A network model

Constructing a theory about networks is very risky. For the most part, network theory has been based on physical systems that function as networks: communications, information, and transportation systems, just to name a few, all of which have their own theoretical heritages, primarily derived from engineering.

In the people-to-people/group-to-group networks that are the subject of this book, practice has preceded theory. Thus, we have used our personal knowledge and our interpretation of the experience of others to create a "model" of networks, briefly encapsulated in ten aspects or characteristics. We do not now have nor will we ever have the sole "correct" model of networks. What we have is a model that for us makes sense out of the mass of material we assembled.

Our model was not created in a vacuum, nor simply from our mail-order materials and personal experience. Some of our correspondents became collaborators in our struggle to understand networks. They wrote letters, sent articles, and recommended books that they thought might be helpful. One article in particular, by anthropologist Virginia Hine, was often mentioned by knowledgeable people, and a number of copies were sent to us. Indeed, Robert A. Smith, III (see Chapter 1) had sent it to us shortly after its 1977 publication in *World Issues*, the magazine of the Center for the Study of Democratic Institutions. In this article, "The basic paradigm of a future socio-cultural system," Hine, whose seminal work on networks has been done in conjunction with anthropologist Luther Gerlach, writes, "Wherever people organize themselves to change some aspect of society, a non-bureaucratic but very effective form of organizational structure seems to emerge.

We called the type of structure we were observing a 'segmented polycephalous network.'"

In four breathtaking pages, Hine identifies three essential qualities of networks. They are (1) *segmented,* "composed of autonomous segments which are organizationally self-sufficient." Networks are (2) *decentralized,* connected by horizontal linkages such as overlapping membership and mobile leadership. And networks are held together through a fabric of (3) *shared values* and unifying ideas, an "ideological bond" that, in Hine's view, is the most important network characteristic. Shared values hold the decentralized segments of a network together in a dynamic pattern of interaction.

Challenging the assumption that bureaucracy and hierarchy are the only viable forms of organization for large numbers of people, Hine points to networks as another, and in many cases a more appropriate, form of large-scale organization. From her outpost on the social frontier, Hine sees networks growing most vigorously at the extreme ends of the scales of power and influence. Networks, she says, are emerging both among the global elite and the powerless everywhere.

If this model has any validity, the organizational structure of the future is already being created by the most as well as the least powerful. It is very clear, however, that the ideologies which inform [networks] at the two levels are diametrically opposed.

In this chapter we present a network model. Our ten-point model may be viewed as simply an extension of the Gerlach/Hine three-point model. We see the same network phenomena that they see, and that many others see. We suspect that most people will find that many of the network characteristics discussed here fit with their own images and ideas about networking.

Our model of networks consists of ten characteristics, five of which describe a network's structure and five of which describe a network's process.'

Structure	*Process*
Holons	Relationships
Levels	Fuzziness
Decentralized	Nodes and Links
Fly-eyed	Me and We
Polycephalous	Values

Each of the ten attributes represents one significant idea about networks and networking; all networks reflect at least one, if not several, of these aspects or characteristics. For us, the overall concept of networks includes all ten ideas working together, creating one general pattern that distinguishes networks from other types of organizations. In our minds, these concepts overlap and interweave into what Bateson called "a pattern that connects."

The structure of networks

(1) Holons

All of life is made up of "whole" things that are also "part" of something else. A network is both a *whole* in and of itself, and a *part* of something larger than itself. A network participant is both a whole in and of it/him/herself and part of something larger—namely,, a network. We use the word coined by Arthur Koestler, "holon," meaning whole-part, to describe this interconnected attribute of the world around us.

Life abounds with examples of holons. A person is both a whole individual *and* a part of a family. A family is a whole social unit of relatives *and* a part of a community. A community is a whole collection of individuals and families *and* a part of a country and a world. A person as a whole is also a macro-universe of his/her own, structured in another sequence of holons: a whole body is an integration of many organ parts, human organs are wholes made up of cellular parts, and cells are wholes made up of molecular and atomic parts.

In networks of individuals, people are parts who are recognized as self-sufficient wholes capable of autonomous functioning. At the same time, a person participates—literally, "takes part"—in the "wholeness" of the network that arises from the work of many people. The same concept applies to networks that link groups and organizations: each group is respected for its integrity and independent activities as a whole, while simultaneously being integrated as a part into the larger whole of the network. Judy Norsigian, for example, is a unique person who participates in the Boston Women's Health Book Collective. The Collective, in turn, is a part of the National Women's Health Network, composed of groups and individuals.

Virginia Hine uses the word *segmentation* to refer to the holon nature of networks. Describing a network as "a badly knotted fishnet", a web of links between self-reliant nodes, Hine considers segmentation to be one of the three key characteristics of a network. It is precisely this attribute of self-sustaining parts that gives the network form its remarkable resiliency and its adaptability to stress. Segmentation explains why, for example, underground political movements are so difficult to suppress. Squashing one node does little to impair the effectiveness of the net as a whole.

The independence of holons in networks contrasts sharply with the standardized, synchronized, and precisely fitted parts of a bureaucracy that become more dependent as specialization and size increase. For example, while a person like Judy Norsigian can testify at a public health hearing without obtaining ''clearance'' from any "higher authority," an employee of a health insurance company does not enjoy such autonomy. Of course, no one in a network can be totally self-reliant, and, indeed, a network arises out of needs and visions that cannot be fulfilled in isolation. But by attributing respect to its own parts and supporting the independence of its participants, a network is encouraged to recognize the qualities of autonomy and interdependence at all levels of social interaction.

Because it treats its participants with respect, a network as a whole expects its voice to be treated with respect as it plays a part in a larger whole. Ultimately, the meaning of networks always comes back to people. The principle of holons, of autonomy and respect for participants, is fundamentally a respect for people, a respect for one another's individuality and potential contribution to the whole.

(2) Levels

While networks are not hierarchies, they do reflect the pattern of levels. Just as everything is a holon, so does everything reflect the pattern of levels. A whole is one level and a part is another level. In the same way as atoms, molecules, cells, organs, and organisms are all levels within levels, so are people, groups, organizations and societies levels within levels.

Levels are a useful tool for organizing complex structures, one we use every day to describe the world around us. Governments

operate at the local, state and national levels. Currency is composed of levels of values—cents in dimes in dollars. Measuring systems are made up of linear levels—inches in feet in miles. Time is counted in levels of seconds making up minutes which count hours in a day. Information systems are invariably organized in levels, from the Dewey Decimal codes at the local library to the parts of our telephone number (area code + local exchange + our phone). Computer hardware (the machine itself) is built up as a series of levels from simple on-off switches to highly complex "hardwired" logic. Computer software (the programs that tell the machine what to do) is designed in levels of increasingly general "languages"— machine languages, assembly languages, "higher" languages such as BASIC and Pascal, support and management utilities, and, finally, customized application procedures.

So, like everything else in the universe, networks are completely caught up in the pattern of levels. Networks are collectives of friends, organizations of members, coalitions of organizations, and alliances of coalitions. Networks form in neighborhoods to deal with community problems, in regions to deal with global problems, in transnational associations to deal with human problems. Networks are formed in every conceivable combination of social levels—from person to humankind.

Virtually every significant issue motivating the development of the networks on the Invisible Planet has to do with the relations between levels of social organization—global, national, regional, state, local, grass-roots, family, individual. Whether the concern is with health care, ecology, energy, economics, power, personal growth, education, or communications, the networking approach invariably involves the rights, responsibilities and interconnections of the many levels of social decision making. Jack Miller, of Anvil Press, expresses the sentiments of many networkers when he says, "We believe that forming networks is simply a natural outgrowth of our commitment to be responsible members of our community, region, nation, and world."

A network is a whole made up of participant parts. In networks comprising individuals, each participant in turn is the hub of a personal network of family, friends, and contacts. Networks are composed of participants who have friends. This indistinct level of informally connected "friends" of participants is a rarely recognized but often crucial level for understanding the astonishing

growth and influence that a small network might exert in a particular situation—an aspect of networking that politicians understand intuitively. Gerlach and Hine describe this as a process of "face-to-face recruitment along lines of pre-existing positive affect relationships." Hine translates from "social scientific-ese":

> Networks expand along these lines not because of media coverage or speeches by charismatic leaders. Too many networkers make the "old age" mistake (a costly one) of thinking they can attract numbers or spread ideas with mailings or flyers, when it is the one-to-one contact that is the basic growth mechanism of a network.

Networks also comprise groups (Gerlach and Hine define the "basic structure for sociocultural change" as a network made up of groups), and networks themselves may form networks. While new networks opening up new issues might think of themselves as alone in the world, many networks articulate important variations on the same general theme. For example, within the renewable-energy field, one network might concentrate on the whole spectrum of solar power, while another network might concentrate on passive solar devices, while still another network might concentrate on underground homes in the context of passive solar technologies. These networks of a feather often flock together as parts of a loosely seen "metanetwork"—a network of networks.

Like other types of organizations, networks reflect a level pattern. We see networks in terms of four levels: a group of *friends* (level 1) includes people who are *participants* (level 2) in a *network* (level 3) which is part of a larger *metanetwork* (level 4).

For the most part, the networks mentioned in this book are level 3 organizations. That is, these networks have some features of collective identity, including at least (a) a group name and (b) a mailing address. A level 3 network may also be identified by having a telephone number, a logo, stationery, flyers, publications, other media, products, offices, and/or a staff. In some cases, these groups operate in hierarchical fashion, with officers and traditional lines of authority, yet their interaction with other, similar groups makes them *nodes* (see below) in the larger network.

There are, of course, numerous level 2 networks, largely undocumentable, usually having a small membership but none or little of the level 3 group-identity paraphernalia. Examples of these would

be groups of community, business, or professional friends who share experiences and exchange information. As for level 1, personal networks, most of us have a web of relationships that sustain us (or not) in our daily lives.

A few examples in this book are truly level 4 metanetworks, and there are many substantial fragments of metanetworks in most of the areas covered in our survey. It is our view that there is an increasingly choate metanetwork of shared values among all the extremely diverse networks we have identified as parts of an Invisible Planet. Indeed, we hope that by putting such differing groups together we can help communicate the underlying pattern that connects them all and can contribute to the emergence of a globally/ personally concerned metanetwork. The Invisible Planet is a grand metanetwork, a pattern that connects us to a future of hope for ourselves and our children.

(3) Decentralized

Although networks and bureaucracies both have level structure and are wholes with parts within wholes, networks and bureaucracies differ in how they structure the relationship between the whole and its parts. Bureaucracies tend to bring parts together through *centralized* control and to *maximize* the dependency of parts on the whole. Networks tend to bring parts together under *decentralized* cooperation and to *minimize* their dependency on the whole. Network parts are dispersed and flexibly connected, whereas bureaucratic parts are concentrated and rigidly connected.

Ideally, the forces of distribution and concentration can work together to maintain healthy parts and growing wholes. But in our time it is the tendency to centralization which has gone too far, and it is the process of decentralization which needs development right now.

The statement of principles by TRANET, the Transnational Network of Appropriate/Alternative Technology, explains why they chose the term “network” to describe their organization.

> For governance, “network” implies a non-hierarchical system of equal, independent, self-sustaining members. Unlike a bureaucracy a network is dependent on no one of its parts. No organ performs a specialized task necessary for the

> function of the whole. A net has no center. It is made up of links between parts. TRANET's role [is] to strengthen these links.... The potentials for the future demand a humanization through decentralization.

TRANET is a whole: there are a name, an office in Rangeley, Maine, a staff, some files, and a vast collective memory bank of personal experience in its chosen field, appropriate technology (AT). Organizationally, TRANET resembles many of its member groups. Within the network, TRANET's role is not control but facilitation. Whereas a bureaucracy invariably has a controlling organ that serves as a decision maker, TRANET and other network hubs function to facilitate cooperative decision making.

A simple mental test can be used to judge whether a particular organization is predominately centralized or decentralized. Just remove the individual or group that functions for the whole.

Imagine TRANET vanishing overnight. The international AT movement would certainly not collapse, nor would any of TRANET's members, although they would likely be somewhat inconvenienced and considerably saddened that a trusted channel of global communication had disappeared. Shortly thereafter, however, another international AT clearinghouse would certainly spring up, or perhaps several, particularly if TRANET happened to explode from internal dissension over goals and means.

By contrast, mentally remove "command central" from an industrial-age institution. The likely result is either paralysis or disintegration, or both. Imagine a bureaucratic army with its headquarters blown away: a helpless, headless, fragmenting giant. Now remember how many times United States aircraft "destroyed" the guerrilla headquarters of the "Viet Cong." The jungle network endured, and won.

According to the Gerlach/Hine model, decentralization is the second major characteristic of networks, a concept that incorporates cooperation with independence. Networks strive for decentralization at every level, an idea that reflects a respect for the integrity and responsibility of people, each and every one of us. In networks, the world now has many experiments in new forms of democratic cooperation.

(4) Fly-eyed

Like the fly whose ''one'' eye comprises thousands of individual eyes, networks "see" through many perspectives, although the unknowing observer may think they have only one point of view.

At times, a network seems to "see" with one eye and "speak" with one voice, testifying to consensus around an idea or a strategy. Such moments of unanimity are important, because they often reveal the essential common values and bonds that explain the unity among the diversity of network viewpoints.

At other times, a network may appear to be a babble of disconnected concerns and interests, or an arena of internecine warfare. Hine calls this trait "the 'fission-fusion' characteristic that confuses observers and leads the bureaucratically minded to see networks as 'lacking' in organization." Networks not only tend to put up with disagreement, in many ways they depend upon it. The forthright independence of the members keeps the network as a whole from being dominated by any single node. Hine writes that while it is a shared vision that keeps a network together, "it is the conflicting concepts of goals-means that prevent any one segment from taking permanent control over all the others."

Reflecting a structure that requires relatively few people in authority, hierarchies are governed by rigid rules and codes, while bureaucracies keep order through standards and policies. The idea that there could be, or ought to be, one "correct" viewpoint, one authority who "knows best," is certainly consistent with the old-time physics, as well as the old-time religion. But just as the priestly ruler, from whom the word hierarchy is taken, is rapidly receding into history, so is the idea that there is *only one right* point of view.

Where once, BE (before Einstein), educated folk knew for sure that the universe was governed by absolutes of space and time, right and wrong, now we all slip and slide around in a universe of relatives. Einstein shook off the blinders of his schooling in Newtonian mechanics and saw differently. He saw that the meaning of distance, speed and time vary depending on your perspective.

Until the great triumphs of Copernicus, Kepler and Galileo, the conventional Western wisdom had been that the earth was the center of the universe. Everything else in the heavens was explained

from our God-given position on terra firma. Early scientists inaugurated a new age of humankind by establishing the sun as the "correct" and "true" center of at least our local heavens. Now even that view is seen as only one of many. The solar system may be understood with a point of reference on the sun, the earth, Pluto, the moon, an orbiting space station, or the star Alpha Centauri. All are valid perspectives.

The many perspectives of a network derive from the autonomy of its members. All have their own turf and agendas, yet they cooperate in the network because they also have some common values and visions. Just as the many points of reference of Einstein's universe are bound together by universal patterns of energy (such as the speed of light), so the many perspectives of a network are bound together by universal patterns of value.

An excellent example of this is manifest in the natural childbirth movement—a loose network of parents, professionals and health-care activists advocating a variety of alternatives to the routine maternity experience. While millions of people associate themselves in some way with the idea of "natural childbirth," sharp differences exist among those who favor medication-free births in the delivery room, those who advocate the use of in-hospital birthing rooms, and those who are working to establish out-of-hospital, freestanding birth centers, all of which are constituencies quite apart from those favoring midwife-attended home births. Although these separate voices disagree as to which strategy will provide the best balance of risk, health and meaningful experience for babies, mothers and fathers, all are in agreement that the high-technology model of childbirth propounded by much of the medical profession must be changed and humanized.

(5) Polycephalous

Networks, like all social organizations, need leadership, whether distributed or centralized. In networks, leadership is "polycephalous," to use Gerlach and Hine's term, which literally means "many-heads." Ideally, all the participants in a network share in the leadership functions by taking responsibility for tasks and viewpoints related to the network as a whole. In practice, for the most part, network leadership is plural and porous.

As we pointed out above in the TRANET example, leadership in

a network means facilitation, not control. An obvious and frequent problem that plagues contemporary networks is a confusion and conflict between cooperative leadership and singular control. In a telephone interview with us, James Gordon, a physician and an energetic networker, remarked that the biggest problem in networks is power. Big egos. People losing spirit and falling into factionalism. It is hard, he said, to develop good leaders, and it is harder still to know how to deal with them. Hine comments:

> This factionalism, the ego-prickles of leaders, is one of the principal reasons for the spread of a network. Squabbles between leaders in a network often lead to splits so that two nodes appear in the place of one. I had many instances in my files ... like the "eco-radical" who had a talent for inspiring a one-shot activity and collecting people who would then become a group around his leadership. Invariably, a dispute would arise as he tended to be very authoritarian. The group would fight with him. He would leave in a huff and start something else, leaving a trail of anger/bad vibes behind him but *also* six or eight *viable,* active nodes in the network. Leadership "problems" can be blessings in disguise though they never feel that way at the time.

The issue of leadership, cooperation conflicting with control, is not resolved in networks, as it can never be in any final sense. But in networks, contemporary society has experiments in many-headed leadership to offer as an alternative to the centuries of domination by singular, "top dog" leadership structures.

Polycephalous network leadership is not only cooperative and distributed, Hine points out, but it is also extremely mobile. People who are leaders in one segment of a network can easily serve a facilitating function in another segment of the same network or a different network. A "natural networker," particularly in the younger, "hobo" days, moves around from place to place, entering or starting networks at each stop, relating each new or newly discovered network to the ones encountered before, whether social action or progressive contacts.

The decade-long movement against the American war in Vietnam provides a dramatic example of mobile polycephalous leadership on a massive scale. Leadership sprouted everywhere, appearing and disappearing, incessantly moving, changing from

moment to moment. Multiple leadership worked because there was a strong central core of values and assumptions that all members of the antiwar network shared either implicitly or explicitly.

In an active, dynamically growing network oriented to a change in the status quo, leadership may be even more than multiheaded and mobile. When a bureaucracy tries to suppress an unwelcome network, it may find itself confronting the second labor of Hercules. Each time one head was cut from the body of the Hydra, this multiheaded dragon of fable, two heads grew in its place. In multiple-leader networks, new leaders emerge in response to circumstance and need, and two heads will arise to fill a role left by the removal of any one head as needs demand.

The *process of networking*

(6) Relationships

Networks work because of the dynamic relationships that transpire among the people involved. To understand the process of networking, we have to shift from thinking about *things* and the way they are built to thinking about *relationships* and the way they behave.

Normally, through the conceptual glasses of substance and space, we are tuned to the things of the world, looking for solidity when we sit down and detouring around objects in our way. When we look at networks through the same materialistic glasses, they seem quite invisible. "Networks," writes Johnny Light, a veteran networker originally based in Detroit, "are quite invisible to the eye and difficult to document." But we all know, as futurist Robert Theobald says, "that much of the work in any system is done through informal and invisible networks, rather than through the formal visible authority structures.''

Networks seem invisible because so much of the meaning of networks is bound up in relationships: the links, connections, communications, friendships, trusts and values that give the network its life. In a network, the spatial furniture can be quite minimal: a phone, index cards, file drawers, a room in the basement. Try using time-lapse photography magically tuned to the vibrations of human relationships. A network is revealed as having a richly diverse ecology of intertwining patterns and flows.

Another image of the visible and invisible worlds beneath our noses is suggested by a flight along the northeast megalopolis corridor from Boston to Washington (BOS-WASH, as the people on the air shuttle call it). In the morning, on the flight south, the structures and fixed patterns of the industrial world fill the window: roads, buildings, football fields, water towers. On the trip north, at night, a wonderous transformation has occurred. There are no asphalt parking lots, nor brick- and-mortar factories, nor geometrically plowed fields. Instead there are ribbons and clusters of light, myriad faint pinpricks in dark spaces between great shimmering seas of urban brilliance—a reality completely invisible to the daytime traveler.

(7) Fuzziness

Now that you have tuned your mental vision to relationships, look again at the networks around you. If they still seem fuzzy, do not worry. Your relational glasses are not foggy, nor is your channel having technical difficulties. The boundaries of networks are often blurred and their activity often seems to turn on and off with no discernible regularity.

Think of your personal network. Can you clearly see who is in it and who is not? Is all of it always active with respect to you? Are your experiences with your friends always the same? If your networks are like our networks, the edges fade into an indistinct penumbra of relations and friends of friends. The personal network of Jack Eyerly, a "networker's networker" in Portland, Oregon (the "city of ash, roses and rain"), "is a scattergun of affectations and affections, a universe of layered maps and diagrams, dark and bright, illuminated one by the others."

Hierarchies and bureaucracies are clearly bounded. You are either in or out. You are either a part of the royal family or you are not. You either work for General Motors or you do not. Within these institutions, a major subsystem serves as a boundary, like the skin of a body or the borders of a nation. While some networks do indeed have limited, carefully defined memberships, and may even be closed to outside interactions, most networks are quite open and have a very loosely defined participantship. Network patterns ebb and flow according to the needs of the participants and consequences of external events.

In a note to us, Hine said that in her experience "no node in any network is aware of all the other nodes. It is the very nature of networks that they are fuzzily bounded if at all." Instead of being held together within a boundary, a network coheres from shared values, interests, goals, and objectives. A network is recognized by its clusters of interaction and channels of communication, rather than by a fixed boundary that includes and excludes.

It is shared values that establish the persisting identity of a network. Each person creates his or her own fuzzily bounded universe of interactions and values as members of many networks. For Eyerly, "From the beginning I knew the little knots I tied into the tapestry had resonance; they reverberate still. Each new tying is with more skill, but the original tingle remains the final value."

(8) Nodes and links

If you sat as a fly on our wall one day, you might have observed an exchange something like this:

> Robin in Toronto calls us in Boston. He wants to demonstrate the virtues of computer conferencing at his college; do we have any suggestions? We do. Call Barry at the University of Toronto. By the way, does Robin know of any networks in computer-aided art? He does. Robin suggests that we call Jackie at MIT in Cambridge or Ron in Los Angeles.

When we suggest that Robin call Barry, we are functioning as a link while treating Robin and Barry as nodes. When Robin suggests that we call Jackie and Ron, Robin is doing the linking and we are being a node.

In human networks, people are both nodes and links. It is people who set up relationships and it is people who are related. The roles are different but complementary, opposite but necessary for one another. As the above vignette illustrates, within one exchange a person may rapidly alternate between being a node and doing the linking.

Every participant of a network is potentially both a node and a link in the pattern of communication that constitutes the network as a whole. Each participant sometimes initiates or receives information as a node, and each participant sometimes acts as a link for other participants. At the level of personal networks, we daily

experience this constant shifting back and forth between these two roles in communication.

In practice, in most established networks, some people and organizations will be nodes most of the time, while others will take on greater linking responsibilities. Indeed, the people we casually call "networkers" are the people who feel a personal calling to the task of setting up and maintaining relationships—links. Networks typically have a few participants who do most of the linking and many participants who are primarily nodes, but the possible combinations of these interrelationships are endless.

When modern physicists look at reality through their current models, they sometimes see a swarm of particles and they sometimes see a ripple of waves. Nodes and links are like particles and waves: networks may appear to be assemblies of nodes or webs of links, depending upon the perspective chosen. As nodes, participants in a network are like "particles," single entries in a mailing list or phone directory. People are just so many pieces of mail when you are licking stamps. In linking, however, participants seem more like "waves" of interaction, spectra of interests, and diffraction patterns of meaning. When you are talking on the telephone to one of those pieces of mail, the feeling is very different.

(9) Me and we

In every area of networking we reached in creating this book, we encountered a deep concern with the relationship between individual people and the many levels of social organization that seem to encompass the person.

With respect to people, networkers do not choose between the one and the many; they affirm both. Many networks express their vision as simultaneously encompassing the integrity and significance of the individual and concern with the importance of cooperation and collective interests. Like networks, people are holons, autonomous individuals inevitably connected to other people by a variety of relationships. We are each simultaneously "me" and ''we.

In the prevailing scientific models of evolution, both old and new, the track of progress seems to run from atoms to cells to organisms to societies. The place of the human individual and the development of consciousness are completely finessed, skipped over

as if the question does not have its own unique meaning. On the one hand, people are seen as "special" organisms, and on the other hand people are regarded as simply units in societies. The implication of this viewpoint is that societies made up of people represent a more advanced stage of evolution than the individuals that compose them.

Recognizing a single track of evolution, we also perceive two interconnected rails on a spiraling track, like the double helix of DNA. One rail represents the successive development of more complex levels of individuality—amoebas to mollusks to apes to humans. The other rail represents the successive development of more complex levels of collectivity—mates to groups to tribes to civilizations. Our interpretation of evolution (see Chapter 10) is that the evolutionary development of individuals and their collective forms take place side by side.

Even without the framework of an evolutionary perspective, it is clear that in the worldview of the networkers of the Invisible Planet the value of the individual and the value of the group are equivalent. Of course, within the context of a particular issue, either individual rights or collective interests might be emphasized to redress larger imbalances. Concern may shift from pole to pole within one issue.

When networkers hold self-interest and group-interest together, these values often appear conflicting and ambiguous, perhaps paradoxical. Much of this discomfort naturally comes from our shared conceptual habit of dualism, which encourages us to choose one or the other pole of apparent opposites. But just as a physicist looks first at waves and then at particles to understand the one reality of both together, so each of us daily alternates between group and individual viewpoints to grasp the meaning of our one life.

A remarkable example of a network (and culture) that sees the unity in complements, rather than irreconcilable opposites, is expressed in the statement of principles by the National Indian Youth Council (NIYC):

> NIYC views individuals as part of their community and there is no distinction between the two. While NIYC is concerned with individualistic problems such as economic poverty, employment discrimination, health care and education, the

approach to these problems includes the community as a whole.

Within this worldview, individuals and communities grow and change together.

On the Invisible Planet, it is commonly recognized that social transformation cannot take place without personal transformation. Describing the common assumptions of the people in the Action. Linkage network he has orchestrated, Theobald, for instance, says, we accept that any effective pattern of action will require us to change both our personal values and the institutions which were formed in the industrial era." Expressing a similar understanding, the newsletter of the National Association for the Legal Support of Alternative Schools displays the following quotation from Kahlil Gibran *(The Prophet)* as a permanent feature of its masthead:

> If it is an unjust law you would abolish, that law was written with your own hand upon your own forehead. . . . And if it is a despot you would dethrone, see first that his throne erected within you is destroyed.

(10) Values

The context that gives coherence to a network is seen in values, not in objects. Network bonds tend to be subjective, rather than objective, more mental than physical, which is why, as we have said, networks seem so invisible to the object-trained eye.

Our human value heritage is deep and wide, rooted in the origin of the planet and life itself, blossoming over the past half billion years of births and deaths. With each new twist of evolution, life acquired new patterns of values to add to the values already established. The emergence of mortality and sex in simple cell groups, of instinct in reptiles and emotion in mammals, and of tools and speech in the far-distant human generations, have all contributed to our vast value heritage.

Strangely, among the values of the industrial age is the unfortunate paradox that human value is itself devalued. To the old-style scientific observer, measuring stick and rat cage in hand, values seemed mired in subjectivity. Values are "intangible" and cannot be registered on instrument dials; consequently, scientists have said, values must be "unreal." In contrast, among the values of the

networks of the Invisible Planet is the value of *valuing* itself. Human values are considered "real" within the Invisible Planet, and a concern with value is seen as essential for humane organization and purpose.

For members of the Southwest Research and Information Center, ''one of the most important characteristics of the Center is the commitment of everyone connected with it." Networks cohere through the shared commitment of their participants to a cluster of values. Hine believes that the value bond is "perhaps the most significant aspect of the segmentary mode of organization. ... The power of a unifying idea ... lies in a deep commitment to a very few basic tenets shared by all."

The values of the Invisible Planet do not present a consistent tableau of step-by-step precepts for behavior. A set of values that stresses collective interests over individual interests or the reverse implies that more of one means less of the other. On the Invisible Planet, a healthy dose of self-interest is regarded as acceptable if a person also has a healthy measure of group-interest. Self-growth is good when balanced with a consciousness of collective-growth. The values of the Invisible Planet are about people and planet together.

As we said at the outset of this book, it is not the network form or process which distinguishes a movement for social change from an elite breakfast club that runs an industry, nor is it bonds of values. The difference between *all* networks and the *particular* networks we selected to represent the Invisible Planet lies in the values themselves.

Hine, Muller and others have pointed out that networks are now most evident at the two extremes of power, but the ideologies in these sectors are utterly different. Since the life of a network lies in its values, then, says Hine:

> Perhaps one of the crucial tasks of the immediate future is to clarify and expose the underlying assumptions that provide the ideological "glue" for [networks] emerging at the various levels of the global social structure. The key to the future may very well be conceptual rather than organizational.