PERSONAL PROFILE

Karl Fuchs ICL President

The Inter-Union Commission on the Lithosphere (ICL), which runs the International Lithosphere Program (ILP) for the International Unions of Geological Sciences (IUGS) and of Geodesy and Geophysics (IUGG), has a practice of alternating its presidents between geology and geophysics. When in 1984 it came the turn of IUGG to propose a successor to Raymond Price, a Canadian geologist, the choice of Karl Fuchs, a leading seismologist from West Germany, was a natural one in view of his wide scientific interests and organizational experiences. For Prof. Dr. Karl Fuchs this assignment is a natural progression in a distinguished career.

As a student in the 1950s, Karl Fuchs was attracted to geophysics, and seismology in particular, by his interest in mathematics and physics and by a vacation job in exploration seismology with SEISMOS in Hannover. Following studies at the University of Hamburg and Imperial College London, he graduated in 1957 from the Technical University Clausthal with the degree of "Diplom-Geophysiker" and subsequently earned his Ph.D. from the same institution with a thesis on wave propagation. In 1968 a second thesis on the reflection of spherical waves was accepted by Karlsruhe University, and he has been on the faculty there ever since, apart from short visits to American, Canadian and Australian universities and institutions.

Dr. Fuchs acknowledges the early guidance of Karl Jung at Clausthal, who provided the necessary foundation for solid earth physics and fascinated his students with "the right mixture of guidance, encouragement and freedom." Heinz Menzel of Clausthal-Hamburg taught him that a "seismogram contains more information than just travel times." Stephan Müller of Zurich demonstrated the importance of experimental seismology and of a broad unified approach by all geophysical disciplines, and Henning Illies at Karlsruhe showed him how to "bridge the gap between the earth sciences" and introduced him to continental rifting in the Rhine Graben and to the role of stress in the intra-continental lithosphere.

At the Geophysical Institute of Karlsruhe University, Prof. Fuchs's research ranges from deep seismic sounding of the lower crust and mantle, to lithospheric stress, numerical modelling of wave propagation, and continental deep drilling. He has been involved in the European Geophysical Traverse and other multi-national seismic profiles, and he regards the observation of the fine structure in the sub-crustal lithosphere with its layers of unexpected high and low velocities as a challenge to geophysicists, structural geologists and petrologists. After the BIRPS discovery of the Flanagan Trough fault off Scotland as a reflector dipping into the mantle to a depth of 100 km, he says, I can foresee worldwide efforts to find similar structures elsewhere. This may strongly influence our current thinking on the depth range of intra-plate tectonics."

Dr. Fuchs is a member of all four major geoscience societies in Europe, the European Association of Exploration Geophysicists (EAEG), the European Seismological Commission (ESC), the European Union of Geosciences (EUG) and the

European Geophysical Society (EGS). He recognizes "the growing conviction among earth scientists in Europe that there is a need for cooperation across national and disciplinary boundaries," and he sees closer cooperation in the future especially between EUG and EGS, for example through joint meetings.

As regards relations between the two Earth science unions, IUGS and IUGG, Dr. Fuchs points to the continuous growth in communication and cooperation between them, necessitated by the advent of plate tectonics and exemplified by the upper mantle project, the international geodynamics project and now ILP itself. In response to the question of why even closer links have not developed, he emphasizes the different approaches of each union to the study of how the Earth is structured and how it works.

"The geophysicist," he says, "like the physicist, tries to understand his object by abstracting the general out of the confusing details of the observed picture in a quantitative way. This approach leads to simple models of the Earth's interior, which lack the details that are the daily bread of geologists. Such detailed observations are much more difficult to model in a quantitative way, therefore geologists must frequently rely upon qualitative models. Both approaches are right and necessary."

However, Dr. Fuchs points out that with the advent of more and more high resolution data on satellite space techniques, global digital seismic networks, deep drilling, etc., and with the availability of super computers geophysicists and geologists can now talk directly to one another. In this new field of cooperation there should be a "code of honour for geophysicists to provide a range of possible models compatible with observations, rather than a single 'best' model. And it should also be a code of honour for geologists to check the proposed model against all relevant data, rather than being satisfied with a model that matches only some observations."

Naturally, this brings us to the ICL, which now links over 400 scientists from all over the world. The Commission, which Dr. Fuchs heads, encourages frontier research in the earth sciences, and several international projects have grown under its umbrella, for example on reflection profiling the continental basement, on deep drilling, and on the lower crust. This focus has encouraged many funding agencies to support research under the ILP flag, says Dr. Fuchs.

ICL has launched a number of new global projects and has actively sponsored efforts on a global scale. Under the project on global geoscience transects, all available geophysical and geological data along about 200 corridors through crucial tectonic features will be compiled worldwide. This will create a natural link between the lithosphere program and IGCP. A project entitled "Stress Map of the World" is another new one. The distribution of stress within the crust of continents and oceans will be compiled from various sources such as earthquake mechanisms, break-outs in boreholes and hydrofrac experiments. This project will lead to closer cooperation with industry; it will define stress provinces, may provide constraints for convection modelling, and could even become of practical importance for engineers and the mineral industry.

Seismic tomography, already a key ILP project, and the establishment of a global digital seismic network provide new tools to understand how the planet Earth works at depth. Dr. Fuchs regards it as "a future challenge to the earth sciences to estimate the life time of the tomographic heterogeneities by dating geochemical reservoirs. This could provide new constraints for modelling convection in

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the Earth's mantle. ICL regards this project as a new frontier in the earth sciences and offers all necessary help to promote it worldwide."

As regards support for the ILP, Dr. Fuchs points out that in every country the funding of lithosphere research is different. Some have established special national programs for the ILP, while others have not made any special arrangements for research on the lithosphere. He does not "ask for any preferential treatment of proposals from ILP; highest quality should be the trademark of research in the program. But all member countries should try to support the research on the lithosphere by setting up special programs with the necessary funds to implement them. If such an involvement does not come about, it may be that such a country does not get the returns from the ILP that are expected."

"The involvement of scientists from developing countries is of special concern to the ILP," says Dr. Fuchs. This needs improvement, and it is hoped that the project on global transects will lead to a better integration. He recognizes the need to bring more scientists from that part of the world to symposia, workshops and schools and to have them participate in new experiments."

As to the future of the ILP, Dr. Fuchs says that "IUGG and IUGS have jointly proposed to ICSU that the Program should become a continuing one in the solid earth sciences. This would mean that the cooperation between the two unions can continue beyond 1990, when the ILP ends, without the need to completely rebuild the links on an international level again. Regular reviewing of the program and rotation of members should be applied to keep alive the fresh spirit of ILP."

Whether the ILP continues or not, its scientific aims and goals may eventually be met through the actions of productive scientists with enthusiasm, ability and leadership, just like Karl Fuchs.

IN MEMORIAM

Edwin Sherbon Hills, on May 2, 1986, Emeritus Professor of Geology at the University of Melbourne, Australia. Widely known for his work in structural geology, geomorphology, and his many contributions to the geology of Australia. A past Chairman of the IUGS Committee on Geology Teaching, he was an accomplished administrator and scientist.

Georges Choubert, Paris, on January 21, 1986. World authority on the geology of Morocco and major contributor to the work of CGMW, especially the Geological Map of Africa and the Geological World Atlas.

PERSONAL NOTES

In Transition

After 12 years as Secretary for the International Geological Correlation Programme in Paris, **Dr. E. von Braun** has returned to the Bundestanalt für Geowissenschaften und Rohstoffe in Hannover (F.R.G.). His replacement is **Dr. E. Dudich** from the Hungarian Geological Institute in Budapest, a sedimentary geochemist with special interests in bauxite and Paleogene stratigraphy. Dr. Dudich is also Secretary of INHIGEO, the International Commission on the History of Geological Sciences of IUGS.

Sr. Antolín Aldonza, President of the Colegio de Geólogos de España to Secretary-General of the European Federation of Geologists.

Awards

From the American Geophysical Union for 1986 to:

James Dooce, University College, Dublin, the William Bowie Medal for outstanding contributions to fundamental geophysics and for unselfish cooperation in research.

John Imbrie, Woods Hole Oceanographic Institution, Mass., the Maurice Ewing Award for significant original contributions to understanding physical, geophysical, and geological processes in the oceans.

From the newly formed (1985) European Association for Geochemistry to:

Harold C. Hegelson, Professor of Geochemistry at Berkeley, California, the first Honorary Membership in the EAG for "outstanding and significant contributions to theoretical geochemistry."

From the European Union of Geosciences to:

D.L. Anderson, California Institute Technology, Pasadena; **Chang Chen Fa**, Academia Sinica, Beijing; **S.J. Gould**, Harvard University, Cambridge, Mass.; **D.H. Green**, University of Tasmania, Hobart; and **V.A. Zharikov**, Institute of Experimental Mineralogy, Moscow, Foreign Honorary Fellowship in the EUG in recognition of their merit and achievements in the field of Earth and Planetary Sciences.

From the Geological Society of Australia to:

Germaine Joplin, Canberra, the W.R. Browne Medal in recognition of over 50 years research in petrology, including her classic work on metamorphic and plutonic rocks, especially shoshonites.

From the U.S. National Academy of Sciences to:

Kenneth J. Hsu, Swiss Federal Institute of Technology, Zurich, and Chairman of IUGS Commission on Marine Geology, election as a Foreign Associate of the NAS; and to, **Susan W. Kieffer**, U.S. Geological Survey, Flagstaff, Ariz., and **Donald L. Turcotte**, Cornell University, Ithaca, N.Y., election as Members, all for "their distinguished and continuing achievements in original research."

LIST OF ABBREVIATIONS

(Aside from those identified in the text or in Directory of IUGS Bodies)

AGID	Association of Geoscientists for International Development
BIRPS	British Institutions Reflection Profiling Syndicate
BRGM	Bureau de Recherches Géologiques et Minières
CIFEG	Centre International pour la Formation et les Echanges Géologiques
EAEG	European Association of Exploration Geophysics
EGS	European Geophysical Society
ESC	European Seismological Commission
EUG	European Union of Geosciences
GSGP	Global Sedimentary Geology Program
IAVCEI	International Association of Volcanology and Chemistry of the Earth's Interior
ICL	Inter-Union Commission on the Lithosphere
ICSU	International Council of Scientific Unions
IGCP	International Geological Correlation Programme
ILP	International Lithosphere Program
INQUA	International Union for Quaternary Research
IUGG	International Union of Geodesy and Geophysics
IUPAC	International Union of Pure and Applied Chemistry