

Architecture for Health – 2050: International Trends in Relation to Healthcare in Poland*

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July, 2004

Abstract

The planning and design of environments for healthcare is complex and at times contradictory. Research and critical discourse to date in his area has been fragmented and has not provided by any measure the degree of support required by the architectural profession. This dilemma is compounded by the enormous capital investment countries around the globe expend annually to promote the health status of their citizens. As a means to help rectify this situation, landmark international developments in the relationship between architecture and health are outlined within a dualistic conceptual framework that is part historical and part futurist. Prognostications for the year 2050 are put forth on issues concerning the rise of alternative care settings to the traditional acute care hospital. This portion of the discussion examines the rising importance of home and community based care, the functions of nature as a therapeutic modality, patient empowerment, the critical need for socially equitable and sustainable environments for healthcare, and the need for new paradigms in the planning and design of therapeutically supportive architectural care and treatment settings. Two developments in particular with architectural currency, functional deconstruction and residentialism, are described

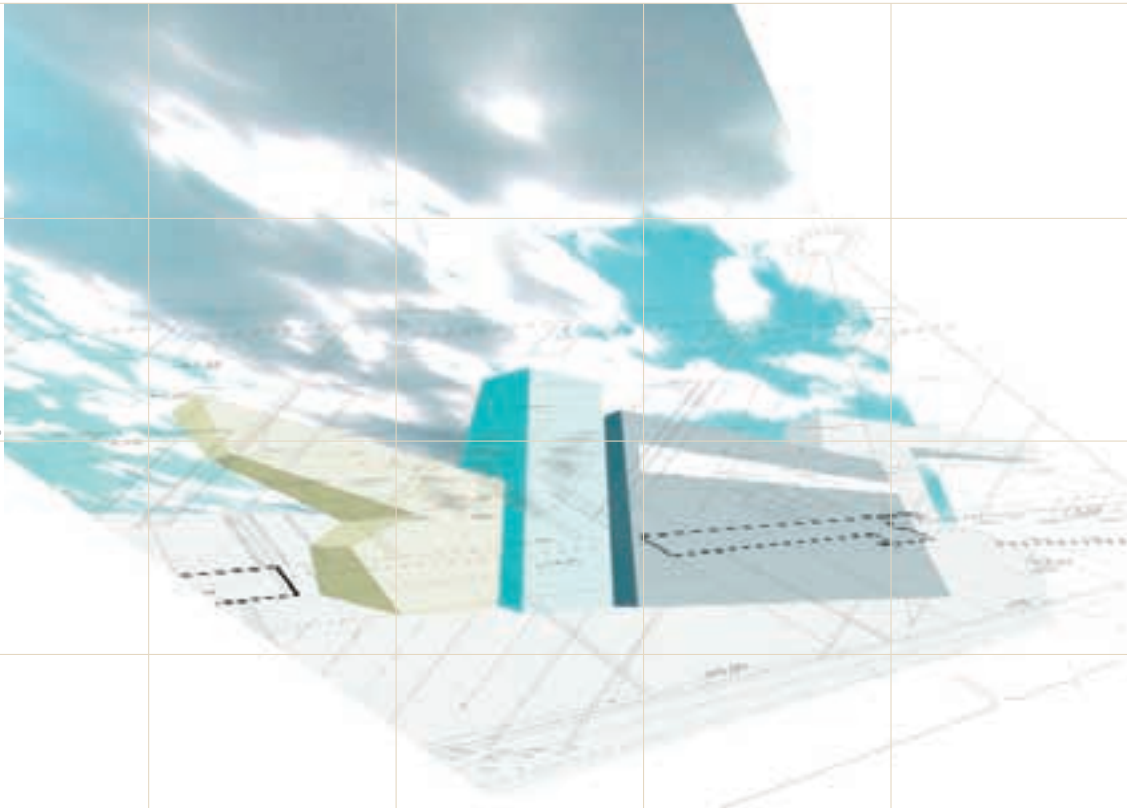
in some detail in relation to the situation in Poland, and the importance of interdisciplinary approaches in meeting the global research and practice challenges which lie ahead in this century.

Introduction

Since the mid-nineteenth century the field of architecture has evolved from a vocation with a singular emphasis on professional practice to a much broader disciplinary endeavor. This process has involved a search for greater professional relevancy to society while seeking to establish autonomy within the community of professions. Relevancy and autonomy, it has been reasoned, correspondingly carry greater stature and prestige than one or the other alone. It has been further reasoned that the generation and legitimization of new knowledge through research carried out within a discipline of architecture would further propel progress toward attaining this aim. By comparison, such a model had been successfully adopted by the medical and legal professions over one hundred years ago as these disciples elevated themselves during the past century to their present positions of relatively high societal visibility and relevancy. In recent decades a discipline of architecture has ever so slowly, pedantically evolved, accruing its own body of

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**Keynote lecture presented at the „Hospital – Architecture, Technology, Economics” national conference held in Wroclaw, Poland, May 23-25, 2004, sponsored by Euromedicare. Accepted to publication in the magazine *Menedżer Zdrowia/Manager of Health*, 2004.



knowledge in a rather haphazard manner (Robinson, 2001). Although precise global statistics are nonexistent the amount of research on this subject has remained scant in comparison to the massive capital resources invested annually around the globe in the name of improving the level of health of societies worldwide. Genuine disciplinary-based contributions to new knowledge in architecture remain in their infancy from the standpoint of their positivist foundations and in terms of truly elevating, i.e. further validating, the field of architecture in its entirety in the eyes of society.

Architectural theory is gradually evolving from a traditional reliance on historical precedent to a position informed by critical analysis and, to some extent, scientific method. As Lang points out (1987), disciplinary activity in architecture remains rather fractured and diffuse largely as a function of the continued, at times random, borrowing from allied fields in the social sciences, the humanities, and the engineering sciences. Lang refers to this persistent, chronic dilemma as the lack of synthesis within and between the major streams of research activity which constitute a nascent *discipline* of architecture. Synthesis in the context of the present discussion is defined as the need to reexamine of precursors, precursors of value in acquiring a useful understanding of the present condition, precursors which can inform a meaningful course for future action.

Critics who argue that research within architecture too infrequently coalesces the three data points of past, present, and future have pinpointed one of the main reasons why the disciplinary knowledge base of the field advances at such a glacial pace. It is essential for historical

perspectives and new developments to be examinable in transverse paradigmatic discourse across time and space without focusing on history alone, nor on the present, or only on the future. The fledgling discipline of architecture can in turn contribute codified knowledge by aiming higher, setting as its goal the eradication of fragmented efforts in a search for relevancy without sacrificing autonomy. This dilemma of non-connectivity continues to have unfortunate consequences for the discipline, for professional practice, and with regards to articulating new pedagogical vehicles in the education of future architects. Broader canvases therefore must be stretched in a discourse, which attempts to interweave precedent, the present condition, and the future. With this said, the three principal aims of this discussion are 1. To view research on the subject of architecture for health in the context of an emerging discipline of architecture, 2. To present a dualistic historical-futurist perspective guided by a chronology of landmark developments, and 3. To sketch some prognostications for the discipline and practice of architecture of architecture for health in Poland for the year 2050.

In the first half of this discussion various periods of development, or waves, are delineated based on the work of Verderber and Fine (2000). 1 International, epochal developments in architecture, health and society are cited which span more than three thousand years of human history. The author owes a debt of gratitude to the work of late John Thompson and Grace Golden, and their landmark book *The Hospital: A Social and Architectural History* (1975) for their articulation of major developments from the age of ancient Greece to the mid-20th century. 2 Unfortunately, due to limitations of space this chronology can function

as little more than an introduction to what amounts to a fascinating, polymorphic, and at times contradictory subject.

The Ancient Period

1. The city-state emerges as the provider of centers for sickness prevention and retreat, and for the patient's communality with the natural environment. Early hospitals in the Middle East and in Asian urban centers are advanced in comparison to their European counterparts.

From earliest times, the cave functioned as a refuge for the care and treatment of the sick and dying. In the earliest Neolithic settlements, a sick house was set aside for the care of the ill as it was considered gradually to be acceptable practice to separate these individuals from the mainstream community. Nonetheless, the bulk of care for most was provided in the home setting, by immediate family members. Later, in ancient Greece, the natural environment was a central component at the Asklepieon at Pergamon. By contemporary standards the typical treatment was based on wellness care, emphasizing a protocol of communality with nature-related treatment regimen, be it water, vegetation, air, more their restorative amenity. The earliest known formal hospitals, later to have a profound impact on European hospital architecture were built in the Middle East, in Iraq, Iran, Egypt, and Turkey (Montague, 1982). Throughout Europe the *sickhouse* and the *deathhouse* evolved as the repository for the disenfranchised, indigent, the insane and the terminally ill. In these buildings patterns of segregation and discrimination dominated the landscape. Healing environments in Japan and in the Far East distinguished between *sacred* and *secular* settings early on. Similarly, Chinese healing environments centered on the home, with the private dwelling as the principal care setting where, in multigenerational settings, younger family members typically provided care for the aged within the household. Across the Roman Empire, following the fall of Greece, military hospitals referred to as *valetudinarians* were constructed as a direct response to the need to repair and return soldiers to battle.

The Medieval Period

2. In Europe, Christian religious orders provide care through networks of monastic hospitals based on cross-ward plans, and the separation of sacred from secular facilities. Precursors to the modern medical center campus evolve. Middle Eastern medical centers continue to be more advanced than their European counterparts during this period.

With the fall of Rome in the 4th century chaos ensued across Europe. Deadly plagues such as the *bubonic* plague swept through entire communities in a matter of days, at times killing more than 90% of the inhabitants. With the decline of secular city-states the Catholic Church emerged to fill the void in healthcare across Europe from the third through fourteenth centuries. A mainstay of medicinal care throughout this period, *bloodletting*, was relied upon in the treatment of a vast assortment of ailments, diseases, and sicknesses. Later, the antecedents of modern scientific surgical procedures would be introduced as a progressive alternative to medieval treatment protocol.

Gradually, the Catholic Church, with its singular emphasis on faith as the means to redemption and salvation (if not recovery, which seldom occurred) came de-emphasis of the amenity of nature as a treatment modality. The virtual disappearance of the incorporation of nature in this manner in Western health institutions would last until the rise of wellness spas in the late nineteenth century. In contrast, the therapeutic amenity of nature would remain a central concern in Far Eastern care settings. Hospitals in Cairo and Baghdad were considered more advanced than their counterparts in central and northern Europe with respect to scientific medical advances, and with respect to the influence of architectural responses to climate in the mosque hospitals built during the Middle Ages.

In villages and cities in medieval Europe a social order emerged whereby social misfits, undesirables, the disfigured, disabled, and the infirm were sentenced to miserable institutions by public decree. In large cities vast institutions de-evolved into hellholes for these outcasts. Physicians and hospital administrators first achieved a modicum of autonomy and self-sufficiency in terms of social status and influence in the scope and quality of care at this time. Fortifications were built to protect monastic medical centers. Within the compound were myriad secular structures, all of which supported the function of sacred space – the church-wards. Infirmaries and “accident rooms” were created for the on-site care of the sick and injured.

In the 9th century AD, St. Gall's monastic hospital was constructed in what is now Switzerland. The Cluny Monastery was built in France, shown in 1157. Dozens if not a hundred or more such medical centers were built although the exact number remains unknown. The concept of care centered on each patient hearing mass

each day from one's bed within the large open ward, as close to the alter as practicable. Single wards eventually were expanded into replicated cross-ward open plan monastic chapel-wards on a single site. These chapel-wards were places of disease, displacement, illness and utter misery. The hospice at this time first appeared as an alternative: part inn-part infirmary, providing counterpoint to the hellish conditions of the chapel-ward. These waystations served capably during the Crusades (as do their contemporary successors up to the present day), affording respite for the sick and the dying.

A new building type, the insane asylum, was developed as the repository for the mentally ill and for social outcasts. In urban centers vast medical complexes were built, housing upwards of a thousand beds each, such as the Hotel Dieu in Paris, operated at first by the church and later in partnership with local government. Increasingly, in municipalities with public governmental (non-feudal) rule, local authorities controlled admittance to the hospital. Vast plague hospitals, such as the Ospedale Maggiore in Milan, were constructed with public funds and then subject to neglect due to chronic underfinancing.

The Renaissance

3. Hospitals are now designed and built principally to emulate palaces of the period. The public hospital emerged as the successor to the donor hospital, i.e., a hospital donated as an act of charity by a wealthy philanthropist or private benefactor. The advent of humanism which places "man" (human) at the center with attendant interest in the workings of the human body. Scientifically based medical education and practice proliferates during this period.

The Renaissance, which flourished in Italy in the 15th and 16th centuries, represented a reawakening of interest in classical antiquity and in the idealization of the cultural values embodied in classical thought and governance. The Abbot of the medieval medical center had overseen a vast staff of ward superintendents, logistical support assistants such as bookkeepers and dietitians, and ward attendants.

For the insane, new techniques were developed to maximize control of the patient-inmate, such as in the 17th century at Bethlehem (Bedlam) Hospital in London. Bethlehem Hospital typified the style of neoclassical architecture as expressed in healthcare facilities. Its stately appearance, from the exterior at least, was to convey a noble face

(facade) to the world. Within, however, conditions for the patient-inmate were deplorable. The private room, by no means a recent invention, having first appeared in private rooms for the influential in early monastic hospitals, essentially was for the benefit of the upper classes. Meanwhile, the lower classes continued to be relegated to immense, unkempt, disease-ridden, hellhole wards, often three or more per straw mattress. At the palace hospital in Wurtzberg, Germany (1576-1585) and similar institutions built in the same period in Italy, England, and France, the chapel diminished in physical size, placement, and importance, paralleling the rising status of organized, scientifically based medicine.

"Advanced" (or so-called) care philosophies for the mistreatment of the maladaptive insane were personified by the invention of the *straightjacket*, first used at St. Thomas Hospital in London in the 18th century. Nature vastly diminishes in importance in Western culture. The large, and frequently, multiple courtyards dominating the palace hospitals of the Renaissance become more diminutive in size and eventually disappear entirely from urban hospitals constantly expanding on land-starved sites in dense urban neighborhoods. Based on the writings of Jeremy Bentham, among other leading healthcare facility experts, a new prototype developed, the *Panopticon Asylum*. The Glasgow Asylum (1801-1810) was among the most significant of this new building type. The amenity provided for the inmate was negligible. In a parallel development, The Ecole des Beaux Arts in Paris was established by the French government at this time to promote neoclassicism, the official style which would dominate European and to a certain extent international architectural movements, hospitals notwithstanding, until the early 20th century.

The Nightingale Period

4. The modern transposition of effective medical and nursing principles into architectural form occurs beginning with the work of Florence Nightingale. The Nightingale ward, and later, adaptations of Nightingale principles to the "skyscraper" hospitals occur internationally.

Innovations in the design and function of the hospital were incorporated in the colonies ruled by the British Empire during the 18th and 19th centuries. The political pressure back at home to succeed at war elevated the overseas military hospital to a level of critical importance. This trend would manifest in a period of healthcare architecture dominating a period of

approximately eighty-five years (1860-1945) beginning with the work of Florence Nightingale and ending with World War II (1941-1945). Nightingale was dispatched to the front lines of the Crimean War in Turkey, in late 1855 in a last ditch attempt to reform a failing makeshift barracks hospital. At *Scutari*, in a converted military installation atop a bluff fortification, she encountered a mortality rate unacceptably high. Prior to her arrival nearly 11,000 out of 14,000 troops were housed in the infirmary or deemed too sick to be designated as battle-ready. The ensuing scandal caused a Parliament to fall.

Meanwhile, an engineer named Brunel designed and constructed a new barracks hospital at Renkioi, Turkey (1855), remarkably similar to what would become known internationally as the *Nightingale Ward*. A prefabricated patient care ward, each housing 50 patients, was designed and pretested in Paddington, England. The hospital at Renkioi consisted of a pair of rows of numerous one level prefabricated wards, built of wood, arrayed along a dual circulation spine. This facility proved highly successful in terms of reducing patient mortality rates. At *Scutari*, with thirty-eight nurses Nightingale transformed a deplorable facility. She was widely praised for this achievement.

Upon her return after the war, Nightingale authored two influential books, *Notes on Hospitals* (1858), and *Notes on Nursing* (1859). Among Nightingale's many innovations were provisions for fresh air circulating within a bright, a cheerful open ward with no more than 30 patients per ward, in a volume 30 feet wide by 128 feet in length, such as at the Hospital of Santa Cruz in Barcelona, Spain. Her functionally driven planning model was modernist in its expression, interiorly at least. Its interior expression was non-ornamental, aesthetically. However, nearly all hospital exteriors continued to be cloaked in the neoclassicism in vogue. Her writings set the standard against which all hospitals would be judged, to a greater or lesser extent, until 1945. This is a precursor to the present practice of the interior healthcare facility planner, in many cases, a specialist apart from the person charged with the design of the exterior of a hospital or related health facility.

In North America, during the Indian Wars waged against Native Americans throughout the 1870s and 1880s, the U.S. Army constructed tent hospitals in the Western sector as a means to provide medical treatment to wounded soldiers. These facilities carried forward advancements introduced a decade earlier, during the American

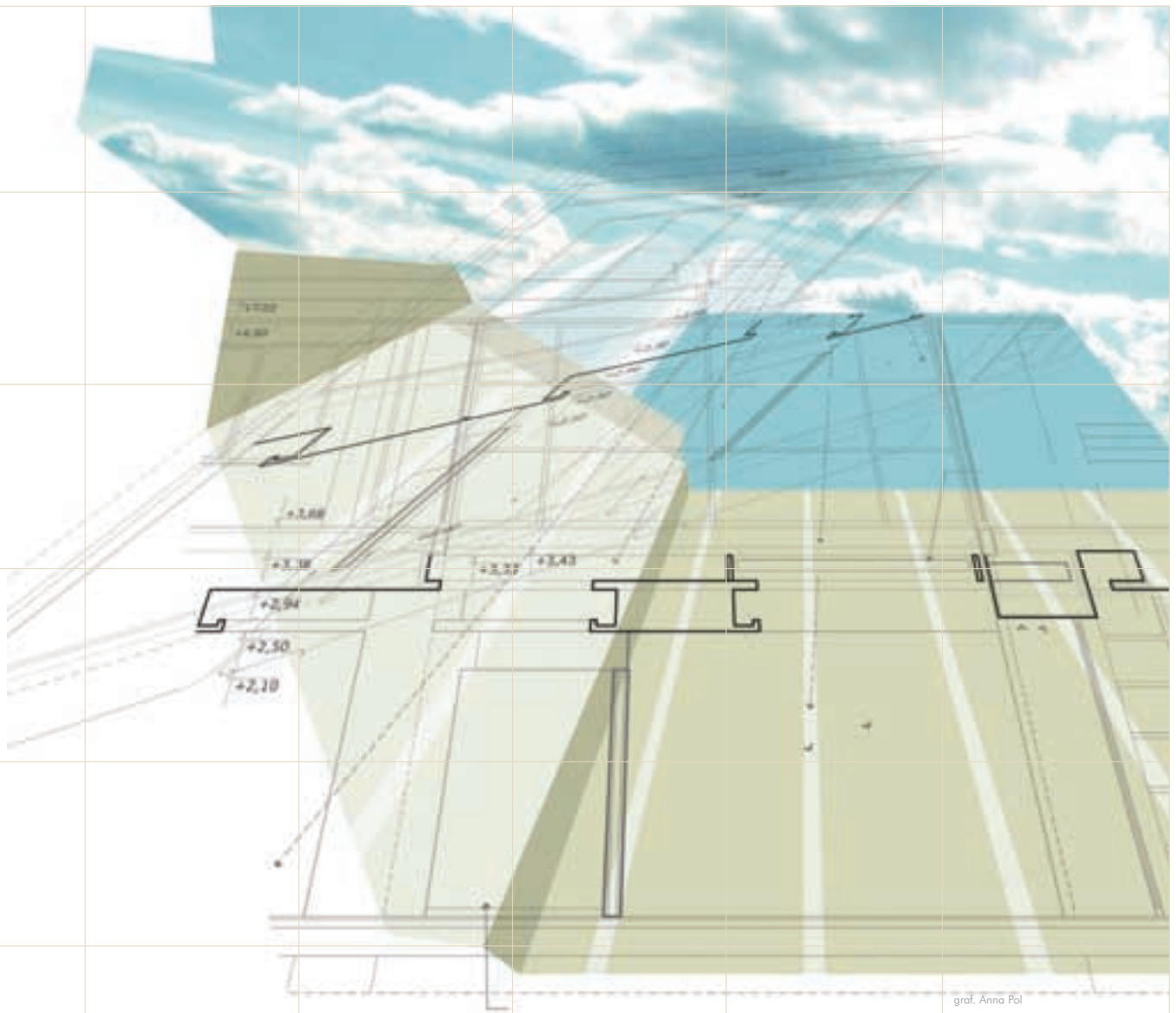
Civil War (1861-1865). High-rise hospitals of the pre-WWII period were first incorporated central *air-conditioning* systems in their adaptation of Nightingale's modern healthcare facility planning precepts. Specialized departments with new architectural requirements, i.e. radiology, appeared, and dramatic growth occurred in the urban centers where they were constructed on "tight" sites. The *Superintendent* answered to a board of directors. Exponential expansionism occurred in order to keep pace with new medical technologies, expressing a mantra of *bigger is better*. Bed capacity was a key indicator of institutional status among peers. As new community hospitals were built in new suburbs new networks of roads were built outward from older urban centers. The private car now made it possible for patients to travel farther distances more expediently for care, fostering an entirely new type of hospital.

Era of the Modernist Megahospital

5. The International Style dominates the hospital as a building type. The movement to incorporate advanced building technologies results in the interstitial hospital movement and the unabated expansion of the modern medical center. Health planning emerges as a distinct profession. Health-based political bureaucracies emerge in countries around the globe. The regional teaching hospital evolves in recognition of the need to allow for internal flexibility and external extension in a highly complex, dynamic organism.

The massive utopian megahospital of the late 20th century represented the apotheosis of an unyielding belief in the power of medical science in the post-1945 era. Beginning in 1946, the race was on to construct ever larger and more complex hospitals and medical research centers, often occurring at the expense of long-established ethnic neighborhoods often disfigured in the name of urban renewal. Medical centers were transformed in a single decade (1946-56) into behemoths of unprecedented urban scale and complexity – as "medievalist" enclaves. By the 1960s, critics assailed hospitals as frequently being obsolete from opening day. Chronic renovations, upheaval, and premature obsolescence in the face of dramatic advancements in medical science and technology gave rise to a new wave of thought.

The *interstitial* hospital was conceived as a vehicle capable of responding to the period's hyper-accelerated rate of change in the healthcare landscape. Architecture was a delimiting force in the view of many an administrator and medical chief of



graf. Anna Pol

staff. The hospital had to become anticipatory, no longer solely reactive to external determinants. Interstitialism was to promote "infinite" internal flexibility – universality – achieved by intermittently stacking one layer of a, say, patient care floor, with technical support floor either directly above or below. One of the largest of the megahospitals, the massive McMaster's Medical Center in Hamilton Ontario, which opened in 1972, was to represent the ultimate response to the architect's curse of accelerated facility obsolescence. Its proponents asserted the interstitialist hospital was to be reinventable one hundred years or more into the future. Soon it was learned, however, that it cost as much as 30-40% more in initial construction costs to incorporate interstitial systems. Compromises appeared such as partial interstitial systems where only one half or one third of the total floor areas per floor were served by an unoccupied support floor, such as at the St. Mary's Hospital on the Isle of Wright, in the UK. Many hospitals in developed nations which in 1980 operated 800-1000 beds by 2000 staffed hundreds fewer beds.

The Virtual Healthscape and Architecture

6. The downsizing and redeployment of healthcare services expresses a pattern of functional

deconstruction within the postmodern hospital. A hub (mothership) and spoke (clinic) system of care delivery widely disperses care to an increasing number of small-scale facilities in community outpatient settings. Accordingly, smaller concentrations of beds for inpatient care are required in acute care hospitals. Increasingly, the hospital is a last resort and reflects the failure of primary and secondary care systems to prevent illness and disease, caring only for the sickest of the sick. Information technology and the Internet emerge, providing assistance in the promotion of sickness prevention. A digital divide persists globally, as does the inequitable distribution of services. Healthless versus healthful societies emerge, in the extreme. Health promotion, sickness prevention education, and self-empowerment is occurs, inhibited by a global discrepancy between high tech versus low tech societies and conflicting priorities between private and public agencies. Inequitable access and poor quality of healthcare for the poor and disenfranchised remains at critical levels on an increasingly populated planet.

A new period in the ontology of architectural movements in healthcare appeared at the end of the century, synchronous with the advent of the

Internet and World Wide Web. The Internet, functioning as the primary source of global communications over the coming decades, is fostering innovations in healthcare and in architecture for health. New developments are enormously influencing medical science, leading to the advent of the *empowered patient* and will effect in some way all places where healthcare is dispensed and care received.

7. By 2050, for those fortunate enough to have one, the home, not the hospital, will be the center of one's healthcare "universe" supplemented by anyplace where one has online access to health information.

The hospital and its successor institution will retain an essential role in the care of only the most acutely ill. This is already occurring: online medical databanks and telemedicine practices are being formed in anticipation of the coming boom in home-based virtual healthcare. The dwelling will need to be rethought in support of its new function as a virtual *clinic*. Holographic "consultation sessions" with one's caregiver will occur in one's family room or kitchen. The possibility exists, in theory at least, that the patient, if one has access to such resources, will have access to health information anywhere, anytime.

8. The physical space at present separating the individual from contact with the natural environment will gradually disappear. Buildings for health will increasingly express anthropomorphic forms and anti-machine imagery.

Artificial terrain tools and software packages will make it possible to fuse transparent linkages between human sensory modalities and the content of the experience of natural environments. Immersion landscapes, many of which are already to be found in zoos and aquariums, combine various elements of such real and virtual natural landscapes, and are able to be geared to suppress any undesirable, i.e. counter-therapeutic, content. They are fully controllable and monitored to create a desired effect such as at the Lied Jungle at the Henry Doorly Zoo in Omaha, Nebraska (www.vterrain.org, 2002). The cultural critic Umberto Eco writes of "hyperreality" – imitations intended to be better than the originals. Artificial rain forests such as at the zoo in Omaha at present provide visitors a condensed version of world travel in which they experience only the most interesting and edifying features of natural places. Experiences such as this will be well integrated into the planning and design of hospital and related healthcare settings by 2050. The therapeutic effects of artificial

landscape simulation in buildings will enhance the healing process. The natural environment itself will have by then been widely contaminated; all that is left will be faint recollections of the real thing, for simulations, sad as the truth is, will be the norm rather than the exception (Bentley, 2002).

Translucent, backlighted curvilinear wall panels replace the stoic traditional walls in the corridors of the *Arizona Center for Health and Medicine*. The panels transverse the color wheel, presenting a dawn to dusk panoramic progression (Calmenson, 1999). In 2050, hospitals in dense urban settings will be able to tune out all undesirable, i.e. counter-therapeutic, stimuli (noisy traffic, smog, etc.). Active simulations will be supplemented by passive devices such as wall murals (a technique used at present in a number of institutions) and sophisticated lighting. One of the first modular patient rooms to incorporate active nature simulations is *The Wellness Room*. Walls and the ceiling can be specified with an aluminum lightbox housing photographic artwork. It is flush-mounted in a wood frame. Backlighting is used to activate the nature scene and to provide ambient lighting, controllable by the patient (www.wellnessllc.com, 2002). Techniques such as these will certainly appear quaint by mid-century. Architects can take a leadership role in creating intelligent design applications for virtual nature technologies.

As for buildings designed for health in 2050, the "CO2", its nickname derived from its plan configuration, community health and wellness center in Narita, Japan, near Tokyo, by M. Kazuhiro (2000) perhaps provides a glimpse into the future as it embodies nature and anthropomorphism in its parti'. Today, we think of the natural environment as itself the best source of contact with nature for the sick and diseased. Organic patterns found in nature provided inspiration and artifact for built form, as actual trees become structural elements. These interior trees anchor a white fabric membrane roof system, beneath which rooms are deployed around a pair of courtyards shaped by the irregular curvature of the structure. In this manner, nature is brought into buildings as a means to protect it, to "save" it, ironically, from "destruction", and to preserve its inherent beauty for future generations to admire well into the 22nd century, when deforestation will have done its irrevocable damage to the earth's virgin forests.

9. The digital divide will continue to separate the haves from the have-nots in the global healthcare landscape.

By 2050 the expert, empowered patient will have emerged only in those cultures wealthy enough to afford the technology to do so. In sharp contrast, the sheer volume of information available will elevate the patient and one's family to an unprecedented level of sophistication in richer societies. In poor societies the recipient (already widely referred to as the "consumer" in rich countries) will be more acutely aware of one's plight, and the available options, and therefore less (or more) empowered than at any time in history. An impediment to attaining political balance between the privileged and underprivileged in societies will remain what is widely referred to as the digital divide – those with Internet access versus those without. This is no different than during the Middle Ages, where those who could afford to barter for privacy received a private room far from the hellish open ward.

10. Healthcare organizations will be forced to become better citizens to sustain and enhance human life without promoting environmental degradation. The functional deconstruction of hospitals and allied institutions will continue to occur and new uses for vacant hospitals will be created. As obsolete hospitals are destroyed, environmentally compassionate new uses for their former sites will be articulated.

Why is it that hospitals are often among the worst polluters in their communities? They generate excessive amounts of toxic waste, and the institution is nearly always planned and built with little regard to issues of environmental sustainability. The time has come when healthcare facilities must realize, accept, and appreciate the value of architectural sustainability (Ashton, 2002). At the very least they will be forced awake to the public relations wisdom of being able to "market" their institution from this perspective. By 2050, all healthcare providers will have been mandated to adopt "zero waste" policies. Hospital incinerators will have been demolished, having outlived their original purpose. Where possible, site planning and building massing will be "reinvented" in a reprise of traditional Nightingalian practices, such as in the 19th and early 20th centuries, in *microhospitals*.

The biggest problem will remain excessive resource consumption. By 2050 the notion of healthy bodies, healthy environment, will of necessity be widely accepted (Green and Wright, 2002). But by then it may be too late. In the latest *Global Environmental Outlook*, the UN Environment Program points out that one of the three pillars of sustainable development, the environment, is "seriously listing" because of the distortions placed on it by excessively insensitive

human actions. There is a paramount need to reduce the excessive consumption of the more affluent – "as long as the richest 20% continue to account for 86% of consumption, sustainable development will never be achieved" (Thurgood, 2002). Healthcare facilities globally will have to adopt the zero waste concept, following the lead taken by the manufacturing sector, where the initial objective was to simply reduce emission of wastewater and solid waste.

In India there are more than 5,000 small and private hospitals and nursing homes. Increasing population has caused a rapid proliferation of health facilities. India alone generates 3 million tons of medical waste annually and this figure is growing by 8% each year. Waste segregation at the source remains the number one problem, a looming crisis by 2050, yet this concept is not ingrained whatsoever in the culture, and therefore remains a low priority for administrators (Express Healthcare Management, 2001). In many parts of the globe, such cultural indifference will continue hinder progress. Architects, armed with the results drawn from successful case studies, in consort with physicians, can lead in these re-education efforts in the community (Connor, 2002). Architecture and the fields of community health and social ecology will merge into a single entity, in part out of regulatory necessity.

Steve Connor, in his recent article "Hospitals for a Healthier Planet" (2002) outlined current best practices in sustainable hospital construction. Architectural research on this subject will need to identify ways in which healthier healthcare facilities can be integrated with eco-parks in towns and neighborhoods. Improved on-site management of waste from the point of site preparation and construction onward, and the establishment of materials specs on a "fitness for purpose" basis will be mandated by law. In addition, policies will require little or no waste is created from the demolition of old buildings (as all materials will have to be rechanneled). Buildings will be designed for ease of disassembly and redeployment, with recycled first generation building materials used only when absolutely necessary. Contractors will be daily participants in centralized waste exchanges in order to stream old waste to new "wasteless" uses.

The process of functional deconstruction appeared in the U.S. in 1983 with the advent in the U.S. of federal healthcare cost containment legislation. It has more recently begun to occur in other highly developed countries. Immense hospitals have become too expensive to staff and

operate. Hospitals are being forced to reexamine their mission, scope of services, and community role. The trend toward outpatient care has resulted in a precipitous drop in the demand for inpatient beds needed for overnight stays. This process is ongoing in the U.S. and is occurring in many countries, including the UK's recent Best Buy hospitals, and Japan, both of which have been loath to accept a less than singular role of the highly centralized hospital in the total scheme of things. The functionally deconstructed hospital will require architectural research on its future complexion and its civic function, public and patient perceptions of its role, and its very sustainability in a resource-starved world. The movement toward smaller *residentialist* patient focused care centers is deeply rooted.

Meanwhile, the international *hospice movement* will continue to symbolize this rejection. The palliative care dispensed in hospice is a late 20th century reaction against the scale and hyper-institutionality of the megahospital. As for acute care, smaller *Critical Care Centers* (CCCs) will emerge in the coming years although large teaching hospitals attached to medical schools will always be needed (Verderber and Fine, 2000). In the microstitial hospital and larger facilities alike, every inpatient room will possess transformable step-up or step-down technological capability at a moment's notice: from the most intensive levels of care to its use as a pre-operative dormitory room. Due to cost constraints, small-scale wards will return. Older, architecturally inflexible institutions will simply be too costly to maintain. Architectural research will be called upon to examine viable, high care, cost effective options without sacrificing the element of humanism. Obsolete hospitals, no longer justifiable on either a quality of care or economic basis, will be demolished by the hundreds, or adapted to new uses, such as housing for the underprivileged.

11. Interdisciplinism between architecture and allied disciplines will be essential in the coming decades.

Collaboration denotes openness to the necessity of sharing, of collective problem solving. New coalitions will out of sheer necessity occur with global resource management, optical imaging and holography, human genetics and biomedical engineering, chaos theorists, nanotechnologists, community health agencies, public policy experts, gerontologists and other social scientists, and specialists in many other fields. Useful architectural and environmental design research will be needed on the issue of design intervention, scenario planning, and

identification of effective community-based participatory planning protocol.

12. In wealthy countries, patients' rights movements will blossom by 2050. In poor societies patients will continue to struggle to attain even minimal control over their health conditions. Advanced health technologies, including nanotechnology, will have an uneven impact globally on human health and well being.

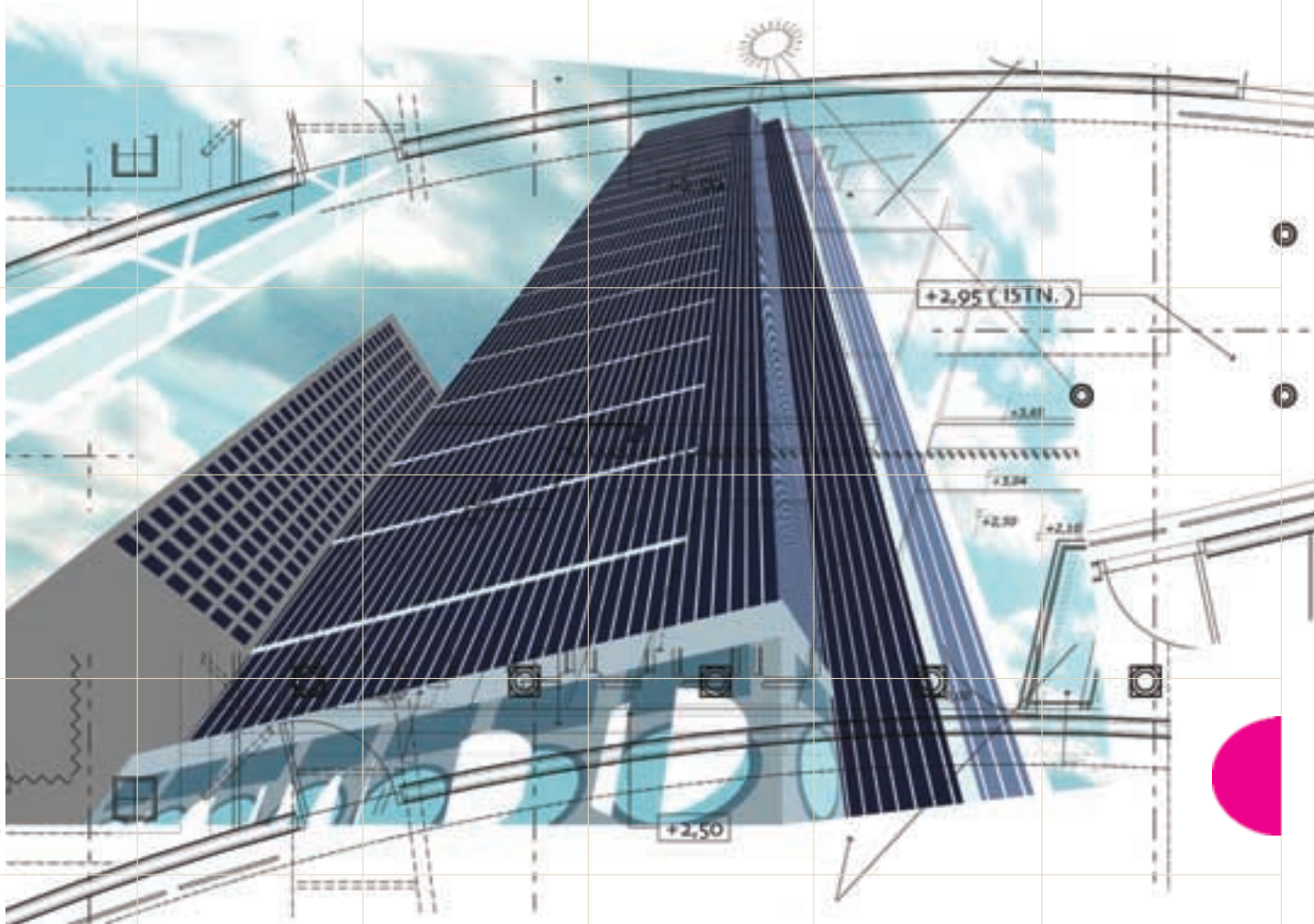
With the proliferation of HIV/AIDs and the outbreak of unforeseen plaques and epidemics in the coming decades, newly formed patients' rights groups will by default adopt extremist tactics. In a wave of anti-globalism, certain hospitals and clinics may be burned by patient care anarchists, while other factions will seek subtler means of change to the healthcare systems in their countries. Although much of this anger will be focused on the government-based systems of care around the globe, dysfunctional hospital architecture will come to represent an easy symbolic target, not dissimilar from how Middle Eastern extremists saw the World Trade Center in New York prior to 9/11. Sustainable provider-recipient partnerships will by definition be explicitly democratic, with proponents taking the view that people cannot be persuaded to care for themselves when they haven't had a voice in their own fate. Healthcare autocracies, for the less fortunate, will issue decrees as to who will live and who will die, as cost will emerge as the overarching factor in the age of (God forbid) human cloning.

Community development professionals have known for years that in order to engage effectively with disadvantaged groups one first must address the power imbalances that persist between them and the provider entity, i.e. the governmental agency, head-on. This practice is widely referred to as "linking social capital" (Tuxworth, 2002). However, the digital divide will persist as a major political and practical barrier in the coming decades within the informational cognoscenti in the effective dissemination of health-related knowledge.

Aside from geopolitical interventions, advances in biomedical science will result in what will become known as the *agelessness* movement. The debates are already reaching a feverish pitch (Kramer, 1997; 2001). In an essay "On Becoming Posthuman", Max More describes the science of *extrophy*, a state attainable in, in his view, the aftermath of sweeping advancements in neurophysiology, neurochemistry, and human genetics. He asserts that we have taken our first steps along this road by altering our species

genetic structure to remedy nature's failures, and will soon develop a cure for cancer. We can now use Prozac, Piracetam, Hydergine, and Deprenyl to modify our physiology, enhance our concentration, and to slow brain aging. Research into more specific and powerful modifiers will accelerate as we apply new tools from molecular biology, computer assisted molecular design, and brain imaging. Health-monitoring machines are becoming more organic, self-modifying, and intelligent. Artificial life, neural networks, fuzzy logic are trends which signify the human race is beginning to incorporate its technology into ourselves. Computers and their interfaces will rapidly evolve to fit us: from mainframes and text-based interfaces to PCs and GUIs, PDAs, voice-recognition, and knowbots. How long before *nanocomputers* are implanted? We have embarked upon the road toward transmutation of the elements themselves in a bizarre quest for immortality (More, 2001).

Molecular nanotechnology will eventually afford total control over the structure of matter, allowing us to build anything, perfectly, atom by atom, even the reconstructed body. Some futurists believe that the abolition of aging and most involuntary death will be one result (Uldrich, 2002). Machine intelligence researchers, roboticists, and cognitive scientists foresee even more radical possibilities. We may be able to "upload" ourselves, our psychological outlook, memories, emotional responses, and values. This will occur just as we now do with software, only from our biological brain to our synthetic brain. Powered by these devices our cognitive mental processes could function hundreds of thousands of times faster (God forbid) than at present. This is the epochal world depicted in Steven Spielberg's futurist film *A/I* (2000). More attainable at a much earlier date will be the discovery of spinal cord regenerative medicine



(Vikhanski, 2001) and the fusing the robotics with the design of the built environment (Mulhall, 2002), including the application of robotic personal assistants, or RPAs, for residents in long term care setting. This is already occurring in Japan on a pilot case basis (Stewart, 2002).

13. Greater diversity is will be essential to the success of future research endeavors in architecture for health. This will require the broad participation of "end user" constituencies previously shut out of the planning and design process.

A far broader spectrum of participation will be needed, including those affected by issues of racial equity, gender equity, and economic and political marginalization (Bingdman, et al, 2002). It no longer suffices for the health facility researcher to speak only with the staff and administrators of the institution. What of the poor residents of the local community? Who will represent their views? The distance between the end user, usually at the bottom of the decision making pyramid, and the leadership of an organization, usually at the top, will have to be compressed, and, in extreme cases, inverted.

The Future of Healthcare Architecture in Poland

Through history, architects, no strangers to making future-oriented prognostications, have often worked in isolation, adopting an aloof, heroic stance. But this approach will not result in success in Poland at this time because everyone with a stake in the healthcare system in Poland must work together. Design competitions sponsored by the government and by cities can help to foster new ideas but the architect must work closely with healthcare administrators, physicians, nurses, funding agencies and public policy makers (Allgood, 1997). Similarly, polemical manifestos put forth by Polish architects will have little impact if these are written in isolation (Toy and Jencks, 2000). Regardless, healthcare clients have generally dismissed the design competition as a means to award commissions for their buildings. In Poland and elsewhere major improvements to healthcare facilities will require speaking to persons with whom the architect and health planner may have little in common by way of background. Sometimes, a local mayor will have to be told that no new building is needed whatsoever in his or her community, as it might conflict with the sustainability of local bio-ecological systems, or because market demand simply calls for a new building to be built in a different community, not

theirs. These decisions can have serious political repercussions. Regardless, many hospitals and clinics are urgently in need of replacement in Poland. Four major challenges confront Poland at this time concerning the future of its healthcare facility infrastructure:

- The system is moving too slowly towards a free, open competitive marketplace. As a result, existing facilities are rapidly becoming obsolete. The system still depends too much on the operation of costly large inpatient care facilities.
- The current infrastructure of hospitals, clinics and related support facilities needs major upgrading. Many healthcare facilities do not conform to EU standards at this time. Limited funds are available from the government or elsewhere to undertake these needed improvements.
- A private insurance industry has yet to develop and mature. As one result, healthcare professionals are paid less than their counterparts in EU nations. This also has many negative implications for the construction of state of the art healthcare facilities throughout Poland.
- Funds are lacking to determine what the best strategies are at this time to identify the most pressing healthcare needs of the public at this time and into the future. Hospitals are far too expensive to build to continue to repeat the same mistakes over and over. A recent field, evidence-based design, is taking root in the architectural profession in the United States and in many EU nations, and this movement needs to be allowed to take root in Poland. In this way, the results of surveys, interviews, site visits, and post occupancy evaluations of what works and what does not work at this time then becomes built into any new designs for future healthcare facilities.

Healthcare architecture in Poland must first position itself politically to respond to an entirely new set of challenges in the coming years. Clear, achievable goals must be set on a national, regional and local level. First, new knowledge on facility *transprogramism* – buildings are that mixed or multi-use, i.e. a hospital with an outpatient clinic, a school combined with a wellness center, a health food store with a wellness center, will be needed with regards to universal flex properties of buildings and the demise of single-use buildings for healthcare in crowded, land-starved urban landscapes. Westerners can learn useful lessons from the Japanese, who have mastered the design of multi-programmatic (far beyond the static concept of "mixed use") buildings in their densely packed cities. New, anticipatory "flex" properties of healthcare buildings must be researched in response to patients and staff persons' daily and long term needs and aspirations.

Second, in Poland and elsewhere, completely new types of hospitals centered on *person-nature transactions* need to be researched and built. The era of the massive machine megahospital is over. The hospital of the future in Poland should resemble more a *village* (rather than a monolithic machine) with smaller; more human scaled yet highly interwoven architectural components. Bigger is no longer better. Reinvent the hospital much more around contact between the patient and nature. Therapeutic views of nature from hospital room windows have been proven to have a positive impact on well-being. This work, however, has been centered largely on the patient's access to *authentic* contact with nature, not on a boring faded print on the wall of one's room. Much more work is needed on small-scaled hospital prototypes, person-nature transactions, and on artificial landscape representations, in relation to the health status of the inpatient and outpatient.

Third, *architectural technology* research, based in universities, government agencies, and in private industry, is urgently needed to advance the planning and design of healthcare facilities throughout Poland. Advanced building technologies will enable humans to attain a far greater level of interactivity with one's healthcare setting now and well into the future. Bionic, robotic engineering, and anthropomorphism will have a strong influence in design decision making on the human side with respect to the design of the hospital of the future in Poland. New, sustainable materials, assembly systems, and anatomical-operational systems will have a similarly profound influence on the design of hospitals, critical care centers for trauma care, inpatient rooms, specialty facilities for psychiatric care, pediatric care, Alzheimer's units in hospitals and in freestanding facilities, nursing home long term skilled care, surgical centers, and community wellness clinics.

Fourth, future research in Poland must fuse all this with the timeless, enduring qualities of architecture. These humanistic properties include the importance of place, hierarchy, appropriate human scale, harmony with the facility's site context, the sense of safety and enclosure, appropriate use of sustainable building materials, interiors, furnishings and equipment, the design of ornament and use of interesting non-institutional colors, the therapeutic value of art in healthcare facilities, the need to control the trend toward bare-bone construction budgets in hospital architecture, and the timeless importance of wellness care in the overall quality of life of citizens (Salingaros, 2002).

In Summation

From the epochal events of 11 September 2001 to the inability of a mother in Ethiopia to obtain life-saving immunizations for her infant, complex global issues loom larger than ever before. Geopolitical and population issues demand attention. The world's 6.1 billion population increases by nearly 9,000 persons each hour. Several worldwide population institutes estimate that, by 2050, between 9 and 9.5 billion people will be living on the planet (World Health Organization, 1998; 2000). Populations in need of global architectural intervention will include communities ravaged by HIV/AIDs, malaria, tuberculosis, plagues such as the virulent Ebola virus in Africa, and new strains of yellow fever. Add to this the profound pain caused by new settlements built in places where they should not, such as in low-lying coastal zones, earthquake-prone regions, and in the midst of notorious "hurricane alleys".

Viewed in this larger context, the intent of this discussion has not been to present a manifesto of any sort. It is merely a sketch of some of the many events which are unfolding now and just beyond the immediate horizon, and their implications for Poland. Dismissal would be premature and unfortunate, as there is a curious, at times dismissive, attitude toward the acceptance of new research-based knowledge by the mainstream global profession of architecture. Robinson (2001) writes:

"Today it is insufficient to simply assert expertise. Expertise must be backed up by a clearly defined, visible, usually linguistically described, coherent body of knowledge. Lacking this, the profession of architecture has found itself at a disadvantage relative to other fields and with questionable status as a profession... Before, the architect was simply trusted to know about building... the architect (now) must provide verbal evidence and justification for one's decisions... the existing structure of this knowledge base and of theory within architecture, however, does not easily incorporate... New forms of explicit knowledge... Rather than simply being (put) in the responsive mode, architects will have to become proactive, generating full discussion of (the) issues."

Futurist perspectives on the situation in Poland or elsewhere always run the risk of didacticism.

Regardless, as with any attempt to look into the past as a means to examine the present and the future, in Poland and elsewhere, it will be viewed skeptically by some. At the very least, it is hoped it will be of value to healthcare providers in Poland. It is also hoped that this conceptualization and others like it can serve as stimulants for an expanded, far more generously funded set of new initiatives by the Polish government in consort with private enterprise healthcare providers. The private and the public sectors in Poland will absolutely need to work together, with shared goals for the future, becoming very active co-sponsors of such work. The future of disciplinary discourse in healthcare architecture in Poland deserves no less, as it is now time to fully recognize that progressive thinking and rapid action in the area of architecture for health has much to offer not only the people of Poland, but societies around the globe.

Notes

1. An organization, *Global University Programs in Healthcare Architecture* (GUPHA) was founded in 1998. The group's objective is to articulate prognostications for the year 2050.
2. This timeline was first developed by the author for use in a course called *Architecture and Human Health*, taught at Tulane University.
3. Tuxworth reasons that as long as the gap between the promise of local democracy and what it actually delivers to the individual is so wide in ultra-capitalistic societies, it is highly unlikely that shopping will be dethroned as the ultimate expression of self.

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