CONFERENCE REPORTS...

Focus on Southern Andes

SECOND CHILEAN GEOLOGICAL CONGRESS
Arica, Chile, August 4-11, 1979

The first Precambrian age determination in Chilean territory was reported at the international Second Chilean Geological Congress in August: a 1000 Ma Rb/Sr isochron was established for the Belen schists in the Pre-Cordillera of the Arica province. This and many other age determinations were reported at a symposium organized by IGCP Project 120 ("Magmatic Evolution of the Andes"), and held in conjunction with the Congress. Meetings of CGMW projects on metamorphic and geological maps of South America were also held.

The wide-ranging agenda included 110 papers on the geology of the Southern Andes. Congress proceedings and papers were distributed to the 250 participants and are available, on request, from the Instituto de Investigaciones Geológicas de Chile, Casilla 10465, Santiago, Chile.

Carlos L. Huete and Francisco A. Herve
Instituto de Investigaciones Geológicas, Chile

Congress field trip included a traverse of the Altiplano plateau of Arica where participants, at 4400 m above sea level, examined Tertiary rhyolites in a setting of lagoons and salars with central-type Quaternary volcanoes in the distance.

Phosphorite Geologists Explore Western U.S.A.

IGCP Project 156 Workshop/Seminar: August 10-17, 1979

Detailed examination of the facies setting of the Permian phosphorite deposits in western U.S.A. gave participants in the field workshop/seminar sponsored by IGCP Project 156 (on Proterozoic-Cambrian Phosphorites) an analogue to compare with the rocks of their own countries. Discussions during the seminars and on the outcrops increased the evidence for (and acceptance of) the fact that the black shale-chert-phosphorite assemblage is worldwide in rocks of Phanerozoic age, and that this assemblage is formed at low paleolatitudes in relatively shallow water at the boundaries between major oceans and continents. Many (but not all) of the participants agreed that with paleo-oceanographic reconstructions using plate tectonic concepts, nearly all phosphorites of this assemblage could be shown to have originated in low paleolatitudes and in a similar facies environment. Arguments ensued on interstitial diagenetic precipitation of apatite as opposed to primary precipitation of apatite at the sediment-water interface.

The Cambrian facies, ranging from shallow to deeper water and analogous to the Permian facies, were examined in the House Range, Utah. The algal facies were particularly well exposed and a minor phosphatic facies was discovered basinward from the algal reefs and oncolite sediment bodies. R.L. Christie described a similar setting for Cambrian phosphorite occurrences in northern British Columbia and the Yukon. The relationship was of interest to both the Indian and the Chinese phosphorite geologists studying stromatolitic phosphorites in their own countries. Also the general facies position of the phosphatic rocks was of particular interest to the Australian, Soviet and Chinese geologists studying Cambrian phosphorites.

A workshop on Fertilizer Raw Material Resources, held at the Resource Systems Institute of the East-West Center in Honolulu, Hawaii, was followed by the Fertilizer Flows Preparatory Conference. Seven papers on the geology of phosphate-bearing regions of Asia and the Pacific, and another seven, along with a panel discussion on the economic geology of phosphate deposits, were given at the Workshop,

while three panels on phosphate resource potential and development opportunities in geological provinces of Asia and the Pacific were also convened.

Some 50 phosphate geologists from 19 countries attended the successful field workshop. The next meeting of IGCP Project 156 is scheduled for June of 1980 in Mongolia; a visit to the phosphorite deposits of Cambrian age in the Hubsugul Basin is planned, as well as a three-day seminar in Ulan Bator.

Richard P. Sheldon
*Chairman, U.S. Working Group
IGCP Project 156*

Some of the workshop participants examine an excavation in the Phosphoria Formation of Permian age, Crawford Mountains, Utah, U.S.A.

Global Interest in Pacific Ocean Natural Resources

XIV PACIFIC SCIENCE CONGRESS: Khabarovsk, U.S.S.R., August 20-September 5, 1979

Advancing the general Congress theme of "Natural Resources of the Pacific Ocean for the Benefit of Humanity", the Scientific Committee on Solid Earth Sciences organized a program aimed at

- solving some of the key tectonic and geochemical problems in studies of the origin and development of the Pacific Ocean and its surrounding continental framework, and
- clarifying the regular patterns of metallogenic distribution in order to encourage the development of mineral resources in the Ocean and its margins, particularly in the relatively little studied developing countries.

Papers presented under the seven Sections which comprised the Solid Earth Sciences program included the most recent achievements in geological, geophysical and geochemical research as it pertains to continental margins, the transitional zone from continents to Ocean, as well as the boundaries of the oceanic crust itself.

Specifically, the following resolutions were discussed and adopted:

- to expand the international collaborative geological research and drilling operations in the Pacific; it was stressed also that improved techniques should be developed to facilitate communication of the resulting data and information to a wider audience;
- to broaden the scope of current research under existing international projects in the Pacific rim countries - projects which concern the correlation of tectonic, petrological, geochemical and geophysical peculiarities, as well as geodynamic studies;
- to prepare inventories on the nature and structure of the oceanic crust and ophiolites of the islands in the Pacific Ocean and its continental rim - under the auspices of IGCP Project 39 - "Ophiolites";
- to organize international research on stratigraphic correlation and the paleobiogeography of the Circum-Pacific (encompassing the late Precambrian and entire Phanerozoic, and including not only the continental margins but also the sedimentary cover of the oceanic crust). To coordinate this program with ongoing ones in other international organizations, a committee would have to be appointed relying initially on national support; this committee could establish a common program devoted to stratigraphic and paleobiogeographical problems;
- to intensify current stratigraphic studies in the NW sector of the Pacific Ocean, with a view to publishing a monograph;
- to request the U.S.S.R. Academy of Sciences and the Ministry of Geology to include the Far East and north-eastern regions of the U.S.S.R. in the excursion program of the International Geological Congress if it is held in the U.S.S.R. in 1984;

- to study the geochemical nature of magmatic rocks in the "Continent-Ocean" region in order to establish possible relationships among magmas, fluids and ore genesis; and
- to increase research on geochemistry of hydrothermal mineralization in volcanogenic belts and active marginal zones of continents.

A symposium on granitoids (organized under the auspices of IGCP Project 30 - "Circum-Pacific Plutonism") aroused lively discussion. Of special interest was the Project's draft international map on Circum-Pacific magmatism, indicating a growing interest in the need to clarify the relationship between orogenesis and magmatism. The map is expected to be published in 1981 in the U.S.S.R.

Great interest was also shown in a symposium dealing with the metallogeny of the Precambrian in the Pacific rim (under the framework of IGCP Project 91 - "Metallogenesis of the Precambrian") as well as in a symposium on the asynchronous volcanism of the Pacific belt.

Some 600 scientists from all over the world participated in the XIV Pacific Science Congress. IUGS representation was active and included many IGCP participants, members of the Commission on Stratigraphy and several of its subcommissions, as well as of the IUGS affiliated organizations IAGOD and IAGC. Especially popular were the pre-Congress field trips to Kolyma, Aldan, Omolon and the central regions of the Magadan. A voyage to the Island of Sakhalin following the Congress gave participants an excellent opportunity to examine Cenozoic marine sediment exposures in the district of Makarov.

Acad. N.A. Shilo
Far Eastern Scientific Centre
Vladivostok, U.S.S.R.

Acad. V.V. Menner (centre), Vice President of IUGS, reviews with Dr. L.S. Zhidkova (left) outcrops of marine Pliocene at the Makarovskiy section on Sakhalin Island.

World Reserves of Oil and Gas Scrutinized

TENTH WORLD PETROLEUM CONGRESS
Bucharest, Romania, September 9-14, 1979

Five thousand delegates from almost every oil-producing and refining country arrived in Romania in September to discuss subjects such as world reserves of oil and gas, developments in production systems for deepwater, drilling in hostile environments, limitations of present seismic techniques and possible future developments, and exploration in new areas.

Ten review papers included an interesting examination of the Romanian petroleum industry, and a lively study of the developments in geochemistry and their contribution to hydrocarbon exploration. Thirteen Special Papers were presented, as well as three General Addresses, one of them delivered by the President of Romania. Technical field trips

CONFERENCE REPORTS (continued)

were organized to run concurrently throughout the week; these included visits to the Ploiesti Oilfield, the Pitesti petrochemical works, Tirgoviste Equipment Works, and the Berca Oilfield and Mud Volcanoes.

All papers presented at the Congress have been edited and typeset; further information may be obtained from the General Chairman of the Congress, Mr. V. Patilinet, the Minister of Mines, Petroleum and Geology of Romania. World Petroleum Congresses have been organized quadrennially (with the exception of the World War II years) since 1933, prior to which International Petroleum Congresses were held, including one in Bucharest in 1907. The British National Committee of the World Petroleum Congresses will host the next "Jubilee" Congress in London, August 27 -September 1, 1983.

N.J. McMillan
Senior Geologist,
Acquittaine Co. of Canada

Geological field trip and lecture tour to the mud volcanoes of Berca: Tenth World Petroleum Congress, Romania.

Precambrian Subdivided

IUGS Subcommittee on Precambrian Stratigraphy
Fifth Meeting, September 15-19, Minnesota, U.S.A.

Further subdivision of Precambrian time beyond that afforded by the first-order division into Proterozoic and Archean eons, as recommended by the Subcommittee previously (see James, H.L., 1978, Subdivision of the Precambrian - a brief review and a report on recent decisions by the Subcommittee on Precambrian Stratigraphy: Precambrian Research, v. 7, p. 193-204), was the principal issue addressed by the IUGS Subcommittee on Precambrian Stratigraphy at its Fifth Meeting in September.

The principles employed have evolved progressively over the past decade or so as a result of the Subcommittee's extensive correspondence on the topic, and the preparation and review of chrono-lithologic charts for large regions of the earth. In essence, these principles embody recognition of the need for a convention, or series of conventions, that will facilitate international discourse. Time units are to be selected so as to provide convenient groupings of geological events in major parts of the world; time boundaries are defined by chronometric age so as to provide a common basis for region-to-region and continent-to-continent application.

With one member abstaining, consensus was reached on a provisional recommendation for subdivision of the Proterozoic as follows:

EON	ERA	AGE OF BOUNDARY (in Ma)
PROTEROZOIC		570 (approximate)
	Proterozoic III	
	Proterozoic II	900
	Proterozoic I	1600
		2500

Labelling of the time units is informal, pending final decisions on subdivisions; suggestions for an appropriate nomenclature will be welcomed. Two time boundaries within

the Archean Eon, at 2900 Ma and 3500 Ma, are suggested for further consideration, but no firm recommendations have been offered at this time.

Suggestions will be reviewed at the next meeting of the Subcommittee, tentatively scheduled for February, 1982. Criticism and comments are being solicited and should be addressed to the Secretary (P.K. Sims, U.S. Geological Survey, MS 912, Denver, Colorado 80225, U.S.A.).

A 10-day field excursion preceded the meeting and covered some 3000 km, traversing the classic Grenville and Huronian sequences in Ontario (Canada), and the Marquette Range and Keweenaw sequences of Michigan and their equivalents in Wisconsin and Minnesota. The stratigraphy and time range of these units, and the significant elements of geological history represented were evaluated, particularly in relation to the Subcommittee's basic task of devising an acceptable time subdivision for the Precambrian.

In the Grenville province, now known to be underlain in considerable part by reworked strata of both lower Proterozoic and Archean age, the "typical" carbonate-bearing Grenville is younger than 1500 Ma. The Huronian, with an age bracketed between about 2150 and 2500 Ma, contains clear evidence for a continental glaciation, and its strata may record the transition of the earth's atmosphere from an anoxygenous to an oxygenous state (basal beds of the Supergroup contain detrital uraninite and pyrite, whereas upper units contain red beds). The Marquette Range Supergroup, with an age apparently bracketed between about 1900 and 2050 Ma, contains the thickest single unit of iron-formation in the world (more than 700 m), possibly also reflecting a major change in the chemistry of the earth's atmosphere and oceans. The Keweenaw Supergroup, with its immense thickness of basaltic flows and clastic rocks, records a continental rifting event about 1100 Ma ago.

Harold L. James
Chairman, Subcommittee on Precambrian
Stratigraphy

New Processes in Aluminium Production

ICSOPA-AIM Conference
Cagliari, Sardinia/Italy, September 26-28, 1979

The emphasis was on improvements in the classical methods of producing aluminium, as well as developing technologies for producing alumina and aluminium (or aluminium alloys) from leucite, anorthosite and clays, at a six-session inter-

national symposium sponsored by ICSOPA, AIM, ALSAR and ALUMETAL in September.

Technological progress in the use of non-conventional "raw

CONFERENCE REPORTS (continued)

materials" (bauxite) is a requirement for any future solution of the problem of supply of raw materials for aluminium: whereas Al is an abundant element in the earth's crust, the bauxite ore is not inexhaustible. Development of techniques for extracting alumina and aluminium from anorthosite, nephelinite, leucite, alunite and clays will ensure the continuation of the use of Al on an even greater scale in the future.

In the meantime, discovery of new bauxite deposits, combined with technological improvements in aluminium extraction from bauxites, will extend this "transition" period. Research aimed at making the silica-rich bauxites more

useful, and using red mud as a raw material, should prove fruitful. Bauxite is used increasingly as a source of abrasives and, more recently, refractory materials.

All papers presented at the Cagliari Conference are to be published in a single volume, available from the Conference Secretariat: AIM, Piazzale Rodolfo Morandi 2, 20121 Milan, Italy.

S.S. Augustithis
President, ICSOBA

Emphasis on Ecostratigraphy

VIIth International Congress on Mediterranean Neogene
Athens, Greece, September 27 - October 2, 1979

Future research will probably concentrate on the wide field of Ecostratigraphy - this was the general consensus of opinion amongst some 325 scientists from 33 countries participating in the IUGS Regional Committee on Mediterranean Neogene Stratigraphy's VIIth International Congress, organized by the National and Kapodistrian University of Athens, under the auspices of the Greek Ministry of Culture and Sciences. Investigations of factors controlling the distribution of fauna and flora in space and time are now a logical next step after twenty years of the Regional Committee's work, which has produced a sound, detailed bio and chronostratigraphic frame for the Neogene of the Mediterranean and the Paratethys.

The Athens Congress, therefore, was a meeting where promising research topics for the future were identified. In order to achieve some of the goals, interim colloquia on specific items will be organized within the next two to three years. Such colloquia will serve as the link between the Athens meeting and an VIIIth RCMNS Congress, to be held in about six years.

The scientific sessions of the Congress were devoted to general presentations covering stratigraphic, paleogeographic and geodynamic aspects of the Mediterranean Neogene, and to discussions on nine selected fields of interest including principles and problems of non-marine, marine and physical correlation methods, paleoenvironments, evaporites in the Mediterranean, the Paratethys and the Middle East, paleogeographic evolution and geodynamics, and the interrelation between changes in paleogeographic configurations and faunal migrations. The results of research connected with various IGCP Projects (No. 1: Accuracy in time; No. 25: Stratigraphic correlation of the Tethys - Paratethys Neogene; No. 96: Messinian correlation; No. 117: Geological events at the Miocene - Pliocene boundary, and No. 128: Late Cenozoic magnetostratigraphy) were incorporated into the discussions; business meetings were organized by the chairmen of some of the IGCP Projects. A special session was dedicated to the Paleogene - Neogene boundary, organized by the IUGS Working Group on the Paleogene-Neogene Boundary.

A seven-day pre-Congress excursion, with 98 participants from 22 countries, focussed on the stratigraphy and paleogeography of the Neogene of Crete. A one-day excursion to the Neogene of Attica, held immediately after the scientific meetings, enabled participants to study classical localities around Athens. The first four-day post-Congress field trip (with 75 participants from 16 countries) dealt with Neogene basins of western, continental Greece and the island of Zakynthos; it was followed by a three-day excursion to northern Greece devoted to the interrelation between the Mediterranean and Paratethys regions. The results of integrated research presented during the excursions may have helped to indicate some of the future lines of study to be stimulated by the RCMNS.

The more than 150 submitted contributions were published

prior to the Congress in three special volumes of the Annales Géologiques des Pays Helléniques (see FOR YOUR BOOK-SHELVES...).

Johan E. Meulenkaamp
Chairman, IUGS Regional Committee on
Mediterranean Neogene Stratigraphy

Addressing delegates gathered in Athens, Greece for the VIIth International Congress on Mediterranean Neogene are: (at podium) Prof. G. Paraskeropoulos, Rector of the University of Athens, and (seated, left to right): Prof. N. Symeonidis, President of the Congress Organizing Committee, Prof. G. Theodorou, Vice-Rector, University of Athens, and Dr. J. Senes (Czechoslovakia), outgoing Chairman of the Regional Committee on Mediterranean Neogene Stratigraphy (of the IUGS Commission on Stratigraphy).

Attending the opening ceremony of the Congress are (left to right): Prof. N. Dermitzakis, Secretary of RCMNS, Prof. G. Marinos, Vice-President of the Congress Honorary Committee, University of Athens, Prof. G. Marakis, Member of the Congress Honorary Committee, University of Athens, and Dr. W.W. Hutchison, Secretary General, IUGS; second row: Dr. E. von Braun, Secretary of IGCP (with earphones), and Prof. G. Demarcq (France), member of RCMNS.

African Basement: Economic Mineral Potential

GEOLOGICAL SOCIETY OF AFRICA: 5th Conference
Cairo, Egypt, October 6-15, 1979

Most of the papers presented at the 5th Conference on African Geology were on basement or Precambrian geology of Africa and its economic mineral potential. Starting with a general review of the uranium potential of Africa by Prof. Dr. E.M. El Shazly (Egypt), contributions during the technical sessions concentrated on differentiation between Mozambiquian Basement and Pan-African suprastructures as well as age relationships in Pan-African fold belts. A number of speakers dealt with the basement geology of Egypt and its neighbouring countries. The successful use of Landsat images and conventional aerial photographs in delineating some geological aspects of the Central Eastern Desert in Egypt was reviewed; this new tool will obviously continue to increase in importance as exploration programs in remote parts of the African continent are intensified.

Economic geology featured prominently in the Conference program, with papers ranging from general topics such as the economic minerals of Uganda, to more specific ones such as the favourable host rocks for uranium and thorium mineralization in the Central Eastern Desert of Egypt. It was evident from these papers that economic considerations dictated the initiation of most geological projects in the continent, although the importance of well organized geological and geophysical preliminary surveys of economically interesting areas was emphasized.

Papers on hydrogeology and engineering geology covered topics such as slope stability evaluation of sediments in Nigeria, and hydrogeological conditions and paleohydrogeological reconstruction of some areas in the Egyptian deserts. A new approach to the hydrology of the Aswan Kurkur area, proposed by S. Omara (Saudi Arabia) et al., was particularly

interesting: from the geological, hydrogeological and hydrochemical conditions of Nubian and post-Nubian aquifers, the authors concluded that Nubian aquifers may have great effect on both post-Nubian aquifers and on the Nile River.

The few contributions on sedimentary basins of Africa included a study of the Maastrichtian and Paleocene macrofossils of the Iullemeden Basin, West Africa and their paleogeographic distribution, as well as a review paper on the Continental Terminal and the Continental Intercalaire - two important groups outcropping extensively in West, North and Central Africa. Perhaps the greatest value of this section was that it gave workers from West and North Africa an opportunity to compare fossils and work out possible correlations.

Two other papers should be noted: one came from a paleobotanist who felt that paleobotanic investigations tend to support the view that Africa was finally separated from India during the Lower Cretaceous. In another paper (on the Quaternary Geology of Egypt), it was pointed out that during the last 25 years, thousands of cores have been obtained from drilling in the modern Nile Delta, along with an equivalent number of soil profiles. Results obtained have greatly enhanced the geomorphologic and morphopedologic knowledge of the Nile Delta.

A post-conference excursion took participants to the Bahariya Oasis (325 km SW of Cairo): the sedimentary section exposed there ranges in age from Upper Cretaceous to Recent (see EPISODES, v. 1979, No. 3, p. 27). In the sequence, iron ore has diagenetically replaced part of the Middle Eocene carbonates.

The 5th Conference on African Geology was sponsored by the Geological Society of Africa and hosted by the Egyptian Geological Survey with Dr. Bahay Issawi serving as the Conference Organizing Secretary. The 250 or so delegates came from 27 countries. Dr. G.O. Kesse (Ghana), President of the Geological Society of Africa, urged African geologists to tackle the challenges of geological exploration and exploitation in a continent that is in a hurry to develop its infrastructure. He appealed to African governments to help supply the basic laboratory and field resources required by geologists.

IUGS was represented by the Secretary General who presented a goodwill address, many IGCP participants (several IGCP Projects held meetings during the Conference), and members of the IUGS affiliated association CGMW.

Cornelius A. Kogbe
General Secretary,
Geological Society of Africa

Left to right: Prof. C.A. Kogbe (Nigeria), General Secretary of the Geological Society of Africa, Dr. B. Issawi (Egypt), Secretary, 5th Conference on African Geology, and Dr. G.O. Kesse (Ghana), President, Geological Society of Africa and member of the IGCP Board.

Resources for Twenty-First Century

U.S. Geological Survey: International Centennial Symposium

Technical sessions of the U.S. Geological Survey's International Centennial Symposium in October were devoted to identifying, exploring, and developing resources of minerals, energy, and water. In many papers, the necessity for national inventories was stressed, and useful descriptions were given as to the various ways in which such surveys are carried out. Generally speaking, evaluation of mineral resources emerged as a national concern, but it is significant, in terms of current trends, that papers on energy resources tended to take an international view.

Another major focus of the week-long meeting was the environment: sessions were devoted to the effects of geological hazards such as earthquakes and volcanoes, and to less spectacular, but equally important, environmental changes resulting from man's modification of the earth's surface. Extensive alteration of the landscape has led to the need for environmental mapping.

Sharing of the knowledge necessary to attack our resource and environmental problems requires use of the best means of communication; in earth sciences, cartography must be em-

CONFERENCE REPORTS (continued)

phasized. It was thus fitting that the Symposium included a session on surveying, mapping and cartography, and one (sponsored jointly with CGMW) on the cartography and printing of coloured geological maps.

Highlights of the meeting included

- a banquet address by Ahmed Zaki Yamani, Minister of Petroleum and Mineral Resources, Saudi Arabia, who spoke on "The Growing Oil Scarcity and the Challenge of Future Discoveries": Sheikh Yamani paid tribute to geologists and engineers for their significant part in discovering the world's oil; he pointed out the increased use of energy in the last ten years, which has involved a more than proportional increase in oil consumption, and emphasized the importance of more efficient methods of oil recovery as well as the necessity for rationalization of consumption;
- a welcoming speech by the Survey's Director, H. William Menard, who pointed out that the nearly 500 scientists and officials from 48 nations who were attending the Symposium represented more than 3000 million people living on 96 million km² of the earth's crust; he stressed the need for improving our techniques of mineral-resource estimates;
- an evening "smoker" session during which Prof. Rudolph Trümpy, President of IUGS, spoke on "Earth History as Moral Lesson"; proceeding from the complexity of the earth to the necessity for repeated adjustments in our hypotheses, he made a plea for increased cooperation between earth scientists which can be expressed, among other ways, through international organizations.

The primary objective of the Symposium was to bring together scientists from countries with differing resources and varying degrees of development in order to examine mutual problems and their implications for the coming century. The

proceedings of the Symposium will be published as a Professional Paper of the U.S. Geological Survey.

Frank C. Whitmore, Jr.
General Chairman, Centennial Symposium

Sheikh Z. Yamani of Saudi Arabia and H.W. Menard, Director of the U.S. Geological Survey, at the banquet head table.

V.E. McKelvey (left), former Director of the U.S. Geological Survey and member of the IUGS Ad Hoc Committee for the Revision of the Constitution, and R. Trümpy, President of IUGS, during "smoker" session.

GSA "Rattles Continental Skeletons"

92nd Annual Meeting

San Diego, California, U.S.A., November 5-8, 1979

For sheer size and variety, an annual meeting of the Geological Society of America and its associated societies is hard to beat. This year's meeting in San Diego attracted 4,500 participants.

Here are some selected highlights from but a few themes:

- a one-day symposium on granites began with a model for irreversible differentiation of the earth (D.L. Anderson, U.S.A.), in which oceanic island and continental flood basalts are considered to be derived from the thermal boundary zone in peridotite above 250 km in depth, when an underlying convection cell in eclogite becomes unstable and creates a 'hot spot' of approximately 200 Ma duration;
- a review of granites as images of their source rocks (B.W. Chappell, Australia) distinguished two major groups of suites: those derived from partial melting of igneous rocks (I-type granites) and those derived from partial melting of sedimentary rocks (S-type granites);
- a theory that the large volumes of I-type granites found in fold belts are derived from very deep crustal levels (deeper than for S-types) where igneous material may have underplated the crust was presented by A.J. White (Australia);
- magmas of the Sierra Nevada Batholith, California, were considered by P.C. Bateman (U.S.A.) to have been derived from lower crust and/or upper mantle sources, with emplacement occurring episodically during periods of relaxation between regional deformations;
- a major, deeply-penetrating fracture system (1600 km in length) focussed I-type magmas in Coastal Peru into "gregarious assemblages of multipulse plutons" that consistently reached high levels in the earth's crust or even breached it (W.S. Pitcher, U.K.);
- a special session devoted to the Inter-Union Commission on Geodynamics (ICG), organized by G. Gastil, U.S.A. for Working Group 10, concentrated on relationships between variations in the subduction of oceanic plates and vari-

ations in the magmatic and mineralogic substances believed to be the products of subduction. It ranged through consideration of anticipated subduction products based on experimental studies (P.J. Wyllie, U.S.A.), recognition of the isotopic signature of oceanic crust and mantle, and identification of melts derived from subducted plates (S.B. Jacobsen and G.J. Wasserburg, U.S.A.), to controls of subduction geometry and location of magmatic arcs (T.A. Cross and R.H. Pilger, U.S.A.). In addition, metallogenic zoning of mineral deposits, formed between 120 to 10 Ma ago in southwestern North America (S.B. Keith, U.S.A.) and in western Mexico (K.F. Clark and C.T. Foster, U.S.A.), was interpreted as a possible product of subduction. Models related the zoning to rates of subduction which in turn controlled the angle of dip of the underthrusting slab, and hence, the locus and composition of the magmas;

- a special symposium devoted to "Perspectives on Government and Science" to commemorate the Centennial of the U.S. Geological Survey dealt mainly with the North American scene, though a number of universal aspects emerged: Dr. P.H. Abelson, Past President of IUGS, noted that government growth had given scientists diminished access to decision makers and had led to a concurrent deterioration in effective conduct of scientific research by government agencies. Describing the role of earth science in government from a Canadian perspective, Dr. D.J. McLaren (Director General, Geological Survey of Canada and Chairman, IGCP Board), referred to Canada as being, in one sense, a developing country which must strengthen its research base and knowledge of resources, concluding that for Canada "a world view is inevitable requiring long-term knowledge of resource endowment, an understanding of total energy needs for its exploitation and recognition that more equitable distribution must necessarily restrain

CONFERENCE REPORTS (continued)

local growth";

- the Presidential Address by Prof. L.T. Silver on "Rattling continental skeletons: arcs and orogenes, cratons and margins, rifts and roots, magmas and metals", and based on decades of detailed field, chemical and isotopic studies in southwestern North America, drew some global conclusions: for example, the fact that mantle-derived magmatic rocks, which intruded a particular region of craton in episodes from Precambrian to the Tertiary, all display the same geochemical signature for certain elements and isotopes, appears to imply that part of the upper mantle (above 220 km depth) was attached to continental crust through long periods of geological time.

W.W. Hutchison
Secretary General, IUGS

At the GSA Past Presidents' Breakfast in San Diego (left to right): Dr. R.H. Jahns, Dr. L.L. Sloss (incoming President of GSA) and Dr. J.C. Maxwell (IGCP Board member). (Photo courtesy John Frye)

Ink and Rocks

AESE ANNUAL MEETING

Ink and rocks mixed as usual last October as the Association of Earth Science Editors (AESE) held its thirteenth annual meeting in Tulsa, Oklahoma, U.S.A. As always, the technical sessions concerned the selection of words and their distribution in the form of ink on paper and film; the rocks were shown about half way through the three-day meeting as the group toured the area around Tulsa, and learned about local geological history and environmental problems.

"Many good scientists are lousy writers," Robert Day of the American Society for Microbiology told the group, and much of the meeting was devoted to analyzing that problem. Helen Hodgson of the U.S. Geological Survey proposed lectures and other means of helping geologists to write better, and I previewed a workshop (held later at the GSA Annual Meeting in San Diego) called "Geowriting for Results".

William Kaufmann, a California publisher, described innovations in printing, citing the recently published California Water Atlas and its highly informative charts; Julie Jackson of the American Geological Institute said that the revised Glossary of Geology, to be published early in 1980, would define about 36,000 terms; Jay Fussell of the University of Nebraska predicted that conventional dictionaries would give way to computer print-outs on demand; James H. Shea of the Journal of Geological Education told of lessons learned the hard way by an elected editor...

Next October the AESE will meet on ink and rocks in Halifax, Nova Scotia, Canada.

Wendell Cochran
Editor, GEOTIMES

FACTS AND PRINCIPLES OF WORLD PETROLEUM OCCURRENCE

Edited by: Andrew D. Miall

Obtainable from:

STACS DATA SERVICES LTD.

3651 - 23rd Street N.E.,
Calgary, Alberta
Canada T2E 6T2

C.S.P.G. MEMOIR 6

The volume contains forty-three of the main papers given at the 50th Anniversary Conference of the C.S.P.G. in 1978.

Eighteen of the articles review the Principles of Petroleum Accumulation. Thirteen articles consider Worldwide Petroleum Provinces and twelve articles deal with Canada.

Hard cover, 17 x 24 cm., 1000 pages.
1979

ISBN 0-920230-07-5

Cost:

\$40.00 postpaid in Canadian or U.S. funds