 181

37

It should be noted that some foundations do not engage in carrot and stick tactics. One is the Campaign for Human Development.

38

Fantini and Gittell, p. 48.

39

One recent example. Because a local board in Queens refused to heed a Central Board edict concerning personnel expenditures, its' petty cash fund was frozen by the Central Board-as a result, no refreshments at the local Board meetings until they toed the Central Board's line. While this is a trivial incident, it is impossible to quantify the "chilling effect" that such incidents may have on local boards that disagree with Central policy, but don't wish to incur the wrath of 110 Livingston Street.

40

Converstaion with one of the fingerprinted people (who shall remain nameless).

41

Jerry Cromwell and Peter Merrill, "Minority Business Performance and the Community Development Corporation," Review of Black Political Economy 3 (Spring, 1973): 41.

42

John J. Panarese, "Application of the Five Managerial Functions to CDC Operation," in Easton, p. 541.

43

ibid., p. 553.

44

Case and Hunnius, pp. 8-9.

45

P. Selznick, "Foundations of the Theory of Organizations," in F.E. Emery, ed., Systems Thinking; Selected Readings (New York: Penguin Books, 1969)., p. 278.

46

Stephen R. Weissman, "The Limits of Citizen Participation: Lessons from San Francisco's Model Cities Program," The Western Political Quarterly 31, no. 1 (March, 1978): 46.

47

Norman I. and Susan S. Fainstein, "The Future of Community Control," The American Political Science Review 70, no. 3 (September, 1976): 922-23.

48

see Bertram M. Gross, Friendly Fascism (New York: Evans, 1980) for a discussion of the consequences of social fragmentation.

49

One innovative effort is taking place in Pittsburgh, where a community group has entered the real estate business in order to raise funds for the organization's programs.

50

In Greenpoint/Williamsburgh,(Brooklyn) more than half of the

128 member groups of a community coalition disbanded between November, 1980 and November, 1981 as a result of the withdrawal of Federal Law Enforcement Assistance Administration (LEAA) and Community Development funds.