Paradigms Lost
by George M. Woodwell

One of the most significant advances of the last decade or so in biology has been the discovery of behavior-controlling substances, especially the pheromones and other allelochemes. The discovery is important, not simply because of the new dimension it adds to our understanding of evolution, but especially because of the proof it offers of direct biotic effects of biogenic substances in the general environment at concentrations in the range of parts per billion or parts per trillion. Anthopleurine, the alarm pheromone of the sea anemone, for instance, is reported to be effective at a concentration of 1 molecule in $1.5 \times 10^{11}$ molecules of water (Howe and Shoikh, 1975). Recently Kreuger and Reed (1976) have shown the biotic effects of small concentrations of ions in air, long a doubtful and controversial topic. Kreuger and Reed close their article with the somewhat wistful hope that pollution control will restore the normal air-ion balance and produce a more “salubrious ecology” approximating what exists in nature.

Biologists, of course, are not surprised at such chemical marvels. They have their experience with trace metals and with the potential of food webs for accumulating radioisotopes and fat-soluble hydrocarbons to concentrations that are sometimes $10^6$ or more above concentrations in the environment. Kreuger’s and Reed’s hope for a return to a natural air chemistry is shared broadly by biologist and applies to the chemistry of water and land as well. The hope is drawn from the core of the biologist’s model of environment. This paradigm, however, seems lost today.

Our Daily Model—The Economic Paradigm

The dominant model of environment is that articulated, not by biologists, but by economists and propagated by powerful industrial and commercial interests in a meandering alliance with government. It is the growth model that has served us reasonably well over the last decades and scarcely requires elaboration now.

The basic tenet is that technology is sufficiently versatile that its evolution will provide new resources to replace those lost and economic growth can be sustained thereby. Biotic resources are treated not differently from others in this model; they, too, are thought to be replaceable when exhausted. The principal resource is cheap energy for industry supplemented by human ingenuity.

The growth paradigm is vulnerable on many counts. My concern is not with the vulnerability of its basic tenets but with a set of corollaries that establishes the pattern of management of environment. I would suggest that the pattern that has emerged presents a threat to the human race second only to those gross failures of government that would bring nuclear war. The threat is the rapid toxification of the earth, with effects on the biota and humans. The threat also presents a series of dilemmas for scientists and a basic challenge to science itself.

Development of the Economic Paradigm

The dominant paradigm has a long and successful history and is not to be dismissed casually. Its history is the history of the development of the western democracies. During most of the period of that development the resources of environment appeared very large in proportion to the demands placed on them, and there appeared to be ample basis for the assumption that waste released into the general environment would ultimately be rendered innocuous. Nonetheless, the possibility of annoying one’s neighbors with noxious wastes was recognized. We have the benefit of a splen-
did discussion of this topic provided by Charles Cheney Humpstone, President of the International Research Technology Corporation, in an article in the January, 1972 issue of Foreign Affairs. He calls attention to the citation of a Latin maxim "Six utere tuo ut alienum non laedes" (Use your own property so as not to injure another's) in the mid-Eighteenth Century by Sir William Blackstone who cited it as the foundation of the Law of Nuisance. Humpstone offers a series of illustrations quoted from Blackstone: "To build a house so close to another's that rainwater from your roof spills on to his, is to commit a nuisance." So was keeping hogs so near to another's house "...that the stench of them incommodes him and makes the air unwholesome." One might not "corrupt or poison a water-course by erecting a dye house or a lime pit for the use of trade in the upper part of the stream." 

Humpstone pointed out that the courts of that time would prevent or provide compensation for any act in itself lawful that necessarily tended to damage the property of another and that Blackstone had said of the person responsible, "It is incumbent upon him to find some other place to do that act where it is less offensive." Humpstone, however, recognizes that as the demands on resources become greater, the ancient solution of requiring polluting activities to move to more remote areas breaks down. He concludes that the model is failing and there is no alternative to an "international no-release policy." Humpstone realizes that no other policy will work. And here lies our dilemma and the basis of the challenge to science.

Assumptions of the Economic Paradigm

The assumption implicit in growth with respect to management of environment is that resource can be regulated by compromise. Compromise is assumed to be a suitable basis for reconciling competing interests in exploitation of everything from an ore body through a fishery to the pollution of water or air. Time and experience have institutionalized this approach in law and in the rules and philosophy of our regulatory agencies. It has also led to the assumption by the various aspects of business that pollution at some low level is reasonable and acceptable. The role of the scientist is assigned as that of the technician helping to draw the line, not on whether—but how much—pollution.
The ramifications of this series of assumptions, developed over generations, are many and profound. Two of the assumptions are especially important and bear close critical examination from biologists at the moment. These are first, the assumption that the environment has an assimilative capacity for almost any waste. Second, the assumption that there is a threshold for biotic effects of any toxin. The first is derived logically from the growth model in which biotic resources are large in proportion to the demands on them and are assumed to be unaffected by the release. When effects are seen, the arguments run, they are of no consequence. The threshold assumption is one of the first assumption, elaborated in part from industrial toxicology whose practitioners are pressed continuously to define in industry levels of pollution that are acceptable to industrial employees. The applicability of this approach to problems of the general environment is clearly challengeable, but the challenge is seldom made. The thesis that a small amount of poison is acceptable is so firmly fixed in our minds that any challenge seems unreasonable.

The difficulties with this aspect of the growth paradigm are becoming apparent now as we move with rapidly increasing frequency acute problems with toxic substances. Not surprisingly, the problems are most serious with substances that are accumulated into the biota either on the basis of differential solubility or through food chain concentration. The first of these to be recognized was radioactivity, followed closely by DDT, the PCBs, and by the other chlorinated hydrocarbons, all highly soluble in fats and very much less soluble in water. All, including radioactivity, are subject to accumulation in the biota to levels that may be many orders of magnitude above the concentrations in the general environment. When such concentrating mechanisms occur, defining a concentration in the environment that is low enough not to present a hazard to the biota or to humans becomes virtually impossible. The problem is still greater if the substance does not break down readily or is degraded to other substances that are also toxic. In such instances the concept of assimilative capacity and threshold have little meaning. There is virtually no way of controlling the amounts of such substances with sufficient precision to prevent their migration and ultimate accumulation in the biota, including humans. Many, perhaps most, toxins fall in this pattern.

Pollution Crises

Biologists have made these points in telling fashion for DDT over the last three decades and government has responded appropriately by banning the use of DDT in the United States, an extraordinary step—we have simply foresworn the use of an important piece of technology. Similar steps have been taken with other halogenated hydrocarbons and there is now ample precedent for acknowledging the virtual impossibility of managing such substances in ways that do not present serious hazards to the biota, including humans. While we seem to have learned this lesson, the pressure remains to relax our controls and to avoid putting other substances that must behave similarly under similar restrictions. Thus we have a rash of serious pollution in our coastal waters including the recent pollution of the James River with kepone, the pollution of the Hudson with PCBs, the pollution of Lake Michigan with dieldrin and Lake Huron with mirex, and the increasing number of examples of pollution of coastal sediments and shellfish with various hydrocarbons.

We are also recognizing a worldwide component of the pollution: PCBs, and DDT appear now in virtually every organism in the oceans, including certain fishes of the lower Continental Shelf. The pollution at this stage is irreversible, at least by any short-term human act. Whether or not the long-term problem of a large source of DDT, world use currently exceeds the peak United States production of the 1960s and there is no reason to assume that our problems are over. We have restricted use, but only after an irreversible worldwide pollution, and the rest of the world has not yet joined us in determining that there is a serious problem.

With the current rush toward development of new sources of energy in support of technology and continued industrial growth, there is every reason to expect that the problems with toxins will continue to soar. Consider the challenge of coal gasification or conversion to oil with their release of various unknown toxins in large quantities. If we must trace each of these through the environment, determine its salient effect, establish a threshold, and then force controls, science will never be large enough.

Biologists and the Economic Model

Biologists have difficulty in participating in the elaboration and application of this model in human affairs. The model violates almost every basic precept of ecology and evolution and threatens reason itself when applied as it is under increasing duress in a shrinking world.

Unfortunately biologists have not united to articulate a paradigm of environment that can be identified as theirs. They usually represent several, each a partial model, inadequate for the immediate challenge. Nonetheless, I believe I can detect the resurgence of the basis evolutionary model that biologists have tended to suppress over recent years.

The Biologist's Paradigm Emerges

The emergent paradigm is that of the world as a living system, not simply an economic system. We have long had the thought that the biosphere is the product of the interactions through time of the earth's great chemical and physical
systems: atmosphere, oceans, continental masses, and the biota. We have tended to diminish in our thinking the role of the biota because its mass is small, its reaction slow, because it seems so dependent on weather and climate, and because we have found that there is often profit for humankind in modifying it greatly. Contemporary research has shown however that the role of the biota in regulating climate and in stabilizing the biosphere as a whole is much greater than we have commonly assumed. The forests and humus of the earth, for instance, contain two to three times the amount of carbon present as CO₂ in air and the biota processes each year in total photosynthesis as much as ten percent of the carbon in the atmosphere. And despite the pollution explosion, the spread of agriculture, and the industrialization of the earth, eighty to ninety percent of the earth is in some state of succession toward a natural climax, not managed or intensively controlled by humans, although grossly affected by them in many instances. The paradigm that is emerging is of a biosphere that is a set of interacting units or ecosystems. These were originally, before the advent of an abundant human race, natural. As human influence has spread, the incidence of human dominance has increased and we now recognize cities and agricultural landscapes as a part of the mosaic of ecosystems that is the biosphere.

Insights of New Research
The new paradigm is complex, based in classical principles of Darwinian evolution, and is supported now by impressive research records: five years of studies under the National Science Foundation support for the International Biological Program; fifteen years of studies of the forest of Brookhaven, New York; fifteen years at Hubbard Brook, New Hampshire; two full generations of scientists at the Coweeta Experimental Forest, North Carolina; and so on around the world. Two findings dominate. First, from the standpoint of the efficiency of fixation of solar energy, natural forests are among the most efficient. Certain kelp beds and marshes also appear to have high capacities for fixing energy, but taken broadly, forests are the most efficient of the major vegetations of the earth. By comparison most agriculture is inefficient in total energy fixed though it may be highly efficient in the transformation of solar energy into food. The total amount of energy available through the biota as net primary production worldwide is about 850 x 10^{12} kWh, about fifteen times the amount of energy currently used in technology. This energy, the energy fixed by the biota, is the basic resource in support of humans in the context of the emergent paradigm. The use that we make of technology is simply to transform this resource and to transport it from one place to another for human convenience.

Second, we have confirmed in detail what biologists have known in general for many years: that there is an extremely close mutual connection between the chemistry of the biota and the chemistry of the environment. We can show this connection for substances amounting to as little as one billionth or one trillionth of a gram in the general environment. The subject is now widely accepted as a reasonable subject for the attention of scientists and the results are provable beyond any reasonable doubt in several different areas. Furthermore, abundant evidence of the pattern of changes produced by the accumulation of toxins in the environment. The pattern is a systematic one of progressive reduction in the structure, complexity, and usually in the capacity for fixing solar energy. This pattern of impoverishment has been set forth most starkly for gross disturbances such as the sulfate and heavy metal pollution at Sudbury, Ontario, and the irradiated forest at Brookhaven. But it is appearing now in marine systems as we learn more about the effects of toxins there on phytoplankton. Dr. Nicholas Fisher has shown that the hardy species that survived DDT in water also survive other chemical insults and become a part of the flora of the chronically toxified plant communities (Fisher, 1976). Small increments of change in the chemistry of environment must be assumed to produce small increments of change in the structure and function of communities: there are no thresholds at the ecosystem level. There are only effects. Thresholds are a human invention. The identification of such toxins as DDT and PCBs in virtually all of the oceans means that the process of impoverishment is well underway there, too.

Consequences and Challenge
There is no question that recent advances in ecology have immeasurably strengthened the Darwinian model of environment and have widened the gap between biologists and those who follow the economic paradigm. And the gap will continue to increase as long as scientists continue to accept the thesis that we can allow human artifacts including toxins and other influences to diffuse more and more widely around the world. To the extent that our re-
search programs in support of the current paradigm facilitate this further diffusion, we cause additional problems for the human race, rather than cure them. This statement is a major indictment of contemporary science.

The challenge for biology, for the science of environment, for technology, for the national laboratories, and for the political supporters of science is clear now, supported by virtually each new discovery in ecology, behavior, evolution, environmental chemistry, and the long, sad tale of progressive pollution. It is the challenge of containing human influences under the pressure of population growth and of preserving, even enhancing, the biotic resources of the earth. It is the challenge of developing new science of small, tight systems in support of man; of a technology that does not leak toxins; of urban, suburban, and agricultural systems that operate on minimal subsidies of exogenous energy and on other resources that have the potential of stability over decades. It is the challenge of discovering new ways of tapping biotic sources of energy and food without destroying them; of developing new agro-forests that might be perennial, require no pesticides, and little tending; of stabilizing or improving fish yields from the coastal oceans; and, simultaneously, of preserving the earth's biotic resources for they, and not the economy, are the only essential resource for the human race. Where are the new programs in science aimed at these objectives, all outgrowths of the biologist's paradigm?

Perhaps we should take our cue from the lowly but ancient sea anemone and recognize our trillionth of a gram quantities of DDT and PCBs in the ocean as our alarm pheromone, or anthopleurine, that tells us that we should take alarm at current trends in the management of environment.

REFERENCES


FUNDING SOCIAL SERVICES IN MINNESOTA

By Esther Wattenberg
Staff, CURA

Two seminars on funding social services were held during April, sponsored by CURA in cooperation with the Continuing Education Departments of Public Policy and Social Work. The seminars were developed to increase understanding of the implications of House File 1, a bill currently under consideration in the Minnesota State Legislature. About 75 persons attended on April 5th and 12th. They included county welfare directors, commissioners, students, and staff members from public and private social service agencies, and from social service associations.

House File 1 proposes a shift from categorical to block grant funding for the social services. This bill would change the system for allocating health and social service funds to Minnesota counties. Under the present system the Departments of Health and Welfare make allocation decisions by program or category for the counties. House File 1 provides for block social service grants directly to the counties under a formula allocation. The county board of commissioners would then have the authority to decide how much to allocate to individual programs. The county board would first design its own structure for the planning and delivery of social services.

The intent of House File 1, as stated by its authors, is to eliminate categorical state funding for separate client populations and simplifying the appropriation process at the state level is to:

1. ensure that public expenditure decisions are made by elected officials,
2. establish county boards as the primary units of local government responsible for the coordinated planning and delivery of social services to meet local needs and to be accountable to local citizens for the use of social service funds, and
3. provide a simplified and more equitable means of distributing state and federal social service funds and equalizing the dependence on property taxes to support social services throughout the state.

The two CURA seminars considered how categorical grants would be consolidated into block grants under the proposed bill and what the implications would be for local counties and local decision-making. Background materials, speakers, and panel discussions were combined to present various aspects of the proposed legislation.

The first seminar provided a brief review of the definition of social services and information on past expenditures and patterns of use for social services throughout the state. Gary Dodge, program analyst in the state Office of Human Services, provided the seminar participants with information on revenue sources and the extent of funding for what is commonly understood as the domain of social services (Table 1).

The complexity of the social service structures was highlighted in a brief discussion of those services funded federally by Title XX, the additional sources of funding provided by state and local resources, and the diversity of social service delivery systems: public, private, profit and non-profit.

The following state appropriations that presently exist would be folded into the block grant system proposed under House File 1:

1. community mental health centers
2. community health services
3. community-based detoxification centers
4. day activity centers
5. cost of care for retarded and emotionally ill
6. foster grandparent program

<table>
<thead>
<tr>
<th>Table 1: REVENUE SOURCES FOR HUMAN SERVICES: FY 1975 (in millions)</th>
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<tbody>
<tr>
<td><strong>FEDERAL</strong></td>
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<tr>
<td>Health</td>
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<tr>
<td>Public Welfare</td>
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source: Gary Dodge, Program Analyst, Office of Human Services, State of Minnesota.
7. day care  
8. state guardianship for foster care  
9. reimbursement to counties for foster group care  
10. reimbursement to counties for senior citizen group care

Participants at the CURA sponsored seminar received additional background information in the form of expenditure estimates for the current year for each type of social service (Table 2 and Figure 1) and an hierarchical listing of use patterns for services in Minnesota development regions (Table 3 and Figure 2).

Table 2: EXPENDITURE ESTIMATES BY SERVICE  
(Plan Year Oct. 1, 1976 to Sept.-30, 1977)

<table>
<thead>
<tr>
<th>Service</th>
<th>Amount</th>
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<tr>
<td>AFDC</td>
<td>$42,890,289</td>
</tr>
<tr>
<td>Child Welfare</td>
<td>$29,341,573</td>
</tr>
<tr>
<td>Mentally Retarded</td>
<td>$13,453,773</td>
</tr>
<tr>
<td>Chemical Dependency</td>
<td>$10,475,093</td>
</tr>
<tr>
<td>Child Care</td>
<td>$8,373,844</td>
</tr>
<tr>
<td>Information and Referral</td>
<td>$5,164,541</td>
</tr>
<tr>
<td>Aged</td>
<td>$3,036,270</td>
</tr>
<tr>
<td>Others</td>
<td>$4,066,518</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$116,801,901</strong></td>
</tr>
</tbody>
</table>

Prepared from estimates in the Comprehensive Annual Services Program Plan, Title XX, State of Minnesota, Department of Public Welfare, Plan Year, October 1, 1976 to September 30, 1977.

Against this background, Representative Paul McCarron, chief author of House File 1, presented the bill as largely a vehicle for distribution of funds ("a House Ways and Means bill") with a formula that is intended to provide objectivity, stability, and equity. The allocation formula proposed in House File 1 is to be computed on the basis of population, number of persons over age sixty, a per capita funding for each person receiving AFDC and General Assistance, and an additional local contribution from a mill levy. The allocation formula was discussed in terms of the use of these components as proxies for need. The rationale for this particular allocation device was strengthened, it was suggested, by the fact that data on these indicators are available and that the indicators are easily understood by the public at large.

Several points of controversy were raised during the seminar discussion among panel members: Representative John Brandt, Gary Dodge (Office of Human Services), Phil Eckhart (Office of Planning and Development, Hennepin County), and Representative Paul McCarron.

- Are the variables in the formula adequate indicators of need?
- How much weight should be attached to each variable in calculating the formula?

- Is the redistribution of funds from urban centers and selected counties to outstate rural counties equitable? [Those counties that have relied on local mill levies and have taken a vigorous initiative in securing Title XX funds would be relative losers, while outstate counties would gain about 62% on the average.]
- Should the property tax be used to fund social services?
- A state mandate places a ceiling on local taxes which may be levied by counties. This poses an apparent inconsistency with the proposed bill's emphasis on local determination.

Firm figures on total past social service expenditures remain elusive and in this context there was a general consensus that unravelling the precise impacts on funding patterns for social services in the state under House File 1 is inevitably somewhat perplexing.

In the second seminar the discussion focused on questions of implementation and capacity. Another array of questions was raised:
- Can a state-wide plan for social services provide a degree of uniformity in services available throughout the state and at the same time allow for local initiative to reflect local differences?
- Where should the locus of decision-
making fall within the triangle of elected officials, professional staff, and citizen interest groups?

- Does the primitive nature of our information systems act as a constraint on rational decision-making?
- What is the optimum catchment area for human service delivery systems?
- How would the proposed decentralized system be audited or monitored?
- To what extent do the mandated services** and the ceiling on social service funding restrain local discretion to innovate and create new services?

Participating in the panel discussion at the second seminar were Robert Andre (Human Service Evaluator, Association of Minnesota Counties), Gary Dodge, Representative Martin Sabo, Sam Walz (Staff of Human Services Board for the counties of Faribault, Martin, and Watonwan), and William Copeland, Jay Greenberg, and James Jernberg (all from the School of Public Affairs).

At this writing, the fate of House File 1 is yet to be decided.

*Title XX is an amendment to the Social Security Act which provides grants from the federal government to the state for social services.

**Adoption, child protection, detoxification, foster care, mental retardation services, detection and treatment of communicable diseases, public health nursing, and home health services.

Table 3: 
FOUR MOST FREQUENTLY REQUESTED TITLE XX SOCIAL SERVICES BY REGION
(Based on Estimated Number of Clients Served for Plan Year October 1, 1976 to September 30, 1977)

REGION 1
Information and Referral
Counseling
General and Mental Health
Homemaking

REGION 2
Information and Referral
Counseling
Transportation
General and Mental Health

REGION 3
Information and Referral
Counseling
Protection (adult) Sub-acute Detoxification
Protection (children)

REGION 4
Information and Referral
Counseling
Family Planning
Protection (Adult)

REGION 5
Information and Referral
Counseling
General and Mental Health
Protection (children)

REGION 6
(including 6W and 6E)
Information and Referral
Counseling
Transportation
Social and Recreational

REGION 7
(including 7W and 7E)
Information and Referral
Counseling
Protection (children)
Foster Care (children)

REGION 8
Information and Referral
Counseling
Transportation
Social and Recreational

REGION 9
Information and Referral
General and Mental Health
Counseling
Social and Recreational

REGION 10
Information and Referral
Counseling
General and Mental Health
Protection (children)

REGION 11
Information and Referral
Counseling
Foster Care (children)
Homemaking

Prepared from estimates in the Comprehensive Annual Services Program Plan, Title XX, State of Minnesota, Department of Public Welfare, Plan Year, October 1, 1976 to September 33, 1977.
The All-University Council on Aging has recently affiliated with CURA. The council was appointed by Vice-President Koffler in November, 1975 following faculty recommendation that such a council be formed. Its creation culminated nearly a year and half of planning meetings among interested faculty and administrators. A student project during the 1974-75 school year produced *Aging: A Student Guide* (1976) which describes all the courses and programs of study available in the field of aging at each of the University of Minnesota campuses. In preparing the publication it was discovered that some 70 faculty members were involved with different aspects of aging, either in research, teaching, or service programs, without being aware of each other's work.

A 21-member council was chosen by the Vice-President's office from among these faculty members. Six graduate students were also appointed to the council as ex officio representatives from CURA (Tom Scott) and the Vice-President's office (Shirley Clark). Donald McTavish (Sociology) was appointed chairperson to work closely with the Vice Chairperson, Frank Lassman ( Otolaryngology, Physical Medicine and Rehabilitation, and Communication Disorders).

The council has met monthly since its inception in late 1975, guided by three overall purposes: a) to provide information and viability for University-based efforts of faculty and students in such areas as geriatrics, social gerontology, aging and related fields; to provide linking among these people; b) to provide a means for faculty and students interested in gerontology to plan and develop needed programs and offerings related to this area; and c) to facilitate the work of students and faculty in gerontology.

Specific goals were adopted by the council in the Spring of 1976:

1. Establish an All-University Center on Gerontology, including employment of a full-time director and staff.
2. Establish assistantships and fellowships for students interested in aging to facilitate their development in this area.
3. Continue the monthly seminar series and pursue faculty development programs.
4. Publish an updated edition of the student guide to programs and courses in aging at the University.

The field of aging is new and of growing interest to students, faculty, and society as a whole. Government is becoming increasingly aware of the importance of research and planning for the elderly. The medical sciences are taking a fresh look at the mental and physical problems that develop with aging. New medical technology has been able to extend for many of us our chances of being able to live out a full lifespan. Within the social sciences, new methods have developed for analyzing change, process, and aspects of time. These new procedures are now being applied to work in many other areas as well.

The linking of diverse disciplines, biological, psychological, and social, is considered crucial for the development
of studies in aging. Formal Ph.D. programs have barely begun. Faculty involved in teaching, research, or service planning must rely on each other to nourish their understanding and broaden their perspectives. Hence the importance of the formation of the All-University Council on Aging.

During April, the Council moved into offices in Walter Library (Room 304, phone number 376-1759). The new affiliation with CURA promises to strengthen the efforts of the council. "With this resolution of our organizational location," notes chairperson McTavish, "we will have a strong base from which to move ahead with the substantive issues of aging."

The council will be seeking in the next few years to strengthen and greatly expand the opportunities for cooperation and dialogue within the new discipline of aging here at the University of Minnesota. They will continue to develop faculty expertise through monthly forums where faculty members can exchange ideas and discoveries. Annual conferences with nation-wide speakers may be created to expand this function. They will be promoting cross-field research and building a library collection on aging. They will be encouraging student involvement by developing a basic course on aging and by stimulating development of more advanced courses in the many related fields throughout the University. They hope to identify an advisor to serve students planning coordinated study in the field of aging. They will be periodically updating the student guide to courses in aging. They will be seeking to reach outside the University community with the creation of a television course on aging and with possible publications in the field of aging. They will be continuing toward their goal of eventually establishing a Center on Gerontological Development—a center which could serve the entire upper midwest area.

Members of the All-University Council on Aging

Eleanor Anderson, Public Health Nursing
Nancy Anderson, Public Affairs
John Brantner, Health Care Psychology
Shirley Clark, Academic Affairs (ex officio)
Harlan Copeland, Curriculum and Instruction
*Mary Forciea, Internal Medicine
*Karen Foy, General College
Floyd Garetz, Psychiatry
George K. Gordon, Hospital and Health Care Administration
Richard Hey, Family Social Science
Reuben Hill, Sociology
William Hoffman, Social Work and Continuing Education
*Carol Johnson, Adult Education
Hugh Kabat, Clinical Pharmacy
Judith Kaplan, School of Social Development, Duluth Campus
B. J. Kennedy, Medicine
Frank Lassman, Otolaryngology: Physical Medicine and Rehabilitation; Communication Disorders. Vice Chair of the Council
*David Mangen, Sociology
Donald McTavish, Sociology, Chair of the Council
Manfred Meier, Health Care Psychology
Kevin Navarro, Pharmacy
*Mary Ann Reitmeier, Social Work
Etta Salochin, School of Social Work
Vera Schletzer, Counseling, Continuing Education, Extension
Thomas Scott, Center for Urban and Regional Affairs (ex officio)
Wendell Swenson, Psychiatry and Psychology, Mayo Clinic, Rochester
Caroline Weiss, Leisure Education, Recreation and Park Administration
*Stephen Wellington, Public Affairs

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ADDRESS CORRECTION REQUESTED

VOLUME VII, Number 3 June 1977

The Center for Urban and Regional Affairs was established to help make the University of Minnesota more responsive to the needs of the larger community and to increase the constructive interaction between faculty and students, on the one hand, and those dealing directly with major public problems, on the other hand.

The CURA REPORTER is published by CURA to provide information about:
- what CURA projects are doing,
- related programs and projects in the University,
- related programs in other Minnesota colleges and universities, and
- actions outside the educational establishment which affect our plans and programs.

Comments and contributions are welcome. Thomas M. Scott, acting director; Thomas L. Anding, associate director; William J. Craig, assistant director; Judith H. Weir, editor.