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NEWSLETTER

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The End of the University? / Majid Tehranian

It has become fashionable among writers to declare the end of nearly everything – from ideology to history – and some years ago an essay in *Science* even suggested the end of the university. Eli Noam (1995) argued that the three most important functions of the university (creation, preservation, and transmission of knowledge) are all being usurped by the ever-advancing telecommunication technologies.

Scientific knowledge, he pointed out, is growing exponentially. The main response to this phenomenal growth has been to specialize. But there are financial and physical limits to specialization within universities, and so the narrow experts who know more and more about less and less have had to find refuge elsewhere – in think tanks, consultancies, corporate research and development departments, and government research institutes. Thus, the first function of universities – as creators of knowledge – is being overtaken by better-funded and far more specialized research institutions

The second function of universities is the preservation of knowledge. Libraries are often thought of as the heart of a university. But as the production of knowledge grows exponentially, so does the cost of acquisition and storage. "For example," Noam observed, "in 1940 an annual subscription to Chemical Abstracts cost $12; in 1977 it was $3500; and in 1995 it was $17,400." University libraries are finding it increasingly difficult to keep up with the volume and cost of information storage, and are turning to investment in electronic access rather than physical storage.

The third function of universities is transmission of knowledge – their teaching role. "Already," Noam argued, "electronic distant education is available for a wide range of educational instruction through broadcast, cable, on-line, and satellite technologies." He cited several examples of institutions which employ communications technologies to offer courses of instruction entirely on their own or in cooperation with traditional institutions of higher education – and that list has grown.

Are the cards thus stacked against conventional universities? Will they survive? Can they survive the combined blows of technological obsolescence, legislative underfunding, rising costs, moral browbeating, and loss of students to new alternatives for higher education?

A look at the origins of modern universities provides a clue to what will probably happen. The invention of print technology in Europe undermined the authority of the Church and boosted the nascent secular institutions of learning at Padua, Bologna, Montpellier, Prague, Vienna, Paris, Oxford, Cambridge, and Heidelberg. However, the Church did not disappear. It survived, but it was transformed from a monolithic institution into a diversity of churches reflecting national ethos, class divisions, and individual preferences.

Universities also will have to respond to the current challenge by reinventing themselves.

(Continued on page 2)

Save the Dates

November 17-20
2005

The World Academy's General Assembly, "The Future of Knowledge," will take place November 17-20, 2005, in Zagreb, Croatia. Further details to be announced.

"Art is science made clear."

Jean Cocteau

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Since the network technologies are global in character, education must become global in scope. Since they have blurred the institutional boundaries between government, corporate, and academic worlds, universities must be willing to respond to the needs of other institutions in society. Since lifelong learning has become a necessity, universities must also adapt their programs to suit an older generation of students.

The university of the future will be a combination of local nodes and global networks. It will hopefully combine the best features of face-to-face education and distance learning. In such a university, training can be relegated to the distant educational networks, but the education of the young is hardly possible in the absence of close and intimate educational interaction, mentoring, and modeling. Virtual universities will, no doubt, appear and expand – but if the experiences of some of the most well-known distant learning systems, such as the British Open University, are any indication, those who succeed in them will be the students (such as teachers and professionals of various kinds) who have already acquired the self-discipline of autonomous learning.

Despite state budget cuts, declining federal support, and parental grudges against high tuition, universities are here to stay. Like churches some 500 years ago, universities have to adjust to a new social, cultural, and educational environment in which new communication technologies are blurring the boundaries between formal and informal education, schooling and lifelong learning, as well as primary, secondary, and tertiary socialization. Technological transformation presents both risks of obsolescence as well as opportunities for institutional self-renewal that can maximize open learning and minimize classroom drudgery.

Universities must diversify, localize, globalize, and socialize. Rigid boundaries will have to give way to cooperation with other institutions of society in lifelong education. The universities of tomorrow will be even more diversified than they are today. Some will primarily respond to specific training needs. Others will focus on educating broadly and liberally. Learning how to learn is becoming the central function of all schooling.

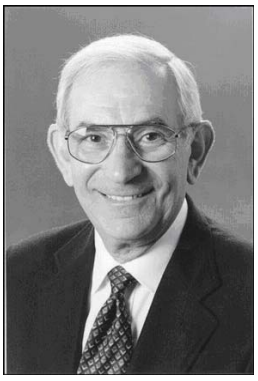
Universities must localize by responding to the social, economic, and educational needs of their own immediate environment. However, universities can no longer stay aloof from the global society that has rapidly come into existence by the global markets, job opportunities, and language and cultural learning that all of this demands. They must engage the other institutions of society in a critical dialogue on societal goals and plans that transcend institutional boundaries by offering lifelong educational opportunities to mid-career religious leaders, military officers, corporate executives, and politicians in order as much to learn from them as to teach.

As these changes unfold, perhaps the entire human society will become a university without walls and national boundaries. •

References

Noam, Eli M. "Electronics and the Dim Future of the University," *Science*, vol. 270, 13 October 1995, pp. 247-249.

Majid Tehranian is professor of international communications at the University of Hawaii and co-director of the project on "Universities of the Future" now being organized by the World Academy, the Toda Institute for Global Peace and Policy Studies, and the Hawaii Research Center for Futures Studies. E-mail: majid@hawaii.edu



Paul H. Silverman / 1925-2004

Paul Silverman was first of all a scientist, who in his long and varied career developed a successful malaria vaccine and established the first U.S. human genome center in 1987 at the Lawrence Berkeley Laboratory. He was also an educator and administrator who served on the faculty at the University of Illinois, Urbana; as vice-president of the University of New Mexico; as provost and president of the research foundation at the State University of New York; as president of the University of Maine, Orono; and as associate chancellor for the Center of Health Sciences at the University of California, Irvine. Working in the private sector he established the first immunoparasitology center at Glaxo Ltd. in London, served as director of scientific affairs for Beckman Instruments, and was on the board of directors for Spectrum Pharmaceuticals. Although he was proud of his work with the Human Genome Project, he was in his last years engaged in questioning the "central dogma" of genetics that posited a direct causative sequence from DNA to RNA to protein. He published an article on "Rethinking Genetic Determinism" in the May 24 issue of *The Scientist* and was continuing work on that subject until the last day of his life. He died July 15 at the University of California, Irvine Medical Center, of complications following bone marrow replacement.

Book Review

Bioelectromagnetic Medicine

Paul J. Rosch and Marko S. Markov, Editors
Marcel Dekker, Inc., New York and Basel, 2004, 851 pages
Reviewed by **Burke Zimmerman**

All life on this planet has evolved in a sea of electric, magnetic and electromagnetic fields, and it is highly probable that many or most organisms, including humans, have adapted to use, or protect themselves against, these elements of nature. Furthermore, it seems entirely reasonable to suspect that electrical, magnetic, and electromagnetic phenomena are an integral part of the physiology and function of living organisms – and that there are interactions of electric, magnetic and electromagnetic fields with cellular components, cells, tissues and organs.

With the emergence of an understanding of electromagnetic fields and the elegant formalism provided by James Clerk Maxwell in the mid 19th century, coupled with advances in physiology that began to reveal the role of electrical phenomena in the contraction of muscles, the conduction of impulses along nerves and ultimately the complex electrical activity of the brain, the legitimate application of electricity, magnetism and electromagnetic fields to the science of healing followed naturally. To date there have been numerous validated medical applications, including treatments of bone healing, cancer, coronary disease, and neuropsychiatiric disorders.

Still, the field remains controversial, owing to the fact that there has been a great deal of pure fraud and charlatanism mixed in with legitimate applications, and to "the inability to identify the mechanisms of action responsible for any benefits." Most readers still regard the entire domain of medical applications of magnets and electromagnetic fields as "alternative" medicine, a New Age fad not to be taken seriously.

This volume, therefore, represents a timely compendium of properly conducted studies on applications of electricity, magnetism and electromagnetic fields to medicine. The book consists of 49 chapters by leading investigators, ranging from the basic science of how electromagnetic energy interacts with cellular components to the results of clinical trials. Except for the acknowledgement of the charlatans in the introduction, discussions of any claimed methods or treatments that are not supported by "evidence-based medicine supported by reference in peer-reviewed publications" are omitted. The editors conclude the volume with a 50th chapter discussing future applications.

Bioelectromagnetic Medicine also examines the natural electric and electromagnetic fields and currents generated *within* an organism, and the function that these may serve. The editors and contributors have "attempted to identify concepts and theories that attempt to explain the mechanisms responsible for mediating the diverse benefits of bioelectromagnetic therapies and, in some instances, how they may relate to ancient concepts of subtle energies in the body that are also found in nature."

I found some of the contributions to be particularly fascinating. Dennis Stillings' chapter entitled "The Theology of Electricity – Electricity, Alchemy and the Unconscious", while it seems not to fit with most of the content of this volume, provides a most interesting discussion of the history of electrical theory and practice. The author was inspired by Carl Jung's *Psychology and Alchemy* and Ernest Benz's *The Theology of Electricity*.

Edgar Mitchell's chapter, "Quantum Holography: A Basis for the Interface between Mind and Matter," draws many inferences from the phenomenon of quantum holography, a fairly obvious theoretical concept that has been validated by functional magnetic resonance imaging (fMRI). He suggests that the mind, as opposed to the brain, is likely associated with a quantum hologram. He also asserts that the famous experiments of Jacques Beniviste with "memory of water" in which he claimed pharmaceutical effects with water diluted 100 orders of magnitude so that none of the original substance could possibly have been present "is easily explained with quantum holography". Unfortunately, this provocative chapter is relatively short and somewhat superficially written so that his assertions are not explained to this reader's satisfaction.

The chapter by Paul J. Rosch (one of the editors) is entitled "Is there an Electrical Circulatory System that Communicates Internally and Externally?" His discussion of internal closed circuits is based on the work of the Swedish investigator Björn Nordenström. The uncanny similarity to the ancient concept of Qi energy with the currents demonstrated by Nordenström is noted and the author asks whether Qi is a form of EMF energy or an entirely separate fifth force of

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"Science is spectral analysis. Art is light synthesis."

Karl Kraus

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nature (in addition to the physicists' weak and strong forces, electromagnetism and gravity). As one who has recently undertaken the study and practice of Qi Gong, I was personally very intrigued by this chapter, especially since I have experienced phenomena first hand that cannot be explained by classical physiology. Nevertheless, a great deal of sound scientific investigation lies ahead before the true nature of Qi will be fully understood.

At 851 pages, this is a comprehensive reference rather than a book intended to be read from cover to cover. Nor would it qualify as a textbook. It does, however, provide the most thorough treatment to date for this emerging field and one that I would recommend highly to medical practitioners, especially those who still regard this area as beyond the fringes of legitimacy.

There is unfortunately no discussion of the risks of exposure to electromagnetic radiation of various frequencies – via high voltage transmissions lines, cell phones, microwave ovens and other man-made sources – that greatly exceed the levels in the natural environment in which humans evolved. The editors acknowledge this omission, citing both a lack of definitive risk-assessment studies as well as the monumental task of assembling a volume of this scope. However, I think such information would have been interesting and useful to many readers.

The editing of some chapters appeared hurried, with frequent grammatical and spelling errors. But the book does provide a huge amount of very useful information – most of it well-written and readable. I was especially impressed by the inclusion of topics such as quantum holography and internal circulating currents that are truly at the edge of inquiry – the kinds of issues that keep science a thrilling endeavor. •

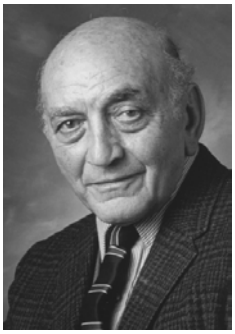
"The most beautiful emotion we can experience is the mystical. It is the power of all true art and science."

Albert Einstein

Burke Zimmerman, Ph.D., is a biophysicist whose career has spanned research in molecular biology and immunology, science policy and the ethics of science and technology, consulting in the area of sustainable biotechnology in lesser developed regions, and more recently as an entrepreneur in vaccine development.

Paul L. Rosch, M.D. is President of the American Institute of Stress (Yonkers, NY) and a professor of Medicine and Psychiatry, New York Medical College, Valhalla, NY. His research has focused on the study of subtle energies in biology and medicine.

Marko S. Markov, Ph.D. has been studying the biological and clinical effects of electromagnetic fields for over three decades and is currently Chairman of the Department of Biophysics and Radiology, Sofia University, Bulgaria.



Lloyd Motz / 1910-2004

Lloyd Motz, professor emeritus of astronomy at Columbia University, was a well-known and beloved educator, author or editor of some two dozen books, and a distinguished scientist and humanitarian. In 1996 the University honored him in a program entitled "Sixty Years of Explaining the Universe, 1937-1997," and established a scholarship in his name in the School of General Studies. His *Essentials of Astronomy* was described by one colleague as "arguably the best introductory astronomy text ever written." Prof. Motz often told friends that he considered one of his greatest accomplishments to be defeating Enrico Fermi in a tennis game in the late 1930s.

Mary Catherine Bateson announces the upcoming conference, "Gregory Bateson: Multiple Versions of the World," celebrating her father's centennial and his continuing influence. Speakers at the conference, to be held November 19-20 at the University of California, Berkeley, include Prof. Bateson, Oakland Mayor Jerry Brown, and Jay Ogilvy of the Global Business Network, author of *Creating Better Futures*. www.BatesonConference.org.

Alex Lightman will chair the next major conference on the New Internet, to be held December 8-10 in Reston, VA. The New Internet, officially known as Internet Protocol version 6 (IPV6), will replace the existing internet standard (IPv4), which has been in effect since 1973. Details of the transition will be presented at the conference, where one of the keynote speakers will be Vinton G. Cerf**,** renowned as father of the first internet. www.usipv6.com

Garry Jacobs is helping to organize a conference in New Delhi on November 20-22, which will mark the tenth anniversary of the International Commission on Peace and Food, chaired by Dr. **M.S. Swaminathan**. The range of the conference is suggested by its title: "Uncommon Opportunities: Roadmap for Employment, Food, & Global Security." The meeting is co-sponsored by the M.S. Swaminathan Research Foundation, the National Commission on Farmers (India), The Mother's Service Society (India), the World Food Programme, and the International Center for Peace and Development (USA), of which **Harlan Cleveland** is chairman. The meeting will focus on (1) global security, including the International Commission's proposal for a World Army of democratic nations under the umbrella of the United Nations; (2) strategies to accelerate employment generation (the Commission had advocated creating 100 million jobs in India primarily by using agriculture and agri-business as an engine for rural development); and (3) prospects for a hunger-free India, inspired by Mahatma Gandhi's plea that in Independent India no child, woman or man should go to bed hungry.

Newly Inducted Fellows

Abigail Alling
President of Biosphere Technologies, Santa Fe NM
President and Director, Planetary Coral Reef Foundation (PCRF), Belize
Giuseppe Caglioti
Professor of physics, Politecnico di Milano
Author of several books on science and art
Lloyd S. Etheredge
Director, International Scientific Networks Project,
Policy Sciences Center, New Haven CT
Gilberto Carlos Gallopín
Regional Adviser on Environmental Policies (Argentina)
Economic Commission for Latin America and the Caribbean (ECLAC)(Chile)
Roger Guillemin
Distinguished Research Professor, Salk Institute, LaJolla CA
Noted computer artist; Nobel Laureate in Medicine, 1976
Eduardo Moacyr Krieger
Professor of Physiology, Faculty of Medicine, University of Sao Paolo
President, Brazilian Academy of Science
Alexander Lightman
CEO and Chairman, Charmed Technology, Santa Monica CA
Chairman, international IPV6 (Internet Protocol Version 6) summit conferences
Lenore Manderson
Key Center for Women's Health in Society, University of Melbourne
Visiting Professor of Public Health, University of Witwatersrand, South Africa
Mohan Munasinghe
Chairman, Munasinghe Institute for Development (MIND), Colombo
Chief Energy Adviser to the Government of Sri Lanka
Jyoti Parikh
Senior Professor, Indira Gandhi Institute of Development Research (IGIDR)
International energy and environmental consultant
Farhad Saba
Professor of Educational Technology, San Diego State University
Former Managing Director, Educational Radio and Television of Iran
Kaoro Yamaguchi
Professor, Graduate School of Business, Doshisha University, Kyoto
International lecturer and futurist

"Art includes everything that stimulates the desire to live; science, everything that sharpens the desire to know ."

Rémy De Gourmont

Guidelines for Nominating New Fellows

All Fellows of the Academy – including Associate Fellows – may nominate new members. There are no formal qualifications – such as age or possession of advanced degrees – for becoming a Fellow. Criteria to be used in selecting candidates include:

- Distinction or accomplishment in one's profession. A nominee should be a person who would qualify for membership in a national academy of his or her field.
- Interdisciplinary interests or accomplishments.
- Record of public service.
- Global perspective. To be a Fellow of the Academy is to be a member of global civil society, concerned for the welfare of an increasingly-interconnected global civilization.

The prospective nominee should have provided a CV or resume to the nominator, and have indicated interest in being nominated. Prospective nominees should be informed that nominations are ordinarily voted on four times yearly, and that nomination does not guarantee election to the Academy. All nominations (including CV or resume) must be on electronic file, preferably MS Word, and should be submitted to: Prof. Ana Maria Sandi, Chair, Admissions Committee, World Academy of Art and Science. Address: asandi@worldbank.org. Membership in the Academy involves no dues or financial obligations, but members are invited annually to make a voluntary contribution to the Academy's work. •

"Art is meant to disturb, science reassures"

Georges Braque

Lost Contact

We have lost contact with the following Fellows. If you have information about them, please send it to Keith Vargo at: kvargo@hhh.umn.edu.

Dr. Mirko Bunc, USA
Dr. M. Taghi Farvar, Iran
Dr. Augusto Forti, Italy
Prof. Kerstin Fredga, Sweden
Rolf Hutter
Prof. Douglas M. Johnston, Canada
Dr. Mutombo Mpanya, USA
Dr. Alina Mungiu Pippidi, Romania
Prof. Amerigo Pomales-Lebron, Puerto Rico
Juan F. Rada
Prof. Pierre Spitz, France
Dr. Carlos E. Springmuhl-Silva, Guatemala
Gershon Weller
Dr. Abdulqawi Ahmed Yusuf, Austria

Quote

"For me, art comes before science. We *feel* things before we *know* what we feel. That's what I think the World Academy of Art and Science represents, even though we may not have known that was what was happening when it was formed and named. Nevertheless that is what was expressed, and after all these years has resulted in the coming together of like-minded people – people who metabolize experience in such a way, those for whom art is whatever it is they do."

-- **Jonas Salk**