AGID Appeals for Financial Support

The Association of Geoscientists for International Development has recently issued a worldwide appeal for the financial assistance needed to carry out its program of work in developing countries. This appeal is addressed to all persons, agencies, companies, foundations or other organizations willing to contribute to the Association's activities in the next five years. AGID was founded in 1974 by a small but dedicated group of geoscientists who saw the urgent need for a non-governmental, non-profit organization that would serve certain needs of the developing world through the geosciences. The main objectives of the organization are to bring geoscientific expertise to developing countries, and, by doing so, help in the proper development and use of the real resources of the Third World.

In formal terms, AGID's aims were expressed as being:

- to encourage communication between geoscientists and others interested in the application of geosciences to international development;
- to promote geoscience activities related to the needs of the developing countries;
- to emphasize the fundamental role of the geosciences in economic and social developments; and
- to promote awareness among geoscientists of their responsibilities in natural resource development.

Ten years later, AGID's original aims and objectives have been fulfilled beyond the wildest dreams of its founders. AGID's total membership is now near the 2,000 mark, drawn from 123 countries. Its headquarters has moved from St. John's, Newfoundland, Canada, to Caracas, Venezuela, and then to Bangkok, Thailand. Regional offices now exist in Bogota (Colombia), Cochabamba (Bolivia), Jos and Zaria (Nigeria), and Kanpur (India).

AGID has achieved a unique position in the field of international geoscientific endeavour. In the words of the Canadian International Development Agency (CIDA) 1981 evaluation of AGID's performance, "AGID . . . provides services to the international geoscientific community which are not substan-

tially duplicated elsewhere." In the same year, AGID was recognized as an 'affiliated organization' of the International Union of Geological Sciences (IUGS); in May 1984, the Association was placed on the roster of the United Nations Economic and Social Council, with the option of designating official representatives to United Nations offices in New York, Geneva and Vienna.

Current Activities

AGID's core activities, carried out mainly at headquarters and the regional offices, include publication of AGID News, and of regional newsletters for Latin America (in Spanish), for Africa (in English and French), and for Southeast Asia (in English). The Association also issues from time to time Special Reports, Training Course Notes, Directories, Membership Lists and so forth. It also provides advisory and other services to members and operates a book exchange scheme.

Special projects constitute AGID's main efforts. These have consisted of over 40 training courses, workshops, seminars, and symposia, which have been held throughout the developing world. Many of these have been described in previous issues of Episodes.

Special projects are, in most instances, proposed by Council or Ordinary Members to serve a specific need in a particular region. Following approval by Council, the organizers are given 'seed' money (varying from \$500 to \$5,000) to allow them to proceed with the detailed planning and soliciting of more funds for the project. AGID's assistance continues in various forms, for example by selection of lecturers and speakers, identification of candidates, and help in fund-raising.

In selecting candidates for financial support, AGID gives preference to the younger, grass-roots geoscientists of the developing countries who would otherwise generally be overlooked or by-passed by those in positions of influence or power in their own countries. This aspect of AGID's work is of the utmost importance, for it promotes and assists in the development of the geosciences at levels where this is most critical. Over the past 10 years geoscientists from more than 123 countries have benefitted in one way or another from these activities.

In its early years, AGID was the main, and at times the only, sponsor for the majority of the seminars, symposia, workshops and training courses that were held. Then every dollar provided by AGID was estimated to generate 7 to 8 dollars in goods, services and/or cash! Over the years, however, in recognition of AGID's experience in organizing such activities, more and more organizations and institutions have been willing to be co-sponsors with AGID in these special projects.

To date AGID's main efforts have been concentrated in the fields of geoscience education, small-scale mining, mineral exploration, mineral resource management, and engineering geology. While these efforts will continue, AGID will also branch out into new and necessary fields such as environmental geology, urban geology, and the co-ordination of mineral resource projects and geoscience activities between developing countries and international development organizations.

Organization and Administration

AGID works through a Council of 21 members, elected every four years, as far as possible, to be representative of both the industrialized world and the developing countries, and to

Figure 1: Gem mining in Thailand.

News Reports

represent the main geoscientific fields. Two new developments are envisaged for the future. One is to increase regional autonomy in the hope that more meaningful regional activities will take place, and that there will be an increase among the members in a sense of 'belonging' to the Association.

The second is the appointment of a full-time Executive Officer who will be able to deal effectively with the tremendous increase in the administrative affairs of the Association. These matters have in the past 10 years been handled almost exclusively on a voluntary basis by professional geoscientists who have been devoted to the cause of AGID and have been more than willing to devote most of their spare time to its affairs. The running of AGID continues now on this basis, but it is being increasingly felt that the time has come for the administration of AGID to be placed in professional hands.

Financial Resources

Throughout the past ten years the funding of AGID's many activities has come mainly from CIDA, but in recent years increasingly supplemented by grants from Australia, Unesco, IUGS and from governments such as the Netherlands for particular projects. However, without CIDA's generous financial support, AGID would not have been able to achieve more than a fraction of what has been accomplished.

Nevertheless, AGID has constantly been beset by 'a serious financial position'. This is now much more serious than it has ever been, and there is concern that AGID will not be able to carry out its essential activities. The average annual budget in recent years has been around \$150,000 U.S., most of which has to come from grants and donations. The present financial position is sufficient to continue the publication of AGID News and maintain operations on a small scale in Asia, Africa and Latin America. However, even this cannot be done without the help of the Asian Institute of Technology, the Geological Surveys of Colombia and Bolivia, the Indian Institute of Technology and the Universities of Jos and Ahmadu Bello in Nigeria, all of which provide support to the Association's offices. To enable the Association to continue its work into 1986, immediate grants are needed as are assurances of

continuing support over the next three to five years. Against this crisis background, AGID for the first time is issuing a mass appeal to all of its members and supporting institutions, to international and aid organizations, and to possible donors throughout the international community.

We need new members. We need to reach more geoscientists throughout the developing and developed world. We need to involve more geoscientists in AGID's activities throughout Africa, Asia and Latin America. But, especially we need financial resources to maintain the momentum that AGID has built up over the years through the efforts of a few dedicated Councillors and many thousands of interested and enthusiastic workers from the international community.

If you have participated in an AGID workshop or training programme, or attended one of its short courses or symposia, you have benefited from the AGID spirit that was set in motion in 1974 in that small Canadian city of St. John's on the coast of Newfoundland. If you have read or bought an AGID publication, or looked up an address in one of its directories, you have realized the efforts of an AGID volunteer somewhere in Africa, Asia or Latin America. Perhaps you have attended a Workshop using an AGID travel fellowship, or been on a field trip guided by an Association volunteer.

AGID has been a bold venture, creating excitement and giving us a glimpse of its tremendous potential. It has been called the most effective non-governmental organization working in the Third World. Each one of its Officers and Councillors has contributed to all that AGID has achieved. Each is a respected geoscientist, with a wealth of practical experience in international development as well as geoscientific work. Each one is highly motivated towards the objectives of AGID and donates his or her competence and time to its activities in the largest measure possible. But dedication and effort are not enough. We are now asking all of you, old members or new, governments, institutions, agencies to give us your support and resources. AGID needs your help now.

We welcome your contribution, no matter how small. Your cheque should be made out to the AGID APPEAL FUND. All such contributions will, of course, be entered into on a legal basis and will be publicly and gratefully acknowledged.

P.G. Cooray, President
T. Thanasuthipitak, Secretary-Treasurer
(AGID, AIT/GTE, Box 2794, Bangkok 10501, Thailand)

New Mineral Deposit Modelling Program Underway

IUGS and Unesco have set up a new Mineral Deposit Modelling Program to advance the knowledge of and expertise in deposit modelling for use in exploration, assessment and development of mineral resources. A major objective of the program is to "transfer knowledge and expertise" to developing countries. Under the program, information on existing mineral deposits models will be compiled and published, including brief summaries of the major attributes of mineral deposits, the identification of the various models, and the definition of tectono-stratigraphic relationships of selected deposit types. Field studies and research programs will also be organized to formulate models appropriate to developing nations, and a third activity will be the organization of workshops to be held in these countries.

The Deposit Modelling Program was presented recently to the 5th Arab Congress on Mineral Resources held in February, 1985, in Khartoum. As a result, the 250 scientific and technical leaders from the Arab nations in attendance resolved to

request that the Arab Organization of Mineral Resources sponsor technical seminars and workshops on this topic. Contacts for this purpose have already been made with the program's Steering Committee.

The Steering Committee will shortly issue the first of its newsletters, which describes the general concept of workshops on mineral deposit modelling. These will be one to three weeks in duration, and each will be designed for the country proposing them. The first phase of the workshop will be an instructional seminar to emphasize deposit types appropriate to the host country. The second phase will be field excursions to typical deposits and geological terrains, the third phase would be a seminar with the leaders and participants examining the applicability of existing models to the deposits and terrains seen in the field, and the fourth phase would be a report by the host country to IUGS on the execution and technical content of the workshop.

News Reports

The workshops would be aimed toward participants with the equivalent of a Bachelor's degree in earth sciences (preferably geology) plus some field exploration experience. The workshop would be conducted primarily in English, and attendance would be limited to a maximum of 40 scientists. The host country will be responsible for obtaining the appropriate facilities and for making all arrangements for the field excursions. Salary costs for workshop leaders will be the responsibility of institutions participating in the program and not the host country. IUGS-Unesco has funds to cover all or part of air travel of workshop leaders, but local costs such

as room, board and transportation will be the responsibility of the host country. Unesco is also willing to assist geologists from developing countries in their travel expenses. Those interested in organizing a workshop under this program are invited to contact the chairman of the steering committee, Dr. G.H. Allcott, U.S. Geological Survey, MS 913, Reston, Virginia 22092, U.S.A.

The first major activity organized by the program is expected to be a Symposium on Mineral Deposit Modelling to be held on December 5-14, 1985, in Manila, Philippines. This will include a seminar on geothermal energy, porphyry copper, massive sulphides, lode gold, and chromite metallogeny. It will be followed by a five-day excursion in Luzon and will close with a workshop to discuss the resulting mineral deposit models.

Loess and Paleoenvironment

Earth scientists from Great Britain, France, Italy and China are cooperating in an international program of research into the sedimentology, stratigraphy, weathering, environmental history and geotechnical behaviour of the loess and loess-like sediments of western Europe. The initiative grew out of work in 1980 and 1984 by E. Derbyshire in the Loess Plateau of Central China in collaboration with the Chinese Academy of Sciences, and from preliminary work in both field and laboratory in western Europe.

The prevailing view is that the vast bulk of the Chinese loess, which exceeds 320 m in thickness at Lanzhou in Gansu Province, is of desert and aeolian origin (see Liu and others in the March 1985 issue of *Episodes* - Ed.). In contrast, the loess of western Europe rarely exceeds 10 m in thickness, and its deposition was closely related to the growth and decay of nearby ice sheets during the Pleistocene.

The loess of western Europe also differs from that of Asia in that it displays the effects of higher moisture contents, erosion and re-deposition by water, and widespread disturbance by ground ice, both seasonal and perennial, in periglacial climatic phases during the Pleistocene. A number of structures have been recognized indicating modification of the primary fabric of loess, including those due to ground freezing, pedogenesis and cementation.

Preliminary SEM studies at Leicester of selected loessic silts from Gansu and Henan in China, from Uzbekistan and Tajikistan in the U.S.S.R., and from a few sites in western Europe suggest that re-working of loess by these and other processes causes distinctive changes in the sedimentary fabric. Similar indications have also been detected in the European loess by several workers using impregnated thin sections. The Leicester work has shown in particular, that the distribution of clay-grade material in true aeolian loess is quite different from that in loess redeposited in alluvium and colluvium. Determination of the genetic properties of aeolian, alluvial and colluvial silts currently referred to simply as "loess" should improve our ability to infer past conditions of deposition and to reconstruct paleoenvironments and cyclical climatic changes.

Geotechnically, loess is a special material because of its metastable behaviour on saturation (hydroconsolidation). The metastability is a function of deposition from suspension in air of particles with atmospheric pore pressures: theoretically, the grain skeleton should have a disposition close to random. Factors inducing strong particle anisotropy in loessic silts require closer study. True loess of all ages in China shows metastable behaviour, although the amount of collapse decreases with the age of the loess, a trend that correlates with microfabric type as shown by SEM studies. The precise role of the fabric in the collapse mechanism is,

however, still only poorly understood. More work needs to be done to quantify the relationship between depositional environment, sediment fabric and collapse behaviour.

In this project, the fabric of loessic types will be determined by studying the sedimentary structure in the field of selected sites in western Europe, by qualitative and quantitative study of SEM imagery of undisturbed sample faces, and by study of impregnated thin sections. A library of micrographs, stereo-micrographs and photomosaics is being built up.

The variability of loess fabric is being quantified in two ways. The variation in three-dimensional void ratios is estimated by measuring the two-dimensional void ratios on photomicrographs using a semi-automatic densitometer with hard copy facility. Grain and void anisotropy is directly measured by means of laser scanning and Fourier transform methods. The distribution and mineralogy of any cementation is being determined by the use of SEM electron backscatter, SEM probe, and by impregnated thin-section analysis.

In another approach, samples of loess from dry locations that lack frost-induced features in Central Asia are being subjected to freezing cycles at different moisture contents and loads, in order to simulate the environmental conditions thought to have been responsible for the widespread frost features in the western European loess. It is hoped to infer from this the nature of the environmental influences on loess and climatic gradients during the Pleistocene in contrasting locations including the French and Italian piedmonts, Normandy and Belgium. A series of loading tests equivalent to a range of overburdens will also be conducted. Loess

Loess deposits of the world (after S.R. Taylor et al., *Geochimica et Cosmochimica Acta*, v. 47, p. 1987, 1983).

News Reports

samples taken from different stages in these tests will be examined using SEM. The aim is to improve our understanding of the collapse mechanism and the role of flocculated clay as a component of strength.

Preliminary tests on loess and other sediments from China, France, and the North Sea basin suggest that there is a relationship between grain anisotropy (as determined by SEM) and bulk magnetic anisotropy. This is being quantified with a view to assessing bulk magnetic anisotropy as a rapid surrogate for grain anisotropy in the investigation of reworked and loaded (compacted) loess and the effect on the strength anisotropy (directional strength) of loess. Grain anisotropy (by SEM) and bulk magnetic anisotropy will also be measured and compared with the natural permanent magnetism (NRM) signature for selected European sites to provide a critical assessment of NRM-based age estimates.

The first stages of the program have concentrated on evaluation of the analytical techniques used in the cooperating laboratories with a view to standardization. Early results on particle size analysis and the complementary use of scanning electron microscopy and thin section analysis are encouraging. The upper Pleistocene units in Europe are richer in aeolian fabric characteristics and, as in central China, tend to be the coarsest in the sequence. However,

fine-grained anisotropy (including micro-lamination) is very common in many loessic silts. In some cases it can be shown to be related to slopewash, whereas in others it consists of particle size fractionation and micro-shearing induced by ground freezing; it has yet to be proved that grain anisotropy is related to wind directions.

Cooperating institutions include the Soils Research Laboratory in the Department of Geography at the University of Leicester, the CNRS Laboratoire de Géographie Physique at Meudon in Paris, the Centre de Géomorphologie at Caen, and the Department of Earth Science in the University of Milan. Cooperating scientists involved also come from Academia Sinica in Lanzhou, China, INA at Paris-Grignon, the Geophysics Laboratory at University College, Cardiff (remnant magnetism), the Department of Oceanography, of the University of Southampton (bulk magnetic properties), and a geotechnical consultant (T. Mellors, U.K.) is also contributing. The program has been made possible by a grant from the Scientific Affairs Division of NATO, following preliminary funding from the British Council.

E. Derbyshire,
Dept. of Geography, University of Leicester, U.K.
A. Billard
CNRS Meudon, Paris
J.-P. Lautridou,
Caen, France
G. Orombelli,
University of Milan, Italy

First Results from ODP

The results from the first two legs of the Ocean Drilling Program have now been released. Leg 101 recovered core from 19 holes at 11 sites throughout the Bahamas that were drilled to test the theory that the entire region from Mexico to the eastern seaboard of the U.S.A. constituted a vast carbonate platform or megabank. This was disrupted in the mid-Cretaceous, with only isolated high-standing areas like

the present Bahamas continuing to grow. The results obtained by the *Joides Resolution*, the ODP drill ship, may favour the megabank theory over the graben hypothesis, according to which the topography formed 160 Ma ago when the African and North American plates drifted apart, leaving both topographic highs and deep canyons.

Figure 1: The top of the advanced piston corer on the *Joides Resolution*.

Figure 2: Bringing the 9.5m-long, core-filled liner to be cut into 1.5m sections for study.

News Reports

At Site 627 the drill hit shallow water carbonates at 500 m below sea level, which coincides with a seismic discontinuity found elsewhere in the area. Other holes, however, failed to reach this horizon, and there is still some debate over the results by ODP scientists involved. The stratigraphy of the sites suggests that mid-Cretaceous drowning was not everywhere synchronous and that it predates the mid-Cenomanian sea-level cycle of Vail and others.

Mature hydrocarbons were also encountered in several holes, emphasizing the oil and gas potential of the Bahamas. Another result was the observation that periods of low sea-level and bank exposure 3 Ma and 5-6 Ma ago correspond to intervals of slow deposition and scarcity of turbidites in the basins. This supports the idea of high-stand shedding of platforms, whereby sedimentation rates increased greatly when sea level was high and banks were flooded - the reverse of low-stand shedding of terrigenous continental margins.

Leg 102 aimed to clean out, deepen and log a DSDP hole drilled on the south end of the Bermuda rise in order to test drilling technology and to collect downhole geophysical data for base-line studies. The original hole, which was drilled in nearly 5,000m of water, was successfully re-entered and experiments conducted to measure physical and chemical properties of the crust. Extensive bridges of alteration products such as clay and calcite were found to have developed in the uncased sediments during the eight-year gap between the DSDP and ODP studies.

Leg 103 was due for completion on June 20 after drilling sites on the Galicia Bank off Spain to investigate sediment deposition and the structural history of the Iberian passive continental margin. Leg 104 will drill sites in the Norwegian sea in July and August to study the passive margin along the Voring Plateau and the changing sedimentary patterns in the Norwegian Sea.

New IAGC Journal Planned

The International Association of Geochemistry and Cosmochemistry (IAGC), an affiliate of IUGS, has for the last two decades been one of the main international geochemical and cosmochemical organizations. Its chief objective is to foster the advancement of and cooperation in geochemistry and cosmochemistry in the broadest sense. This is achieved by working with interested groups in planning meetings related to these fields, by sponsoring publications of a type not normally covered by existing organizations, and through the activities of its Working Groups.

The Working Groups study problems that would require or profit from international cooperation. They cover a wide spectrum of activities including geochemical prospecting, interactions between rock, water and living matter, extra-terrestrial geochemistry, weathering sedimentary and diagenetic processes, isotope geochemistry, thermodynamics of natural processes, geochemistry of health and disease, international standards, and cooperation in applied geochemistry with the emphasis on special training for developing countries. Partial financial support for the Working Groups comes from IAGC, but most are self sustaining.

In 1986 IAGC will launch a new bimonthly journal, APPLIED GEOCHEMISTRY. This international journal will be devoted to original research papers in geochemistry and cosmochemistry that have practical application to aspects of human endeavour. Topics to be covered will include search for mineral and energy resources, the upgrading of these resources where there is a direct geochemical application, the use of geochemistry for environmental protection from pollution, medical geochemistry, and agricultural aspects of geochemistry. APPLIED GEOCHEMISTRY will be published by Pergamon Press and will be available on an individual subscription basis only to members of IAGC. IAGC is therefore encouraging those who may be interested in this journal to join the Association at the current rate of US\$25, or US\$10 for those who do not want the new journal.

Further information may be obtained from the IAGC Secretary, Dr. Brian Hitchon, Alberta Research Council, Terrace Plaza, 4445 Calgary Trail South, Edmonton, Alberta, Canada T6H 5R7.

GARS Tackles Kibaran of East Africa

The IUGS-Unesco program on the Geological Applications of Remote Sensing (GARS) has planned for its first project a study of the application of advanced remote sensing techniques to lithostructural discrimination in the middle Proterozoic Kibaran Belt of eastern and central Africa. The two-year project will study the influence of tropical weathering on the detection of characteristic mineral assemblages. It will also investigate structural controls on mineralization and metamorphism associated with shear zones. An attempt will be made to differentiate Kibaran structures from those due to more recent rift tectonics, to identify granites belonging to different intrusive phases and to map their contact metamorphic aureoles.

A study will also be directed towards geobotanical indicators in an area of lateritic soils and vegetation varying from tropical forest to savannah. A special effort will be made to train national geoscientists in interpreting radiometric techniques and to introduce to them new concepts in remote sensing.

The GARS project will cooperate closely with Unesco's Geology for Development Program, especially its geotraverse and mapping studies in the Kibaran (see Episodes, March, 1984), and with the CODATA Multisatellite Thematic Mapping Project, working in the same region. The latter aims to develop a methodology combining thermal data of low resolution from METEOSAT, NOAA 7, TIROS N with reflective data of high resolution from LANDSAT.

Proposals are now being assessed for specific projects using data from test areas in Burundi and Tanzania. The operational stage is expected to start later this year when more remote sensing data become available. Approved projects will receive assistance in acquiring remote sensing data, carrying out field work in the Kibaran, and in introducing new concepts of remote sensing in the study area. Proposals from developing countries are eligible for assistance in handling digital data. Further information on the GARS program may be obtained from the IUGS Liaison Office, 103, rue de Lille, 75007 Paris, France.

SCOR Sets Up New Geoscience Groups

The ICSU Scientific Committee on Oceanic Research (SCOR) recently established several new working groups involving the geosciences, some as a result of proposals from IUGS Commission on Marine Geology (CMG). Geological variations in carbon dioxide and the carbon cycle will be the focus of WG 79, under the chairmanship of E. Sundquist (U.S.A.).

In its original submission, CMG noted that an understanding of the geological record of the carbon cycle was required in order to forecast the long-term effect of changes in CO₂ on climate. The geological record shows a significant degree of carbon cycle variability before any human influence, suggesting the possibility of past atmospheric CO₂ fluctuations. What caused these variations? How were they related to atmospheric CO₂? Were they associated with climate changes consistent with current predictive models? WG 79 will focus primarily on processes and events having time scales of 1,000 years and longer. It will promote and recommend priorities for international and interdisciplinary research by earth scientists concerned with the long-term geochemical behaviour of atmospheric CO₂ and the global cycle.

WG 80, which will study the effects of hydrothermal processes in oceans, was prompted by the realization of the importance of hydrothermal activity, especially around sea floor vents. It will assess the importance of hydrothermal circulation in the global geochemical balance, on developments in the ocean, on ocean biotic productivity, and on physical characteristics of deep ocean waters.

WG 81 on deep water paleo-oceanography will stimulate interaction between physical and chemical oceanographers and marine geologists in order to identify the critical areas requiring more detailed study. It will evaluate geologically determined boundary conditions for past ocean states and ascertain which should be better determined in order to improve the modelling of past circulation of deep oceanic waters. Attention will be focused on the geologically recent past so as to interface with and add a time dimension to data obtained in other SCOR programs. WG 81 will also identify and promote the acquisition of chemical oceanographic data that are presently inadequate for paleo-oceanographic purposes.

Paleo-environments in the deep polar seas will be the focus of WG 82, chaired by J. Theide (F.R.G.). Polar deep sea regions have developed at many points throughout geological time and have often, but not always, been characterized by relatively low temperatures. Because of the cyclic destruction of oceanic crust due to plate tectonics, only the paleo-environments of late Mesozoic and Cenozoic polar oceans are available for study in terms of undisturbed and relatively unaltered sediment sequences. WG 82 will encourage the reconstruction of Mesozoic and early Cenozoic "warm" polar oceans and will assess the "paleoclimatic asymmetry between the initiation and inhibition of a glacial type climate in the polar regions." It may also study the evolution and adaptation of polar marine fauna and flora throughout geological time, especially as regards bi-polar species.

Kail's Geophysical PROJECTOR

**Enlarge or Reduce opaque images
by automatic focusing**

The Model K-A5 Reflecting Projector, ideal for mapping, aerial photography, drawings, layouts and seismic studies. Projector enclosed to form a table top for ease in large material handling. Images are transposed from one glass plane to the other without head or hand interference.

- Image in focus in entire scale range
- Scale from 5x to 1/5x
- Reflects opaque materials to translucent papers
- Single automatic focus remote control
- Fine focus control knob
- Dimensions 80" long, 30" wide, 36" high

Philip B. Kail Associates, Inc.
1010 West 1st Avenue
Denver, Colorado 80223
(303) 623-5987