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An Ecological Perspective on Housing, Health and Well-being

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Human ecology is a term that has been used frequently since the beginning of this century to examine some of the relationships between people and their surroundings. This article presents a different interpretation to that commonly used by academics and professionals in the medical and social sciences. The ecological perspective developed and illustrated here stems from an appraisal of many contemporary contributions, and an examination of Hippocrates's treatise "On Airs, Waters, And Places". The perspective presented herein accounts for the impacts of human products and processes on the biotic and abiotic constituents of the environment, as well as the human organism. Feedback from the state of the environment on human activities, and on the health and well-being of the human organism, is explicitly accounted for. It is suggested and shown how this ecological perspective is appropriate for studies of the interrelations between housing conditions, and human health and well-being.

Human ecology is a term that has been used increasingly since the beginning of this century, yet it has been and still is characterized by some confusion, and a lack of consensus about what it means (Catalano, 1979; Young, 1983). For example, human ecology has commonly been equated with studies of the relations between people and their immediate surroundings. Such studies have commonly been completed by academics or professionals with training within established social science disciplines. In sociology, for example, an ecological approach has commonly been attributed to Robert Park, Roderick McKenzie, Ernest Burgess and Louis Wirth. This group of sociologists examined the spatial, social, and economic patterns and processes with respect to the human behaviour of individuals and groups in specific localities (cf. Park, Burgess and McKenzie, 1925). Likewise, ecological psychology (e.g., Wicker, 1979) and ecological geography (e.g., MacArthur, 1972) have examined the

relations between human activities and specific localities or environments using approaches and methods specific to each of the parent disciplines of psychology and geography. Consequently, the term *environment* has been interpreted and studied according to academic traditions that often emphasize the spatial and social constituents in which human activities occur, whereas both the inorganic and biological constituents of the environment have been overlooked. Furthermore, many of these studies do not identify the impacts or consequences of human activities on these constituents. Therefore, it is not unfair to claim that, in general, these contributions are not *ecological* but *environmental* sociology, psychology or geography, because they do not account for the ecosystem in which human beings are but one component. Fortunately, the biological sciences do provide cues for the application of corrective measures to overcome these kinds of shortcomings. These cues now warrant our attention.

Principles for an Ecological Perspective

The term *ecology* was used by biological scientists during the nineteenth century to refer to studies of the relationships between organisms — animals and plants — and their immediate environment. An *ecosystem* refers to a circumscribed environment, all of the organisms and inorganic constituents contained therein and the interrelations between them. From this perspective, it is noteworthy that the environment of any living species (such as communities of insects, or plants) is multi-dimensional, and complex, quite the opposite connotation to that used by many social scientists who refer to “human environments” as if they were a neutral background. In order to comprehend this complexity, it is instructive to recall a distinction frequently made in the biological sciences, between autecology and synecology. Whereas *autecology* examines one biological species, *synecology* analyzes communities of biological species — animals and plants — in terms of their interrelations with the biotic and abiotic constituents of their environment. The relationships between organisms and their environment are examined with respect to at least three subsystems: (a) the organism or community of organisms; (b) the abiotic and biotic environment; and,

(c) the sets of relationships between the organism(s) and the constituents of the environment, including the impact of the organism on these constituents. Although we refute biological analogies of the kind frequently used to interpret the individual or group behaviour and activities of humans (cf. Catalano, 1979), we admit that ecological studies in the biological sciences do provide important cues for social scientists who wish to formulate an integrative perspective for human ecology. This perspective will now be elaborated and illustrated.

What is human ecology?

Human ecology is an holistic, integrative interpretation of those processes, products, orders and mediating factors that regulate natural and human ecosystems at all scales of the earth's surface and atmosphere. It implies a systemic framework for the analysis and comprehension of three logics and the interrelations between their constituents using a temporal perspective. These three logics are: (a) A bio-logic, or the orders of biological organisms; (b) An eco-logic, or the orders of inorganic constituents (e.g. water, air, soil and sun); and, (c) A human-logic, or the ordering of cultural, societal and individual human factors.

It is suggested that this macro-system of three logics regulates the World. Consequently, it is inappropriate to emphasize one set of constituents to the detriment of others. Moreover, it is erroneous to distinguish between the "physical" and the "social" constituents of environments. This definition implies that a contextual approach is pertinent. This kind of integrative approach would examine specific situations in terms of the reciprocal relations between the three logics, both at one point in time, and over an extended period of time.

The interpretation challenges the "Man-environment paradigm", which has consistently been used since Antiquity to distinguish human beings from their "natural habitat", and to claim that the transformation of the material constituents of that habitat by people is an "underlying force" that has guided human history. This point of view creates a dualism between people and their habitat. Such chasms are bridged if it is accepted that it is misleading to study the inorganic, biological

or human constituents of the environment, because they are mutually defined by, and defining components of, one ecosystem in which people are but one constituent. Human attitudes, motives and values influence what people perceive and construe, how they use precise settings, and how they modify them over time. Moreover, the location, composition and organization of a setting has some bearing on how it is perceived and used. In sum, it is not "the people" or "the environment" which should be given priority, or become the methodological unit of study. Rather, the interrelations between the three logics presented above should be examined over an extended period of time in the context in which they occur.

The preceding definition of human ecology can be applied to examine precise subjects, such as housing, health and well-being, bearing in mind the following principles.

First, the interrelations between humans and the constituents of their surroundings are manifested through a wide range of physiological and psychological processes. These processes include sensations and perceptions (which animals also share) but also beliefs, doctrines, ideas and representations, which are uniquely human and now-observable. *The interrelations between people and their environment are not just spatial, nor observable, but also (and indeed significantly) cultural and metaphysical.* Moreover, *these interrelations are not absolute, nor static, but dialectical, and subject to change during the lapse of relatively short and longer periods of time.*

Second, unlike other biological organisms, the sets of interrelations between human beings are characterized by both discursive and reflexive knowledge, including a recourse to symbols, particularly (but not exclusively) linguistic symbols (Leach, 1976). This characteristic is a distinguishing feature between anthropoid behaviour and human behaviour: it has important implications with respect to the human interpretation of landscapes and the biosphere.

Third, the "human environment" can be distinguished from the "environment" of other biological organisms by its instrumental nature. Human products and processes transform the constituents of the environment in order to respond to prescribed aspirations, needs and goals, that are defined both by

individuals and human groups. Nearly all geographical regions of the world today have been used, constructed, or modified by humans for a wide range of purposes. An historical perspective can illustrate these human processes.

Ecological and Historical Explanations

According to some human ecologists, including Boyden (1987), a bio-historical analysis of human civilizations identifies four ecological phases which are defined with respect to the interrelations between the biosphere and human societies, as well as the interrelations between the health and well-being of people and their immediate surroundings. The four phases are: (a) The hunter-gatherer phase, by far the longest of the four; (b) The early agricultural, farming phase, with sedentary settlements, beginning about 400 generations ago; (c) The early urban settlements phase, beginning in some regions of the world about 200 generations ago; and, (d) The high-energy phase, beginning in a few regions, initially on a small scale, about 8 generations ago.

The distinguishing features of these four phases include the cultivation, production and consumption of food, the accumulation of waste products, the construction of human settlements, and the production and use of energy with respect to all the characteristics of daily life. We cannot elaborate on all these characteristics in this short article. However, in the context of this paper, it is important to indicate the interrelations between the distinguishing features of these four phases of human civilization and the health and well-being of people.

Although it is generally recognized that housing conditions have an effect on the health of residents, it is also apparent that it is not pertinent to extract material housing conditions and study them in isolation from other factors which form an integral part of the lifestyle of the inhabitants, and influence their health and well-being. Inadequate nutrition, for example, has an important role to play. Yet, can nutrition only be considered in terms of socio-economic factors, or should seasonal variations in the supply of food, and the lack of facilities for the storage and preparation of food also be examined? Clearly, there are many questions

that medical and housing practitioners, environmental health officers and human ecologists can (and should) ask. Any reply to these questions will ultimately depend on the conceptual framework or the theoretical stance adopted by the respondent.

An historical overview by Catalano (1979) of some of the varied explanations recurrently used to account for human illness, abnormal behaviour, and the health and well-being of communities indicates that some explanations, including those founded on "the germ paradigm" were usually partial and causal interpretations. In contrast, however, some contemporary studies, which Catalano labels "ecological explanations" uphold that the presence of a germ is a necessary but not a sufficient condition for all people to become ill. This kind of interpretation is not novel, but has some antecedents, grounded at least partially, in the works of Hippocrates (460–377, B.C. (?)), a Greek physician who taught at a medical school on the island of Cos. Many accounts of the Hippocratic treatise — some of which are quite misleading — have already been published. Those readers who require more details than those included here can refer to Glacken (1976, pp. 80–115) for an interesting overview. A summary of the Hippocratic treatise "On Airs, Waters, And Places" is presented here with the aim of showing the pertinence of an ecological perspective in order to examine housing, health and well-being in a more comprehensive way than other recurrent approaches such as "the germ paradigm".

The Contribution of Hippocrates

The Hippocratic treatise "On Airs, Waters, And Places", published initially about 2600 years ago, is founded on ethnographical, geographical and medical observations that are worthy of recalling today. Hippocrates maintained that human health and well-being are associated with a desirable state of balance or imbalance between the human organism — the humors — and its environmental conditions. He illustrated this viewpoint by describing the contextual conditions in which some specific populations of Asia and Europe lived. In order to understand the health environmental conditions and lifestyles of specific populations Hippocrates refuted commonly shared

beliefs in divine infliction and providence, and replaced such interpretations by an ecological perspective

...when one comes into a city to which he is a stranger, he ought to consider its situation, how it lies as to the winds and the rising of the sun; for its influence is not the same whether it lies to the north or the south, to the rising or to the setting sun. These things one ought to consider most attentively, ... (p. 190)

There is not doubt that Hippocrates underlines the importance of meteorological and astrological factors in this and other passages of his treatise. Yet, he is also equally concerned with comprehending the impact of micro-climatic factors, biological organisms (both animals and plants), and inorganic entities (namely air, soil, sun, and water) on human health and well-being in precise contexts. Hippocrates, and other medical teachers during the Middle Ages, maintained that the world contained four primary elements: air, fire, water, and earth, which had characteristic qualities. For example:

...and concerning the waters which the inhabitants use, whether they be marshy and soft, or hard, and running from elevated and rocky situations, and then if saltish and unfit for cooking; and the ground, whether it be naked and deficient in water, or wooded and well-watered, and whether it lies in a hollow, confined situation, or is elevated and cold, ... (p. 190)

It could be claimed that Hippocrates, like some epidemiologists, ethnologists and human geographers, presents a case for strict climatic/environmental determinism. Such a claim, however, can be refuted, as Glacken (1976) notes, because Hippocrates not only examines biological and inorganic factors, but also cultural and societal parameters, especially in relation to the work, leisure, and nourishment of specific populations in order to comprehend why the inhabitants of diverse regions of the globe are different:

...and the mode in which the inhabitants live, and what are their pursuits, whether they are fond of drinking and eating to excess, and given to indolence, or are fond of exercise and labour, and not give to excess in eating and drinking. (p. 190)

From these things he must proceed to investigate everything else. For if one knows all these things well, or at least the greater part of them, he cannot miss knowing, when he comes into a strange city, either the diseases peculiar to the place, or the particular nature of common diseases, so that he will not be in doubt as to the treatment of the diseases, or commit mistakes, as is likely to be the case provided one had not previously considered these matters. (p. 191)

Hippocrates noted that the patterns of lifestyle, health and disease in human societies are variable. His interpretation has subsequently been supported by palaeobiological studies of human remains, and anthropological and medical studies in contemporary hunter-gatherer societies (Boyden, 1987).

Hippocrates maintained that it was not the health of the individual, or his immediate surroundings that needed to be considered, but a thorough understanding of the contextual conditions in which people live. This interpretation is far removed from those stemming from "the germ paradigm". It upholds that human health and well-being are grounded in the interrelations between the human organism and its milieu. Moreover, milieu is not equivalent to "personal space" or "residential environment" but explicitly accounts for biological organisms and inorganic entities. In this respect, Hippocrates proposed a perspective and advocated an approach to medical practice which is far removed from much contemporary academic research and professional practice adopted by people who isolate variables from each other and from the contextual conditions in which they occur. Consequently, it has been common practice to study the relations between one indicator of environmental conditions (e.g., noise or air pollution in residential quarters), or one indicator of housing quality (e.g., dampness in the building structure, or the quality of indoor air) and "its effect" on the health and well-being of the inhabitants (Kasl and Harburg, 1975; Jacobs and Stevenson, 1981). Alternatively, measures of the morbidity of resident populations (e.g., psychological strain are related to one dimension of the domestic setting (e.g., floor level above the ground in high-rise housing), as Mitchell (1971) has shown.

Irrespective of the simplifications inherent in research using these approaches, the findings of many studies of this kind have

rarely been replicated in the same or different residential settings, as Churchman and Ginsberg (1984), and Gabe and Williams (1986) have noted. Moreover, much contemporary research usually examines the relations between isolated variables at only one point in time. Yet, there is sufficient information that shows that the aspirations, preferences and lifestyle of people change during the life-cycle (e.g., Stokols, 1982); that the health and well-being of people are neither constant nor mono-dimensional; and that environmental conditions and housing quality vary during the course of time (e.g., Lawrence, 1987). Therefore, one should not only be critical of the limited perspective of many contemporary studies, but also formulate alternative theoretical and methodological principles for future research. We suggest that a human ecology perspective is a pertinent response to this requirement.

Applied Human Ecology to Housing and Health

A human ecology perspective acknowledges three main levels of interrelated sets of variables that account for:

- 1) *The physiological state of individuals*, in relation to human activities; the impacts of these activities on the health and well-being on individuals, and on the condition or state of their immediate surroundings. For example, those human activities which create air and noise pollution, may produce negative effects, such as respiratory illness, deafness, or stress, in the human organism, as well as reducing the quality of air or other constituent of the eco-logic, or the bio-logic.
- 2) *The immediate surroundings of individuals and small groups*; the interrelations between this small scale of the global environment, and the impacts of human processes and products on environmental conditions at this scale; the cumulative effect or impact of human activities and environmental conditions at this scale on the condition or state of the biosphere. For example, air quality and noise levels at home and in work places are influenced by the design of residential and work places as well as the activities that occur in them; the accumulation of air and noise pollution may induce negative effects on human groups and societies, and also lead to the

degradation of the biological and inorganic constituents of human ecosystems.

- 3) *The total environment of the biosphere*; the development of modifications to it owing to human processes and products that utilize nonorganic and biological constituents according to cultural and societal values, norms and traditions. For example, the accumulation of air pollution in precise contexts can often be related to the design and use of the built environment, particularly when natural resources, such as forestry timbers, are used and not replenished; consequently, human activities can lead to an imbalance in the ecosystem. Similarly, human activities can produce toxic wastes, that are harmful for human health and well-being; and if they are not treated prior to disposal they will engender negative effects on the biosphere.

It is important to underline here that the impact of human processes and products is quite different at each of these three levels. Nonetheless, such distinctions at these different levels are not common in many lists of health indicators. The need for such distinctions can be illustrated by a brief overview of some seminal interpretations of human health in relation to the built environment, in general, and residential quarters, in particular.

Health and Housing: a complex subject

Since the early nineteenth century, there has been a growing concern about the quality of the "environment" at various levels or scales, ranging from the quality of building interiors (e.g., indoor air pollution) to the quality of regional and global atmospheric conditions (e.g., the amount of carbon dioxide, nitrogen dioxide, and sulphur dioxide in the atmosphere). It has been shown that the health and well-being of people is not only influenced by the quality of air at these extreme levels or scales, but that atmospheric conditions are simultaneously influenced by human products and processes at these levels or scales. Although we shall not elaborate on the bacteriological, chemical and epidemiological characteristics of diseases due to atmospheric or other conditions in this article, it is noteworthy that the Public Health Movement in England, which began in the early nineteenth century, established correlations between the health and housing conditions of people at that time.

The Contribution of Edwin Chadwick

As Secretary to the Poor Law Commission, Edwin Chadwick (1842) wrote an influential report, which established that those people who lived in sanitary dwelling units generally lived longer than those who lived in slums; and, those persons from the same socio-economic class who lived in the country generally lived longer than those who lived in urban areas. Hence, in general, Chadwick underlined the need to examine the contextual conditions in which people lived: their domestic accommodation, its location and its immediate surroundings, and their work conditions. At another level, he noted that the provision and quality of air, sunlight, water and waste disposal was as equally important as the state of housing construction. Finally, he underlined the importance of the life-style of the inhabitants by noting the ill-effects of overcrowding, inadequate cleansing and ventilation, and the presence of noxious substances.

Chadwick suggested how housing conditions could be improved by sound public administration, and the enforcement of parliamentary laws. The removal of all refuse from dwelling units, streets and roads; and the improvement of drainage, lighting ventilation and water supply we recommended. These recommendations became the foundations of the sanitary and housing reform movement in the United Kingdom during the nineteenth century. From the groundwork accomplished by Chadwick, the condition of dwelling units and their immediate surroundings, became explicitly associated with the Public Health Campaign. In other words, the design and management of housing was related to the broader geographical context in which it was constructed. Concurrently, the provision and condition of the housing stock was considered in terms of economic and political parameters, including property rights, tenure and cost of rent. Consequently, it became the subject of a prolonged, ideological debate, grounded in the notions of *laissez-faire* and *self-help*.

During the course of the nineteenth century there was a slowly increasing involvement by government in the enactment of public health legislation. The Public Health Act of 1875 was a milestone. However, it is also noteworthy that all progress during this period was grounded on the misfounded yet common

interpretation of the transmission of infectious disease by unpleasant odours (e.g., miasmatic vapours). The so-called miasmatic theory of disease, upheld by Chadwick and many reformers, proved to be misfounded and was rejected only after Louis Pasteur and other bacteriologists had made their discovery. This brief overview illustrates that although there was considerable progress in the health and housing conditions of people in England by the end of the last century, e.g., the last outbreak of cholera occurred in 1861 and cases of tuberculosis decreased — all reforms and progress in that field were based on an erroneous theory of the transmission of communicable diseases. (It is important to note, however, that if the role of micro-organisms in the transmission of such diseases had been established earlier, then the reforms outlined above may have been implemented sooner, because such new knowledge would have confirmed Chadwick's recommendations for improvement). Yet, it is also pertinent to note here that any improvements in the health and well-being of the population cannot be limited to the vast range of variables that were examined, because improvements in the clothing and diet of people were but a few indicators of a general improvement in the livelihood of the population during the Victorian era.

Calculating and Monitoring Costs and Benefits

The preceding sections of this article illustrate that it is too restrictive to examine the interrelations between housing and health only in terms of bio-medical and environmental factors. Studies of the housing conditions of the majority of urban populations in England, during the nineteenth century, and in many countries today, confirm that it is also necessary to consider a range of political and economic parameters that structure and function in human societies. The design, management and use of the housing stock is but one set of products and processes of human ecosystems. During the last century, as for today, those people who did not have regular employment, who could not afford to pay prearranged housing rents or fixed mortgage payments, who needed to live in inner urban quarters to be readily accessible to the job market, had (and still often have) the

most unfavourable housing conditions. Then (as now) the advent of "slum clearance" which was explained by the construction of railroads, factories, and road widening projects, meant that vast numbers of these unfavourable housing units were demolished. Consequently, overcrowding increased — not by choice as the advocates of *laissez-faire* pretended — but by economic necessity. These processes, and their consequences were (and still are) the crux of health and housing problems in many cities around the world. Hence, if we adopt an approach like that advocated by Chadwick, we will tackle an important part of the problem, but not its core unless political and economic parameters related to the ownership of land and the housing stock, as well as the domestic economy of households are also considered.

From this perspective, it is noteworthy that although epidemiological studies in London from 1951 presented a cause-effect relationship between air pollution and the high number of deaths, in more recent years, some epidemiologists have shown that a wide range of other factors were involved in the high mortality rates; by addition, the London smog became a catalytic factor that surpassed the threshold of tolerance. This enlarged interpretation related the degree of atmospheric pollution to climatic and microclimatic conditions (e.g., inversion of temperature, wind velocity and atmospheric precipitations); to the use of fossil fuels for heating and energy in the work place, at home, and for transportation between these localities and other services and facilities; and to personal habits related to life-style (such as cigarette smoking, private motor-car transport, daily exercise). The impacts of these human practices and products are numerous and varied: some will be positive, others negative, depending on what criteria are used to assess them.

Many land uses, including housing construction, generate benefits and costs of diverse kinds. The decision to construct a new factory — for a pharmaceutical company, for example — is usually related to the purchase price of alternative sites, the costs of transportation, site services and infrastructure, the cost and availability of energy supplies, and other parameters which are readily quantifiable. Those persons employed in the factory will usually try to choose the location of their residence by

trading off the cost, the distance and travelling time from home to work with access to community services and facilities, the attractiveness of the neighbourhood, and a range of other social and economic parameters. Neither the factory owner, nor each of the workers, is responsible for (or fully aware of) the external costs generated by their respective decisions. Nonetheless, although the factory benefits the local community by providing employment, the production processes it shelters may release nontoxic and toxic wastes that cannot be eliminated, pollute the air and/or subterranean soil, thus creating direct, harmful effects on some inorganic and biological constituents of the local ecosystem. There may also be harmful effects on the health and well-being of the workers and the local population. Likewise each of the workers (like all motorized commuters) will pollute the atmosphere, use nonrenewable fossil fuels, and contribute to noise while travelling between home and work. In essence, what may seem rational for the factory owner or worker (at least in economic terms) may not serve the best interests of the local human ecosystem, at any point in time.

This example shows that the calculation and monitoring of costs and benefits is a fundamental, controversial, and complex function that should be assumed by government, owing to the need to examine all the constituents of bio-logic, the eco-logic and the human-logic in a precise context, at the three levels of interrelations presented earlier in this paper. Environmental health officers, medical practitioners, architects, social scientists, and planners can make an important contribution to the accounting and monitoring of the constituents of human ecosystems. Subsequently, alternative proposals for land uses and housing, for example, can be formulated, tradeoffs can be examined, and compromises can be negotiated. Nonetheless, today so few public or private institutions are examining the benefits and costs of developments and changes for specific communities, or populations, or ecosystems, so that informed decisions are made, costs and benefits are correctly assigned, and negative impacts are reduced. Unfortunately, this kind of approach was not implemented prior to the construction of vast numbers of rental housing units in numerous countries around the world during this century, and especially since the Second

World War as Dunleavy (1981), and Prak and Priemus (1985) have shown. The legacy for current and future generations is a grim one: although many dwelling units were constructed in response to a housing shortage, which many countries faced in the 1920s and 1950s, it has only been in recent decades that the ecological and economic costs of such housing have been studied in detail (e.g., Prak and Priemus, 1985). The condition of these housing units has been related to the nature of their immediate surroundings, and also to conditions in other areas of the city or region in which they are located. For example, some attention has focused on the quality of atmospheric conditions, the micro-climates of housing estates, and indoor air quality. Concurrently, it has been found that respiratory illnesses and diseases are the primary cause of death in European countries today. Moreover, new (or formerly unidentified) diseases have been tabled. One example is *legionellosis*, which comprises two distinct but related illnesses: an infection of the lower lung, known as legionnaires' disease, and Pontiac fever, a non-pulmonary disease like influenza. According to a recent report published by the World Health Organization (1986, p. 1):

Legionnaires's disease accounts for only a small proportion of all reported cases of pneumonia, though the rate of infection is higher in men over 50 years of age. Numerous outbreaks have appeared in recent years all over Europe, North America and North Africa, mainly in hospitals and hotels but also less often in other buildings.

The disease has been associated with conditions in residential buildings. Numerous studies have established that room humidifiers, air conditioning systems and cooling towers, and hot and cold water supplies nurture *legionellae* bacteria and transmit them through the indoor building environment, or discharge them into the atmosphere outside the building. Although chlorination and temperature control are crucial for both hot water supply (not below 60c) and cold water supply (not above 20c), the ecological perspective presented in this article also raises many other issues. One could begin by asking why the water supply has become prone to bacteria, much in the same vein that Edwin Chadwick approached the question of water supply. One could examine the amount of energy

required to pump, filter and heat hot and cold water supplies in relation to the increase in comfort and convenience provided. One could also examine "the need" to install air humidifying, air conditioning and ventilation systems in an increasing number of buildings that have internal rooms or spaces devoid of natural light and ventilation. Apart from the installation, the maintenance and running costs of these services, are there not alternative practices for building and housing design even at relatively high densities? We suggest that the ecological perspective presented in this paper not only raises fundamental questions of this kind, but also enables us to respond to them in a more comprehensive way than has commonly been done in the recent past.

Conclusion

When the health and well-being of individuals and human communities are examined by environmental and public health officials some of their attention ought to focus on architectural, economic and socio-psychological indicators, e.g., the design, the meaning and use of the built environment — which are associated with human health and well-being. Furthermore, when architects, planners and housing administrators examine the built environment, then a range of environmental health indicators, e.g., safety hazards, stressors, nonbiological toxins and other pollutants — need to be considered. This paper requests and suggests that much more attention is devoted to the interrelations between those indicators of health and well-being, as well as those environmental and housing indicators, that reflect the demographic, economic, political and life-style characteristics of local populations. Moreover, the monitoring and the regulation of the condition or state of the biological, inorganic and human constituents of specific human ecosystems has not been widely achieved in a comprehensive manner. This paper indicates that much more methodological research and applications are required before remedial and preventive strategies can be formulated and implemented. The ecological perspective presented and illustrated in this paper can enable professionals, practitioners and laypeople to achieve this goal.

If human ecology is to become an integrative perspective (rather than a multi-disciplinary field), for the study of housing,

health and well-being, then there ought to be an integrative conceptual framework. This paper has briefly presented and illustrated a tripartite framework. In sum, according to this interpretation, human ecology is simultaneously concerned with the impact of human processes and products on the inorganic and biological constituents of the environment, and the reciprocal relations of these impacts on human processes and products. This ecological perspective can generate a coherent body of knowledge by identifying those operant principles that ought to be accounted for in a precise context, at a specific point in time, as well as at larger geographical scales, over a relatively long period of time. These principles define the orders, the conditions, the benefits and the costs that enable human populations, their immediate surroundings, and the ecosystem which supports them to remain sustainable. Using such a coherent body of knowledge, public administrators, politicians, and other professionals in tandem with local populations, could formulate and implement policies that encourage sustainable conditions not just inside dwelling units, but at other geographical scales, from the house, the neighbourhood, the city and region to the world ecosystem.

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