

From Our Members

25 Years of Sino-European Co-operation in Earth Observation

By John van Genderen, ITC

During February and March of 2003, Professor Dr. John van Genderen of the ITC in Enschede, The Netherlands will celebrate the Silver Jubilee of scientific co-operation between Europe and China, with a lecture tour to various cities in China.

It all started in 1977, when a senior delegation of officials and scientists from the Chinese Academy of Sciences (CAS), visited Europe to discuss establishing scientific co-operation between European researchers and Chinese ones. This visit was hosted by The Royal Society in London, United Kingdom. As one of the fields in which China wished to establish joint research activities was Remote Sensing, Professor van Genderen was invited to join these discussions in London. As a result, he was invited by CAS to visit China in the Spring of 1978 for follow-up.

On his first visit to P.R. China during April and May of 1978, he gave several lectures and held meetings with Chinese scientists to discuss the setting up of an Institute for Remote Sensing. He was the first European remote sensing scientist to visit China. This was still in the time before Deng Xiaoping became President of China and started the "Open Door" policy. The president during Professor van Genderen's first visit was Guo Hua Feng.

With typical Chinese organisational efficiency, the CAS established its Institute for Remote Sensing Applications

(CAS-IRSA), which commenced work in 1980, with Academician Professor Cheng Shu Peng as its first Director. Since then, there has been a long and strong relationship between CAS-IRSA and the ITC and other European remote sensing organisations. In 2000, Professor van Genderen was one of the guests at the 20th Anniversary Celebrations of CAS-IRSA.

As a result of his first visit, Dr. He Changchui, a young physics graduate at the time and who acted as his interpreter and guide during that trip, came to ITC to study the following year. Also several other ITC staff members were invited to China for follow-up later on.

Many of the more than 300 Chinese who have studied geoinformation and earth observation at ITC since then have obtained senior positions back in China.

Over the past 25 years, Professor van Genderen has visited China over 100 times. During this long period of co-operation with Chinese organisations he has carried out numerous research and consulting projects in China.

In 1986 ITC received large grant from The Netherlands government to set up a sister institute in Wuhan. This Educational Centre for Urban and Rural Planning and Management (ECURSPAM) was affiliated with the then Wuhan Technical University of Surveying and Mapping



From left to right; Dr. He Changchui, Prof. Ma, Prof. Van Genderen, and Academician Prof. Cheng Shupeng, on the Great Wall, April 1978.

(recently merged with Wuhan University). The European Union has awarded him several research projects under the 3rd, 4th and 5th Framework Programmes. For the Asian Development Bank, he was Team Leader for a major Technical Assistance Project on "Monitoring and Management of Fragile Ecosystems in Shanxi-Shaanxi-Inner Mongolia".

He has given numerous training courses and research seminars on Earth Observation throughout China, funded by organisations such as the UN, European Space Agency, Radarsat International, and others. In 1994, he attended, on behalf of the Netherlands Government, the First Ministerial Conference on Space Applications in the Asian Pacific Region, held in Beijing, as well as attending many other international conferences in China over the past quarter of a century, such as the Asian Conference on Remote Sensing, the International Geological Congress, the first International Symposium on Digital Earth and many others.

Professor van Genderen is probably best known for his research into the problem of underground coal fires in north-west China. Since 1987 he and his team of remote sensing researchers at ITC have carried out numerous projects in this field in Xinjiang, Gansu, Ningxia, Shaanxi, Inner Mongolia. This research has resulted in many scien-

tific publications in internationally refereed journals, wide coverage in the media, and in several Achievement Awards by the Chinese government.

In 1987 he was appointed an Honorary Professor in Remote Sensing at the Xi'an University of Science and Technology, and in 1996 he also became an Honorary Professor at the Wuhan University.

He has often been referred to as the Dutch "Marco Polo" building a bridge between China and Europe, and contributing, both to knowledge transfer and joint Sino-European co-operation. The many Post-Doctoral scientists, visiting scholars, PhD and MSc students that he has assisted, are now ensuring that China is becoming a leading actor on the international earth observation scene.

By personally leading many Chinese delegations on European study tours to visit remote sensing companies, research institutes and government organisations throughout Europe, he has fostered further co-operation between China and Europe in Earth Observation.

To mark the 25th Anniversary of remote sensing co-operation between Europe and China a Banquet will be held in his honour in Beijing in March 2003.

ICSU Unions' Initiative on 'Science for Health and Well-being'

Since joining the International Council for Science (ICSU) in September 2003, ISPRS has been involved in ICSU activities. One of these is an initiative to promote the elaboration and utilisation of scientific information appropriate to understanding human and environmental health and well-being. ISPRS has been involved in this and an executive summary and draft working papers prepared at the meeting are reproduced below.

ISPRS Council will welcome any comments on these papers or offers participation. Please contact Secretary General Ian Dowman. (idowman@ge.ucl.ac.uk)

Ian Dowman

Executive Summary

A meeting of representatives of several ICSU Unions and other ICSU bodies was held in Paris February 17-18, 2003, to develop a cross-Union, transdisciplinary initiative. The plan to develop such a partnership resulted from a meeting of Union representatives at the ICSU General Assembly in Rio de Janeiro in September, 2002.

The statement of scope and mission for the initiative is:

Science for Health and Well-being

We recognise that the health sciences require the partnership of a broad range of sciences and technologies to advance human health and well-being. The initiative 'Science for Health and Well-being' is a collaborative effort by ICSU Unions and other ICSU bodies to promote the elaboration and utilisation of the scientific information appropriate to understanding human and environmental health and well-being in its many dimensions.

The goals of the initiative are to

- 1 **demonstrate** the extent to which a range of science and technology is important to health and well-being,
- 2 **educate** (at multiple levels) about science and technology using modern means of communication,
- 3 **collaborate to identify** areas unmet and produce new ideas, science and technology partnerships to look to the future, and
- 4 **develop an inventory** of ongoing programmes, activities in order to identify unmet needs

in order to

empower the science community, the public and policy-makers

and in all countries with the knowledge base to effect their health and well-being.

We prepared the following recommendation, which will be transmitted to ICSU:

The representatives of ICSU Unions and ICSU bodies (IGU, IUBS, IBRO, IUGG, IAHS, IUNS, IUPAC, IUPESM, IUPS, IUPsyS, ISPRS, and SCOPE), assembled 10-11 February 2003 to consider an initiative for multi-Union collaboration, strongly recommend to ICSU that it consider the general topic of the relationships and contributions of science, broadly construed, to maintain and increase the health and wellbeing of humans and all other living species as a primary focus for funding for 2005.

Immediate follow-up activities and plans include:

The consortium should develop a strategy to fulfil the mission statement which would include:

- (1) *Develop core domains* for inter-union collaboration (drafts of working papers are appended):
 - (a) *Living Environments*
Chair: Professor Ron Abler (IGU)
 - (b) *Connections between water and health*
Co-Chairs: Professor Joann Joselyn (IUGG)
Professor Ian Dowman (ISPRS)
 - (c) *The Impacts of Technology on Health and Well-being*
Co-Chairs: Professor Michel Denis (IUPsyS)
Professor Ove Petersen (IUPS)

Advice will be sought on these domains from interested Unions as to how they might generate projects and funding proposals.

- (2) Seek Alliances between the ICSU consortium and major international partners in "Science for Health and Well-Being", using the "Core Collaborative Domains" document, especially with:
 - (i) WHO
 - (ii) WMO (World Meteorological Organisation)
 - (iii) International Social Sciences Council at UNESCO, Paris
 - (iv) World Medical Association (WMA)
 - (v) The EU Science/Development Secretariats as well as
 - (vi) The Private Sector
 - (vii) Foundations
 - (viii) NGOs.
- (3)
 - (i) To promote *conjoint events at Union Conferences*, particularly in the form of Symposia and Workshops involving 2 or more Unions, with the underlying theme of Science for Health and Well-being, invited speakers, etc.
 - (ii) An index of Union meetings will be established in a more current and comprehensive fashion on the ICSU web-site and
 - (iii) Union web-sites will direct to each other's sites

for information about their meetings.

- (4) ICSU will compile information on UN Resolutions on Well-being and Sustainable Development, to form a basis for future development of the "Well-Being" agenda.

Working Paper I: Living Environments

The mutual relationships between natural and built environments on the one hand, and health and wellbeing on the other, are increasingly seen to be critical to both the short- and long-term sustainability of the places where people live, and especially large cities and megacities. Under the broad heading of Living Environments, four more focused themes should be pursued as part of the Science for Health and Wellbeing initiative: 1) settlement density, interconnections and structures; 2) health incentives and disincentives for living in agglomerated settlements; 3) environmental and settlement dynamics; and 4) modern metropolitan culture. Many members of the ICSU family as well as cognate international organisations will find the topic and its themes of interest and will contribute to the production of publications of interest and value to the many constituencies holding stakes in large settlements.

Settlement Density, Interconnections, and Structures

Concentrated human settlements, especially toward the megacity end of the urban scale, depend upon intense interconnections with distant places in order to assemble the goods, services, people, and information upon which their sustenance and viability necessarily rely. Thus settlement structure both conditions and is conditioned by the technologies that move commodities, people, and information among and within them. Transportation technologies can be facilitators of as well as obstacles to health and wellbeing in human settlements, depending on how well they are managed. Accidents related to transportation are serious causes of injury and death among certain age groups, and the frequency of accidents resulting in injury or death in different kinds and sizes of settlements deserves investigation. These events and processes are integral parts of living environments. Poor design will augment their negative health effects. Good design can minimise harmful consequences, not only as regards transportation itself but also more generally; a facet of urban design that should be explored is the ways the physical layout of cities might be planned to provide residents with incentives and opportunities to exercise regularly as integral parts of their daily routines.

Communication and information technologies complement transportation systems in human settlements, acting as the nervous systems for these social organisms. New technologies enable individuals and small groups to bypass gatekeepers and middlemen who formerly controlled access to information, prices, etc., thereby reducing the communications friction (and its associated costs) within and between settlements. New technologies and networks

offer significant opportunities for identifying, monitoring, and managing many fundamental dimensions and individual facets of the complex relationships between urbanisation and health and wellbeing. A focus on science-based approaches to minimising environmental degradation by and within settlements using advanced information and communication technologies seems especially promising.

Health Incentives and Disincentives for Living in Large Agglomerations

Establishing the concept of geodisease—a dysfunctional, non-sustainable complex of human and natural systems evident at specific places would be a helpful conceptual and theoretical framework for applying science to health and wellbeing of human and not human life. Geodisease research would go beyond current practices in health risk mapping, identifying geographical and temporal variations in health and wellbeing indicators, and the search for environmental and anthropogenic causes to create taxonomies of geodisease and to seek commonalities and differences among occurrences of similar instances in different places. Specific elements of this approach might focus on the detection of disease clustering in relation to exposure to sources and agents (for example, relationships between land use and land cover on the one hand, and such diseases as trypanosomiasis; malaria; sleeping sickness; tsetse; and yellow fever on the other), modelling disease outbreaks and spread, and exploration of regional medicometry (the effects of medical infrastructure on health and wellbeing).

A point of increasing interest in the next decade will be the ways geodisease and medicometry combine to create incentives and disincentives for migration to and residence in large settlements. Although many aspects of high density living in large settlements are unhealthy, rural areas and small towns have their own inherent health and wellbeing disadvantages, and both the quantity and quality of medical care available in large settlements generally exceed that present at the smaller, less agglomerated end of the settlement scale. As populations age they become more attuned to the need for access to high quality medical care, and the aging of world's populations will constitute an additional incentive for migration to large agglomerations in the next several decades.

Environmental and Settlement Dynamics

Science and engineering have contributed greatly to the quality of life and to the health and wellbeing of large settlements in the last several centuries through the basic science and science-based infrastructure that provide unprecedented number of people living at unprecedented densities with clean water, sanitation, and reliable sources of cheap energy. Maintaining that infrastructure and supply and extending them where they are currently inadequate will present serious challenges as settlements continue to expand and intensify and as world populations continue to urbanise. Obtaining water and managing its use will become increasingly difficult in the next twenty years and

beyond. Obtaining adequate energy will become more demanding as per capita energy consumption in the developing world increases. Mitigating pollution from energy generation and transportation should rank high among metropolitan scientific and engineering priorities. Constant monitoring and steady conservation efforts and innovation will be needed to ensure that urban living environments are well ventilated in order to impede respiratory diseases, well plumbed in order to avoid intestinal disorders, that solid waste is recycled in a sustainable manner, and that settlements are increasingly designed to better withstand such ineluctable hazards as earthquakes, fires, flooding, landslides, tsunamis, and volcanoes. In all these respects, urban design will enhance health and wellbeing more effectively to the degree that it is science based, drawing upon the experience of many large settlements in different parts of the world.

Modern Metropolitan Culture

Highly agglomerated living offers residents considerably greater freedom of choice in personal and small group behaviour and mores than has historically been possible in smaller settlements. Many of the historically new freedoms cities offer seem to enhance health and wellbeing, but some seem to leave some individuals and groups adrift in unfamiliar settings. Science and technology might be more effectively employed on behalf of large settlements if more were known about the interplay of culture and settlements. Some possibilities that might profitably be pursued are the tensions between community and diversity among new migrants to large settlements, how trade and travel affect cultures and cultural values, and the health consequences of the globalisation of food sources and supplies, with specific reference to the ways foodways change when people migrate to and settle in large urban agglomerations. Articulated food chains usually result in greater food diversity and more reliable supply than is characteristic of rural areas, but typically at higher cost and with the substitution of refined for whole foods. Altered and new ways of preparing food may also have beneficial or harmful consequences.

Players

Many members of the ICSU family of organisations and affiliates would find a focus on living environments an element of direct interest if included as part of an initiative on science for health and wellbeing, including, but not restricted to: IGU, ISPRS, IUAES, IUBS, IUFoST, IUGG, IUGS, IUMS, IUNS, IUPAC, IUPESM, IUPS, IUPsyS, IUSS.

Outputs

The working group on living environments suggested that the products of living environments research on science for health and wellbeing should consist of publications designed for and useful to educators at the secondary school and university levels, and of policy-focused and policy-relevant publications consisting of guidelines, standards, and recommendations. The identification of these

outputs is not meant to preclude such other forms of dissemination of results as workshops, short courses, etc., when and where appropriate.

Audiences

Consistent with the outputs noted above, the working group proposed that the results of living environments research be addressed specifically to: government agencies at various levels from local to international; legislators and regulators; professional groups, especially in health care specialties; educators; relevant private sector decision makers and researchers; town planners; and citizen and volunteer organisations.

Prepared by Ronald Abler (*rabler@aag.org*)

Working Paper 2: Water

Connections between Water and Health:

- 1 Pollutants: poisons and contaminants.
- 2 Waterborne disease: biological pollutants.
- 3 Food supply: indirect effect on health – nutrition, land degradation. Effect of both animals and crops
- 4 Balancing the use of water between agriculture, domestic, industrial - at larger scale feeds into conflict (internal and international).
- 5 Flooding – general well being, pollution, degradation of habitats, spread of disease; risk control prediction.
- 6 Desertification – nutrition.

Water Management:

Local level: Watershed development – sources of pollutants, (natural and chemical), agriculture.

- 1 Collection of data (soils, geology, hydrology, vegetation (habitats), aquifers, actual per capita consumption (in local context) [ISPRS, IUSS, IUGG/IAHS]
- 2 Planning collection, storage and distribution of water – introduce health aspects into planning [IGU, IUNS, IUPAC, IUBS, IUGS, IUGG, IUMS, IUFoST, IUPESM]
- 3 Policy - pricing and economic control of water; planning of development, conservation.

Regional level: strategy for water use, flood control, geopolitical aspects.

National level: conflict, sharing water, strategic issues.

Influence of technology: desalinisation, cloud seeding, sanitation.

Outputs

Local requirements in a global context (global climate change, water cycle, consequences of not managing water can be catastrophic)

Data requirements

Factors to be considered

Implications for policy makers

Implications on environment

Risks (data deficiencies)

Audience

Science community, local users, resource planners, strategic planners, healthcare industry, educators.

Prepared by JoAnn Joselyn (*jjoselyn@cires.colorado.edu*) and Ian Dowman (*idowman@ge.ucl.ac.uk*)

Working Paper 3: The Impacts of Technology on Health and Wellbeing

1 Unions to Be Involved

IUPsyS, IBRO, IUPESM, IUPS. Others?

2 Topics and Focus

How do technologies - mainly information technologies - impact human health and wellbeing? The topic will be focused on some specific issues, most of them related to brain and cognitive functions.

First of all, we will consider those technologies which provide means for diagnosis and remediation. The first case to be considered is the set of technologies developed to investigate brain functioning. Neuroimaging is becoming a common tool in the study of cognitive processes, which necessitates deeper mutual knowledge between scientists developing models of the brain functions and scientists who design or refine modern neuroimaging tools (PET and fMRI).

Another set of techniques which are expanding are the Virtual Reality techniques, which provide a method for exposing patients to situations, for instance in desensitisation procedures. Phobias, mainly social and spatial phobias, can be treated by using controlled immersion of patients in virtual environments (a technique that can be used in hospital contexts, but also at the patient's home). People with mild psychopathological disorders can benefit from these techniques which avoid direct exposure to situations that are quite difficult to reconstruct in hospital settings.

Virtual Reality must also be approached as a currently available product in our societies and an object for which some people develop intense interest, and even some forms of addiction. The consequence is loss of reality monitoring and tendency to mix up reality and imagination. By generating a strong feeling of presence, these techniques are a source of emotional disturbances that require more documented approach in order to prevent users of computer-based virtual environments from weakened sense of reality.

3 Outputs of Collaboration

An inventory of the impact of information technologies on mental processes; a set of guidelines regarding the practice of technology-based therapies.

4 Audience for These Outputs

Clinical community; researchers involved in clinical settings.

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