

Gilbert F. White

1911-2006

Great Aspirations: Local Studies, National Comparisons, Global Challenges

Gilbert White's seven decades of professional life were nurtured in Chicago, begun in Washington, practiced in Africa, Europe, and North America, and matured in Boulder, Colorado. Over time, he aspired to help address some of the great global challenges of nature and society, but in keeping with his essential humility, these aspirations grew slowly, encouraged by the expanding scale of his scientific research. Almost always they began with local and place-based studies of what people actually did and thought about in their use of the environment, in adjustment to hazard, in management of resources, and in their relationship with people and nature. Then, always working with others, local studies were compared, and if sufficient, merged into national assessments, and compared in turn with the experience of other nations. These, then would become major contributions of scientific research to what became global grand challenges of sustainable development.

To illustrate, I identify five of these great aspirations listed in chronological order by what appears to me to be their published beginning. These are:

- Bring safe water to all the world's people as a human right
- Reduce significantly the global toll of hazard deaths and damages
- Facilitate peace through joint water development and management
- Make geography (in particular) and science (in general) more useful to the world
- Enable people to coexist with nature and develop sustainably

Not all of these follow the full evolution from local study to great aspiration, but all reflect this development. For each I briefly lay out the body of research and practice that is drawn upon, the main messages that emerge from these findings, the societal responses to them, and the current state of success in meeting the global challenges. As often as I can, I use Gilbert's own words.

All of these great aspirations began here in Washington, but reflect as well Gilbert's earlier two decades of life as he described:

Each of us looks at the world around us from a unique background. As a boy living in the neighborhood of the University of Chicago and working summers on a Wyoming ranch along the

Tongue River, my mental images were a mix of Gothic academic campus, raw city streets, lakeshore, semi-arid mesa, mountain forest, and tumbling river. The world beyond was successively war-torn, booming, and then depressed. It had a special natural character for me because of the vision and tribulations of a neighbor who had fought to establish the National Park Service. As I attended the high school founded by John Dewey and went on to the University of Chicago, where in parochial fashion, I received three geography degrees, there was a lively interest in a field called “ecology.” I took university courses in plant ecology, urban ecology, and in a discipline—geography—that my mentor, as president of the Association of American Geographers, defined as “human ecology”(Barrows, 1923). Geographic field work in the early 1930s exposed me to Wisconsin fisheries, Ontario forests degraded by smelter-fumes, decaying British estuarysides, a celebration of colonialism in Paris, well-tended Alpine meadows, and Berlin students debating the merits of Hitler versus Hindenburg.

These were among the images contributing to the view of the world that I brought to Washington, DC in 1934 to work in the New Deal. I soon identified with others who saw themselves as devoted to getting the country back on track. (White, 1994:2)

Gilbert was 23 years old, an ABD—all but the dissertation, when he joined his mentor Harlan Barrows as a research assistant to help prepare a report on the Missouri river basin for the Mississippi Valley Committee of the Public Works Administration. He stayed eight years, moving from the staff of one resource committee to another as planning and policy shifted in the New Deal, and ending finally in the Bureau of the Budget. It is in Washington that his nascent analyses of water and flood hazard began, his commitment to peace and non-violence took shape, his understanding of the opportunities and limits for geography and science to influence public policy was formed, and an underlying imperative to co-exist with nature emerged. But it is also here that his love and partnership with Anne Underwood ensued, his amazing network of friends and colleagues was shaped, and his skills as researcher, facilitator, and synthesizer developed.

Bring safe water to all the world’s people as a human right

And it is here in Washington that Gilbert wrote his first published paper for the *Journal of the American Water Works Association*—a report of a national survey of the effect of the great drought of 1934 on public water supplies. The drought of 1934 was then the most serious in American history since the time of settlement and led to widespread reports of public water shortage and the need for government remedial action. Searching for an appropriate response the staff of the fledgling Natural Resources Board sought empirical data and initiated a national survey of public water systems with the assistance of the Water Works Association. They assigned the preparation of the report to the most junior member of the Water Planning Committee.

In his sparse, concise, hyperbole-free style, White found that despite the serious and widespread drought, public water supplies were adequate and only 2% of the population served suffered shortages, and these were in specific regions with drought, limited groundwater resources, and inadequate development of supply. And in what would set a pattern for his lifetime, Gilbert discovered the values of empirical data in public policy decisions, of collaboration with practitioners in obtaining it, and of publication in sharing it.

Gilbert went on to study and write about industrial water use, river basin development, and arid lands, but did not really return to water supply until the 1960s. Offered support by the Rockefeller Foundation he and Anne decided, because of their interest in decisionmaking, “to look into the most elemental of decisions made about water and see if that could not provide some new insights into water management.” Joined with David Bradley, an epidemiologist and expert in tropical disease they chose East Africa for both its diversity of culture and environment and similarity with the two-thirds of the world who drew their water from a source outside the household.

We went into about 35 different sites and inquired about how people decide to use water... We did something rudimentary but nobody had done before. We found out where they got their water, how much they used, and what it cost them to use it in terms of time, energy, and health. ... the three of us produced first examination of what is involved in carrying domestic water to a household, and how people make their choices as to where they go. In almost all cases people have alternative sources from which they can draw water. Thus, they make two decisions everyday: how much water they draw, and where they will go to get it, which involves who will go to get it, generally “she.”. (Reuss, 1993:72)

Drawers of Water, published in 1972, did more than that and challenged prevailing dogma in a number of ways (Thompson and Cairncross, 2002). It created a new typology of water-related diseases based on modes of transmission rather than pathogens as a key to the interventions that could reduce their incidence. It asserted that more water (not necessarily cleaner water) was needed for health if used for washing people, clothes, utensils and food. It found that providing water sources closer to users do not necessarily increase consumption. And it called for more diverse and flexible approaches for providing access—in rural areas more use of community and individual initiatives, in urban areas more use of single-taps and standpipes. Today most of these findings are part of good practice.

In 1973, a year after *Drawers of Water* was published, White addressed the global challenge of providing healthy water supply for all the world’s people by moving from a view of water as a good to water as a human right. He then gave voice to his great aspiration:

In a period of twenty-five years [1998] would it be practicable to improve the water supply for those populations now inadequately served so as to provide water supply and sanitation with low or insignificant health hazard to 95 percent of the human family?...If we extrapolate the trends of the past decade for ninety developing countries the answer is “no”: over three decades at least half the rural population, or more than 1.5 billion people, still would not enjoy the benefits of improvement. If we assume that the level and tempo of technical development, administrative management, and training and education are stepped up as part of an international initiative based on helping governments to enable people to claim their right to clean water, the answer is a hopeful “yes.” (White, 1973, in Kates & Burton, 1986:372-3)

Unfortunately, Gilbert’s 1998 projection of the then current trends was exactly right although a little improved since then. Today, an estimated 1.1 billion people are without access to safe water. And in East Africa 30 years after *Drawers of Water*, a remarkable restudy of their original villages, using the same random sampling scheme, found that while more people had access to piped water supplies, these supplies were failing more, over-stressed by lack of maintenance and a population that had increased threefold. Consumption per capita had declined by 50% in urban piped households, and while doubled in rural areas, had declined overall by 30% in thirty years.

Recognizing that campaigns that aimed to bring “water and sanitation for all by 1990” had failed, the United Nations replaced it with the Millennium Development Goal of cutting in half the number without access to safe water by 2015. The latest estimates project that this more modest goal will be met overall in 2015 except in Sub-Saharan Africa and the Arab States. In these two regions, at current rates of improvement, it would be 2040 before the “halfway there” goal is reached, thus globally, there will be some 800 million people still needing access to safe water in 2015. Bringing safe water to all the world’s people remains a grand challenge.

Reduce significantly the global toll of hazard deaths and damages

It is also here in Washington that White’s most important and sustained aspiration began—to reduce natural hazard deaths and damages. Beginning in 1934 White reviewed flood control proposals intended to reduce the future toll of lives lost and property damaged —“a goal” he writes, “about which I soon became skeptical” (White, 1994:3). “Floods,” he would write in the late 1930s, “are acts of God, but flood losses are largely acts of man. Human encroachment upon the floodplains of rivers accounts for the high annual total of flood losses.” (White, 1945:2)

His skepticism that flood damages could be reduced by dam, levee, and channel construction led White to consider how users and residents of floodplains might adjust to recurrent flood hazard. He did this in his dissertation, *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United*

States, the most influential dissertation ever written in American geography. Begun in 1938, he completed it in 1942, just days before leaving for voluntary service in Europe. In it, he described eight forms of human adjustment to floods: elevating land, abating floods by land treatment, protecting against floods by levees and dams, providing emergency warning and evacuation, making structural changes in buildings and transportation, changing land use to reduce vulnerability, distributing relief, and taking out insurance.

He then concluded with some principles. Public policy should recognize that while all possible adjustments should be considered, adjustments are not neutral but rather can favor one form of floodplain use over others. To identify appropriate floodplain use, public policy should weigh the full range of social costs and benefits incurred by society in employing these adjustments, not merely the costs and benefits that are easy to measure.

But further work on these principles awaited White's return from service in France, internment in Germany, a stint at a college presidency, and a return to the University of Chicago. There he launched a fifteen-year effort to categorize the various types of floodplains across the United States and the adjustments that make possible their use (Burton, 1962; White et al., 1958), to identify the range of possible adjustments (White, 1964) and people's knowledge of them (Kates, 1962), to consider promising but underused adjustments (Murphy, 1958; Sheaffer, 1960), and to compare the full range of social costs and benefits in particular places (White, 1964).

Building on these research findings, a new public policy emerged and within a decade had become part of a Unified National Program for Floodplain Management (U. S. Water Resources Council, 1979) that included not only flood protection and relief but a broad set of alternatives including floodplain maps, insurance, zoning, and building construction.

The effort to broaden the choice of adjustments was applied to other hazards: coastal flooding, coastal erosion, drought, earthquake, hurricane, and the hazards of a place, beginning with empirical place-based studies. These were then extended globally in an international collaborative study of nine different hazards under the aegis of the International Geographical Union at 40 sites in 17 countries. Building on the local studies, comparative national assessments in a developing and developed country were carried out for flood, drought, hurricanes, and air pollution. And these in turn were followed by a national assessment for the United States that included the full range of natural hazards and constituted a major interdisciplinary effort.

By then White had moved from the University of Chicago to Colorado, and created a center for Natural Hazards Research and, since 1975, an annual summer workshop to bring together academic researchers practitioners, and policy makers in hazards management.

A major finding from the various national assessments was the differential in hazard social costs between developing and industrialized countries. An estimate published in 1980 found hazard induced mortality from geophysical and biological hazards 3-5% of annual mortality in the U.S. and 10-25% in developing countries. The social costs of hazard were 2-4% of annual GNP in industrialized countries and 15-40% in developing countries. In 1978, Ian Burton and I joined Gilbert in a great aspiration to reduce significantly the global toll of hazard deaths and damages. We estimated that it was possible to reduce the loss of life from hazards worldwide by 80-85% and property damages by 45-50% through a comprehensive application of best practice adjustments.

Given this large potential for development from reducing the global toll of hazards, Gilbert initiated efforts to interest the United Nations Development Program, the World Bank, and other international agencies in hazard reduction, work that Ian Burton continues to this day. But the international commitments have to date been modest. In the 1990s, an International Decade of Natural Hazard Reduction emphasized a narrow range of forecasting and engineering adjustments. Indeed during the decade hazard losses continued to rise, by one estimate threefold during the decade as compared to the previous one.

In the three decades since we estimated the potential to reduce hazard deaths and damages, a different data set recorded 6,400 natural disasters that had killed more than 2 million people, affected a cumulative total of 5.1 billion individuals, left 182 million homeless, and caused \$1.4 trillion worth of damages. Over those thirty years the number of recorded disasters increased 3.8 fold, while the number of victims, controlling for population growth, increased 5.0 fold. And on the positive side, while the number of victims had risen, the number of deaths had declined.

Thus in the last paper that we wrote together, “Knowing Better but Losing Even More: The Use of Knowledge in Hazard Management,” we posed the question as to why, despite our much increased hazard knowledge and many best practices for a wide range of adjustments, do losses continue to rise?

In industrialized countries, we noted, disaster losses have grown with population and economic growth, but they have not increased significantly as a portion of national wealth. In the United States and other developed countries there is abundant knowledge, yet the many programs to reduce losses from natural hazards have often proven ineffective. Flood control projects have served to encourage more floodplain development. Federal disaster assistance in some areas has encouraged continued occupancy and repetitive losses (Conrad, 1998). Earthquake building codes have not been properly enforced. Land use regulations have been opposed through aggressive legal action and have often been applied with a lack of conviction. Insurance, even when coupled to land use regulation, has probably

increased losses by encouraging growth in hazardous areas. (U.S. Congress, 1966)

In developing countries, given the greater accessibility of knowledge and information, fundamental knowledge is adequate. Yet disasters continue to take people, communities and governments by surprise and insufficient preparation has been made to deal with emergencies, even though this has been a major thrust of international activity. Longer-term and more farsighted programs to reduce vulnerability through disaster mitigation are conspicuous by their absence. This reflects both lack of resources and other pressing priorities. The growth in vulnerability through population increase, urban expansion, economic growth, wealth inequity, and diminution in traditional means of adjustment overwhelms the modest efforts to manage hazards. Disasters in places as different as Honduras and El Salvador, and Pakistan, Indonesia, and Turkey tell of expanding human settlements, with people, often poor, forced to live on faults, floodplains, hillsides, and mountain slopes and in poorly constructed and inspected buildings. In many countries the problem is made more difficult by the inability or unwillingness to address the underlying poverty, inequalities, and corruption that make for greater vulnerability. Now, as the possibilities of more intense and/or frequent droughts, fires, floods, and storms are enhanced by global warming, hazard reduction is still a grand challenge despite the encouraging but slow reduction in hazard deaths.

Facilitate peace through joint water development and management

For Gilbert, peace was always a great aspiration—internal peace through daily meditation, commitment to peace begun in Washington, DC at the Florida Street Meeting of Friends, rejection of war as a conscientious objector in World War II, as a witness for peace in refugee service in France, and in major international initiatives designed to bring together peoples or bridge conflicts. A few of these initiatives seemed independent of his geographical science, for example his 45-year-long effort in facilitating Quaker conferences of diplomats that brought together between the 1950s and 1990s some 2000 diplomats from 90 countries.

But the clearest integration of his science and his aspirations for peace began with his great aspiration of 1963 that the integrated development of the lower Mekong River could provide “a peaceful and honorable resolution of the conflict [then] in South Vietnam and Laos.”

It is just barely possible that out of this most incredible of places—the swirling political caldron of Southeast Asia—may come a new pattern for international action in harnessing nature’s riches to achieve peaceful change. (White, 1964, in Kates & Burton, 1986:184)

The possibility of harnessing nature's riches to achieve peaceful change began for White in Washington and in the integrated river basin development of the Tennessee Valley. Then in 1956, he joined an expert panel of the United Nations on how to foster cooperative international action in integrated river development. This was followed by chairing a Ford Foundation consulting group on the social and economic aspects of developing the Lower Mekong in Southeast Asia. As the war deepened in Laos and Vietnam, he developed an audacious proposal for a fourth alternative to those of expanding the war:

The Lower Mekong River may be the key to a fourth course of action, a more constructive and humane one than any of the others. For the imaginative scheme to manage the winding streams and alluvial soils of that great basin now provides a framework within which all nations could join their technical, financial, and police assistance under the United Nations flag in working toward a concrete goal. The attractions of taking positive international action based on indigenous plans for the Lower Mekong are obvious. The difficulties for getting agreement are great and have not been fully assessed. But they should be explored with all of the energy and skill now going into war plans. (White, 1964, in Kates & Burton, 1986:177)

Gilbert published his proposal in the *Bulletin of Atomic Scientists* and the American Friends Service Committee circulated it to a thousand recipients. Through contacts with the White House it reached President Johnson who addressed possible investment in Mekong development in a later speech. But years later Gilbert would wonder what might have happened had the Ford report been received earlier and was more forceful in providing an alternative to the intensifying war. Despite this failure, the indigenous effort at planning and development uniting Cambodia, Laos, Thailand, and Vietnam continued through the war and its aftermath, and the latest Mekong River Commission Strategic Plan for 2006-2010 has just been released with plans for more effective use of the Mekong's water and related resources to alleviate poverty while protecting the environment.

White went on during the long Cold War to encourage the creation of international scientific action on a variety of major problems. But accompanying these efforts was his desire to keep open channels of dialogue, especially between the U.S and the USSR. He organized an extended riverboat field trip at the International Geographical Union's meeting in the Soviet Union in 1975 with equal numbers of Soviet and foreign participants. He worked to improve his Russian language skills and was elected to the Russian Academy of Sciences.

But his years of effort not only on river basin development, but on water supply and arid lands offered another albeit modest opportunity to help bring peace through joint water development and

management. As chair of the Committee on Sustainable Water Supplies for the Middle East, he described the effort:

Representatives of the principal science councils of Israel, Jordan, the Palestinian Authority, and the United States first met in Washington, D.C., in 1994, to consider ways in which they might collaborate for the mutual benefit of their communities [and] concluded that the most critical of these problems was ensuring sustainable water supplies in the Middle East.

Notwithstanding a good deal of discussion in international scientific circles, there have been very few attempts to apply definitions and measurements of indices of sustainable development of water resources in a unified fashion to one area.... There has also been a notable lack of integration of social and economic considerations with considerations of ecosystem health and services, especially as they are related to biodiversity. The committee sought to canvass the full range of alternatives—physical, biological, and social that might be considered in sustaining the water supplies of the study area. ...

While during the period of the study the international political scene in the study area was marked by tensions and contending charges, this situation did not color or interfere with the participation of committee members or scientific agencies from which they drew information and expert opinion. This final report was unanimously approved by all committee members and reflects a friendly process of frank discussion and mutual learning that it is hoped will be continued by scientists and scholars. This cooperative spirit was seen even in the unprecedented process of peer review by representatives of four political communities. All shared the sense that this was a unique opportunity, a chance to demonstrate the ability of concerned scientists and engineers to jointly help lay the groundwork for peaceful solutions to issues of critical social and environmental import in the foreseeable future. (Committee on Sustainable Water Supplies for the Middle East, 1999: xi)

Today terror and nuclear proliferation have made peace more complicated, but the practice of science to bring together potential adversaries is consistently pursued as for example in the recent Academy interactions with scientists in Iran, efforts by members of the Committee on Human Rights to create joint research projects between Israeli and Palestinian scientists, and in the ongoing struggle to keep open the free flow of people and ideas to international meetings especially here in the U.S.

Make geography (in particular) and science (in general) more useful to the world

And it is here in Washington, Gilbert, observed, intuited, practiced, and experimented with what is now widely recognized as the three necessary characteristics for scientific research and advice to be used in public policy. Such research or advice needs to be salient, legitimate and credible. To be salient is to address real world problems and the search for their solutions. To be legitimate is to have the research and advice result from a fair and transparent process that recognizes the diverse interests of stakeholders, and involves practitioners, and those potentially affected. To be credible the most

authoritative science is brought together from all relevant sources and disciplines and is subject to a stringent review process. He learned these key lessons in helping to identify problems and frame questions, in bringing together diverse agency practitioners and local interests, and in observing the constant tension between advocacy and scientific evidence.

He practiced these in his participation in task forces and commissions seeking to improve water policy, while serving as the young president of Haverford College and in his early years at the University of Chicago. But he begins to shape his great aspiration as president of the AAG in 1961.

The contributions which geographic thought can make to the advancement of society are relatively few, simple and powerful. They are so few and simple that a significant proportion of them can be taught to high school and beginning undergraduate students. They are so powerful that failure to recognize them jeopardizes the ability of citizens to deal intelligently with a rapidly changing and increasingly complex world....

There clearly are several urgent social problems on which geographic discipline has an important bearing. One of these is the tremendous wave of urbanization which is moving swiftly in both industrialized and nonindustrialized countries. Another is the pervasive question of the capacity of constantly changing natural resources to meet future population needs at rising levels of living and technology. Obviously, geographers do not have full answers to either these or other problems which might be stated, but they do contribute important insights. (White, 1962, in Kates & Burton, 1986:166, 168)

White's goal of improving geographic education moved forward, but his encouragement of geographic participation in public policy remains a paradox that is only slowly being resolved today—significant contributions by individual geographers, but the potential for contributions by the field as a whole goes unrecognized.

By 1969, the urgent social problems have in his concern reached a crisis point:

I would be delighted... [if] twenty years from now we all can look back with amusement to those harassed days of 1970 when we entertained serious doubt that man could avoid a nuclear holocaust or genuinely prevent global disorganization or keep from fouling his nest irreparably. Humanity's capacity to do any of these things is new and undisputed. (White, 1972, in Kates & Burton, 1986:316)

Paraphrasing Marx, perhaps unwittingly, he goes on to state his great aspiration for geography:

Let it not be said that geographers have become so habituated to talking about the world that they are reluctant to make themselves a vital instrument for changing the world. This position will no longer do for research, for teaching at the college level, or for teaching at the high school level. It can survive only at the peril of the society which permits its comfortable and encapsulated existence. If we wish to direct geography's very modest contributions to the structuring of new social processes and organization, we can act now in three ways. We can

commit ourselves to a continuing and persistent questioning of our own teaching and research in relation to its definition and reduction of social problems. We can advocate the adoption by our Association of measures to sharpen and support such activity by groups of us here and on the international level. We can give our thoughts to the reshaping of the university as an educational institution.... This is the path on which we should be moving. What shall it profit a profession if it fabricate a nifty discipline about the world while that world and the human spirit are degraded? (White, 1972, in Kates & Burton, 1986:321-2)

Now, 37 years later, none of his great fears have been realized, but there is no amusement as nuclear proliferation has revived fears of a nuclear war, global organization is still a central concern, and greenhouse gas emissions may foul humankind's nest irreparably.

Even as his strongest and perhaps most controversial expression of his wish for salience in what geographers do was being published, Gilbert was at work with Tom Malone in creating a new international initiative for scientific research and advice—SCOPE, the ICSU-sponsored Scientific Committee on Problems of the Environment. By the time Gilbert assumed the presidency in 1976, SCOPE had weathered a period of experimentation to achieve salience, legitimacy and credibility. White was elected to the National Academy of Sciences in 1973, and SCOPE seemed to reflect many of the practices of the National Research Council: questions posed by potential users of research, ad hoc committees, with unpaid and interdisciplinary scientist participation, and vigorous report reviews. For salience it worked on a small set of truly global interdisciplinary problems—biogeochemical cycles, ecotoxicology, human settlement, and land transformation, and needed methods of simulation modeling, communication of environmental information, and environmental impact and risk assessment. For legitimacy, the organization is ensconced in the mantle of the International Council of Scientific Unions, the initiatives do not duplicate normal bench and field science, and funding is modest and from multiple public and private sources. For credibility, it sought balance in its scientific participation, excellence in its major criterion, and it attracted the voluntary efforts of major scientists and subjected their work to a vigorous review process.

Today, Gilbert's great aspiration to make geography in particular and science in general useful to the world continues to move ahead. The much admired National Academies model of tendering timely scientific advice, while drawing on the best interdisciplinary science in response to queries from government and society, is being extended internationally in the InterAcademy Council, in a number of other national academies, and in a major effort to strengthen the academies of Africa.

The unique social invention of international scientific assessments with their combination of scientific independence and rigor, capacity building, and governmental and stakeholder involvement

was an innovation by SCOPE veterans, particularly Bert Bolin of Sweden. Climate change is now in its fourth assessment, ecosystems have just been assessed, agriculture is underway, and new proposals for assessments are continuously offered.

And science itself may be changing with the emergence of sustainability science, described by the *Proceedings of the National Academy of Sciences* as “an emerging field of research dealing with the interactions between natural and social systems, and with how those interactions affect the challenge of sustainability: meeting the needs of present and future generations while substantially reducing poverty and conserving the planet’s life support systems.”

Enable people to coexist with nature and develop sustainably

If research articles in sustainability science now appear each week in the *Proceedings*, and each month in *Environment* magazine on implications for policy, and a library of major sustainability science documents can be found on the AAAS website—Gilbert surely anticipated these developments. For even here in Washington, he pondered how to coexist with nature and yet develop sustainably, how to balance society’s requirements for resources in restoring development to a depressed nation or in alleviating the impacts of drought and flood, while preventing the many cases of “reservoirs that leaked, dams that failed, dams that didn’t serve their purpose, drainage projects that destroyed large areas of wildlife habitat without proportionate gains in economic production.” (White, 1993, in Reuss, 1993:18)

In 1970, at the birth of Earth Day and the environmental movement Gilbert spoke at UCLA:

The high-income countries are enthusiastic about convening in 1972 in Stockholm a world conference on the human environment. The developing countries are far from enthusiastic and have lagged in expressions of interest. Why, it is asked, are the rich countries calling for caution in the use of fertilizers and pesticides and the development of power plants and mineral extraction for a growing population after they, having polluted their environment in the process, arrive at a point of economic and political dominance? The environment issue places in sharp focus the question of what stance the rich will take toward the poor as the income gap widens and export sources are depleted. It should not be a stance of condescension or of moral condemnation of the spawning poor to an eternity of suffering. A new level of understanding and of scientific and economic cooperation will be required. (White, 1970, in Kates & Burton, 1986:287-8)

In 1975, a decade before Dr. Bruntland would begin her work, Gilbert’s offered a view of what would be called sustainable development, stating that

the human race is a family that has inherited a place on the earth in common, that its members have an obligation to work toward sharing it so none is deprived of the elementary needs of life,

and that all have a responsibility to leave it undegraded for those who follow. (White, 1975 in Kates & Burton, 1986: 404

Gilbert, always one to look back and to look forward, shared four views of the earth when he was honored by the Cosmos Club in 1993. He looked back some 56 years before his arrival in Washington at John Wesley Powell and his survey of the arid West from whence he derived the image of *earth surveyed*. Then followed a long subsequent period of an *earth to be developed*, followed by an *earth at risk*. But then returning to his roots in the Florida Street Meeting of Friends, Gilbert concluded with *an earth as spiritual home*, a sacred earth:

The essential point, I believe, is that people around the world in the 1990s are perceiving the earth as more than a globe to be surveyed, or developed for the public good in the short term, or to be protected from threats to its well-being both human and natural. It is all of those in some degree, but has additional dimensions. People in many cultures accept its scientific description as a matter of belief. They recognize a commitment to care for it in perpetuity. They accept reluctantly an obligation to come to terms with problems posed by growth in numbers and appetites. This is not simply anxious analysis of economic and social consequences of political policies toward environmental matters. The roots are in a growing solemn sense of the individual as part of one human family for whom the earth is its one spiritual home.

He concludes as I do tonight:

What an exciting time to be looking back and to be looking forward, in such good company, to the ways the world community views and may view its tenure on earth! (White, 1993:13)