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OF GEOLOGICAL SCIENCES**

INHIGEO

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INHIGEO is

A Commission of the International Union of Geological Sciences

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**An Affiliate of the International Union of the History and Philosophy of
Sciences**

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INHIGEO Secretary-General**

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CONTENTS

THE INHIGEO BOARD	3
REPORTS	
President's Message	3
Secretary-General's Report	4
Minutes of the INHIGEO Business Meeting, Dublin, 2003	6
Geoarchives Report No. 5	8
INHIGEO BUSINESS MEETING, FLORENCE, 2004, PROVISIONAL AGENDA	9
CORRESPONDENCE	9
CONFERENCE REPORTS	
'Geological Travellers', Trinity College, Dublin, 14–18 July, 2003	11
200 Years of Mineralogy and Geology at the <i>Alma Mater Vilnensis</i> , 8–9 October, 2003	15
German Society for the History of Geophysics and Cosmical Physics	17
The Development of Meteorology in the 19 th Century, 25–26 September, 2003	17
ARTICLE	
'Historical Developments in Soil Classification', by Dan Yaalon	18
AWARDS	
Ellis Yochelson: History of Geology Award, Geological Society of America	21
Michel Durand-Delga: Prix Wegmann, <i>Société géologique de France</i>	22
OBITUARIES	
'Walter Oscar Kupsch (1919–2003)', by David Spalding	22
'William Anthony Swithin Sarjeant', by Richard Howarth	23
'Xia Xianrong', by Wang Hongzhen	30
Eduard G. Malkhassian', by Yu.A. Soloviev, G.P. Khomisouri, and V.B. Seyvanian	30
AN INFORMAL INTERVIEW WITH GORDON HERRIES DAVIES: David Oldroyd	31
FORTHCOMING MEETINGS	36
BOOK REVIEWS	
'A French View of Jules Marcou', by Kennard Bork	38
'Geoarchives', by Martin Rudwick	39
'A Valuable Hugh Miller Reprint', by David Oldroyd	41
'Obeisances to Hugh Miller', by David Oldroyd	41
'Geology at Wroclaw University', by Wojciech Narebski and Zbigniew Wojcik	43
'The History of Biology and Geology from an Iberian Perspective', by Manuel Pinto	43
'Geology in the Lake District for Two Hundred Years', by Beryl Hamilton	44
'In Honour of Endre Dudich' by Teresa Póka	45
'The World's First Biography of Mary Anning, Published in Japanese', by Yasumoto Suzuki	46
'A Notable New Zealand Geologist's Recollections', by Mike Johnston	47
'New Zealander Makes Good in America—and on the Moon', by Ursula Marvin	48
'An Institution for the Teaching of Geology in New Zealand', by Bruce Waterhouse	49
'Truth as Strange as Fiction?', by David Spalding	50
'Falcogens: A Large-Scale History of Large-Scale Geological Phenomena', by David Oldroyd	51
'Debates at the Geological Society of London in the Heroic Period of the History of Geology', by David Oldroyd	54
'At Last! A Thoroughgoing History of Igneous Petrology', by David Oldroyd	54
'Thatcherised Geology', by David Oldroyd	56
'Geology in the West of Ireland', by Gordon Herries Davies	57
NOTES AND QUERIES	58
PUBLICATIONS RECEIVED	63

COUNTRY REPORTS

Australia	65
Austria (2002–2003)	66
Belarus	70
Bolivia	70
Brazil (2002)	71
Brazil (2003)	72
China (2002–2003)	73
Costa Rica (2002–2003)	75
Czech Republic (Prague)	75
France	76
Germany	77
Hungary	78
India	79
Ireland	79
Israel	80
Japan	80
Lithuania	81
Malta	81
New Zealand	81
Norway	82
Poland	82
Portugal	83
Russia	85
South Africa	85
Spain	86
Turkey	87
United Kingdom	87
United States of America	89
Uzbekistan	91
HONORARY SENIOR MEMBERS	92
INHIGEO MEMBERS	93

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Latin America: Position vacant

REPORTS

President's Message

1. I should like to start this, my last address, by thanking all the INHIGEO members whom I worked more closely with, in particular: Professor David Oldroyd, who I had the privilege of having as Secretary-General during that period, and who, with his institutional hard work, wonderful books and articles on the history of geology and international acquaintances, helped quite a lot to make INHIGEO being a highly-rated IUGS Commission in 2003; Dr Ursula Marvin, Vice President, who combining good common sense with a large 'institutional memory' contributed many times to smooth things and put them in perspective; and Professor Hugh Torrens, Past President, who with his always welcome good humour and wit continued his strenuous fight for the importance of the history of geology to be recognised in every corner of the world. Unfortunately, I did not have many chances of getting in touch personally with Professors Kanenori Suwa (Vice President for Asia) and Nicoletta Morello (Vice President for Europe), who nevertheless deserve many thanks for their work for INHIGEO.

This four-year period has given me some sort of personal fulfilment. Some colleagues talked to me in 1999 in Freiberg about my 'availability' to eventually become President of INHIGEO and to my surprise I was elected in Rio de Janeiro. In Rio Professor Ed de Mulder's 'Action Plan Revival IUGS 2000-2004', published after his election as IUGS President, provided some ideas on how the activities of INHIGEO in that period should be carried out. I have done my best for the Commission, with help from many members. I have tried to participate actively in the Commission's activities presenting to IUGS some suggestions of projects in which as many of its members as possible should be involved: a suggestion of a project of papers on the history of the various editions of the International Geological Congress to be submitted to *Episodes* (that was very well received by many INHIGEO members who decided to contribute), a suggestion on the preparation of a booklet on the history of IUGS, now under discussion; and a suggestion about the preparation of a book on the history of the development of ideas on the geology of Africa, still under study. I became involved much more than I expected in the history of geology and that meant not only presenting papers at INHIGEO meetings but also going to places of geological interest where I had not expected to pay visits. And I made good friends and had wonderful moments of conviviality with colleagues from different parts of the world. What more could I have asked for?

Unsuccessful tasks? Several: INHIGEO has not yet a permanent forum for discussion and has not yet its own site in the Internet, though it has a place as part of the IUGS site; the discussion of it being associated with a journal on the history of geology (HOG) has quietly died; the discussion on the Commission promoting the interest of universities in HOG studies never was initiated, etc.

2. INHIGEO has currently (2002-2003 period) 166 members in 40 countries plus 9 Honorary Senior Members. The number of members (including the honorary ones) and the number of countries have increased relative to the periods of 1999-2000 (159 and members in 36 countries), 2000-2001 (171 members and 37 countries), 2001-2002 (169 members in 41 countries), the European and North American countries having always had an imbalance in terms of membership. A discussion on the issue of ageing of the INHIGEO membership, the nomination of elderly persons, naming of honorary

members, and the nomination of younger persons was held within INHIGEO and between IUGS and the Commission in 2003 (see pp. 5 and 8).

3. A conference was held in Ireland on the theme of 'Geological Travellers' in July, 2003, with a meeting in Dublin and visits to several places of interest for 'geo-historians'. For 2004, arrangements have been made for a symposium to be held in Florence, during the International Geological Congress. For 2005, things also look good, one meeting having already been planned for Prague and another one, in Beijing, during the IUHPS Congress, being under discussion (but see p. 38). However, for 2006 no firm offers INHIGEO meetings, but we understand that at least three countries have expressed interest in hosting meetings.
4. As for published material in 2003, please see the Secretary-General Report and the reports from the countries in this *Newsletter*, the conclusion being that the general view is encouraging. It is specially pleasant to see that *Episodes* has published a good deal of material concerning the history of geological sciences ('Classic Papers') and that it will certainly receive a good supply of papers concerning the history of the various editions of the International Geological Congress.
5. Following a meeting in Nice, in April, 2003, of the IUGS Board with several presidents of IUGS commissions, it was decided that INHIGEO should be subject to reviewing in Dublin, in July, 2003. The outcome of the reviewing was most satisfactory, as explained first-hand by the IUGS Secretary-General, Dr Werner Janoscheck, in his address to the participants of the conference referred to above.
6. In 2003, INHIGEO received financial support from IUGS and from IUHPS/DHS. Many thanks are due to both Unions for that. Unfortunately what was received was not enough to cover the needs of all the members who requested the INHIGEO Board for travel funds.

I should like once more to stress the fact that the activities of the members of the Board are supported in several ways by the institutions where they work and so such institutions certainly deserve a word of gratitude from INHIGEO.

7. This is the appropriate time and place to wish all the best to the new Board that will be elected in Florence in August, 2004, and to tell the future President that I shall be happy to help whenever needed. And I say good-bye, as President, to all INHIGEO Members and wish them well.

Manuel S. Pinto, Aveiro

Secretary-General's Report

This year marks the conclusion of my period of office as INHIGEO Secretary-General. The eight years of work have provided an interesting, challenging, and quite productive period for the early years of my retirement from being a full-time academic.

When teaching, I was required to do all manner of things, from science and ethics, to ideas about the relations between the arts and the sciences, Darwinism, history of philosophy, chemistry, music theory, and I know not what. And there were the awful burdens of being head of a small, fractious department, worrying about phone bills, lecturers that never got their marks in on time, or preferred to be out collaring money through personal consulting work rather than being with their students. I tried to mediate between those who thought that History and Philosophy of Science/Science and Technology Studies meant the study of megaliths; those who thought it should be a branch of cognitive science; or those who thought it was about advising governments on policies for transport development in China. What a relief to escape from all that! My predecessor as head thought it was one of his crowning glories to change the School's name from HPS to STS. A successor regards it a major triumph to change it back again. I kid you not!

But after my retirement I was able to concentrate on the aspect of the history of science that I found most interesting, namely the history of geology. And I want to say that INHIGEO provided me with a wonderful opportunity to do just that, meeting and making friends with all sorts of delightful and interesting people, and travelling to places that I might never have hoped to reach in the normal way of things. I am really grateful, and I think I've learned a lot. INHIGEO is anything but a fractious organisation, though it has now perhaps become a bit unwieldy as it continues to grow; and I'm told that in the bad old days the Cold War cast its chill even in a body such as INHIGEO. Happily that situation is long since past.

INHIGEO is a group of students of the history of the geosciences, and it receives its sustenance from the International Union of Geological Sciences (about \$US4000 p.a.) and from the International Union of History and Philosophy of Science (Division of History of Science) (about \$US1000 p.a.). We are a different kind of body from all the other Commissions of the IUGS, which may want specific tasks performed by its Commissions (e.g. settle how the Silurian and its subdivisions are to be correlated internationally). Such work may be difficult, time consuming, and expensive, but it is a relatively clearly-defined task and may be relatively short-term in nature. But to keep a watching brief on the whole history of geology in a unified way is a different kind of exercise altogether. People are all 'doing their own thing' in different ways. What INHIGEO can do—or try to do—is bring together historians of geology in different parts of the world so that they may exchange ideas and information, in part by direct social contacts, and in part by the network that we provide through our address-list. Also, our meetings allow people to get to know something about the geological formations of different parts of the world and the histories of the geosciences in different countries. We must realise that the history of geology is *far more* than the study of the works of Murchison, Dana, Cuvier, Werner, or whoever. (Some of the most profound ideas on metamorphism were developed in the forests of Victoria, Australia, by Alfred William Howitt in Australia in the nineteenth century!) INHIGEO helps people realise that geology is a global science and its history *has* to be studied as an international phenomenon.

But there are limits to what the Commission can accomplish. It could not and cannot produce something like William Sarjeant's monumental bibliography *Geologists and the History of Geology*. It cannot, on its own, produce unified histories of geology for regions that transcend national boundaries. It cannot, in itself, ensure that geoarchives are conserved worldwide. It can, however, assist international investigations and it can promote conservation of both geological sites and geologists' archives. For example, I can imagine that if a British geohistorian studying Murchison wants to get assistance in looking at Murchison's work in Russia INHIGEO would be willing and able to assist by providing the necessary contacts.

But, thinking of the source of the Commission's financial wellbeing, it must be emphasised that INHIGEO has a duty to undertake historical tasks that lie within its powers, and particularly with regard to contributions to the IUGS journal *Episodes*. In this connection, we have been happy to provide articles for its 'Classic Papers' series, and we are now engaged in bringing

together a series of articles on the histories of individual meetings of the International Geological Congress. The response to this project has been most encouraging thus far, and four good articles have been submitted on this theme: on the three IGC meetings in Russia, the one in Stockholm, the one in Madrid, and the London meeting of 1948. I am most grateful to the authors of these papers, and look forward to the receipt of further contributions and offers of contributions (specifically for Mexico, Belgium, Canada, and India). I should like to say here, incidentally that I have been pleased to establish cordial relations with the efficient editorial office in Beijing, and we have been able to assist them also in the matter of book reviews and the refereeing of some historical contributions submitted to the journal. Very recently, I received a warm letter of thanks from the editorial committee in China for the contributions that INHIGEO has been able to make.

The duties of individual INHIGEO Members are not onerous, except when they take on the organising of a conference or the editing of some conference proceedings. But membership is for life and many of the Members (and some of the most active) are now quite elderly. The IUGS has therefore urged us to try to reduce the age of the membership somewhat. Two measures in this direction have been taken, so that the quota of 11 Members per country does not become unduly filled by aging and/or inactive scholars.

First, we instituted the category of Honorary Senior Member, for persons of exceptionally high standing as historians of geology, and/or for those who have given noteworthy service to INHIGEO. The names of suitable people are canvassed among the Board Members, and suitable person's names are put forward at business meetings of the Commission (thus far without any person being refused by a meeting!). These Honorary Members can continue as Members of the Commission in any way they wish (e.g. two of them have written articles on IGCs) but they do not count towards a country's quota of eleven Members.

Second, following the suggestion of the IUGS Secretary-General during the review of the Commission held in Dublin in 2003, it has been decided that persons aged 70 or over shall not count towards the quota either. But reaching the age of 70 does not in itself constitute even a *prima facie* reason for acquiring honorary status! People over 70 may still be nominated to the Commission (though this is not really regarded as an ideal practice) and persons over 70 have to fulfil their obligation to vote in ballots in order to retain their Membership, whereas the Honorary Senior Members do not have to do so. People over 70 can, of course, occupy positions on the INHIGEO Board.

Looking back on my term of office, I should draw attention to the fact that we now hold meetings annually, and ballots are held every two years. These arrangements are not set in stone and may be changed by future decisions of the Board if it is thought appropriate. The number of Members has increased significantly in the eight years that I have been Secretary-General, which should be attributed to the growth of interest in the field, not just my proselytizing (though I have done a bit of that).

Financially, there has been a deficit in the last four years of A\$277.88 in a turn-over of about A\$28,000, so that things are fairly well in control there, and we have modest reserves in hand. It should be emphasised that INHIGEO would be well and truly bankrupt by now were it not for the free postal services made available by my university, where I still hold an honorary position.

The Commission has been successful in getting a number of significant books published in the last few years, and has also assisted the production of booklets of a bibliographical nature, compiled by individual Members. I have thought it important that the standard of English be improved in INHIGEO's productions, to give them a more professional character. Thus I have made considerable efforts in this direction. This may be thought by some to be an act of impertinent supererogation on my part, coming from someone whose linguistic competence is limited to English and French reading! But I do think it important, if INHIGEO is to achieve, as best it can, good-quality products whatever be their language; and whether we like it or not English has become the principal language of scholarly communication, and this tendency has increased even in the last eight years. I have therefore taken to enquiring about nominees' knowledge of languages when preparing ballot papers. This information can be useful when asking people to review books for the *Newsletter* or writing articles for *Episodes*.

In practice, all nominees, these days, have a working knowledge of English. It should be emphasised that knowledge of this language is *not* a formal criterion for membership of the Commission; but it must be acknowledged that, if a person does not know English, what the Commission does can be of little value to that person; and a non-English-speaking person can not do very much for the Commission. I did discover that some of the Commission's older Members had no knowledge of the language, which explained why I never heard from them. I was trying to make arrangements for such persons each to be allocated a 'minder' from their own country, but the last Member in this position known to me is now deceased, so I suppose we can say that the problem has come to an end.

Further on the question of publications, and the associated 'problem' of conferences, there is, as I see it, a difficulty that needs discussion at our next Business Meeting. As a Commission of the IUGS and an affiliate of the International Union of History and Philosophy of Science (Division of History of Science), we have an obligation to make contributions to their respective international congresses. But this is problematical for INHIGEO. The congresses may be held in places where we have few Members, or are not particularly well suited to the holding of field excursions for geohistorians. Moreover, the international congresses are becoming very expensive, and those who want to participate in an INHIGEO meeting may not necessarily wish to attend a full 10-day congress on geology or history of science. Further, these large international conferences, with a plethora of very short papers (15 minutes) or poster presentations, are not well suited to historical meetings, for which the presentations need to be followed by suitable discussion periods. In addition, there is the problem that INHIGEO grant money cannot be used to provide Members with subventions to help them attend the International Geological Congress meetings.

At the meeting in Rio de Janeiro, there were immense complications as we tried to obtain permission to hold 30-minute papers. We 'sort of' managed, but the organising authorities did not like it at all! We can, however, run 'workshops', where there are not the same time constraints and it may well be that that should be the way to proceed for the future. This needs further exploration by the incoming Board. If people came, by invitation, to present longer papers, and to explore specific historiographic *problems*, or geohistorical *topics*, one could envisage some substantial concrete products emerging, in the form of Geological Society Special Publications, or whatever. I commend this idea for examination and consideration by the Board. The Special Publications (of which INHIGEO has already produced one) need to be thoroughly refereed, which is, I think, entirely appropriate, moving the Commission's products from the 'grey area' of conference proceedings to high-quality publications, and not of a hagiographical nature. (It is my impression that a substantial number of geohistorians think that their role is to 'do honour' to their forerunners. Personally, I do not see it that way. I think the object of the exercise should be to understand and

expound the work of earlier geologists, and see how it fitted into the context of their time, or the organisations in which they worked. And there are, of course, many other things for geohistorians to do, of course.) I should mention here the new publishing agreement signed between the Geological Society and the IUGS (see p. 58), which can provide a real opportunity for INHIGEO activity; but also a lot of work.

In editing the Commission's *Newsletter*, I have made a substantial effort to impose a uniform system of referencing on contributors. This has been reasonably successful, but I have still had to do a lot of 'cleaning up' of references. It is also very irksome to have to deal with abbreviations in languages with which one is not familiar. (There is one language group above all others that cleaves to abbreviations! I shall not say here which group it is, but my message still needs to be sung ever more loudly so that it will be heard.) I urge my successor to use a megaphone on this matter. I acknowledge, however, that there *has* been improvement in this regard over the last eight years.

I should like to take the opportunity here to thank our Indian Member Professor Murty for the work he has done on the matter of gearchives, which he volunteered to do when INHIGEO met in Freiberg. His efforts are much appreciated, but to tell the truth his work has now been overtaken by technology. If you wish to locate an archive the surest approach these days is to have recourse to the Google search engine on the internet. This will not uncover everything of course; but it is amazing what it can produce, almost instantaneously. So we have decided to terminate the archive reports, while continuing to urge Members to do all in their power to ensure the preservation of archives in the countries where they are domiciled. It may be mentioned here, also, that INHIGEO matters are now posted on the IUGS website at <http://www.iugs.org/iugs/science/sci-chog.htm>.

And now I must make some specific thanks. My predecessor Ursula Marvin has been a constant source of judicious advice, with her detailed knowledge of the institutional history of INHIGEO, and has saved me from many silly mistakes. I am really grateful to her for all that she has done to assist me. I should also like to thank colleagues Hugh Torrens and Manuel Pinto as the two Presidents with whom I have had the pleasure to work. Additionally, Past-President David Branagan has been a great help, being close to hand in Sydney, when advice has been needed. I should also mention Silvia Figueirôa was a tower of strength for the Rio Congress (2000), and I have had the pleasure of working closely with Nicoletta Morello in preparation for the coming Florence Congress. We also owe her much for her editing the huge *Volcanoes and History* volume (1998). Manuel Pinto did sterling work for the meeting in Portugal and the editing of its *Proceedings*. The conferences held in Switzerland (Rudolf Truempy, Jean-Paul Schaer, and Henri Masson, 1998) and Ireland (Patrick Wyse Jackson, 2003) were real 'home-grown' INHIGEO Meetings, and these organisers saw to, or are seeing to, the matter of quality publication of papers. The Liège meeting (1997) was organised by the IUHPS, but the work of Hugh Torrens and Kenneth Taylor in arranging our programme and getting papers published in *Annals of Science* was much appreciated. The meeting at Freiberg (1999) was largely organised by the host Academy, where the work of Helmut Albrecht and Roland Ladwig (neither of whom are INHIGEO Members) should be acknowledged. In France (2002), INHIGEO was the 'guest' of COFRHIGEO, where the work of Philippe Taquet both as general and genial host, editor, and field guide was much appreciated. And thanks are obviously appropriate to all those who have taken time to prepare country reports, and write items for our *Newsletter*.

Arrangements are well in hand for the 2005 meeting in the Czech Republic, and provisional offers have been received for future meetings from the USA, Germany, and Lithuania, which will have to be considered at the Florence Congress, and decisions made.

I should mention here that in order to provide greater continuity of Membership for the incoming Board, and to give representation on the Board for Australasia (where quite a lot of geohistorical work is done) it has been proposed that a position on the Board of Vice-President (Australasia and Oceania) be created; and I am offering myself for this position.

Finally, I should like to say that it has been an honour and a pleasure to work for INHIGEO for eight years. I have learnt a great deal during that period. And now, maybe, I shall start my real retirement!

David Oldroyd, Sydney

Minutes of the Business Meeting of INHIGEO, held at the Museum of Trinity College, Dublin, on 17 July, 2003, at 4.45 p.m., with the President Professor Manuel Pinto in the Chair

Present

David Oldroyd (Australia), Silvia Figueirôa (Brazil), Philippe Taquet (France), Martin Guntau (Germany), Martina Koelbl-Ebert (Germany), Patrick Wyse-Jackson (Ireland), Ezio Vaccari (Italy), Michael Johnston (New Zealand), Ana Carneiro (Portugal), Efgenji Milanovsky (Russia), John Fuller (United Kingdom), Beryl Hamilton (United Kingdom), Hugh Torrens (United Kingdom), Gregory Good (United States), Kenneth Taylor (United States)

In attendance

Nigel Monaghan (Ireland), Geoffrey Larmine (United Kingdom), Cyril Galvin (United States), Richard Gentile (United States), Robert Silliman (United States)

1. *Apologies* were received from David Branagan (Australia), Maria Margaret Lopez (Brazil), Bernhard Fritscher (Germany), Peter Kreuger (Germany), Kanenori Suwa (Japan), Algimantas Grigelis (Lithuania), Alan Mason (New Zealand), Bruce Waterhouse (New Zealand), Yuri Soloviev (Russia), Ursula Marvin (United States).
2. *Arrangement of Agenda*
No changes to the provisional agenda, published in *Newsletter* No 35, were requested, and that agenda was adopted.
3. *Minutes of previous meeting*
The Minutes of the previous meeting, as published in *Newsletter* No. 35, were accepted *nem. con.*
4. There were no matters arising.
5. *The President* reminded Members that his Report for the previous year had been published in *Newsletter* No. 35.
6. *Matters arising*
 - a. In answer to a question as to the progress of his proposed volume on the history of geology in Africa, he regretted that he had nothing additional to report (but see p. 3).
 - b. On the question of INHIGEO representation in Africa, the Secretary-General (S-G) stated that the Commission had not been successful in obtaining new Members from African countries other than the new Member in Namibia, the Director of that

country's Survey, who had an interest in the history of mining. The Geological Society of Africa had suggested three possible Members, but they did not have appropriate credentials.

7. *Secretary-General's report*

The S-G reported the sad news that Professor Walter Kupsch (Canada) had recently died (see p. 22). New Members in Canada were urgently needed. David Spalding had undertaken to attend to that matter.

No ballot had been held in 2003, but one was to be held in 2004, in which year all Members would be required to formally indicate their wish to remain Members of the Commission. Also, the rule that Members would lose their place on the Commission if they failed to vote in two successive ballots would be applied, as in previous years.

The President had informed the S-G that he only wished to stand for re-election as President if no other person wished to be nominated.

The position of Vice-President (Latin America) was currently vacant owing to the resignation of the previous incumbent. Further, Professor Morello (Vice-President, Europe) had been seriously affected by problems with her eyes, and there might be a change there in 2004 as a result. Professor Suwa had informed the S-G that he wished to step down from the position of Vice-President (Asia) in 2004. The S-G was able to report that a very suitable candidate for his own position (which would become vacant in 2004 after his 8 years in office) had been found, and some fruitful exploratory conversations had been had with regard to the position of President. He also proposed that a position of Vice-President (Australasia and Oceania) be created, for which position he would be willing to be nominated, with a view to providing some additional continuity between the old and new boards, given Dr Marvin's term as Vice President (North America) would also be completed in 2004.

The S-G additionally reminded Members of the necessity of providing an on-going flow of Classic Papers for *Episodes*. One item was currently in press, but at present he only had two or three further items on offer, but not actually received.

About three contributions were needed per year. A sheet of paper was circulated for offers of additional items.

The financial position of the Commission was satisfactory at present. A grant of US\$4000 had been received in 2003, and \$1000 from the IUHPS.

8. *Matters arising*

John Fuller queried the utility of submitting papers to *Episodes*, given that, in his understanding, it was not a highly regarded journal of wide circulation. In reply, the S-G stated that the citation index was known to be rising (he would enquire about the exact figures [see p. 10]) and that *Episodes* was the official journal of the IUGS, for which INHIGEO was one of its commissions and therefore had an obligation to support the journal as it did. Dr Koelbl-Ebert stated that in her experience the papers she had published in *Episodes* attracted greater attention than those she had published in other journals. It was believed that it had a circulation of about 10,000 and was chiefly distributed to developing countries. The S-G undertook to make further inquiries about the matter.

9. *Meeting of Board representatives with a Review Committee of the IUGS, held on 13 July, 2003, in Dublin*

Professors Pinto and Oldroyd had met with Dr Werner Janoscheck (S-G, IUGS, Austria) and Professor Tadashi Sato (Japan). (Professor Celâl Şengör had been unable to attend as planned, because of a visa problem.)

INHIGEO had received favourable comment on its work, following all administrative rules appropriately. According to Dr Janoscheck's minutes of the meeting the Commission's Reports to Council had been of "high quality and timely". The contributions to *Episodes* were appreciated, and in general "INHIGEO was congratulated on its excellent performance in the past and its promising plans for the future; and it was encouraged to continue in its successful way".

The IUGS was anxious that INHIGEO should have its own web-page, and the S-G had been requested to contact the IUGS webmaster about this. Also, INHIGEO was asked to distribute the IUGS *Newsletter* to its Members electronically.

Dr Janoscheck had suggested that Members of INHIGEO aged over (say) 75 should not be included among the quota of 11 representatives per country, which would then make it possible to elect younger Members in countries whose quotas were currently full.

After extended discussion, a motion was passed, *nem. con.*, that persons aged 70 or over should not be regarded as part of a country's quota of Members. The S-G would contact the IUGS with a view to enacting a change of by-laws, at the next IUGS Council Meeting in Florence.

The S-G also noted that the IUGS now proposed that its various commissions would standardly operate for a period of 8 years, but that in the case of INHIGEO, which had long been in existence, its activities would be ongoing, subject to review by the IUGS every 8 years.

10. *Future Meetings of the Commission*

Dr Vaccari reported that plans for the 6-day field excursion in Italy after the Florence conference were well advanced, but that because of Professor Morello's illness it might be necessary for him to take over part of the organisation. Further information on the meeting would be transmitted to Members soon. (The arrangements for the field excursion are given on p. 37.)

Regarding the proposed INHIGEO Symposium for the Congress in Florence—'Museums and Scientific Societies in the History of the Geosciences'—the Third Circular had now been distributed and a call for abstracts was necessary. The forms could be found at www.32igc.org.

Kenneth Taylor expressed concern that 15 minutes was unsuitable for the presentation of historical work, and the S-G was requested to write immediately to the IGC, requesting that all items for the INHIGEO symposium should be allocated 30-minute time-slots.

The S-G reported that a formal letter to the organisers for the planned meeting in Prague in 2005 had been written, expressing INHIGEO's wish and intention to hold a meeting in the city. The Local Organising Committee's chairman would be Dr Jan Kozak. The meeting would focus on topics in the history of geophysics, but there would be opportunity for material on other aspects of geoscience, having regard to the sites available in Czechia and the history of earth sciences in Bohemia. The Czechs were proposing to nominate some new younger Members in 2004.

There would also be a smaller meeting in China in 2005, in conjunction with the IUHPS meeting in Beijing that year, with the history of geosciences in Asia as the theme. This meeting would be organised by the Chinese Members of INHIGEO under the leadership of Professor Zhai. (But see p. 38.)

For 2006, offers had been received from Martina Koelbl-Ebert (Germany) and Algimantas Grigelis (Lithuania).

Unfortunately Professor Grigelis had been prevented from travelling to Dublin because of illness, but the S-G would consult further with him. Dr Koelbl-Ebert emphasised that her offer could be for either 2006 or 2007, but in either case she had the theme 'Geology and Religion' in mind, having regard to the occurrence of the famous archaeopteryx fossils found near her Museum at Eichstätt. 'Women in Geology' and 'Geological Culture' could be additional themes. Professor Torrens noted the importance of lithography for the history of geological illustrations, which issue could be considered in connection with the lithographic stone in which the archaeopteryx remains were discovered.

11. *Honorary Senior Members*

Professors Efgenyi Milanovsky (Russia), Wolfhart Langer (Germany) and Gordon Herries Davies (Ireland) were nominated as Honorary Senior Members, and their names were accepted with acclamation

12. *Business without Notice*

The S-G reported the wish of a group in Australia to prepare a TV series on *The Geologists: A Political History of and Ancient Profession*, for which David Oldroyd would act as an historical adviser. The group sought the support of INHIGEO and the IUGS in their search for funding support, and permission to use the Union's and the Commission's logos on the funding applications. Dr Janoscheck had already stated his view that the proposal had merit and should receive support. The INHIGEO Members present thought likewise, and gave permission for the use of the INHIGEO logo. [Since the preparation of these minutes, the group in Australia found that it could not raise the necessary funds for the project, so it has been put 'on hold'.]

13. At the request of the President, the S-G moved a hearty vote of thanks to Dr Patrick Wyse-Jackson for his almost single-handed organisation of an excellent conference, with a strong coherent theme. The proposal was supported by enthusiastic applause.

The meeting concluded at 6.25 p.m.

A note of clarification

The proposal regarding the quota of Members per country is to be understood as follows. Each country shall have an entitlement of 11 Members, aged 70 or younger. Members who pass that age may continue as regular Members, and may occupy positions on the Board, but their number will not be taken into account as one of the 11 permitted Members per country. Naturally, older Members may resign if they so wish. Apart from the Honorary Senior Members, all Members, regardless of age, must vote at each ballot, and, every four years, they must express their wish to continue their Membership of the Commission. Transition to Honorary Senior Membership is not automatic. Persons must be formally elected to that status by proposal and vote at a business meeting of the Commission. Honorary Senior Members are not required to vote or participate in the Commission's activities in any way, unless they so wish, in which case their participation will be greatly appreciated. They will continue to receive the *Newsletter*, where their names will be listed.

Geoarchives Progress Report No. 5 (final)

Progress Report No. 4 (*Newsletter* No. 35, 2003 for 2002) covered the period April 2002 to 31 March 2003. The present Report is the final one in the series for with advances in internet facilities information on geoarchives can now be acquired with considerable ease. However, I shall be happy receive further information from whatever source, and convey the same to INHIGEO. I should like to take this opportunity to thank all those persons who have provided information and thus helped me discharge my duty. I have acquired a better appreciation and knowledge of the topic and thank INHIGEO/IUHPS/IUGS/ICSU for having given me the opportunity to be of service. It has been a pleasure to have worked on this project.

Brazil

The Brazilian Commission of Geological and Palaeobiological Sites: information can be obtained from www.unb.br/ig/sigep/indexenglish.html. It referred me also to: Earth Heritage Conservation (www.open.ac.uk/media/experts-guide/fields/t_1057.shtml); World Heritage List (www.whc.unesco.org/heritage.htm); UNESCO World Heritage Centre (wh-info@unesco.org); ICOMOS (www.icomos.org or www.international.icomos.org) ICCROM (www.icrom.org); ICOM (www.natmus.min/dk/cons/icom_cc); Geologists' Association (www.geologist.demon.co.uk/local_grtroups.html).

Finland

The Geological Survey of Finland is a national geoscience expert agency under the Ministry of Trade and Industry (address: Betonimiehekuja 402150 ESPOO, Post Box 98, FIN-02151, Finland. The main archives are:

- (1) The archives of the Geological Survey of Finland, which contain over 70,000 items (reports, field notebooks, maps, etc.), mainly in Swedish or Finnish, from 1864 to the present. The archivist is Mrs Riitta Henriksson (Riitta.Henriksson@gsf.fi).
- (2) National drill-core register. The national depot is located at Loppi. It was established in 1974 and contains about 2 million metres of drill core from about 22,400 bore-holes. Contact: Pentii Karhunen (pentii.karhunen@gsf.fi).
- (3) Photo-archives of the Survey. Contact Pentii Karhunen for old material and Jari Väätäinen for new material (jari.vaatainen@gsf.fi).

Iceland

The Icelandic Museum of Natural History (founded 1947) became the Icelandic Institute of Natural History and has care of all archival materials dealing with geology including some older material from its predecessor the Icelandic Natural History Society (1889–1946). All this material is soon to be sent to the National Archives of Iceland. The Institute has been collecting all published maps dealing with Icelandic geology from the beginning. The National and University Library of Iceland received copies of all geology reports and books published in Iceland, but all archival material about geological research goes to the National Archives of Iceland. The National Energy Authority does much geological research and their archival material also goes to the National Archives. Contacts are: National Archives of Iceland (upplysingar@akjalasafin.is); The National and University Library of Iceland (lbs@bok.hi.is); the National Energy Authority (os@os.is).

India

Dr J.V. Subbaraman, who retired from the Bharat Gold Mines in 1987, has reported that the plans and sections of the five mining companies are available in the technical library of the Mine. He has sent a table, listing the important events connected with the mine development prior to 1880 and up to 2001, when the mines were closed.

Japan

Professor Masaru Yoshida, formerly of the Yokohama National University is now with the Gondwana Institute of Geology and Environment (yoshidagondwana@yahoo.com or Gondwana@orion.ocn.ne.jp). Websites are www.gondwanainstit.net/gige and www.gondwanaresearch.com.

South Africa

Mr Roger Price (rprice@geoscience.org.za), archivist of the Council for Geosciences (Geological Survey of South Africa) informs us that the Council is the main repository for geochives for South Africa. See www.geoscience.org.za. A database, SAGEOLIT, is maintained which lists further materials concerning Africa.

Sri Lanka

Information on geoarchival information should be available from the Geological Survey and Mines Bureau, 4 Galle Road, Dehuwala, Sri Lanka; and the National Archives Department, 7 Reid Avenue, Colombo 7, Sri Lanka.

Thailand

Geoarchives may be located at the Department of Mineral Resources, 75/1 Thanon Rama VI, Ratchathewi, Bangkok, 10400 Thailand (www.dmr.go.th) and Library Resource Development Division, The National Library, Samsaen Road, Dusit Dt, Bangkok 10300, Thailand.

United Kingdom

Professor Peter Harper, University of Bath, of the National Cataloguing Unit for the Archives of Contemporary Scientists (www.bath.ac.uk/ncuacs/home/htm) has sent his Progress Report No. 32 (1 October 2002 to 31 March 2003) and reports that seven collections of papers were received during this period, including those of Professor Lawrence Wager, Oxford University, from 1951 to 1963. The Institute of Civil Engineers (UK) has had an archival panel since 1975 and holds papers of engineering geologists (civil-engineering-heritage-1@knowledgelists.ice.org.uk). Professor Malcolm Hart, University of Plymouth (mhart@plymouth.ac.uk) has sent information about Earth Heritage Conservation in the UK.

USA

Mr Roy Cllarke, National Museum of Natural History, informs us that the Meteoritical Society Archives are on deposit with the Smithsonian Institution and are currently being organised. For information on the Society, see: <http://meteoriticalsociety.org>. An informative history of the Society's first sixty years has been published by the Society's historian and one of INHIGEO's Vice-Presidents, Dr Ursula Marvin (*Meteoritics*, 1993, 28, 261–344).

Zambia

The Geological Survey Department, Lusaka, Zambia, holds all records of geological work from 1910 onwards, such as those of the Rhodesian Border Concessions, NR Chartered Concessions, etc. Most of the records are handwritten and are sorted and documanrted. Records and maps of the Survey's work are available. There is also a National Archives repository at Ridgeway, PO Box RW 135, Lusaka, Zambia. Archives of the copperbelt and copper mines of Zambia are maintained by Zambia Consolidated Copper Mines Ltd., Kitwe, Zambia. These archives relate to the discovery of copper from 1902 and the activities of the former Anglo-American and the Selection Trust or AMAX, later merged into Zambia Consolidated Copper Mines. Archives are maintained in the various copper mining towns of Kitwe, Ndola, Chibuluma, Chingola, Muulira, Chililabomwe, and Kabwe.

K.S. Murty, Nagpur, 24 March, 2004

INHIGEO BUSINESS MEETING, FLORENCE, 2004, PROVISIONAL AGENDA

1. Apologies
2. Arrangement of Agenda
3. Minutes of Previous Meeting (see the present *Newsletter*, pp. 6–8)
4. Matters arising
5. President's Report
6. Matters arising
7. Secretary-General's Report
8. Matters arising
9. Information transmitted from IUGS Council Meeting (Secretary-General)
10. Future meetings of the Commission, and discussion of relationships with Congresses of the IUGS and the IUHPS
11. Business without notice
12. Calls for Nomination of Honorary Senior Members
13. Completion of the 2004 ballot for a new INHIGEO Board and new Members
14. Vote of thanks to Italian hosts

CORRESPONDENCE

Letter from the International Union of Geological Sciences, 5 April, 2004

Dear Dr Oldroyd,

At the recent meeting of the Executive Committee of IUGS, held in Oslo, Norway, between 15–19 March, the Committee discussed the International Commission on the History of Geological Sciences, after hearing the comments of the rapporteur. The Committee approved the [4-year] report submitted and thanked the Commission for the considerable amount of work it had undertaken in the last year.

... [money matters!]

The Executive Committee also expressed its thanks that INHIGEO played such a positive role in the review of the Commission, in Dublin. The very positive report from the review committee was appreciated by all members of the EC.

IUGS has recently initiated a Grants Scheme, which is open to all its bodies and affiliates. Details of this are available on the IUGS website . . . [see p. 11 and http://www.iugs.org/iugs/grants/grants_info.htm].

The Executive Committee thanks its constituent bodies for the many articles they have submitted to *Episodes* in the past few years, especially by INHIGEO. IUGS very much appreciates the plan of INHIGEO to produce a series of papers for *Episodes* dealing with the histories of individual International Geological Congresses from the very beginning. The willingness to develop plans for writing the history of IUGS, which will celebrate its 50th anniversary in 2011, is also very welcome, but needs further discussion about the procedure. The Science Citation Index for *Episodes* has risen to 0.944 in this period, with which the Committee is very pleased. However, it is hoped that this value can be improved in the coming years. The regular support of IUGS's bodies, through article submissions, is essential for this.

In a similar vein, the Executive Committee wishes to remind all its bodies of the agreement signed in 2003 with the Geological Society of London, concerning the publication of IUGS' Special Publications. All bodies are very strongly encouraged to submit proposals for scientific volumes arising either from their work or from conferences they organised, to the Geological Society. The first volume from this arrangement is already under way, although still only in its early stages. There is a possibility that the Society will pay a small royalty on such volumes, which would go to the body submitting the volume.

Over the past year, the IUGS website (www.iugs.org) has been revamped by the Webmaster, to incorporate the new IUGS logo. All IUGS bodies are strongly encouraged to look through the website regularly, to keep abreast of new information coming on-line. IUGS bodies can also submit material to the Webmaster to be added to the website for inclusion in the Calendar. The Webmaster has stated that in the past two years there has been a significant increase in the number of people using the website and the range of countries from which they come, reflecting the improved service given by the site.

As you will have noted in my email sent two weeks ago, the IGC Steering Committee has offered *all* IUGS bodies the option of hanging up a scientific poster, free of charge, for the duration of the IGC in Florence.

Also, please note that leaders of Commissions are invited to attend the IUGS Council meetings at the IGC in Florence, August 2004, as observers. The date of the meeting will be announced shortly. If you wish to attend, please let me know as soon as possible, so that I can prepare letters of accreditation.

Yours Sincerely

Werner R. Janoscheck, Secretary General, IUGS

Message from the President of the International Union of Geological Sciences

Dear Friends of the Earth Sciences,

We may look back on 2003 as an interesting year for the Earth sciences in general and for the International Union of Geological Sciences in particular. In some important ways we have changed our face, and our new logo expresses this in indicating that the Union's prime role is to encourage everyone to nurture Planet Earth as the home of humankind. The logo (see below) has already figured prominently in our publications, website and outreach materials. During 2003, almost all of the recommendations of the Strategic Planning Committee were addressed. A 'Strategic Action Plan' was developed and published together with a 'Mid-Term Vision', which sets out our views on the role of the Earth sciences in the years to come.

In the past twelve months, the IUGS has greatly expanded its role in Earth science programmes, by creating a new Groundwater group within the IGCP (in collaboration with UNESCO's Hydrological Division), by its successful bids for major ICSU Grants, by setting up its own Grant Programme, by the number and level of involvement of its Affiliated organisations and by the steeply accelerating SCI rating of *Episodes*. The IUGS started outsourcing its publications in 2003 through the Geological Society of London. In taking such action, the IUGS is enhancing the professional level of its publications and offloading a major work load that is not central to its core business.

The year also brought the realisation of an 'International Year of Planet Earth' closer than ever before. A brochure, released only a few days ago, is already reaching the hands of politicians and the mass media. Support for this event is coming in from all levels and sectors of the Earth science community and should now be transferred to individual governments for proclamation by the United Nations General Assembly. This is a complex process that demands the staunchest support of every one of us in 2004.

In this spirit, and on behalf of the Union's Executive Committee, I wish you and your families an exciting and rewarding 2004 and one that will be marked by the 'golden spike' of a successful International Geological Congress in Florence and the proclamation of an International Year. You may be sure that the IUGS, bolstered by its national and regional bodies and the energy of its individual members, will continue to work hard so as to ensure that the period 2004-2007 will give a new prominence to the Earth sciences around the world. We ask for your fullest support in this challenging endeavour.

Eduardo F.J. de Mulder, President IUGS, Utrecht

IUGS E-Bulletin #5 (December 2003)

Welcome to the International Union of Geological Sciences' fifth E-Bulletin and the last for 2003. All the best for the upcoming year! Our thanks to the many individuals who have contributed information during the past year. In this issue we provide you with commentary by IUGS President Prof. Ed F.J. de Mulder regarding the benefits for affiliation with IUGS. These comments clearly show the mutually beneficial aspects and synergy derived by the joining of forces through one Union. The E-Bulletins are available on the Union's website (<http://www.iugs.org>). Please visit the website for the latest updates in IUGS activities.

IUGS Affiliation: An analysis of benefits

All international, non-governmental, scientific, autonomous organisations may apply for affiliation to the International Union of Geological Sciences (IUGS). The benefit for such affiliations with the Union is that this provides the Union a wider significance, prominent role and a more acknowledged position in the geoscientific world. Through its affiliated organisations the International Union of Geological Sciences indirectly represents the affiliate's membership in other arenas. At present the Union has 38 affiliated organisations with a cumulative membership of over 250,000 geoscientists, which is more than 20% of all professional geoscientists in the world.

Potential benefits for organisations affiliated to IUGS include:

1. **Influence:**
 - a. Representation through IUGS in major international and supra-governmental bodies, such as the International Council for Science (ICSU), the International Geosphere-Biosphere Programme (IGBP), and the Scientific Committee on Problems of the Environment (SCOPE). ICSU is the umbrella organisation for all scientific Unions. Through ICSU and via IUGS affiliated organisations may voice their opinions on major scientific and societal issues to global bodies and supra-governmental organisations such as the United Nations. Through ICSU, IUGS is invited to directly and indirectly voice geo-related political statements. This was the case in the World Summit on Sustainable Development. Affiliated Organisations are invited to provide their views that may be communicated via the Union.
 - b. Representation in IUGS Commissions and Committees, whose Terms of Reference often stipulate the explicit preferential position for individuals of affiliated bodies.
2. **Participation in Projects:**
 - a. Access to international projects such as those in ICSU's annual Grant Programme, open only to ICSU Unions and ICSU member countries. In the past few years IUGS' affiliated organisations participated in or initiated such projects and several such projects have been granted for example the Dark Nature Project, a multi-body project coordinated by the International Union for Quaternary (INQUA) and submitted through IUGS which received an 100,000 US dollar grant for 2004. Similarly the Astronomical Union's (IAU) proposal (IUGS is a supporting partner) on Near Earth Objects and their Impact on Human Society received a 100,000 US dollar grant for 2004.
 - b. Access to 50,000 US dollar annual IUGS Grant Programme that is open to members of the IUGS family, including its affiliated organisations.
 - c. Affiliated organisations may participate in the big science programme and projects of the International Year of Planet Earth (www.esfs.org).
 - d. Affiliated organisations receive first hand information regarding the UNESCO-IUGS joint programme International Geoscience Programme (IGCP). They are also invited to prepare project proposals for this programme.
3. **Financial:**
 - a. Affiliated organisations are eligible to apply for financial support from IUGS for its activities, and some of them rely strongly on such support.
 - b. Members of affiliated organisations are eligible to apply for travel grants to attend the IGC through the IUGS Hutchison Fund and through the GEOHOST programme.
4. **Exposure:**
 - a. Affiliated organisations are invited to participate in the major Outreach Programme for the International Year of Planet Earth through which the organisations will attract significant exposure. They may also participate in the Year's Outreach Programme Committee. A brochure on IYPE is now available (cf. www.esfs.org).
 - b. Recent developments in affiliated organisations will be exposed annually through the IUGS Annual Reports.
 - c. With preference affiliated organisations are invited to develop special symposia in the IGC.
 - d. Affiliated organisations periodically get free publicity pages in EPISODES and may announce their events in the IUGS Calendar of Events.
 - e. Hotlinks through the IUGS website are established with all affiliated organisations.
 - f. As members of IUGS, being the largest Union represented in ICSU, affiliated organisations may strengthen their international profile and prestige.
5. **Network and infrastructure**
 - a. Affiliated organisation may profit from the IUGS networks for tapping relevant expertise to support review or consultation activities in their countries.
 - b. They may have access to important information and the IUGS Directory through the IUGS Permanent Secretariat.
 - c. IUGS has an MOU in place with the Geological Society of London (GSL) for all of its non-serial publications. Affiliates have the opportunity to consider GSL for their publications.
Through affiliation with the Union, organisations become members of the worldwide IUGS family. In sum, affiliation to IUGS provides such organisations outreach beyond their own fields. It also gives their representatives good opportunities to be actively involved in international geoscientific decision-making and provides access to participate in major international science programmes. Through its affiliation the organisation's voice and that of the geoscientific community at large will be heard in major, geo-politically significant events.

CONFERENCE REPORTS

INHIGEO Symposium: 'Geological travellers'. Trinity College, Dublin, Ireland 14–18 July, 2003

The 28th International Symposium and Meeting of the International Commission on the History of Geology was held in Dublin from 14 to 18 July 2003. Fittingly, the venue was the Geological Museum and Department of Geology at Trinity College. The College, founded in 1592, has numerous distinguished graduates, including many in earth sciences and history. The museum, a grand Victorian building with Venetian overtones, has made extensive use of a wide range of building stones from Ireland and Britain, particularly in its breathtaking interior where Connemara Marble abounds. Standing guard on either side of the entrance are the skeletons of the Giant Irish deer. The holding of the symposium at Trinity College was not a random choice, for it was organised, virtually single-handed, by Dr Patrick Wyse Jackson of the Department of Geology. Availing themselves of the opportunity to attend the symposium were 49 delegates, from 17 countries, and a further 19 accompanying members. Most delegates presented papers, ensuring that it was a close-knit as well as friendly meeting. Many of the participants also took advantage of a post-symposium field trip that toured much of Ireland except the southwest.

The symposium commenced with welcoming addresses from Professor Manuel S. Pinto, President of INHIGEO, and Dr Patrick N. Wyse Jackson of Department of Geology at Trinity College. Delegates were then addressed by Dr Werner R. Janoschek of the Austrian Geological Survey and Secretary-General of the International Union of Geological Sciences, who spoke about the structure and workings of the Union and INHIGEO's relationship to that body. The papers that followed were wide ranging, of a high standard and were loosely grouped into geographical regions. The conference papers, which will be published in a special volume edited by Patrick Wyse Jackson, are listed below:

- Sandra Herbert, 'Charles Darwin as a Geological Traveller'
 Paul Pearson and Christopher Nicholas, 'Charles Darwin's Geological Observations at Santiago (St. Jago), Cape Verde Islands'
 Michiko Yajima, 'Franz Hilgendorf (1839–1904) Lectured on Evolution in Tokyo around 1873'
 Philippe Taquet, 'On Camelback: René Chudeau, Conrad Kilian, Albert Félix de Lapparent, and Théodore Monod: Four French Geological Travellers across the Sahara'
 Ursula Marvin, 'Théodore Monod (1902–2000), and his Investigations of the *Fer de Dieu* Meteorite of Chiguetti, Mauritania'
 Tony Orme, 'Clarence Dutton: Soldier, Polymath, and Aesthete'
 David Spalding, 'Two Tyrrells Cross the Barren Lands of Canada, 1893'
 K.S. Murty, 'Pioneering Geological Contributions by Travellers in Pre-Geological Survey of India Times'
 Patrick Wyse-Jackson, 'Professionals in India: The Lives and Friendship of Charles Aemilius Oldham (1831–1869), Geologist, and Thomas Hardinge Going (1827–1875), Railway Engineer'
 Ellen Drake, 'Geological Observations made by Robert Hooke (1635–1703) on the Isle of Wight'
 John Fuller, 'Unpublished Geological Observations by John Strachey F.R.S. (1671–1743)'
 Manuel Pinto, 'The German Geologist Georg Hartung and the Geology of the Azores and Madeira Islands'
 Leonard Wilson, 'The Geological Travels of Sir Charles Lyell in Madeira and the Canary Islands, 1853–54'
 Ken Taylor, 'Geological Travellers in Auvergne, 1751–1800'
 Claudia Principe, 'Teodoro Monticelli and its Foreign Visitors on the Occasion of the Eruption of Vesuvius in 1822'
 Dennis Dean, 'J.D. Forbes in Naples, 1830'
 Gregory Good, 'Geophysical Travellers: The Magnetics of the Carnegie Institution of Washington'
 David Oldroyd, 'In the Footsteps of Thomas Livingstone Mitchell (1792–1855): Soldier, Surveyor, Explorer, Geologist, and the First Person to Compile Geological Maps in Australia'
 Ezio Vaccari, 'The Organised Traveller, Scientific Instructions for Geological Travels (18th–19th Centuries)'
 Sally Newcomb, 'The Alps as a Laboratory'
 Joe Burchfield, 'Tyndall in the Alps: Geological Travels of a Victorian Physicist'
 Christopher Nicholas and Paul Pearson, 'Robert Jameson on the Isle of Arran, 1797–1799: In Search of Hutton's "Theory of the Earth"'
 Martina Kölbl-Ebert, '"Agreeable Dinner, No Fleas"—The Geological Travels of Charles Lyell, Charlotte Murchison, and Roderick I. Murchison in France (1828)'
 Efgenji Milanovskiy, 'Hermann Abich—The Father of Caucasian Geology—and his Travels in the Caucasian and Armenian Highlands'
 Claudia Schweiser, 'Geological Travellers in the Early 19th Century: Johann Wolfgang Goethe and Caspar Maria Count Sternberg.'
 Friedrich Naumann, 'Alexander von Humboldt in Russia—The 1829 Expedition'
 Cynthia Burek and Martina Kölbl-Ebert, 'The Age-Old Problems of Travel for Women Undertaking Fieldwork'
 Ana Carneiro, 'Sharing a Common Ground: The Travels of Nery Delgado (1835–1908) to Spain in 1878'
 Silvia Figueirôa, 'Investigating the Colonies: Local Geological Travellers within the Portuguese Empire in the Transition of 18th–19th Centuries'
 Marianne Klemun, 'Inscription and Fact: 18th-Century Mineralogical Books Based on Travels in the Habsburg Region'
 Robert Silliman, 'Naturalists from Neuchâtel: America and the Dispersal of Agassiz's Scientific Factory'
 Richard Gentile, 'Upper Carboniferous Crinoids—An Extraordinary Collection by the Late 19th-Century Amateur Paleontologists, Kansas City, Missouri'
 Wolf Mayer, 'The Quest for Limestone in Colonial New South Wales—1788–1825'
 Mike Johnston, '19th-Century Observations of the Dun Mountain Ophiolite Belt, Nelson, New Zealand and Trans Tasman Correlations'
 Chris Amstutz, 'Early Geological Travellers and their Influence on Theories of Ore Genesis'

The papers were interspersed with other activities including, on the first day, a visit to the Book of Kells and the Longroom of the Old Library, which houses some 20,000 of Trinity College's oldest books. Following David Oldroyd's keynote address on the second day of papers, delegates attended a civic reception hosted by the Deputy Lord Mayor of Dublin in City Hall, another elegant Dublin building. On the third day delegates on a mild sunny morning boarded a commuter train at a nearby 'DART' railway station and travelled down the coast to Killiney. Despite prior adverse comments about the Irish railways, the train trip was both efficient and enjoyable. For rugby football fans, there was the added bonus of passing the hallowed ground of Lansdowne Road Park.

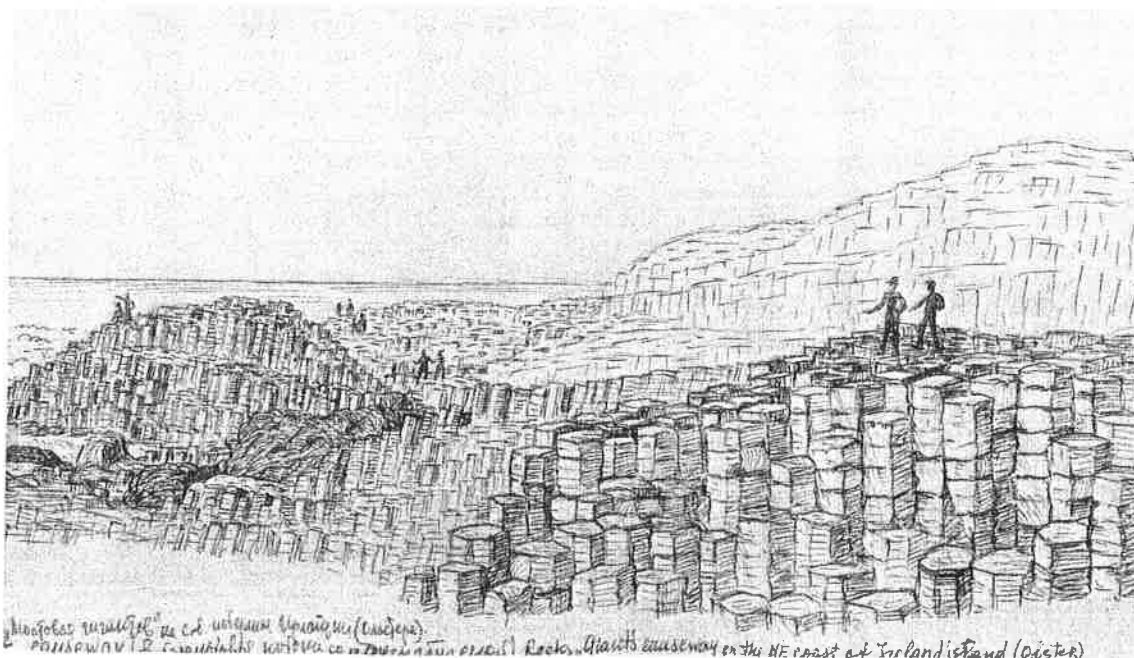
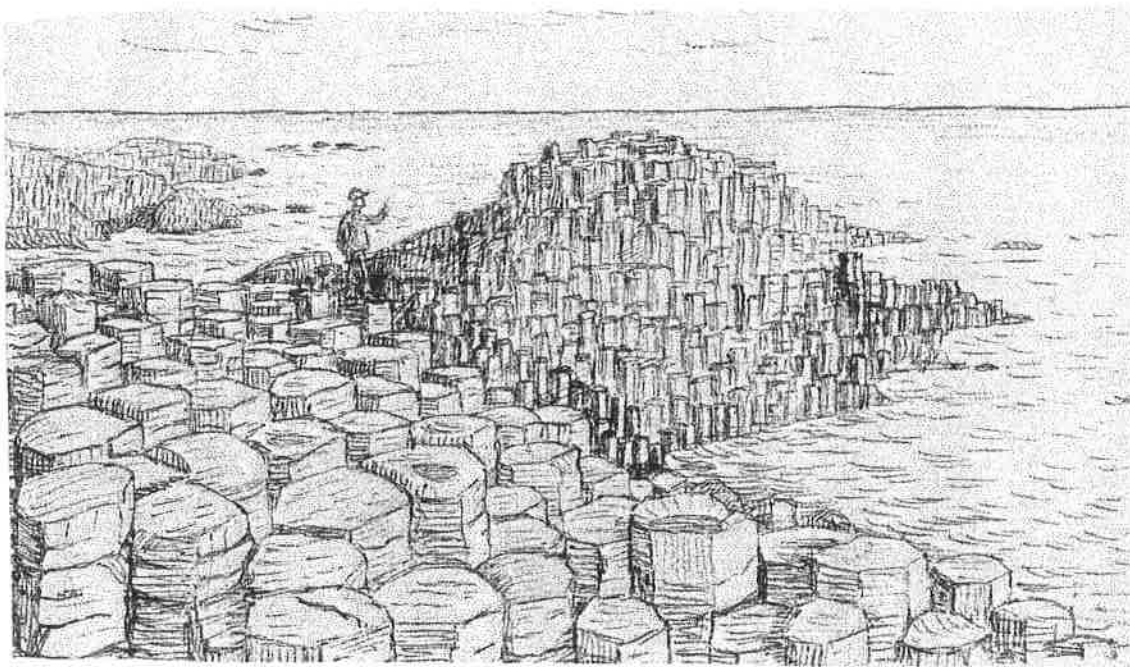
Killiney has an excellent exposure of the intrusive contact between Leinster Granite, of Silurian age, and dark Ordovician sedimentary rocks, the latter now metamorphosed to andalusite schist. Also fronting the beach are high cliffs exposing a complex sequence of till, deposited by ice that advanced south through the area of what is now the Irish Sea, incorporating marine shells plucked from pre-glacial seabeds. For the engineering geologist the beach provided excellent exposures of land sliding, resulting from undercutting of the till by the sea. Killiney is also of importance to historians of geology for it was here that engineer and pioneer seismologist Robert Mallet (1810–1881) utilised the long straight length of beach sand to undertake experimental work. After returning to Dublin, delegates paid homage to a number of prominent Irish scientists interred at the Mt Jerome Cemetery. The numerous monuments also provided fine examples of Irish building stones. Delegates overwhelmed by the occasion were able to retire to a nearby pub.

On the penultimate day of the symposium, the 28th Meeting of INHIGEO took place and the constitutionally most important decision was to expand the Commission. The number of members from each country is limited to eleven, although for many small countries this has not been an issue as they never had, nor are likely to have, a full complement of members. On the other hand, populous countries like the United States and some European nations have their full quota. The changes, more fully explained by Professor Oldroyd in his Secretary-General's report, will allow an expansion of the membership by addition of younger Members and consequently the role of the commission to be more fully implemented.

Another matter discussed was how the commission could initiate the documentation of the history of geology in Africa. This is a huge undertaking and is beyond the capabilities of any one individual. Perhaps the first step is to undertake an inventory of what historical records are available for each African country. Because of colonial rule and the fact that much exploration was undertaken by nationals other than those of the ruling colonial powers, this documentation is widely distributed. The symposium concluded with a traditional meal, accompanied by Irish folk music, in a pub in the Dublin Mountains.

The symposium was followed by an eight-day field trip, led by Patrick Wyse Jackson, anti-clockwise around Ireland. It proved to be a fascinating mixture of archaeology, history, geology, and culture. The first day was devoted to driving north to Portrush on the Antrim coast where the doleritic Portrush Sill intrudes ammonite-bearing Jurassic mudstone. The apparent gradation of the hornfelsed mudstone into igneous rock led the Reverend William Richardson in the late eighteenth century to promote the Neptunist cause that basalts were deposited from the ocean, as it appeared that basalts could contain ammonites. As an interlude on the trip north the Knowth Neolithic Site overlooking the River Boyne was examined.

Sketches of the Celebrated Giant's Causeway by Professor E.E. Milanovsky



Next day, participants were able to clamber over the classic columnar jointing in basalt of the Giant's Causeway, partake of refreshments at the equally famous Bushmills Distillery (and sample its products), and visit the lesser known Downhill House and Mussenden Temple. While the house is derelict, the nearby library building perched on the edge of the basalt cliffs, near the entrance to Loch Foyle, gave some indication of its former glory.

Day Three saw field trip participants heading west to the walled city of Derry, with a stopover at St Columb's Cathedral, before traversing the Caledonian granite country of Donegal. Lunch was taken in the impressive, ice-moulded saddle of the Barnsmore Gap. The afternoon was spent north of Sligo examining coastal outcrops of Carboniferous Limestone with its beautifully and delicately preserved crinoids, corals, bryozoa and brachiopods. Before proceeding to Sligo the day was capped by paying homage to poet William B. Yeats' (1865–1939) grave in Drumcliff Churchyard with its nearby round tower and Celtic crosses.

Day Four involved a return to Northern Ireland, when we headed through the Dartry Mountains towards the centre of Ireland to visit the restored Florence Court House, the former country seat of the Earls of Enniskillen. It was at Florence House that the Third Earl, Lord Cole (1807–1886), amassed a huge collection of fossil fishes. While the fossil fish are no longer there, having been purchased by the British Museum, the Earl's extensive library containing many geological works remains. On heading south to Galway a detour was made to Cregg Castle. While the castle has little architectural merit, it is important in that it was the home of geologist and chemist Richard Kirwan (1733–1812) who is regarded by many as the finest scientist in eighteenth-century Ireland. At the rear of the castle are the remains of what was, for the time, probably the best-equipped chemistry laboratory in the British Isles, but now no more than a smelly shed housing farm animals and rubbish. Participants were also made aware that two Irish words, esker and drumlin, have entered into scientific literature and outstanding drumlin swarms were readily visible in the vicinity of Galway and elsewhere.

After leaving Galway, much of the following day was devoted to the karst topography of the mountains of the Burren. The stripping of the soil by Pleistocene ice has spectacularly highlighted the bedding in Carboniferous Limestone. The bleakness of the weather only served to enhance the topography. In the afternoon, participants were generously entertained by Gordon Herries Davies and Jean Archer at their fine home, with its splendid library, near Nenagh, before travelling on to Cashel.

The next day, after visiting the archaeologically important Rock of Cashel and crossing the rhododendron covered Silurian and Carboniferous rocks of the Knockwealdon Mountains, we were joined by Gordon Herries Davies, who introduced us to the work of the great nineteenth-century Irish geologist Joseph Beete Jukes. Jukes, on the staff of the Geological Survey of Great Britain, devoted much time to trying to understand the geomorphology of southeastern Ireland. He had been intrigued why rivers, such as the Blackwater, flow across the east–west grain of the country, through a series of small gorges, rather than taking a more direct course to the sea. Jukes would have been impressed with the discussion this provoked amongst participants, first in the bus and then a pub sheltering from the rain, where some doubts were expressed about the details of the Jukes explanation of the phenomena, though there was no argument at all about the splendour of Gordon's historical exposition.

The last two full days of the trip were spent on the Hook Peninsula examining selected parts of an almost continuous section of Devonian to Carboniferous rocks, including Carboniferous limestones in the shadow of Slade Castle and Hook Lighthouse and sandstone at Duncannon Fort. The last rocks to be inspected were Cambrian granites at the fishing village of Kilmore. The excursion concluded next day with a direct return to Dublin.

Supplementing the field-trip commentary, and a comprehensive field-guide prepared by Patrick Wyse Jackson, was Tony Orme who had worked in Ireland for many years before taking up a professorship at the Department of Geography, University of California, Los Angeles. He provided much fascinating detail of the glacial geology and the human history of Ireland. Complementing the commentaries were the pertinent observations of Geoffrey Larminie, a Trinity College graduate and former Director of the British Geological Survey. The field trip provided a memorable introduction to Ireland's fascinating geology, landscape, and people. Although the island lived up to its reputation of the 'emerald isle', the weather was generally good, with only one afternoon on the excursion lost to the weather, and rain during the symposium conveniently fell while papers were being presented.

In conclusion, it was a well organised, most instructive symposium that combined the history of Ireland, and particularly its scientists and how the country's geological resources have been utilised, with a wide range of papers devoted to the impact geologists have made throughout the world. Those attending are greatly indebted to Patrick Wyse Jackson. He is editing the papers, which will be published by Pober Publishing House, New York, later in 2004 or early 2005.

Mike Johnston, Nelson, New Zealand

200 Years of Mineralogy and Geology at the *Alma Mater Vilnensis*, 8–9 October, 2003*

The reform of the Commission on National Education, led by H. Kollataj, resulted in nearly simultaneous (1781–1782) formation of departments of natural history in the capitals of the Polish–Lithuanian Commonwealth. However, as far as separate departments of mineralogy and geology are concerned, it was already formed in the capital of Lithuania in 1803, and in Cracow only in 1811. The priority of *Alma Mater Vilnensis*—called at that time *Imperatoria Universitas Vilnensis*, by Tsarist decree—is even more significant when considering the edition of the first original handbooks of mineralogy, written in Polish by Roman Symonowicz (1763–1813) in 1806 and by Feliks Drzewiński (1788–1850) in 1816.

No wonder that the Vilnius University, cultivating the traditions of this 425 years old *Alma Mater*, has celebrated the 200th anniversary of formation of its Department of Mineralogy and Geology by organising on 8–9 October, 2003, an international conference on the history of geology at Vilnius University. This meeting's programme included the lectures concerning the whole history of geosciences in the capital of Lithuania. Among participants there were several foreign specialists from Russia, Estonia, and Poland. Polish INHIGEO members, Commission on the History of Sciences of the Polish Academy of Arts and Sciences, as well as Geological and Mineralogical Societies of Poland, were represented only by the present writer. The conference was held in beautiful great assembly hall of the Faculty of Natural Sciences in the former Czartoryski Collegium

* This conference received financial support from the IUGS, via INHIGEO.

The lectures were delivered in historical order. The first one of Professor Juozas Paškevičius dealt with the period from the foundation of Jesuit *Academia et Universitas Vilnensis* by King Stephanus Batory in 1579 till 1803. Before the reforms of 1781, some elements of natural sciences were included in the lectures of professors of philosophy: Antoni Skorulski (1715–1780), Benedykt Dobszewicz (1722–?) and Joannes Chevalier (1732–1780). In the period 1781–1803, lectures in the natural sciences, including some elements of mineralogy (oryctognosy) and palaeontology, were delivered in Latin and Polish by Jean-Emmanuel Gilibert (1741–1814), Johann Georg Adam Forster (1754–1795), and Stanisław Bonifacy Jundziłł (1761–1847). These professors also initiated the formation of fairly rich collection of minerals, rocks, and fossils, as well as of University's natural science library.

The important period of origin and rapid development of mineralogical sciences in Vilnius (1803–1832), closely related to the celebrated anniversary, was characterised by Lithuanian INHIGEO member Professor Algimantas Grigelis. The first lecturer of mineralogy was A.G. Werner's pupil Roman Symonowicz, who in 1806 edited the first Polish textbook of mineralogy *O stanie dzisiejszym mineralogii (On the Present State of Mineralogy)*. After his death in 1813, mineralogy was taught for a brief period by Marcei Bogatko (1788–1830), and subsequently by Feliks Drzewiński, author of the first academic handbook of mineralogy, edited in 1816 in Polish and entitled *Początki mineralogii podług Wenera ułożone dla słuchaczy akademickich (Rudiments of Mineralogy according to Werner for Academic Students)*. In the years 1817–1824, mineralogy lectures were presented by Ignacy Horodecki (1776–1847) and for one year (1824–5) by Józef Jundziłł (1794–1877). The next lecturer in this area was Ignacy Jakowicki (1794–1847), author of another handbook *Wykład oryctognozji i początków geognozji (Lectures on Oryctognosis and Geognosis)*, published in 1827. He was active till the repressive closure of the University in 1832.

All the aforementioned lecturers were graduates from *Universitas Vilnensis* but supplemented their studies abroad—mainly in Germany and France. As the authors of the first textbooks they were also the pioneers of Polish mineralogical nomenclature. Moreover, considerable attention was paid by them to the role of fieldwork and the use of mineralogical collections in teaching, which they enlarged significantly, to nearly 18,000 specimens. It should be stressed that in this brief period (1803–1832) the Vilnius University became one of the best scientific centres in Central Europe, attracting such eminent professors as the astronomer—and Rector in 1807–1815—Jan Śniadecki (1756–1830); the chemist Jędrzej Śniadecki (1768–1838); and the historian Joachim Lelewel (1786–1861). Moreover, among its honorary professors was Alexandre Brongniart (1770–1847), who had taught the above-mentioned mineralogists studying in France, as well as his other eminent pupil, Ignacy Domeyko (1802–1889).

The next speaker, Dr Irena Skuodienė, discussed in detail the pioneering role of Roman Symonowicz in propagating Werner's ideas in the Vilna University.

After short characterisation of geological relations between Vilnius and Tartu Universities by Tonu Pani (Estonia) and Robert Mokrik (Vilnius), two lectures were presented devoted to the development of geosciences at the *Stephanus Batory* University during the interwar period 1919–1939.

A detailed lecture of Professor Algirdas Gaigalas dealt with the achievements of all the geosciences in *Stephanus Batory* University in the departments of: geology, mineralogy, and physical geography. They were led by eminent specialists Józef Łukaszewicz (1863–1928), Bronisław Rydzewski (1884–1945), Paweł Radziszewski (1890–1931), Mieczysław Limanowski (1876–1948), Edward Passendorfer (1894–1984), and Stanisław Małkowski (1889–1962), who, apart from Łukaszewicz, came from Cracow and Warsaw, and, in co-operation with their talented local pupils, contributed significantly to the rapid development of geological activities in the region. The work included the systematic petrographic study of glacial deposits, including Scandinavian boulders to indicate their source-areas; the climatostratigraphy of the Quaternary cover; the morphogenesis and development of glacial relief and river valleys; and attempts to reveal the character of basement rocks by boreholes. Moreover, Małkowski, with some assistants, investigated the crystalline and magmatic rocks of the Volhynian massif.

The achievements of mineralogical-petrographic school of Stanisław Małkowski were described by the present writer. This lecture, prepared in cooperation with Zbigniew Wójcik, supplemented the data presented by Professor Gaigalas, describing in greater detail the exceptional personality of this outstanding geoscientist, his many-sided scientific, organisational and social activities and the significant role of his pupils in Polish and Lithuanian geosciences.

The next lecture by Professor Meilutė Kabailienė was devoted to the scientific output of the Chair of Geology and Mineralogy of the only Lithuanian higher school during the inter-war period—Vytautas Didysis University in Kaunas—in the years 1922–1940, led by Mykolas Kaveckis and Juozas Dalinkevičius.

Two lectures dealt with the activities of the Geology Department of Vilnius University in the years 1940–1963 by Dr Vytautas Skuodis; and the achievements of the Chair of Geology and Mineralogy in the period 1963–1990 by Professor Juozas Paškevičius.

In 1941, during the German occupation, the building of the Faculty of Natural Sciences was requisitioned and transformed into a military hospital. After the return of Soviet authorities the building was in 1948 returned to the University and provided with salvaged equipment; but from 1955 the existence of university's geoscience in Vilnius was threatened by the unilateral decision of central Soviet Education Ministry. The only solution was the reorganisation of the curriculum by introducing, in 1963, the practical fields of hydrogeology and engineering geology, which were thus celebrating their 40th anniversary during this conference.

In the period 1963 to 1990, the scientific staff of the Chair of Geology and Mineralogy significantly increased to more than twenty persons, including six professors; and Lithuanian geoscientists started to cooperate with several International Geological Correlation Programmes. Moreover, the Geology and Mineralogy Museum was enlarged and enriched in its section devoted to the regional geology of the Baltic countries, prepared by J. Paškevičius, author of a valuable monograph on this subject.

An account of the activities and scientific output of the staff of the Chair of Geology and Mineralogy of the Vilnius University in independent Lithuania (1991–2003) was presented by its present head, Professor Petras Musteikis. After the introduction of a two-stage system, to 2003 112 students had gained the BSc in geosciences and 53 the MSc. The scientific staff, still increasing in number and using modern laboratory and field techniques, are presently carrying out research on three main problems: (1) Precambrian geology of basement crystalline complexes; (2) the palaeozoology, lithology, and evolution of sedimentary basins; and (3) advanced Quaternary studies.

Professors Kastytis Dandulis and Algirdas Jurgaitis presented the achievements of the Chair of Hydrogeology and Engineering Geology. Studies have been devoted mainly to regional hydrodynamic conditions and filtration properties of rocks, as well as to the local water supplies.

Interesting lectures were presented by Dr Eugenija Rudnickaitė concerning the historical development and present state of the University's fine Geology and Mineralogy Museum; and by Professor Gediminas Motuza, Foreign Member of the Polish Academy of Arts and Sciences, who described the collection of crystalline rocks, stored at Vilnius University. It contains numerous samples collected by S. Malkowski and his pupils in Volhynia and Scandinavian countries, which have their original specification cards.

The second day of the conference was devoted to the presentation of the current activities of the Geology and Mineralogy Department of Vilnius University, and also those of the Geological Survey of Lithuania, concerning mainly hydrogeological and ecological problems.

The only presentation by a foreign participant was a most interesting lecture by Professor Emeylan Emelyanov (Kaliningrad Centre of Oceanographic Researches of the Atlantic Ocean) about the participation of graduates of geology of the Vilnius University in oceanographic expeditions. Professor Emelyanov, also graduated from this University, and spoke in Lithuanian, as did all other lecturers except the present writer, who presented his lecture in English, and the Estonians, who spoke in Russian. It is a pity that all the materials of this undoubtedly interesting conference were published in Lithuanian with only brief English summaries. In the present writer's opinion, the complete texts should be published in English or some other 'international' language as they would be interesting for historians of geosciences concerned with the 'global history of geology', who know little about geosciences in Lithuania. Moreover, following my discussions with Lithuanian colleagues and friends, as an INHIGEO Member, I should like to suggest, in this jubilee period, the supplementation of the gallery of distinguished geoscientists of the Geology and Mineralogy Department of *Alma Mater Vilnensis* by some portraits of Polish professors, who significantly contributed to the development of geology in Lithuania.

Summing up, the conference was most interesting and well organised, and has reminded us of the important role of *Alma Mater Vilnensis* in the history of geosciences.

Wojciech Narębski, Cracow

German Society for the History of Geophysics and Cosmical Physics

The Society worked actively during 2003. First, we note the celebration of the 75th birthday of the president Professor Hans-Jürgen Treder. A special meeting was organised by the Society and the *Leibniz Societät* in Berlin. Internationally leading scientists such Helmut Moritz, Past President of IUGG, Professor Schimming (Greifswald), W. Holzmüller (Leipzig), H. Filling (Kierspe), Professor Strobach (Stuttgart) and Dr Burghardt (Austria) presented interesting papers in theoretical geophysics and physics. The papers will be published in the *Sitzungsberichte* of the *Leibniz-Societät* in 2004.

Members of the society, e.g. Holger Filling, continued studies on the star disc of Nebula. Thomas Schalk continued his studies in theoretical physics and Karl-Heinrich Wiederkehr (Hamburg) studied the history of foundation of the German Meteorological Society, 100 years ago. Other members, such Josef Pratl, Hans Scheurich, Karl Ernst Kunst studied problems in relativistic physics and historical background.

In 2003 the Society published its journal *Beiträge zur Geschichte der Geophysik und Kosmischen Physik (Communications for the History of Geophysics and Cosmical Physics)*. Topics were noctilucent clouds, the development of solar-terrestrial physics, and the preparation of a source book of the papers by Albert Einstein related to geophysics.

Interested scientists are invited to contact the Society's Secretary Dr Wilfried Schröder, Geophysical Institute, Hechelstrasse 8, D-28777 Bremen-Roennebeck, Germany.

The Development of Meteorology since the 19th Century. Report on the Fourth Meeting of the History of Meteorology Specialist Group of the German Meteorological Society in Potsdam, 25–26 September, 2003

The fourth meeting of the History of Meteorology Specialist Group of the German Meteorological Society took place on the famous historical research campus of Telegraph Hill (*Telegrafenberg*) in Potsdam, southwest of Berlin. Meteorologists and historians of sciences coming from Austria, Germany and England presented six talks during the meeting.

The first session started with Stefan Emeis (Weilheim), who introduced the process of delineation and co-operation between meteorology and other branches of science, as documented in nineteenth-century textbooks. During the period of definition in meteorology (1800–1840) the first German textbooks appeared written by physicists, mathematicians, and other natural scientists. During the period of 1839–1870, meteorology was established as part of physics. At that time, German textbooks followed the example of the Frenchman, Claude S.M. Pouillet (1791–1868), who published a textbook on physics and meteorology in 1839, which contained numerous explanatory figures. In the third phase (1875–1901), meteorology developed further to become an independent discipline. Not until the foundation of national weather services did a new kind of image of profession develop. Now, meteorologists have taken over to write textbooks on meteorology.

Michael Börngen (Leipzig) described the advancement of meteorology by the astronomer Karl Christian Bruhns (1830–1881), who became well-known not only for his astronomical achievements (discovery of six comets, edition of an atlas of astronomy), but also for his accomplishment in meteorology in Saxony. When the astronomical observatory of Leipzig University was built in 1861, he established a meteorological station as well. In 1863, he organised a Saxon network of 22 observing stations, following the Prussian example. Bruhns organised the first international meeting of meteorologists in Leipzig in 1872, in conjunction with the Director of the Physical Central Observatory at St Petersburg, Heinrich von Wild (1833–1902), and the Director of the Central Institution of Meteorology and Terrestrial Magnetism at Vienna, Carl Jelinek (1822–1876). During the meeting, the first International Meteorological Congress at Vienna in 1873 was planned. Bruhns also became well-known through his biography of Alexander von Humboldt published in three volumes in 1872.

Karl-Heinz Bernhardt (Berlin) presented views about the predictability of weather from Alexander von Humboldt (1769–1859) to Hermann von Helmholtz (1821–1894). Due to his philosophical and scientific ideas, Humboldt did not think that atmospheric changes might be predicted. In contrast to Humboldt, the first Director of the Central Physical Observatory at St

Petersburg, Adolph Th. Kupfer (1799–1867), believed that a method of predicting the future development of meteorological phenomena could be established following the calculation of the course of the planets. The Director of the Norwegian Meteorological Institute in Christiania (today Oslo), Henrik Mohn (1835–1916), had the idea that the condition of the atmosphere at some time in the future could be calculated from the conditions at a given time, if one knew the complete set of laws of the movement of the atmosphere. Helmholtz pointed out that errors in the starting conditions would lead to great mistakes in the predictions. Later it was recognised that even small uncertainties would lead to great differences. Nevertheless, at the end of the nineteenth century there were optimistic expectations that weather prediction would be possible some time in the future.

During the second session of the meeting Christa Hammerl (Vienna) introduced the establishment of a state meteorological service in Austria 1851 through the foundation of the *Zentralanstalt für Meteorologie und Erdmagnetismus* (today ZAMG, Central Institution of Meteorology and Geodynamics) in Vienna. The starting-point was an initiative of the Minister of Education and Culture and the Austrian Academy of Science, who commissioned the Director of the astronomical observatory at Prague, Karl Kreil (1798–1862), to establish a meteorological network for the Austrian monarchy. With Kreil, the joint appointment as Director of the ZAMG and Professor of Meteorology at the University of Vienna started, and still holds to this day, illustrating the lasting influence of scientific research on the Central Institution. From 1865 the ZAMG published daily weather charts. The first International Meteorological Congress took place in 1872 in the new building of the Central Institution at Hohe Warte, where the International Meteorological Organisation (IMO) was established as precursor of the World Meteorological Organisation (WMO). One of Kreil's successors was the important climatologist and founder of the Austrian school of meteorologists, Julius Hann (1839–1921), whose textbook of meteorology appeared in several editions. The prominent theorist and author of *Dynamical Meteorology*, Felix Maria Exner (1876–1930), followed later. When Heinrich Ficker (1881–1952) was Director during the Third Reich, he had to hand over the departments of climatology and weather prediction to the capital of the German Reich Berlin in 1938, while the observatory at Hohe Warte in Vienna became a pure research institute. After 1945, the Central Institution expanded considerably and developed to a modern service enterprise.

Cornelia Lüdecke (Hamburg und München) focused on the international meteorological co-operation south of 30° S, which was a period of intense observation in the tradition of Matthew Fontaine Maury (1806–1873). From the second half of the nineteenth century Maury promoted systematic collection of meteorological and oceanographic data, from which he constructed charts showing the best sailing routes over the oceans, which resulted in a considerable saving of time for the merchant marine. Georg von Neumayer (1826–1909), Director of the German Marine Observatory in Hamburg, followed Maury's ideas. Subsequently, after the first International Polar Year (1882–1883), Neumayer initiated the construction of charts from the South Atlantic, but few data were available, so his attempt failed. Wladimir Köppen (1842–1916), climatologist at the Marine Observatory, used the data-set to develop a wind chart of the Atlantic, which was not very detailed in the South Atlantic. The data needed to describe the general circulation were to be provided by Antarctic expeditions, which departed at the turn to the twentieth century to investigate the last unknown region of the land-surface of the earth. During the VIIth International Geographical Congress at Berlin (1899), an international meteorological co-operation had been agreed upon from 1 October, 1901, until 31 March, 1903, in which four Antarctic expeditions as well as naval and merchant ships participated. Later, the observing period was expanded to 31 March, 1904, when two expeditions wintered over a second time, and a French expedition set sail to go south. Over 600,000 data-items were collected at Berlin and 913 synoptic charts and 30 charts of different mean values were constructed and published in an atlas in 1915. Only the region between South America and the Antarctic Peninsula provided enough data to construct isobars. Nevertheless, this work was an important improvement of the knowledge of the wind conditions of the South Atlantic.

The last paper from Alan J. Thorpe (Reading, UK) gave an historical perspective on Bjerknes' circulation theorem of 1898. The roots of this go back to Helmholtz, who published equations for the rate of change of vorticity (curl of the velocity vector) for a homogeneous non-viscous fluid in 1858. In England, Lord Kelvin (Sir William Thomson, 1824–1907) had approached the problem of rotation by defining a quantity called 'circulation', which is constant for a homogeneous non-viscous fluid around a material circuit. In 1895, J.R. Schütz, a German physicist working at the University of Göttingen, extended Helmholtz's vorticity equations to the case of compressible fluids. Ludwik Silberstein (1872–1948), a Polish physicist from the Polytechnic in Lvov, used Schütz's new equation to consider the cause of the emergence of rotation ('eddies') in a non-homogeneous fluid that initially has no such rotation. Silberstein dealt with all the fundamental aspects that were discussed by Vilhelm Bjerknes (1862–1951) in his famous paper two years later. Bjerknes showed above all that the vorticity equation could be used to explain the properties of geophysical fluids. Finally Thorpe bridged the gap to current applications of dynamical meteorology, where the integral quantity 'circulation' is much less used than its differential relatives: 'vorticity' and 'potential vorticity'. Looking at the early international co-operation, it becomes evident that it occurred mostly on a very personal basis. This fact points to the need for more historical perspectives to be developed that cross national borders and language barriers. The development of meteorology as a discipline tended to ignore those limitations, just as weather does not respect man-made borders.

The meeting closed with a guided tour through the area of Telegraph Hill, where we had a closer look at famous historical institutes such as the Astrophysical Observatory, the Meteorological Observatory, and the Geodetic Institute, all founded in the late nineteenth century, and the recent institutes like the Alfred-Wegener-Institute of Polar and Marine Research or the German Research Centre for Geosciences. In addition, we were introduced to the problem of the meteorological secular station, which will be changed to an automatic station in the future, and due to this it will, of course, lose the input of observations by mere eyes.

Cornelia Lüdecke, Munich

ARTICLE

Historical Developments in Soil Classification

Introduction

Soil classification is an important tool in studies of soils, enabling the establishment of order and possible relationships between pedons (i.e. the three-dimensional bodies of soil, replacing the two-dimensional soil profiles) and polypedons (a group of similar

pedons, i.e. mappable units in soil-survey) at various locations. It is a major tool for the transfer of knowledge and scientific communication in the use of soils for many different purposes. Soils are one of the more complicated systems in nature, possessing both basic properties resistant to alteration and properties that are subject to relatively rapid seasonal, periodic, or human-induced changes. The logic of soil classification recognises several possibilities or ways of grouping the great variation in soil properties, from purely technical soil classifications systems involving only a few selected properties, needed to be recognised for specific designed use—e.g. depth and salinity content when planning for irrigation—to comprehensive soil profile descriptions with analyses and its surroundings features, enabling the interpretation of past soil-scape development and possible changes in the future.

Like modern pedology—which recognises soils through processes controlled by five defined soil-forming factors—soil classification is a young enterprise without deep roots in antiquity. Though attempts were made to arrange and classify soils according to these perceived genetic processes, the current consensus is that basic soil classification must avail itself of recognised properties and features of the whole soil profile, chosen for their pedogenetic significance. Two books compiled by Finkl (1) and more recently by Eswaran *et al.* (2) contain a wealth of articles illustrating the manifold approaches suggested and taken during the development of soil classification in the last 125 years. Other background material will also be considered in this brief paper.

Beginnings of classification

Soil classification, like all classifications, is a human construct made to organise manifold information for a definite purpose: e.g. in preparation for their use; to simplify communication between soil users and scientists; or to establish order and relationships between soil classes. Because soils are essentially deterministic bodies soil taxonomy does not entail discovery or theory but rather observations based on an established conceptual framework, which may vary as the science develops. There is no 'natural classification'. In soil science, classification's major use is in establishing and monitoring soil resources at various scales, besides serving as a base-line for the study and evaluation of the nature, i.e. the properties and processes of its soils.

Ever since the modest beginnings of agriculture some ten thousand years ago, the ancient farmers recognised differences in the productivity or value of the soils, depending on their texture, colour, thickness, stoniness and other properties. The first official classification was probably established in China during the Xian dynasty listing some thirty soil types for taxation purposes. The ancient Chinese also mapped the soils and produced a written soil symbol that took account of the differences between topsoil and subsoil. But this had little influence on the subsequent development of soil classification. In the ancient Middle East, southern Europe or Central and South America, though high-level agriculture flourished during the various historic civilisations, differences in soils were duly recognised and named. But the ancient and classical scholars did not, so far as the surviving written shows, deal with soils as a topic worthy of study and interest.

During the Enlightenment (seventeenth and eighteenth centuries), learned societies began to flourish in Western Europe, and various efforts were made to improve agriculture, requiring the recognition and mapping of the land and soil resources and the beginning of an orderly soil classification (3). The Swedish naturalist Carl Linnaeus (1707–1778), the father of binomial plant classification (*Species plantarum*, 1753), extended this system of naming to animals and minerals (*Systema naturae*, 1758), which included some soils. However, his terms *Argilla communis*, *Arena nobilis*, *Humus ruralis*, like those of his contemporary mineralogist/chemist in Uppsala Johann Wallerius (1709–1785)—*Humus rubra* or *Humus umbra*—did not catch on. It must be remembered that for these savants *humus* meant topsoil, as later for Charles Darwin (1809–1882), in his pioneering earthworm studies (1837, 1881), *vegetable mould* referred to arable topsoil. An essentially agro-geological concept, recognising a few source materials for the soils or evaluating its productivity for taxation purposes, prevailed in describing or naming various soil types (3).

After new ideas about the nature and origin of soils as independent bodies in nature, derived and evolved from the interaction of external and internal factors, emerged in the second half of the nineteenth century, particularly through the work of V.V. Dokuchaev (1846–1903) and E.W. Hilgard (1833–1916), this was rapidly followed by incorporating the new conceptual framework into an orderly soil classification system. Dokuchaev presented his system in 1879 (4), and it was slightly expanded and modified by his student and collaborator N.M. Sibirtzev (1860–1899), whose work was widely disseminated through his textbook of soil science (5).

Two ideas introduced and widely used ever since were: (a) that the unit of soil classification is the soil profile (without defining its spatial extension); and (b) the zonal concept defining the major soil types in the zonal (normal) order, from the tundra in the north to the desert/steppe in the south, with intrazonal and azonal soil groups as special orders. The scheme was hierarchical from the top down. It defined a relatively small number of soil types as major genetic units, essentially equivalent to plant *genera*, which could be subdivided into sub-types as needed or gradually recognised. Numerous Russian folk-names for soils, like *chernozem*, *podzol*, and *solonetz*, were introduced, which continue to be used in various transformations to this day.

In North America, where the zonal regime from east to west is more prevalent, the pioneering pedological work of Hilgard resulted in the recognition of the mid-continental border between the eastern leached humid soils and the western aridic soils with pedogenic CaCO₃ in the profiles, later incorporated as *pedalfers* and *pedocals* in the influential United States Department of Agriculture (USDA) classification scheme of C.M. Marbut (1863–1935) (6). The new, essentially zonal, genetic scheme replaced the Russian 'soil type' term by the *great soil group* category, reflecting the control of soil forming processes over time (7). It became in the American and in many other countries' classification systems (1, 2) the major unit for knowledge transfer, described by modal or centrist properties. At the same time, the American soil classification continued to use the concept of *soil series*, introduced in 1903 (instead of *soil type*) for the principal unit of detailed mapping for soil bodies of similar profile morphology, and similarity in observable and describable properties (8). The *soil series* category was thus akin to the concept of *species* in the plant kingdom. They are given geographical names according to the places where the polypedon was first described. At present, their number in the US reaches tens of thousands, and many of them are endemic. Related *soil series* are grouped into *soil families*, which in turned are grouped into *sub-groups*, thus providing a bottom-to-top hierarchy, which is the opposite of the Russian classification.

The idea of the climato-genetic origin of the zonal soils dominated the concepts of classification up to the middle of the twentieth century, even where zonal grouping was not as clearly evident as in Russia. Strongly weathered and well-developed

soils in the tropics and subtropics also caused problems (Beinroth & Eswaran [2]). In soil-survey mapping, only natural soil properties that are unaffected by human activity or degradation were considered. But this led to another problem, in that it disregarded disturbed or altered (metapedogenetic, anthropogenetic) soils in all classifications. Soil classification schemes and their 'logic' were frequently discussed (1, 2), especially at International Soil Science Congresses, but no international consensus emerged and most countries developed their own local classifications. This impeded the development of pedology, especially in the ease of communication with scientists in related fields, and caused difficulties for users of soil maps.

Modern soil classifications

In the 1950s, the leaders of the USDA (especially Charles Kellogg, 1902–1977) decided to develop a new comprehensive soil classification and charged Guy D. Smith (1902–1981) with the task. He did this over a period of twenty-five years, developing a completely new system with the help and cooperation of a number of American and international colleagues through a series of seven approximations and international committees. The results were published in 1975 as *Soil Taxonomy—A Basic System of Soil Classification for Making and Interpreting Soil Surveys*. It was an open-ended system, subject to continuous testing and revision by the USDA. A second edition was issued in 1999. It is now a six-level hierarchical system with twelve 'soil orders' at the first level. Using a completely new nomenclature (originally subject to considerable criticism because of the novelty), these new terms have gradually entered common use and especially also modern textbooks. The USDA Soil Taxonomy is now the most widely used system of soil classification worldwide. Its major innovations are the consistent use of quantitative limits of observed properties (rather than 'modal values') and especially the use of *diagnostic horizons* (9) as the major differentiating feature at the higher levels of the taxonomic hierarchy. Though originally devised strictly as a classification for properties, including recognising soil temperature and moisture regime as soil properties, alleged pedogenetic process interpretations have gradually been incorporated (Arnold & Eswaran [2]).

During the last two decades, the International Union of Soil Sciences (IUSS, previously ISSS) sponsored an international working group and meetings to develop a World Reference Base for Soil Resources (WRB), which would enable correlation with the many national soil classification systems. The WRB system was developed essentially from the revised FAO/UNESCO World Soil Map Legend, and is now a second system, with a claim to more or less worldwide acceptance (10). It is a two-tier comprehensive system, with thirty *Reference Soil Groups* at the first level, also using diagnostic soil horizons as a differentiating feature. The second level *qualifiers* include many anthropogenic properties—one of the major differentiating features from the USDA soil taxonomy. It was officially adopted by the IUSS in 1998, for general correlation with other soil classifications (Deckers *et al.* [2]).

Other classifications

Besides the above basic soil classifications, it should be remembered that the pedogenic profiles are not the only system in use. Though they make possible expansive interpretations and behavioural predictions, especially when related and neighbouring soils are also identified, comprehensive profile examinations are both time consuming and costly. For many specific uses or limited information needs, a technical classification of a limited number of properties may be no less useful. Thus limited properties surveys and selected physical determinations (e.g. for texture or salinity, as already mentioned in the Introduction) are frequently used, especially in engineering classifications for various construction purposes. Similarly, low to medium level sampling for selected analysed elements are used in geochemical surveys, often for solving environmental or health deficiency problems. When plotted on maps they can provide good baselines, against which more specific geochemical variations, reflecting natural or human-induced sources, can be appraised. In such cases, the range and desirable or non-desirable limits of the examined properties must be known *a priori*, or determined separately.

Other developments have involved various attempts to use numerical classification methods and dynamic computer simulation models to shorten the time-consuming profile analysis, including kriging geostatistics (a procedure that seeks to predict the spatial variance of earth or soil properties), and fuzzy and fractal analysis, for the interpretation and quantification of spatial problems in recognising actual soil bodies in alleged soil continua and in predicting interpolative properties needed for better classification of soil landscapes. These computer-assisted methods are more applicable to soil mapping and are unlikely to replace the basic need for comprehensive soil classification schemes enabling multifaceted interpretations and predictions.

Conclusions

When reviewing the developmental history of pedological soil classification, it becomes evident that at least two well-elaborated systems may lay claim to a more or less worldwide acceptance. General consensus has not yet been reached. National or regional soil classification schemes are likely to continue to be used, especially as more and better evaluation and interpretation of soil resources becomes necessary. The problem of delimiting soil bodies and their two- and three-dimensional limits as the basis for the classification used will probably stay with us for a long time (10).

* For more on Darwin and soil science, see: Feller, C. *et al.*, 'Charles Darwin, Earthworms and the Natural Sciences: Various Lessons from Past to Future', *Agriculture, Ecosystems and Environment*, 2003, 99, 2949. Science Direct: <http://authors.elsevier.com/sd/article/S0167880903001439>.

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AWARDS

History of Geology Award, Geological Society of America, to Ellis L. Yochelson

Citation by Michele L. Aldrich

In presenting Ellis L. Yochelson with the History of Geology Award for 2003, the Geological Society of America recognizes over four decades of scholarship. Ellis published his first work in the history of geology in 1960, but before that he had already established an impressive career in paleontology.

Ellis was born in Washington DC in 1928. He enrolled at the University of Kansas and the University of Maryland, receiving a Bachelor of Science degree in geology in 1949, the Master of Science degree from Kansas in 1950, and PhD from Columbia University in 1955. The most important event of his adult life occurred in 1950, when he married Sally Witt, who has anchored his professional and personal life ever since, including helping organize numerous scientific and historical meetings.

He was affiliated with the Paleontology and Stratigraphy Branch of the United States Geological Survey from 1952 to 1985, after which he served on WAE status, senior scientist emeritus, and volunteer ever since. During his USGS tenure, Ellis has been headquartered at the National Museum of Natural History, where he has served as Research Associate since 1967.

His Smithsonian connection resulted in historical as well as scientific achievements, reflected in his advice on the content and narrative text of several exhibits. Ellis had also taught at American University, George Washington University, University of Maryland, and University of Delaware. He has been active in promoting science education in the schools in Washington DC and Prince Georges County in Maryland.

As a paleontologist, Ellis specializes in gastropods and trace fossils. Like other successful paleontologists, he has an uncanny ability to sense which field localities are apt to yield specimens, just as good historians develop an intuition for which manuscript collections to search (although both phenomena may be self-fulfilling prophecies, of course). Anyone who has done fieldwork with Ellis can attest to his enthusiasm for the science—friends had to drag him off a Northern California beach where, for the first time, he saw masses of by-the-wind sailors, creatures whose relatives he knew well from traces in the fossil record.

His field work led Ellis to undertake significant overseas travel. He has visited Norway several times but his most exotic expedition was to the Ellsmere Mountains (Antarctica) in 1979–1980, which resulted in a record number of slide trays with which to wow his audiences, the most remarkable being a half carousel of white-out slides akin to the monochrome paintings of Robert Rauchenberg.

Ellis is noteworthy for his energetic activities in professional groups to support paleontology and history of geology through the sponsorship of symposia and the publication of books and articles. He has served as an officer in several paleontological organizations, including President of the Paleontology Society in 1975. He was a cofounder of the History of Earth Sciences Society, persuading people that it was crucial to have such a group to support Gerry Friedman's journal, *Earth Sciences History*. Ellis was secretary treasurer of HESS in 1982–1984 and President in 1989.

Officially connected to the organizing body of the USGS Centennial during 1975–1979 but unofficially active in planning long before that, Ellis is responsible for much of the scholarly luster that shined from that event, making it a time for celebration as well as commemoration. He has also advised Canada and the states of New York, Pennsylvania, and Virginia on anniversaries of their geological surveys. He also actively promoted history of earth science as part of the Smithsonian Institution's recent 150th anniversary, most notably through sessions at the North American Paleontology Conference held in Washington DC that year.

But it is primarily for his scholarly achievements in the history of geology that the Division is honoring him today. His first publication on the topic was a biographical sketch in 1960 of J.B. Knight. Ellis's seventy page biography of Charles Doolittle Walcott appeared as a National Academy of Sciences Biographical Memoir in 1968; this is an analytic piece on Walcott's scientific and administrative life based in part on Walcott's papers, not the usual blah commemorative essay that appears in this series.

His interest in biography has continued through essays on geologists in the *Dictionary of Scientific Biography*, *Dictionary of American Biography*, and *American National Biography*. These series have very high editorial standards for accuracy, and demand the ability to compress lifetimes of scientific achievement into a few pages. Ellis is also an accomplished book reviewer for scientific and historical journals, submitting fair-minded work on time, of the right length, and properly formatted.

Ellis has written and edited several items of great use to our field. He coauthored *Images of the USGS* with Cliff Nelson in 1979; 15,000 copies of this 56-page booklet were issued. Ellis produced a history of the National Museum of Natural History building in 1984 in celebration of its 75th anniversary, a topic to which he has returned several times. In 1980, he edited a GSA Special Paper on the ideas of Grove Karl Gilbert, and in 1982 he coedited *Frontiers of Geological Exploration of North America*, arising from a USGS centennial symposium held in Idaho.

But this award is given mainly in recognition of Ellis's massive two volume biography of Charles D. Walcott. For three decades, Ellis shared his research on Walcott through papers at scientific meetings as he worked on this opus. This gave him feedback on all aspects of Walcott's life. We have had Walcott sliced, diced, curried, chicken-fried, sautéed, sweet

and sour, mole, marsala, Florentine, hash, stew, and Walcott Wellington. A history of geology session was incomplete without a Yochelson paper on some aspect of Walcott. This has led to the definitive work on the man, but at a price—the manuscript was much too long. Tom Dutro said to cut it. John Pojeta said to cut it. Alan Leviton said to cut it. Most important, the publisher, Kent State Press, said to cut it—in half. In despair, Ellis said he could not part with another word and asked me to look at it. I chopped out about a third of the first several chapters and told him he could see how to do the rest. He accepted about half my suggestions, and Kent State Press went to print with it.

The book has many merits, but I will mention only two here. First, Ellis dealt masterfully with Stephen Jay Gould's presentist attack on Walcott's work on the Burgess Shale fauna. Instead of a wild *ad hominem* counter-attack, Ellis stuck to the issues and laid out exactly what Walcott did accomplish. Second, the biography places Walcott in his historical context. Ellis explains Walcott's continued administrative service as reflecting the progressive vision of science as a way to solve human problems. While there are many disjunctions between Ellis and Walcott (Ellis has never been noted for his patience with bureaucracy despite or perhaps because of his life in Washington DC), they shared a faith that science could be a force for good on this earth.

Response by Ellis L. Yochelson

Because of "Oscar" Awards, public acknowledging is a well-known activity, and it is virtually impossible to prevent becoming a cliché. As a change, I will skip through the alphabet acknowledging a few people and places. The list is a small sample of the many to whom appreciation should be rendered.

- Z for Karl von Zittel, a chronicler of history of geology.
 - Y is for three Yochelson kids, an investment which has paid grandchild dividends.
 - X for Latin "Ex" (strange) as in expert and "spurt" as in a drip under pressure—my feeling now surrounded by my peers and betters.
 - W for the late Alexander Wetmore, who presented opportunity and challenge to consider the life of Walcott.
 - V for varied, as in my publication record (also eclectic or disorganized).
 - U for USGS for which I worked hard, but also stole time to do important things.
 - T for Taylor, Ken, an exemplar for any history of science graduate student who aspires toward earth sciences.
 - S for Sally who has put up with an incredible amount of aggravation for an incredible number of years; (not all aggravation is from history of geology).
 - R for retirement; (with the formerly generous plan of the government this was my best career move).
 - Q to be forgotten; (quest for knowledge is too dorky to include).
 - P for publication, carrying with it certainty of mistakes; (the way to avoid them is not to publish, which is the biggest mistake).
 - O for opportunity, granted me by many people for more than five decades.
 - N for the Natural History Library, its librarians and all other libraries and librarians consulted; my appreciation includes archives and archivists.
 - M for George Perkins Merrill, the ultimate source of why we are gathered.
 - L for Leviton, Al, who provided unexpected opportunities to talk and publish.
 - K for Kent State University Press, who actually sent a royalty check, which averaged out to \$1.26 per year of investigation/writing, but moved me from mere author to professional writer.
 - J to be ignored; (older son Jeffrey forced me from my KayPro to a real computer).
 - I for Institution, Smithsonian (the "S" is for a more important purpose), for providing research associateship and for its archival staff.
 - H for History of Geology Division and what more can I state other than THANKS!
 - G for Gastropoda, the fossils of which provided my toehold into geology.
 - F for Friedman, Gerald (and Sue) who made *Earth Sciences History* both evolve and progress.
 - E for evaluation, as in book review, some of which make you quell with joy and others make you quake with dismay.
 - D for deadline, a devise of fiendish editors—an oxymoron—and, because the world is not fair, who are always right.
 - C for Claude Albritton, a senior man who went out of his way to be gracious to a greenhorn.
 - B for Bork, Kenneth, who should know already why he is appreciated.
 - A for Aldrich, Michele, who went through a book-length manuscript with both fine-tooth comb and hobnail boots, yet, despite all, was willing to be a citationist.
- I appreciate this honor more than I can express. Insufficient as is the letter "H", conversely it conveys my all.

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Wegmann Prize, Société géologique de France

We are pleased to report the award of the Prize to Professor Michel Durand-Delga, France, but regret that we have not obtained a copy of the citation at the time of publication.

OBITUARIES

Walter Oscar Kupsch (1919–2003)

At his death on 6 July, 2003, at the age of 84, Walter Kupsch had enjoyed a fifty-year association with the University of Saskatchewan, where he contributed extensively to Quaternary geology and geomorphology, Arctic mineral exploration, as well as the history of Earth Sciences.

Walter was born in Amsterdam on 2 March, 1919, and served in the Netherlands Army during World War II. However, he was able to finish his first degree in 1943. After the War he married Emmy Helene de Jong, and sailed for the United States where he took an MSc (1948) and PhD (1950) at the University of Michigan. A post-doctoral appointment brought him to the University of Saskatchewan, beginning his half century association with the department of Geological Sciences, as Assistant

Professor (1950), Associate Professor (1956), and Full Professor (1964). Here the couple settled, and had three children: Helen, Yvonne, and Christopher.

Noted as a teacher, Walter also played many other roles in research, public service, and education, with particular reference to northern Canada. His own early research was on the glaciation of the prairies; but his interests rapidly broadened to the entire north, and he attracted numerous graduate students, for whom he supervised twenty-one theses.

Walter became Director of the University's Institute for Northern Studies in 1965 (initiating and editing its journal, *The Musk-Ox*), and served as Director of the Churchill River Study (1973–1976). He was also a board member and chair of the Arctic Institute of North America. Eventually, he served (in a variety of capacities) eight Federal bodies, seven for Saskatchewan and the Northwest Territories, and eight international or national geological bodies. He travelled extensively in Europe, North America, and Central and South America. He retired in 1986 as Professor Emeritus, and continued to contribute in various ways to his science.

The historical aspects of his research and region engrossed Walter from the time when his PhD thesis on the geology of a region of Montana led him into the early literature. So he became intrigued by the explorers who had made the first observations in western and northern Canada; and, as his long-time colleague Glen Caldwell remembered, "... the history of exploration, in particular, seems always to have fascinated him and it ... [was] notable that he was quick to exploit key events in his career for their historical potential".

Walter compiled the definitive bibliography of Saskatchewan geology from 1823 to 1970 (1967, 1973), with a supplement to 1976 (1979), as well as what he called a 'bibliographic history' of the Saskatchewan Department of Natural Resources (1994). His major thematic studies included editing (with colleague and INHIGEO member, Bill Sarjeant) a *History of Concepts in Precambrian Geology* (1979); 'A survey of nineteenth-century geological writings and writers on the Canadian Arctic' (1981, with a supplement in 1982); 'Mid-nineteenth century studies in the Canadian Interior Plains' (with colleague Glen Caldwell in 1982); and a contribution to the Geological Society of America's Centennial Special Volume (1985). He also celebrated the uranium bicentenary (1989), and the early history of exploratory wells in Western Canada (1993).

Walter did not neglect the biographical studies that are the bread-and-butter of geological history. He wrote a short pamphlet on *Pioneer Geologists in Saskatchewan* (1955), focusing on Richardson, Hector and Hind, described by Caldwell as "a charming work written by a new, young, immigrant professor to help mark the golden jubilee of the province in which he had come to make his home".

Further work was published on Richardson and Hector, as well as papers, maps, or memorials featuring early Saskatchewan or Arctic geologists such as Bernhard Adolf Hantzsch and Alexander Kennedy Isbister; the miner Berry Richards; the magnetic research of Frank T. Davies; and even the Arctic travels of the mammalogist J. Dewey Soper. In all, Kupsch published more than a dozen memorials of more recent associates, and numerous reviews.

Professor Kupsch received many honours, including the Order of Canada (1996); an honorary LID from the University of Saskatchewan (1997); and Fellowships of the Royal Canadian Geographical Society (1957), the Geological Society of America (1961), the Royal Society of Canada (1963), and the Arctic Institute of North America (1973). His contribution to the history of earth sciences was specifically recognised by the prize of the History of Geology Division of the Geological Society of America (won in 2001), presidency of the History of Earth Sciences Society (1987–1988), and by his long involvement with CANHIGEO (Secretary 1976–1990) and INHIGEO (Corresponding Member 1969–1990, then Honorary Senior Member).

Some of Walter Kupsch's papers are deposited in the University of Saskatchewan Archives. I am indebted to Glen Caldwell's Royal Society of Canada obituary for some of the information presented here, and to Brenda Britton for making valuable information available.

David Spalding, Pender Island, Canada

William Antony Swithin Sarjeant (1935–2002)*

William ('Bill') Antony Swithin Sarjeant, palynologist, paleontologist, ichnologist, historian of geology, field naturalist, archivist, bibliophile, local historian, folksinger, musicologist, Sherlockian scholar and novelist, died of cancer of the liver in Saskatoon, Canada, on 8 July 2002. Bill was born on 15 July (St. Swithin's day) 1935, in Sheffield, England, the only child of Harold Sarjeant (1906–1980), storekeeper, and his wife, Margaret (née Cantrell) (1906–1981), a legal assistant.

This tall, well-built, and bearded man, aptly described as having a 'down-to-earth nature and complete lack of any superficial airs', is remembered as a loving husband and father by his family, and with great fondness by his former colleagues, students and many friends. Philippe Taquet recalls him as

a marvelous companion, full of humour, a love of life and amusing stories, with an encyclopedic knowledge of the history of geology and palaeontology, whose knowledge and culture extended to many other subjects ... to travel in his company and to listen to his stories was a source of joy and discovery.

Rob Fensome, writes

to many of his graduate students, ... [Bill] was not just a supervisor, but also a mentor, providing crucial stepping stones in our careers and enriching our lives beyond measure. The same may be said for many of the assistants and lab technicians that Bill has provided opportunities for over the years.

Indeed, Fensome himself experienced similar support—Sarjeant had been his tutor when he was an undergraduate at the University of Nottingham. Following a move to the University of Saskatchewan, Saskatoon, Canada, in 1972, Bill had sufficient belief in the potential of his former tutee to invite him to come to Saskatoon on a graduate scholarship the following year, an act which Fensome described as 'changing [his] life forever'. (Under Sarjeant's supervision, Fensome gained his MSc in 1977 and PhD in 1983.)

Bill was a man of prodigiously wide interests and a gifted teacher (he contributed over 300 hours of classroom time in the last year of his life), whose output of over 275 publications principally embraced three major fields of study:

* Reproduced, in slightly modified form, from the *Proceedings of the Geologists' Association*, 2003, 114, 367–374, by permission of the Editor, Professor Richard Howarth.

- palynology, in which he specialised in the study of three types of microfossil: dinoflagellates (which are today principally represented by marine plankton, these have been traditionally regarded either as one-celled animals (protozoans) or algae (plants), but are now classified as protists); hystrichospheres (now believed to be dormant capsules which protect the dinoflagellate in unfavourable conditions); and what came to be called acritarchs (an artificial group of organic-walled microfossils “of uncertain origin”, possibly the cysts of planktonic algae);
- palaeo-ichnology: studies of dinosaur and other vertebrate trackways; and
- history of geology.

Quite apart from his more serious academic studies, Sarjeant also wrote on geology in fiction and geological humour, was an avid student of detective and science fiction of the late nineteenth century and first half of the twentieth century, and wrote a series of fantasy novels, *The Perilous Quest for Lyonesse* (set in a continent-sized island of Rockall in mid-Atlantic, populated with Tertiary mammals) under the pen-name ‘Antony Swithin’. According to Geoffrey Tresise, Bill always claimed that this massive written output could be attributed to the fact that an eye-defect made it impossible for him to watch television without being subject to dreadful headaches. It obviously had no effect on his ability to read—David Spalding (1997) quotes Sarjeant as saying that he regularly read from twelve to fourteen books a week! Spalding, who has known Bill from their student days in Sheffield, also notes that Bill was always an avid collector: quite apart from books, his collections eventually included military badges, musical instruments, folk, blues and jazz recordings, stamps (a love inherited from his father), beer mats, cigarette packets, matchboxes, wine labels and (an interest shared with his wife) antique maps. Another major part of Bill’s life was the folk-music scene, in which he was actively involved from the 1960s in Nottingham and again, following his emigration to Canada in 1972.

Nevertheless, Sarjeant’s generally sociable, quirky, and perhaps slightly eccentric manner hid a fiercer aspect. Espousing what Jim Riding describes as ‘that endearing Yorkshire trait of plain speaking’, he adds that Bill was ‘not afraid of ruffling feathers both in speech and print’ and Spalding writes that his personality could sometimes be ‘uncompromising’. For example, Dennis Dean recently took sufficient exception to a critical review (Sarjeant, 2000) of his book *Gideon Mantell and the Discovery of Dinosaurs* (Dean, 1999) that he complained about it in a letter to the Editor of *Earth Sciences History* (Dean, 2001). Sarjeant’s (2001) reply was a witty, and devastating, riposte.

However, there is no doubt that some of Sarjeant’s own work—studies of dinoflagellate cysts from India (e.g. Sharma & Sarjeant, 1987), some of his revisions of acritarch taxonomy (e.g. Sarjeant & Stancliffe, 1994; Stancliffe and Sarjeant, 1994), his pre-Bucklandian attribution of ‘dinosaur’ discoveries (e.g. Delair & Sarjeant, 2002), and his objection to the use of non-Latinised names in palaeontological nomenclature (Sarjeant, 1999)—also proved controversial. Although it has been suggested that Sarjeant tended to ignore what anyone else thought, Bill could indeed be prickly about criticism of his own work. Tresise recalls that, following an agreement between Sarjeant, himself, and Michael King (at that time a postgraduate student at Bristol University, conducting an in-depth study of footprints from the British Triassic) to write a joint publication on the reclassification of *Chirotherium* footprints, King and his PhD supervisor, Michael Benton, published a paper (King and Benton, 1996) in which they reassessed evidence described by Sarjeant (1967, 1970) when he was at the University of Nottingham some twenty years earlier. Tresise writes:

Bill took violent exception to this and for three years the *Chirotherium* project looked like a non-starter. Eventually the paper [King *et al.*, 2003] went ahead, but I had quite literally to act as a middle man, redrafting the relevant part of Mike’s texts before sending them to Bill and toning-down Bill’s replies before passing them on to Mike.

SHEFFIELD AND NOTTINGHAM (1956–1972)

Although neither of Sarjeant’s parents had a particularly strong interest in geology when he was a child, his father, an amateur of illuminated lettering and a keen collector of stamps and coins, became active in the subject in later life (Sarjeant, 1981), accompanying Bill and the mineral-collector Leslie Ford (1913–1990) on mineral-collecting trips in Derbyshire in the 1950s. However, both his parents were very much interested in archaeology (his mother in the Egyptians and his father in the Aztecs and Mayas), and this helped to stimulate Bill’s own interest in archaeology and history generally. Sarjeant (1981) recalled that his interest in geology in general, and fossils in particular, developed early. His father had kept a series of short illustrated articles on dinosaurs which had appeared in the *Sheffield Independent*, and he and Bill had found fossils (root-casts of Coal Measures plants, *Stigmaria*) in the spoil heap produced when the family’s WW II air-raid shelter was dug in their garden, at a time when Bill would have been only six or seven years old. By the time he was nine, Bill had decided that he wanted to become a professional geologist. Spalding (1997) recounts how Sarjeant ‘had a solitary childhood marred by ill-health and the deprivations of war’ and that there were few books at home. Consequently, Bill borrowed extensively from the local library. A favourite was Webster Smith’s *The World in the Past* (1926) and one can imagine that its coloured illustrations, and the gilt *Stegosaurus* on its cover, must also have helped to fire Bill’s life-long fascination with dinosaurs.

Having ‘impatiently’ dealt with school, he enrolled as an undergraduate at the University of Sheffield, where he obtained his BSc in geology in 1956. Regarding his choice of topic for his doctoral studies, Sarjeant (1984, 3) wrote:

I had wanted to study dinosaurs but could find neither material nor funding for this. Instead, I was given two choices; to work on Lower Carboniferous rugose corals under Professor [Leslie] Moore’s supervision, or to study Jurassic dinoflagellates and “hystrichospheres” under Charles Downie [as his first research student]. On the whole, I was not keen on a thesis that involved much microscope work; and I am still not clear how it came about that I chose the latter alternative. Was it Charles’ persuasiveness? Was it that the word “dinoflagellate” was a beguiling echo of the word “dinosaur”? Was it simply my liking for Mesozoic rocks? Whatever the reason, in October 1956 I found myself on field work in Yorkshire in Charles’ company, collecting samples for palynological study; for I had been set the task of determining, whether dinoflagellates and “hystrichospheres” could indeed be utilised in the stratigraphical correlation of Jurassic strata.

Fensome adds that:

Despite a lack of enthusiasm at first for microscope work, Bill went on to demonstrate that fossil dinoflagellates were indeed stratigraphically useful—the first thesis to show the value that dinoflagellates have in dating rocks. To Charles Downie should go the initial credit of conceiving that this group of palynological microfossils might be useful, but Bill

proved it. And in so doing, Bill paved the way for other major studies in the field, including generations of students at Sheffield.

Riding notes that Bill was fortunate in being at Sheffield when the palynology group was expanding greatly under the leadership of Moore, and that it was also a pivotal time for the subject. Bill later recalled a visit to Sheffield by William Evitt just prior to Evitt's revolutionary work proving that fossil dinoflagellates represent the resting cyst. Sarjeant was awarded his PhD from Sheffield in 1959, and the greater part of his thesis, on 'Callovian and Oxfordian dinoflagellate cysts and acritarchs from Dorset and Yorkshire' rather surprisingly accomplished using a monocular petrological microscope, was published in a variety of journals over the years 1960–1962.

While still in the course of his PhD studies, Bill became the first editor of *The Sorby Record* (1958–1959), the journal of the Sorby Natural History Society, Sheffield, and, as has been mentioned earlier, he became interested in mineral-collecting in Derbyshire and elsewhere. This provided a basis for his earliest publications (e.g. Sarjeant, 1956a, 1956b; Sarjeant & Ford, 1964) and led to him becoming one of the founders, and first chairman (1959–1960), of the Peak District Mines Historical Society, established in February 1959, to determine and publish the history of lead-mining in Derbyshire. However, Bill's interests were not confined to geology: With a group of fellow enthusiasts, he helped to restore an old tram-car in a quarry at Crich, Derbyshire, where it would be driven over a short stretch of track. It later became part of the collection of the Crich Tramway Museum. Not content with this, as an avid diarist and poet, he managed to infuriate students of the English Department at Sheffield by carrying-off the University poetry prize. He also found the time to engage in some of his life-long interests: browsing in second-hand bookshops (a habit formed at the age of ten), photography (particularly of trams and trolley-buses) and playing and singing folk music.

Initially unsuccessful in securing an academic position, Bill worked for a year as a teacher at the County Technical College, Kings Lynn, Norfolk, then briefly at another school in New Mills, Derbyshire. During this time Downie let him continue to use the facilities at Sheffield while he wrote up his results and began new research. In 1960 Bill took up a position as a Demonstrator and Lecturer (1960–1961) at the University College of North Staffordshire, later to become Keele University. He married Jacqueline Patricia ('Pat') Scott, a teacher, the same year.

Sarjeant next obtained a post-doctoral Research Fellowship at the University of Reading (1961–1962), but his academic career really began in earnest in 1963, with his appointment as Assistant Lecturer at the University of Nottingham. This was followed by his promotion to Lecturer the following year.

Between 1959 and 1966, Sarjeant became rapidly established as one of the leading experts on fossil dinoflagellate studies, and with Downie (Sarjeant & Downie, 1966) established the basis of their classification. Always a prolific writer, he had published 17 articles by the time of his first appointment at Nottingham. Jamie Powell writes that his palynological work during these early years

was characterised by a series of (mostly single authorship) papers dealing, in particular, with Jurassic dinoflagellate cysts (following from his PhD thesis), but also with Cretaceous and freshwater forms. These were important papers in the development of (fossil) dinoflagellate studies, culminating with the landmark 1966 publication by R.J. Davey (his student), C. Downie (his supervisor), Sarjeant and G.L. Williams (Downie's student). During this phase, Sarjeant was also instrumental (with Downie and Evitt in 1963) in developing a classification of acritarchs following Evitt's earlier discovery that many so-called fossil hystrichospheres were, in fact, fossil dinoflagellate cysts.

Fensome has noted that the Davey *et al.* (1966) monograph (the authorship was alphabetical, but Bill was undoubtedly the moving spirit behind it) was subsequently reissued in 1983 (cf. Sarjeant *et al.*, 1966, 1969; Krukewich & Sarjeant, 1983) 'an unprecedented step for such an apparently arcane monograph, and it remains a vital reference in fossil dinoflagellate studies to this day'.

Bill had been an avid collector of early works on geology since his undergraduate days. As he explained in the introduction to Sarjeant (1980, Vol. 1, p. 1), at some point in the early '60s 'little realising the scale of the task [he] had set [himself]', he decided 'for [his] own amusement' to try to prepare a bibliography of books, published in English, on the history of geology. Bill also helped to found the East Midlands Geological Society, becoming the first editor of *The Mercian Geologist* (1964–1970), a journal which provided the outlet for his first publication on the history of geology, co-authored with his bookseller friend Robert Morrell, in 1964. One result of all these various activities was exceptionally long hours of work at the University (Bill was known to often return home only after midnight) and this may have contributed to strain in his marriage, which ended in divorce in 1964. He was devastated when this break-up occurred and was helped through a difficult time by close friends. However, Bill's second marriage, two years later, to [Anne] Margaret ('Peggy') Crowe, a librarian, (who survives him) was altogether happier, ending only with his death, and he is fondly remembered as a devoted husband and father to their three daughters, Nicola, Rachel and Juliet. Fittingly, the dedication in the first volume of his *Geologists and the History of Geology* (1980) is to his wife, 'in gratitude for her patience, forbearance and love enduring despite the manifold stresses and strains of life with a bibliophile and bibliographer'.

Bill was appointed a Visiting Professor at the University of Oklahoma at Norman for the year 1967–1968. He also visited the Department of Geology at the University of Alberta, Edmonton, Canada, in 1967, and in April 1968 he presented a Short Course, 'The Dinophyceae and Acritarcha', at Louisiana State University, Baton Rouge. That summer he, Peggy, and their first daughter (Nicola, born 1967) toured parts of the western and south-western United States. This visit provided a distinct contrast to his participation in the 1968 International Geological Congress, held in Prague that August, which was abruptly terminated by the Warsaw Pact invasion of what was then Czechoslovakia (now the Czech Republic and Slovakia). At about this time, Bill also visited France to study dinoflagellates in the collection made by Georges Deflandre and his wife Marthe Deflandre-Rigaud, housed at the Laboratoire de Paléontologie, Musée National d'Histoire Naturelle, Paris. The visit gave Sarjeant the opportunity to observe 'de Gaulle's crumbling rule . . . being propped up much too visibly by the police and the military' (Lentin, 1992).

A meeting in 1969 with the American Quaternary geologist and historian of geology, Professor George Willard White, convinced Bill that, in compiling his bibliography, he could not afford to ignore journal articles or non-English language literature, and so the die was cast. Serious work on the bibliography of geologists and the history of geology began to encroach

on evenings, weekends and holidays. Bill's involvement with the study of fossil trackways also started in this period (Sarjeant, 1967, 1970). These two subjects were to provide the second and third major strands of his life-long research career.

Already feeling disenchanting with the lower salaries and harsher living conditions experienced by academics in England, compared to those in North America and the apparently increasingly-oppressive nature of the European political scene, he had been thinking of moving to North America ever since his visit to Oklahoma. (It has been suggested that he may have been informally offered a position at the University of Alberta, following his visit there, but that funding did not come through). The last straw was a devastating fire in the Geology Department of Nottingham University early in 1972, which destroyed much of Bill's research materials and many of his papers. Feeling it was time to move on, he accepted an appointment as Associate Professor at the University of Saskatchewan, and he, Peggy and their daughters Nicola and Rachel (born 1969) emigrated to Canada in April 1972. Sarjeant was honoured by Nottingham University later that same year, with the award of its first DSc in geology.

Between 1963 and April 1972, Sarjeant trained several successful PhD students in the study of dinoflagellate cysts and acritarchs: Roger Davey, Gulden Gitmez and Graeme Wilson at Nottingham; David Williams, Cambridge; and Leslie Riley, Open University.

SASKATOON (1972–2002)

The creature comforts of the University of Saskatchewan may have seemed somewhat less alluring on Sarjeant's arrival. The Department of Geological Sciences was in

run-down and overcrowded quarters. Bill was 'temporarily' assigned office space in the prefabricated General-Purpose[s] building [also known as the 'Permanent Building for Temporary Uses'] . . . the Palynology Laboratory was a converted trailer with serious heating and air-flow problems. Persons working in it in winter had to wear fur-lined boots but virtually strip to the waist; moreover they had to deal with such unusual problems as frozen hydrofluoric acid! In summer, in contrast, the trailer overheated to the point where it became too hot to inhabit. This was at first considered entirely inexplicable by the University engineers, till they recognised that the air intake of the trailer was receiving the hot-air outflow from the General-Purpose[s] building' (Lentin, 1992, p. 15).

Bill was soon promoted to full Professor (1976) but he and the rest of the Department had to wait another fourteen years before the University built their present modern facilities.

Despite the initial inconveniences, over the next thirty years at the University of Saskatchewan he contributed over 5,000 hours of teaching time, oversaw 5 successful MSc theses, and supervised PhD theses by Martin Bradford, Stuart Harker, Fensome, Duncan Wall, Russell Stancliffe, Ebrahim Gasemi-Nejad, and Patrick Cashman, again all in the field of palynology. He gave further Short Courses on dinoflagellates at the Louisiana State University in 1975 and 1981, and at the University of Nebraska in 1977. Powell writes of Sarjeant's continuing palynological work, as follows:

The second phase (1967–74) in many ways was an extension of the first with a series of diverse palynological papers again with a strong emphasis on Jurassic dinoflagellate cysts. However, this period was effectively the end of Sarjeant's reign as king of Jurassic dinoflagellate studies. His major contribution at the end of this era was the publication of his book *Fossil and Living Dinoflagellates* [Sarjeant, 1974a] which contained an account of the history of the study of fossil dinoflagellates, giving an insight into his diverse interests. This remained the only useful text book dealing with dinoflagellates until the publication of Evitt's *Sporopollenin Dinoflagellate Cysts* in 1985, by which time Sarjeant's palynological influence and authority was on the decline. The third phase (1975–1986) exhibited a gradual decrease in Sarjeant's Jurassic output as interest in North Sea exploration expanded dramatically (an area where [he] never ventured). Instead, his publication record shows that this period is particularly characterised by the restudy and revision of the holotypes of numerous European palynologists (including Walter Wetzel, Paul von Benedek, Dorothea Maier, Otto Wetzel and Alfred Eisenack). His last single authorship paper was published in 1986. The fourth phase (1987–96) is characterised by collaboration with others (including six with one of his last students, Stancliffe). Despite the decline of his influence (and in some respects his reputation), it is testament to his earlier work that he was listed as a contributor to the monumentally important *Classification of Living and Fossil Dinoflagellates* (Fensome *et al.*, 1993).

The last of Sarjeant's 184 palynological publications was *A Glossary of the Terminology Applied to Dinoflagellates, Acritarchs, and Prasinophytes, with Emphasis on Fossils* (Williams *et al.*, 2000).

Sarjeant's interest in the work of early palynologists and their European type-collections, together with early studies of fossil trackways fitted well with his broader work in the history of geology and the lives of geologists (e.g. Sarjeant 1974b, 1974c). With the financial support of the University of Saskatchewan and the Canada Council (which enabled him to browse the extensive stacks of older international literature in the Geological Survey of Canada library in Ottawa) he continued work on his ever-growing bibliography: *Geologists and the History of Geology*. The first five volumes (4,526 pp.) were issued in 1980. Supported by awards from the Social Sciences and Humanities Research Council of Canada, this was followed by two supplements (1987, 1996; a further 4,048 pp.) which updated his survey of the corpus of literature to 1993. Bill was supported throughout this massive enterprise by a team of research assistants, of whom Linda Dietz deserves particular mention. Over the period 1972–2002, Sarjeant also published more than 45 individual articles in the field. *Geologists and the History of Geology* rapidly became established as an indispensable work of reference.

It has already been mentioned that Bill had begun studies on fossil trackways while at Nottingham (Sarjeant, 1974c). Taquet and Peter Doyle both comment that he was in the forefront of palaeo-ichnological work when it began in the 1960s and '70s (e.g. Sarjeant, 1975) and Bill became Chairman of the Trace Fossil Research Group of the Palaeontological Society (1976–1977). His work was important in consolidating the relevance of vertebrate tracks and traces. He was particularly interested in developing the methodology for the study of footprints and he was influential in helping to define a formality of nomenclature in ichnology (Sarjeant, 1989, 1990). With his move to North America, he had expected not to be able to continue with such work, but his old friend Spalding (who had emigrated to Canada in 1967 and was now working at the Provincial Museum of Alberta) sought his assistance with the Peace River footprint site in British Columbia (Currie & Sarjeant, 1979) in 1975 at a time when Phil Currie had been hired but had no footprint experience. This work was to prove an important incentive for Bill to continue his footprint

studies. Sarjeant eventually collaborated with workers in the Canadian Maritimes, British Columbia, Brazil and Texas, but English students of ichnology have cause to be grateful for his work in documenting the Beasley collection of Triassic footprints from the Wirral (Sarjeant, 1985). Other notable studies among his 55 publications in this field include his work with Tresise to commemorate the sesquicentenary of the first finds in Cheshire (Tresise & Sarjeant, 1998; Batory & Sarjeant, 1989; and Sarjeant *et al.*, 1998).

Justin Delair writes that in the late 1960s Bill saved from destruction the letters of the Irish zoologist, vertebrate palaeontologist and geographer, Joseph Pentland, to and from the Reverend William Buckland (Sarjeant & Delair, 1976, 1980). As a result, Bill became interested in Pentland's geographical field work at, and detailed mapping of, Lake Titicaca (Peru/Bolivia); at various bone caves in the D'Arno Valley, Italy; and in the Siwalik Hills and Cooch Behar in India. In the 1970s, Bill eventually tracked down Pentland's published map of the lake in the archives of The Admiralty, London, and plans of the Italian caves in a library in Perugia. This led to a more general interest in geographical (as against purely geological) exploration.

Some of Bill's later publications began to include comments on palaeontological and geological folklore, and Delair recalls that during the last two years of his life, Bill was contemplating a larger study on the palaeontological origins of mythical entities such as the dragon, the cyclops, and so on. Perhaps 'exploration' and 'geo-folklore' should be added to his already wide range of interests.

The Sarjeant family's third daughter, Juliet, was born in 1973. Outside geology, Saskatoon offered plentiful opportunities for Bill's pursuits. It was not long before he helped to found a local folk group, 'The Prairie Higglers', with whom he went on to play and sing English and other folk-songs for more than twenty years; he eventually became President of the Canadian Folk Music Society (1986–1989) and its archivist from 1989. He also helped to establish Saskatoon's Special Committee for the Identification and Listing of Historic Buildings (Chair, 1974–1979). This led to related involvement with the Saskatoon Environmental Society (President, 1975–1977), Saskatchewan Archives Board and the Saskatoon Heritage Society, for which he was the editor of the *Saskatoon History Review* (1989–2002). He was also President of the Saskatoon Nature Society (1979–1980).

One of the most astonishing things regarding Sarjeant's enormous academic output is that, quite apart from preparation of lectures and working with his students, it was almost entirely accomplished in 'working hours'. Following his second marriage, he is remembered as rarely bringing work home in the evening; he would relax with a detective novel (often making notes for one of his many contributions on such fiction), family and social life, music or heritage matters and, in later years, writing his own novels.

Sarjeant's contributions to geology have been recognised with the award of the Sue Tyler Friedman Medal of the Geological Society, London (1990); the History of Geology Division Award, Geological Society of America (1991); and the Founders' Medal, Society for the History of Natural History (1991). He was a joint recipient of the Golden Trilobite Award of the Palaeontological Society (1995) for the monograph *A classification of Living and Fossil Dinoflagellates* (Fensome *et al.*, 1993), and he was elected to Fellowship of the Royal Society of Canada in 1995. His contributions to folk-music have also been recognised by the award of Honorary membership of the Canadian Society for Traditional Music, but perhaps the greatest pleasure was afforded him by discovering that, in 1999, the British Geological Survey named a number of shallow bathymetric highs, in the vicinity of Rockall, the Lyonesse, Owlsgard, Sandarro, Sandastre and Swithin igneous centres; the first four after place-names in his *Perilous Quest for Lyonesse* novels (Hitchin, 1999).

Many of his friends have described Bill as a 'Renaissance man'. Always someone who meticulously acknowledged receipt of correspondence and reprints, in his last weeks he corresponded with many colleagues by e-mail with courage and dignity, often recalling long friendships with the words 'these are good memories which will not fade'. Many of us, even after relatively short acquaintance, will remember him in similar terms. His funeral service was held in St. John's Anglican cathedral, Saskatoon, on 15 July, 2002. Among other tributes, a Festschrift volume of the journal *Ichnos* is in preparation (to be edited by George Pemberton and Richard McCrea of the University of Alberta, and Martin Lockley of the University of Colorado at Denver) which it is hoped to publish in 2004.

EPILOGUE

Sarjeant's eclectic book collection eventually comprised some 85,000 volumes, mainly geological in nature, but also including works of mystery fiction, fantasy, humour, childrens' books, music, the history of road transport, and travel (Spalding, 1997). In 1996, he presented a collection of 3000 monographs and serials connected with his research for *Geologists and the History of Geology* to the Special Collection of the Science and Technology Library of the University of Alberta, Edmonton, Canada. (A report on the National Library of Canada website that a collection of Sarjeant's books was placed in the Thomas Fisher Rare Book Library of the University of Toronto is erroneous [D. Spalding, pers. comm.].) This was added to in subsequent years, and the remainder are being added this year. It is to be hoped that, as Bill would have fervently wished (*cf.* Sarjeant, 1996, iii–iv), students of history of geology who visit this collection will be able to browse the shelves!

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Richard Howarth, London

Professor W.A.S. Sarjeant in 1996, from an original photograph by Wayne Eyre, University of Saskatchewan.



Xia Xiangrong (1910–2001)

Emeritus Professor Xia Xiangrong passed away on 5 May, 2001, at his home in Wuhan, Hubei Province, at the age of 91. He was the first President (1980–1986) of the Committee of History of Geology of the Geological Society of China (HGGSC).

Graduating from the Tsinghua (Qinghua) University in 1933, Professor Xia was engaged for more than fifty years in geological surveying and teaching, but also had a special interest in the history of geology from the time of his college days. His main books and papers in this area included *A History of the Development of Mining in Ancient China* (1980), *A History of the Geological Society of China* (1982), and *Geological Knowledge in Ancient China* (1996).

Wang Hongzhen, Beijing

Eduard G. Malkhassian (1926–2003)

Eduard G. Malkhassian, one of the most distinguished specialists in geological science in Armenia, passed away on 7 June, 2003, after a brief illness.

Eduard Malkhassian was born on 23 February 23, 1926, in Tbilisi to the Malkhassians—a family of well-known experts in the printing industry of the Transcaucasus. He inherited from his parents, and retained throughout his life, a profound love of science, books, and ‘enlightenment’.

Graduating from the Geology Department of Yerevan State University in 1949, Malkhassian went to work as a geologist with the Armenian Geological Administration. From 1950 to 1953, he undertook graduate studies at the M. Lomonossov

Moscow State University. Upon the successful completion of those studies he defended his dissertation on 'Magmatism of Hayots Dzor (Armenia)' (1953), earning the Candidate of Geological–Mineralogical Sciences degree. For the early years of his career in science Malkhassian worked as a Research Fellow with the Institute of Petroleum of the Soviet Academy of Sciences in Moscow, taking part in a long-term expedition in the Far East and Kamchatka.

In October 1953, Malkhassian returned to Armenia, taking a position as Associate Professor of Geology at Yerevan Polytechnic Institute. In 1956, he moved to the Institute of Geological Sciences of the Armenian Academy of Sciences as a Senior Research Fellow. From 1957, he held the position of Scientific Secretary, and from 1971 he was Head of the Alaverdi Expedition of the Institute of Geological Sciences. During his tenure at the Institute he carried out a number of Government assignments involving research on the Kafan ore-zone, exploring the ore-bearing capacity of the area between the Debet and Agstev Rivers. For this work, he received several awards from the Armenian Academy of Sciences. In 1970, he successfully defended a doctoral dissertation on 'Geological Evolution and Volcanism of Armenia in the Jurassic Period', earning the Doctor of Geological–Mineralogical Sciences degree.

In January, 1977, Malkhassian became a Chief Geologist of the Armenian Geological–Methodological Group at the Caucasus Institute of Mineral Raw Materials, and in 1981 he was appointed Head of the Armenian Branch of the Institute. He held that position until 1991 when he switched entirely to the academic world, being appointed to a full professorship at Yerevan State Teachers' Training Institute, where he supervised three graduate students who prepared and successfully defended dissertations that earned them the Candidate of Geological–Mineralogical Sciences degree.

A man of great erudition, Malkhassian dedicated his life to the study of volcanism and geological evolution of the Caucasus, publishing over three hundred research papers and monographs on that subject. His scientific research efforts and publications gained him wide recognition at numerous scientific conferences held in Armenia, Soviet Union and several foreign countries. But issues in the history of the evolution of geological science in Armenia and the study of the biographical data of distinguished scientists/geologists whose work dealt with Armenia held a significant place in the sphere of interests. Thus Professor Malkhassian was elected a corresponding member of INHIGEO in 1968, and subsequently became a full member. His *Bibliography on the History of Geological Sciences of Armenia (1900–2000)* was published by INHIGEO in Australia in 2000. A larger compilation—a bibliographical guide to all the publications devoted to various aspects and directions of the study of geology in Armenia—was in its final stages of preparation at the time of his decease. Malkhassian also wrote over twenty popular science books and brochures targeting the general public and seeking to present the topical issues in geology, volcanism, and seismology.

Alongside his scientific research, Professor Malkhassian was actively engaged in civic activities. From 1968 he headed the Commission on Geological Studies of Armenia. He was a chairperson of the Scientific-Methodological Council on Earth Sciences at the 'Knowledge Society' of Armenia, Scientific Secretary of the Geology Section of the Armenian Soviet *Encyclopedia*, Deputy Editor-in-Chief of the *Proceedings* of the Armenian Branch of the All-Union Mineralogical Society, and was one of the leading organisers of the First All-Union Conference on Volcanology and of the International Symposium on History of Geology held in Yerevan (where INHIGEO was effectively founded).

Professor Malkhassian's scientific and civic activities received official recognition in a number of ways. He was conferred awards by the Government of the Armenian SSR, the Presidium of the Soviet Academy of Sciences, the Ministry of Geology, and the 'Knowledge Society' of the USSR.

All those who knew that kind and caring person will revere the memory of an untiring researcher of Armenian geology.

Yu.A. Soloviev, Moscow, G.P. Khomissouri, Moscow, and V.B. Seyranian, Yerevan

AN INFORMAL INTERVIEW WITH GORDON HERRIES DAVIES

David Oldroyd

We're meeting at your lovely house near Nenagh near the centre of Ireland, and I hope you'll allow me to ask you some questions about your life and work, which will be of interest to members of INHIGEO and those who read our Newsletter.

Gordon Herries Davies

Do you want to ask me any specific questions to start with, David?

Well, I think it might be an interesting way to proceed to ask you where you see yourself standing today as a scholar—or a student.

I try to be a student; I try to be a scholar.

A polymathic man—and how you reached your present position?

Well, you were asking me a few moments ago, before we came 'on tape', about whether I see myself as a historian of geology, a historian of geography, or a historian of Irish science. I have certainly tried, in my own little way, to contribute to all these fields. I think I'd probably answer your questions by saying that I try to be a creative scholar, I try to do my own thing, and I don't regard myself today as living exclusively in one camp or another. I think my principal contributions have been to the study of the history of the earth sciences, and I also have this involvement in the history of Ireland and Irish science as I'm regarded as someone who 'unearthed' Irish science from beneath a mantle of forgetfulness; and certainly so far as nineteenth-century Irish science is concerned I do feel that I've done something useful, and have reminded the Irish nation that we do have a very strong legacy from the nineteenth century. You yourself yesterday went to one of the great sites of Irish science—you saw the so-called 'Great Leviathan', or Lord Rosse's great reflecting telescope at Birr; and that is quite a sight. So I like to think that I've been contributing to the history of Irish science and that I'm still contributing to the history of the earth sciences. Also, to my own surprise, I find myself increasingly involved in the history of institutional science. I've done a history of the Geological Survey of Ireland, which resulted in my being invited to do the bicentenary history of the Geological Society of London; and in parallel with that I'm also writing the history of the Royal Zoological Society of Ireland, and more especially a history of Dublin Zoo (both as a scientific and a social institution), since the zoo was founded in 1830 with very scientific purposes. People then wanted to know more about zoological topics, and what better way of doing that than by having the zoo in the heart of the capital of Ireland?

Yes, we're all looking forward then to the publication of this bicentenary project. I guess many INHIGEO Members will want to read that. I certainly shall. So that is how we stand at present. Can we go back, now, to the beginning of your career to see how you reached your present situation. For example, where were you born and where did you go to school?

I was born in England in 1932 and went to school in England, and I was both an undergraduate and graduate student there, but I've often felt that my real intellectual development goes back no further than 1954, when I came to Trinity College, Dublin; and I really owe a very deep debt of gratitude to the College for the opportunities which it has given to me. It has continuously been very good to me and it has above all else given me great freedom to do whatever I wished to do. A former Provost of Trinity, F. S. Lyons, once said to me that he hoped that the College would always allow its academics to follow the torch of learning wheresoever it might lead them. And that has certainly been true in my case. Throughout my time there I was a member of staff in the Department of Geography—not Geology—although I was a kind of honorary member of the Geology Department and at one time in my career I did think very seriously of approaching the Professor of Geology of the day, asking that I might transfer from Geography to his department. I actually wrote a letter on that subject, but I never mailed it, and when I eventually revealed, years later, that I had not sent him the letter he said "Oh I am most regretful about that. I wish you had done. We could have received you with open arms." But I stayed where I was in Geography. There was no need really, to effect a change of department because I was perfectly happy where I was, and was allowed to do just those things I wanted to do, but the question of how I became interested in the history of science I don't fully understand myself.

Well, could we go back but a little step? What about the route from Manchester, and what did you do as an undergraduate there? And how did you come to be at Trinity?

As an undergraduate at Manchester, I read Geography. This was a frightful mistake! I went to Manchester under rather peculiar circumstances. In 1949, it wasn't easy to obtain a university place and having passed the Higher School Certificate examination in 1949, I decided to stay a further year at school and try for one of the open scholarships, particularly at Cambridge. But in October or November that year I began to send out applications to a number of universities; and I was summoned almost by return of post to an interview at Manchester, where I was interviewed by Professor Walter Fitzgerald, who in his day was quite a distinguished geographer. He was selecting his candidates somewhat early in the academic year because he was about to go off to Africa for six months leave. He was a communist, and interviewed me with, on his desk, a copy of the *Daily Worker* and a glass of milk. When my headmaster heard that I was going to be interviewed by Walter Fitzgerald at Manchester he said "Oh my God, you can't possibly go there! The man is an out-and-out leftie". But in some strange way we got on famously at the interview. It was one of those cases where two individuals just seemed to 'click'. I liked him enormously, and he liked me. And there and then he said "I'd like you to come to Manchester, into my Department". And I agreed to do so. So my future seemed to be decided, and applications to other universities seemed somewhat unnecessary. But within about ten days of my being interviewed by Professor Fitzgerald he dropped dead! That left me in a kind of moral dilemma. I'd accepted a place from the professor, and the University wrote to say that they would honour his offer—and would I continue with my plan to come to Manchester? And perhaps unwisely, as I now believe, I said that I would. But the department under Fitzgerald's successor was not the same place as the one I thought I was going to, and during my first year I became somewhat disillusioned; and in retrospect I think I should have withdrawn and gone somewhere else.

What was the curriculum in those days?

It was a miserable curriculum! We did Cartography in the first year, and 'Introduction to Geography', which was a waste of time. Second year was a bit more attractive as the department had just acquired a New Zealand academic called Stewart Duncan, who was very good; he later taught in Armidale (Australia). Also there was a South African geomorphologist and student of Lester King from Natal—a man called David Niddrie, who ended his career at the University of Florida. And it was he who excited my interest in geomorphology; and so I began to think of myself as a geomorphologist. But the course overall was disappointing and didn't really enjoy my undergraduate years.

Did you do honours there?

Yes, I did the honours course, and I did geology in the first year, as part of the course and I found that very interesting, and I now began to wonder why I hadn't done geology as an undergraduate. But geology hadn't been part of the programme at the school I attended, whereas geography was, and I really never seriously considered geology. I did consider undertaking a history course, as history has always interested me. I had had a good geography teacher at school and his influence led me to register as a geography student, but I really think I should have dropped geography. But then having got my geography degree I was awarded a scholarship as a graduate student at Manchester, working on a geomorphic problem in North Wales.

Which was?

It was on coastal change near the mouth of the River Clwydd. I never published it, but I finished the project in a year and got an MA. In those days it was not normal to do a PhD. If you did a higher degree it was assumed that you were going for an academic post and if you were any good you were expected to get a position while doing the MA, and anyone who did three or four years doing a PhD was thought to be something of a failure, as they hadn't got a post while doing the Master's degree! While I was a graduate student at Manchester I saw a notice board somewhere saying that Dr Wolfe Mays of the Philosophy Department was going to give a series of lectures on the philosophy of science; and I thought this sounded interesting. So quite clearly I was already beginning to think about history and philosophy of science; and I joined Wolfe Mays' class. It was at 9 o'clock on Monday mornings—not the best of times—but he came week after week, though the class shrank; and I recollect that I was at times the only student there. But he just carried on. His course was extremely interesting. I still remember his lecture on Spinoza very well indeed. So at that stage I was certainly displaying interest in the philosophy of science, and history of science.

Now you asked how I came to arrive in Ireland. Well, after Walter Fitzgerald's death, the department in Manchester was in the care of the Reader in Geography, a man named Thomas Walter Freeman who between 1936 and 1949 had been Reader in Geography at Trinity College, Dublin. At the Easter of my year as a postgraduate student, Freeman told me that he'd been over in Ireland during the vacation; that he had been talking to people in Dublin; and that they were shortly going to advertise a post, for which he thought I would seem to be very well qualified. "I think you should apply", he said. "Indeed, I've already told them that you will apply!"

Well, with this sort of recommendation, when the post was advertised, I *did* apply, and in the fullness of time in July 1954, I was invited to an interview. When I got there, it was one of those beautiful days—blue sky—and I must say that Trinity looked very well. I liked the place, and the people who interviewed me: the Professor of Geology, the Professor of Philosophy, and Joe Haughton who was then in charge of the Geography Department. And I was offered the job, for three years, as an assistant lecturer in physical geography. I was only 22, which was ridiculously early to embark on an academic career, but I thought: “It’s only three years. Trinity’s an attractive place. I’ll take it.” And here I am. I’ve been here ever since.

At the end of the three years, Trinity must have thought I was worth trying to retain, and a lectureship was created for me. So I became a lecturer in 1957—the year of the British Association meeting in Dublin—and then in the fullness of time, in 1967, I was elected to a Fellowship, and I was given a chair in the Department in 1971.

And never looked back!

Yes, I suppose I had a pretty successful career. Certainly I’ve greatly enjoyed my time at Trinity.

But you mentioned to me the other day that you also had an interest in the sea. Your career might have gone in quite a different direction. How did that slot into what we’ve been talking about?

In the mid-1940s, I developed a strong interest in ships, and really did feel the call of the sea. There’s no doubt about that. I think this was the influence of my mother’s mother, Edith Moundsey, or Edith Herries as she became—a lady who I believe was very influential in shaping me. I spent a lot of time with her in her home in Buxton in Derbyshire. At one stage in her career, she had been engaged to a naval officer who was drowned in the West Indies in 1897, and she retained a strong interest in all things naval or maritime; and she and I used to look at picture books of the sea, when I was 3, 4, or 5. There’s no doubt she shaped my thinking. And in the 1940s I told my father very strongly that I wished to join the Royal Navy, and the intention was that I should go in via the old Special Entry Scheme to Dartmouth Royal Naval College in 1948. But this was the time of the Labour Government and for a short period the British fleet was reduced to four destroyers and one cruiser. And when you have grown up in an era when the Home Fleet consisted of two or three battle squadrons, with aircraft carriers, and goodness knows what else, the fleet which the Labour Government had allowed to come into existence in the late 1940s did not look very exciting. My father turned completely against the idea of my going into the Navy. And perhaps, deep-down, I accepted the wisdom of his view.

So the other track took its natural course?

Yes, there was one specific moment. I could still go to the spot in a country lane, not very far from where I lived, and I can remember saying to myself “I’m never going to go into the Navy”. So that’s the background. But I remain interested in ships and the sea, and I’ve always been interested in naval history. Indeed, at one time after graduation, I did seriously think of doing a degree in nautical studies, or something of that kind, but that’s not the way things worked out for me. And I’m very happy with the way things did work out.

It seems to me that Ireland is particularly well suited for a geomorphologist. It’s a compact sort of place, with many things here of great interest for the geomorphologist. Would you agree that Ireland is peculiarly suited to your kind of work?

Yes that’s quite true. I was presented in 1954 with a wonderful opportunity in geomorphology in that very little modern geomorphic research had been done in Ireland; and the research field was wide open, and there was a wide number of interesting problems that one might tackle. Although, having said that, the field was so wide open that it was difficult to know where to start. I came to the Department alongside another geographer who had come over from England. He was a historical geographer and we both found it difficult to start research-wise, because there was no one really here to give us guidance. It was very virgin territory. We both tried various projects before we finally settled down into the areas that we eventually became particularly associated with. It’s not easy to begin work in a wide open field. It’s like being a settler in the American West. Where do you carve out your farm? So it wasn’t easy at the beginning, but eventually I began to work on the geomorphology of southeastern Ireland, County Wicklow in particular, and I did a lot of work there. But there was a problem in the character of the geomorphological work that I was engaged upon. Geomorphology in the 1950s changed markedly. The geomorphology I’d been trained in was that of Wooldridge and Linton. They studied denudation chronology—landscape history—which was what I was doing in southeast Ireland. But in the 1950s geomorphology became concerned with the quantification of landscape processes. And I have to admit that I did not find the ‘new geomorphology’, as we used to call it, quite so exciting. I didn’t like the idea of spending my life alongside a flume tank studying rates of sedimentation or building wooden boxes to study rates of mass movement of material on slopes.

Did you try it?

Oh yes, I did become involved in a small way, but my kind of geomorphology had been landscape history, and that fell from favour, for a very good reason, as it had dawned on geomorphologists that we didn’t know enough about the processes at work on the landscape. You have got to begin by studying the processes; and that is what happened in the 1950s. And people like Eric Brown who had done his work on Wales, or Linton and Wooldridge who’d written what seemed then to be a classic work on the Weald—their are works that no one looks at any more. So there was a change in the character of the science and this may have had a bearing on me as I found myself increasingly involved in thinking about the history of geomorphology and the history of geology. I think it was part of my familiarisation with Irish geology that I developed an interest in this area. I remember when I came over I didn’t know very much about Irish geology or geomorphology and I began to read the literature, as one does. And in particular I remember reading through volume after volume of the *Geological Magazine*, which I found was a fascinating journal. (I still enjoy handling its volumes); and there I began to encounter controversies of the past. I began to encounter distinguished Irish geologists of the past, like Edward Hull, George Henry Kinahan, and so on, and I began to ask myself what kind of people were these men, and why did they entertain the views that they did? So from 1955–56, I began to form an interest in the history of Irish geology. I also started reading Archibald Geikie’s writings. I found his *Founders of Geology* quite enthralling, and I read his biographies of Ramsay and Murchison. And it was while I was reading his biography of Murchison that I came across the account of his tour of the north of Scotland with Geikie.

Of which I wot!

Yes, which you know so well. I thought it would be very interesting to undertake an exploration of how they’d come to hold the views they entertained on the geology of the Scottish Highlands. And that later crystallised out as the idea of writing a book on

the history of geomorphology. At that time I thought it would be a history of global extent. So I began my reading, thinking at the time that James Hutton was the first geomorphologist. It was amazing how little was known about the history of the earth sciences at that time. I thought it all started with Hutton. In 1963, I wrote what I intended as the first chapter of my book—on Hutton and Playfair. But having done that, I thought perhaps I'd better look at what came before them. So I started reading the eighteenth-century literature, and then that of the seventeenth century. And I soon began to appreciate that there was far more in this than I had hitherto understood. I began to meet names like Burnet and Woodward. I don't think I actually tore my chapter on Hutton up, but figuratively I did, and I started all over again, and went back to the beginning. Through correspondence, I met Victor Eyles, who was very helpful to me, and pointed me in certain directions. But, David, you have to remember that at that time in the early 1960s, there were very few people anywhere in the world who'd displayed any interest in the history of the earth sciences, and Victor was perhaps the only person I knew at that time who had such interests. But I soon met Professor Tomkeieff in Newcastle who was also very helpful to me; and I began work on what eventually became in 1969, *The Earth in Decay*. And here again I'd like to pay tribute to Trinity College. It was only the magnificent resources of its library that made it possible for me to pursue the studies in the way I did. I adopted very much a scatter-gun approach, looking for titles that I suspected might contain something of geomorphic significance, and reading those titles as rapidly as I could, looking for geomorphic morsels of information.

That's interesting. I remember you have a reference somewhere to the journal The Reader. And I thought to myself: "How did this guy happen on this? Was he reading everything?. How could he have located that minor thing in such an obscure place?". Was it really a scatter-gun approach that led you to that source?

It was very much a scatter-gun approach. At that time a member of staff could borrow any book from the College library. (This was a system that I was later instrumental in stopping!). I used to borrow ten books at a time—just titles that I thought might contain something of relevance. When I say I read them, I don't, of course, mean that I read them in detail. I just skimmed over pages. But I found a great deal of interesting material in this manner. Eventually I met the American George White (he came over to Dublin in the mid-sixties) and he also was very helpful, and suggested some things I might look at. I found a few things he didn't know himself. And he said that I should draw up a bibliography. I did this, and let him have it. So it was very much an unworked terrain, and one of the things I would emphasise, looking back, was that one was walking through a largely untilled field. *But it comes out as a very smoothly-reading and well-digested text. It didn't have the feeling of a scatter-gun approach—to me, reading the book when it was first published.*

Well, I'm flattered! The book has, I think, worn remarkably well. When I look at it today I never cease to be amazed at how well it comes out, considering that I had no adequate background in the history of science. I remember a reviewer trying to draw parallels between Thomas Kuhn's *Structure of Scientific Revolutions* and the history of geomorphology, and saying how well certain sections of the book seemed to accord with Kuhn's interpretation of scientific history. But at the time I published the book, I'd not even read Kuhn's book!

Well, Kuhn was so popular in those days that everyone had to be a Kuhnian. So if you were put into the Kuhnian box, that was a function of the times, I think.

Yes, that's right. But I might have produced a very feeble book on the history of geomorphology. In the event, the reviewers were very kind to the book and it was remarkably successful, though at the time I wrote it, none of my colleagues took very much interest in what I was doing. Most of them regarded it as very much a secondary activity for me. They thought I should be getting on with my geomorphic research. It was certainly never my intention to become a historian of the earth sciences. I thought that when I'd finished *The Earth in Decay* I'd get back to mainstream geomorphology. But it didn't work out like that, as I found that I was part of a new wave of interest in the history of the earth sciences. People like John Thackray wrote to me saying they'd enjoyed the book. And I remember someone from the University of New South Wales in Australia saying he'd read the book and found it interesting; and I soon began to find myself part of a fast-growing network of people interested in the history of the earth sciences. I suppose the Lyell Symposium of 1975 just put a seal of respectability on this new growth area.

Your next big topic was really the history of the Irish Survey. Did that come your way by offer, or did you go seeking it, so to speak?

No, I just wrote *Sheets of Many Colours* (1983) because I wanted to write it. I had an interest in the history of Irish geological maps, which went right back to my earliest days in Ireland, and I'd collected information, as one does, over a long period of time. Then I found myself in 1978, involved in the organisation of a symposium to commemorate the centenary of the death of Sir Richard Griffith, the 'father of Irish geology', so called. I had persuaded the Royal Dublin Society, with which Griffith had been closely associated, to run a symposium devoted to the life and times of Griffith. We brought together quite a distinguished group of scholars and we had an excellent session on the achievements of Griffith. I eventually edited the collection of papers. My co-editor of the volume was the science officer in the Royal Dublin Society, a Trinity Graduate, the chemist Charles Molland. He later began to take up the history of science himself and he has always been grateful to me for having introduced him to this area in which he's now made a very successful career for himself, not least for his study of the history of Irish scientific instruments. And Charles decided that the Royal Dublin Society had sufficient money to publish a series of books on the history of Irish science and technology. I was anxious that my book on the history of Irish maps should be published with the Royal Dublin Society, which had played such a large part in the history of Irish scientific development. And so the Society was persuaded that it wanted to publish my book on Irish geological maps.

Well, the Geological Survey featured very prominently in *Sheets of Many Colours*, and as we moved towards 1995, the 150th anniversary of the foundation of the Geological Survey of Ireland, I thought it would perhaps be nice to produce a second edition of *Sheets of Many Colours*. But on reflection I thought it would be better to produce a history of the Survey. And that meant a new book. So in 1991 I approached the Geological Survey and asked whether they would be interested in my writing a history of the Survey, 1845–1995. They liked the idea but had to get the permission of the responsible Minister, and also the Department of Finance. And after a year's delay permission came through and I was commissioned to write what became *North*

from the Hook* and I have to say that the Survey treated me very well. It more or less allowed me to spend what I wished so far as illustrations were concerned. So we had pictorial end-papers and ample coloured illustrations. I was very well looked after and very pleased with the outcome of that book.

As well you might be!

I was told "Don't stint yourself!"

And you didn't!

Yes, the bills were paid, and the book was published in 1995. I thought that a history of the Geological Survey of Ireland was perhaps of somewhat limited interest, so I was not prepared for the extent of the interest internationally. It sold well in North America and across the water in Britain, and I think that's how I came to be invited to do the work I'm doing at the moment on the history of the Geological Society of London. The then-President of the Society was Richard Hardman, and his wife was doing a higher degree on the work of William Smith, so the history of the earth sciences was very much in his mind; and he began to start thinking about the bicentenary of the Society in 2007. He looked at my book *North from the Hook* and others from the Society had done likewise; and they thought the author was the right person to write the history of their Society. And I was most happy to receive the invitation.

Well, having just read some of the draft chapters this week, I rather think they got the right person.

You're very kind to say so. But we must leave history to decide.

I guess we should. But would you like to conclude this interview by giving our readers some of your thoughts about current directions in history of geoscience? For example, these days there seem to be as many books about books as there are about the sciences themselves. We're reaching a kind of meta-meta level. I wonder whether you think that's a good thing.

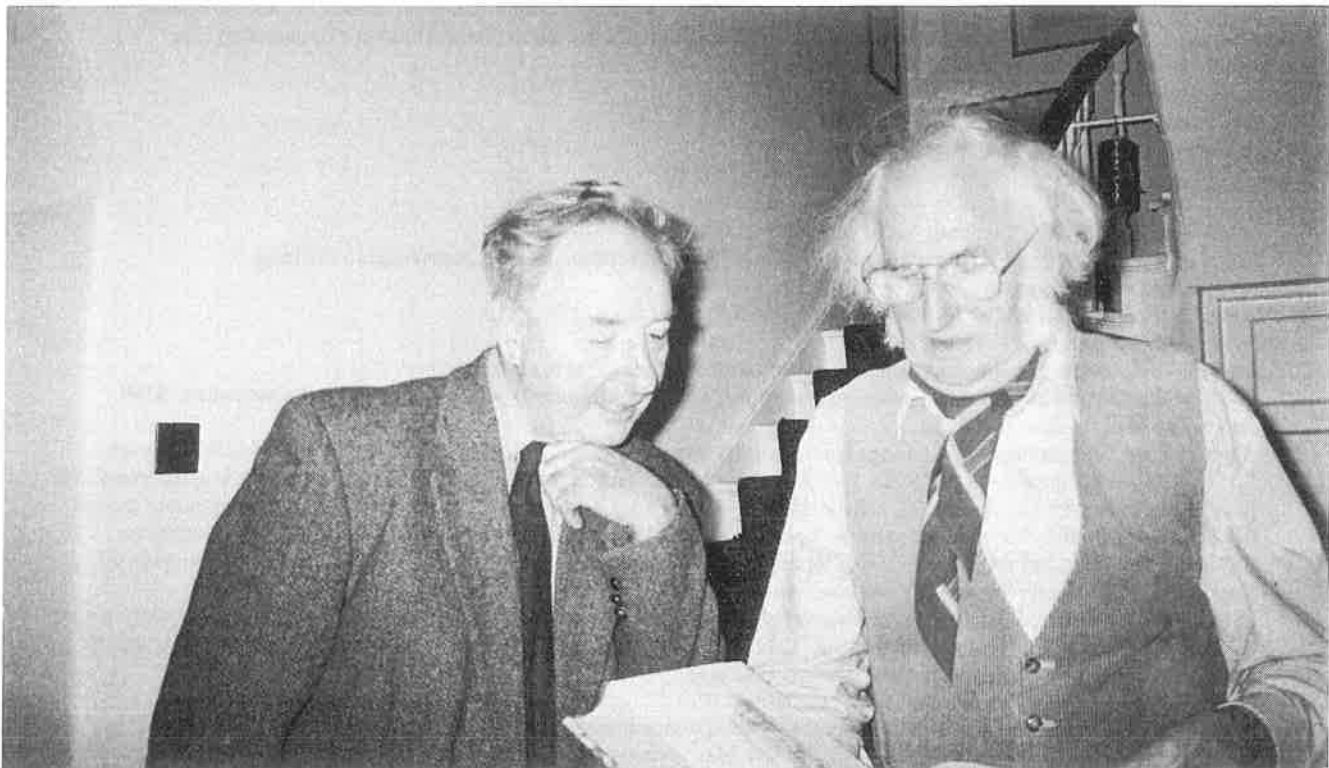
Perhaps it's inevitable?

Well, I do have a slight disappointment over the area. Looking back to the early 1970s, there were a lot of us who'd laid the foundations of what we thought was to be a great growth area. And through the 1970s and into the '80s it began to look as if we were right. But I think it's all fizzling out now, and I don't think our expectations are really being satisfied. I can't but help view some of the works that have appeared recently with a rather critical eye. My feeling is that to write a book involves a lot of effort over a long period of time, and I do so often feel that some authors—I won't mention actual names or titles—have written books in the last fifteen or twenty years have in many cases simply lighted upon a subject that they've thought they could turn into a best-seller of a book. And I don't feel that they've really got fully to grips with their subject.

Do you mean what I call the 'airport lounge' type of book?

Yes, I think 'airport lounge' is a good description of the phenomenon. I've been disappointed with some of the things I've seen in print. Books that have been quite well reviewed, books of which I'd had high expectation when I began to read them. But page after page I've found that the conclusions are half-baked, or inadequately researched, or written by people who don't have as commanding a knowledge of the subject as I feel is necessary if you're to write a work that is going to live. But there, I suppose, we have one of the problems of modern literature. Books published today are not expected to have a long life. Once the original print-run is sold off, no one expects there to be a second edition, or only very rarely.

Contemplating a Non-Airport-Lounge Book from Professor Herries Davies's Library, Nenagh, Co. Tipperary



* The Survey began mapping at the Hook Peninsula in southeast Ireland, and worked outwards from there, eventually covering the whole island (Ed.).

Of course, the history of earth sciences has not become professionalised to any great degree. And there's hardly anywhere where you can take degrees in the field.

Yes, that's a matter about which we must express some measure of disappointment, because in the 1970s we thought we'd see a real development of university courses in the history of the earth sciences. But looking at Ireland, I suppose I have to be quite well satisfied. When I started off I was regarded as having a slightly warped view of the academic field, which is no longer the case.

You were ploughing a lone furrow.

Yes, it was a lone furrow and although people were interested in what I was doing it was regarded as somewhat eccentric. But over the years, I did find geological colleagues who began to develop historical interests of their own. They began to develop the eccentricity themselves! Patrick Wyse-Jackson carries on the mantle at Trinity. But there is no real school of the history of the earth sciences in this country. Nobody in Cork, so far as I can remember on the spur of the moment. Paul Mohr in Galway is interested, but he's retired, and I'm not clear who will carry his work forward. Belfast is rather a sad story as the Geology Department has been closed, as has the Department of History and Philosophy of Science, and that's very sad. So the situation has not developed as we had thought or hoped. Perhaps we're seeing some kind of cyclic history, rather than a progressivist one? *Well, INHIGEO tries to do what it can to keep things going and move them along.*

Yes! And the forthcoming meeting [at Trinity College, July 2003] will, I hope, be outstandingly successful, and I hope people will enjoy themselves.

We shall look forward to seeing you there.

Yes, I shall be there, in College for the meeting.

Well, very many thanks, Gordon, for telling us all that. People will really want to read that, I do promise you.

11 June, 2003, Ballinacloy House, Nenagh, County Tipperary

FORTHCOMING MEETINGS

The St Petersburg Society of Naturalists: 'Life and Rocks: Bio-Inert Interactions'

23–25 June, 2004

Solid rock is one of the habitual symbols of the inert, non-living matter. But in fact the interactions between alive and inert, as between Life and Rock are quite complex and multiform. 'Living matter' in the sense of the Russian biogeochemist and Naturalist Vladimir Vernadsky appears on the base of the inert matter, and rocks give rise to life. On their side, living beings often generate minerals, mineral aggregates and/or become completely transformed into rock and rock signatures throughout the geological history of Earth.

This International Symposium is initiated by the oldest Russian scientific society with one principal target: the teamwork analysis of the scope and range of processes within the frame of the interaction between natural biological and mineralogical systems. This analysis will be carried out by specialists acting in various fields of Life and Earth Sciences in a new Millennium and Century dedicated before all to the expansion of Earth Sciences into Planetary Sciences and Life Science into Exobiology/extraterrestrial Life Search. Life scientists, planetary scientists, chemists and geochemists, crystallographers, mineralogists and last not least physicists and geophysicists are cordially invited to contribute to this Symposium. The Symposium will focus on the following topics:

Bio-inert interactions in biosphere. General problems.

Bio-inert interactions in soils and bottom sediments.

Biogenetic rock- and ore-forming processes

Fossil diagenesis of living organisms. Remains of life in the fossils.

Stones in living organisms. Mineralogy–medicine–pharmacology.

Biological factors damaging stone-built monuments and its monitoring

The problems of environmental mineralogy and geochemistry: its objects, techniques, experience in teaching.

Excursion during the Symposium

1. Natural stone in the art and architecture monuments of St Petersburg

Post-Symposium field trips (26–30 June):

2. Life and rocks of the Valaam Archipelago (trip to Valaam islands in the Ladoga lake).

Ladoga lake, excursions around the island (wonderful landscapes, churches), dinner, excursion to the monastery \$160 inclusive

3. 'Ladoga Ring': excursion around Ladoga lake. Putilovo quarry (Ordovician limestones with numerous fossils); Staraya Ladoga (the oldest stone town in Russia, fortress, ancient churches and the quarries with the numerous Ordovician fossils in limestones); Vvedeno-Ojtsky nunnery; Nishnesvirsky State Nature Reserve (picturesque landscapes, the numerous species of plants, fish, animals, the world-famous bird populations); Alexander Svirsky Monastery (the famous monuments of Russian architecture and art of the XIV–XVIII centuries); mineralogical rarity of Pitkjaranta–"Valaam" granite quarry; Ruskeala marble quarry; Sortavala–Priozersk fortress – St Petersburg. \$ 240 inclusive

4. St Petersburg–Novgorod (geological, historical and architecture monuments). Excursion into the underground gallery within the Cambrian quartz sandstones in the Sablino, the outcrops of the Ordovician limestones, excursion to the old capital of Russia, fortress, ancient churches). One day, \$ 45 inclusive

5. Geological and biological museums of St Petersburg

Registration Fee: \$US 100. Visa support and airport transfer are guaranteed. Symposium languages: Russian and English

Address: The St Petersburg Society of Naturalists (SPSN), Universitetskaya nab., 7/9, St Petersburg, 190034 E-mail:

elena@vexp15.spb.org

In according with the Russian rules for the visa supporting Organising Committee must to get by fax from the foreign participant the list with the copy of the passport.

Organising Committee, St Petersburg

International Commission on the History of Meteorology, Conference, Polling Monastery, Weilheim, Germany, 5–9 July, 2004.

'From Beaufort to Bjerkenes and Beyond: Critical Perspectives on Observing, Analysing and Predicting Weather and Climate'
For information, contact INHIGEO Member Dr Cornelia Luedecke (C.Luedecke@lrz.uni-muenchen.de).

Fifth British-North American Joint Meeting of the British Society for the History of Science, Canadian Society for the History of Science, and the History of Science Society, Halifax, Nova Scotia, Canada, 5–7 August 2004
'Circulating Knowledge'

The Plenary Lecture at the meeting will be given by INHIGEO Member James A. Secord (University of Cambridge), winner of the 2002 Pfiser Prize of the History of Science Society. His talk will be entitled 'Knowledge in Transit'. Keynote sessions are also planned on 'Mediators and Knowledge Networks in Late Eighteenth-Century Imperial Experience'; 'Circulating Psychological Knowledge'; and 'Networks of Knowledge in the Scientific Revolution'. For further information, contact: <http://www.hssonline.org/3Societies/index.html>.

INHIGEO Meeting, Florence, 20–28 August, 2004

The 32nd International Geological Congress

This large congress has two historical symposia, the themes being 'The Origin of Modern Geology in Italy' (organised by Glen Caldwell and Gian Battista Vai) and 'Institutions, Museums, and Scientific Societies in the History of Geosciences' (organised by Nicoletta Morello, Ezio Vaccari, and David Oldroyd). For general information concerning the Congress, please contact Ms Chiara Manetti, Dipartimento di Scienze della Terra, Via La Pira, 4–50121 Firenze, Italy. Tel./Fax: 39 055 2382146 Email: casaitalia@geo.unifi.it. Or visit: www.32igc.org.

Registration fees:	Until 30 June 2004	After 30 June 2004
Members	480€	530€
Accompanying Members	275€	300€

Following the Congress, the INHIGEO field excursion will be held, concerned with 'Italian Institutions and Localities in the History of Geosciences':

Day 1 29 August, 2004

Morning: travel from Pisa to Cornia Valley Mining Complex, 'San Silvestro'—Campiglia Marittima

Afternoon: Etruscan sites in Populonia

Overnight stay in Campiglia Marittima

Day 2 30 September

Morning: Transfer to Siena

Visit to the Academy of Fisiocrati

Afternoon: geological sites in Larderello, Saline di Volterra and Le Balze; traverse from Volterra to Vinci across Val d'Era and Val d'Arno (Steno's geological sites); Leonardo's Museum (Museo Vinciano) at Vinci; evening lecture

Overnight stay in Vinci

Day 3 31 August

Morning: travel to Bologna. Geological sites across the Appenines (Passo della Futa); visit Bologna Academy of Sciences

Afternoon: visit to G.Capellini geological museum and the meeting rooms of the 1881 Geological Congress of Bologna and the museum of Palazzo Poggi (University of Bologna)

Overnight stay in Bologna

Day 4 1 September

Morning: travel to Verona; Verona Museum of Natural History and Mt Balca fossil fish collections

Afternoon: Verona Academy of Agriculture, Sciences and Letters

Overnight stay in Verona

Day 5 2 September

Morning: Verona–Vicenza; traverse across historical palaeontological and geological sites visiting historical geological sites; visit to Bolca (fossil fish museum and Pesciara Quarry)

Afternoon: geological sites in Agno Valley (Arduino); travel to Venice

Overnight in Venice or Mestre

Day 6 3 September

Morning: visit to Venetian Institute of Sciences, Letters and Arts

Afternoon: Venice Museum of Natural History; city tour

Evening: excursion dinner

Overnight in Venice

Geological Society of London William Smith Meeting, 4–5 October, 2004

Earth's Dynamic Surface: Catastrophe and Continuity in Landscape Evolution

The aim of the conference is to bring together high quality international research workers from different fields—geomorphologists, sedimentologists, geochemists, physical and numerical modellers—to address a variety of outstanding issues in this area. In terms of understanding the total evolution of sedimentary systems, the starting point is the eroding source region. In particular, we aim to discuss:

How the geological record preserves the nature and variability of erosion processes over a range of time and spatial scales.

How this record can be interrogated through observation and laboratory analysis.

How physical models can be integrated with these observations and analyses to provide a deeper understanding of the interactions between surface processes, climate and tectonics.

To register or to find out more, please contact lydia.dumont@geolsoc.org.uk

International Conference Devoted to the Commemoration of the 150th Anniversary of Academician Alexey P. Pavlov (1854–1929), Founder of the Moscow Geological School, and Honorary Academician Maria V. Pavlova (1854–1938) Vernadsky State Geological Museum, Moscow, 1–3 December, 2004

Plenary and sectional sessions are planned in three sections: 1. History of Earth Sciences, History of Natural Museums and Collections; 2. Issues in Paleontology and Stratigraphy at the Beginning of Millenium; 3. Natural Museums and Fundamental Sciences: Importance of Museums in Education. For further information, please contact pavlow@sgm.ru or write to Dr Zoya Bessudnova, Vernadsky State Geological Museum, Mokhovaya Street 11, bldg. 2, Moscow, 125009, Russia.

INHIGEO Meeting, Prague, 9–18 July 2005

This meeting, with an organising committee headed by Jan Kozák, will have the history of geophysics as its main focus. (INHIGEO has never held a meeting specifically dedicated to this theme.) However, attention will also be given to the history of mining in Bohemia and to the stratigraphy of the region. For those with botanical interests, there will be the opportunity to visit the Mendel garden and museum in Brno. Needless to say, Prague is a 'must' for tourists.

The provisional programme is:

Registration and gathering of participants in Prague: Wednesday, 9 July 9, morning

Opening, Lectures in Prague: 9 July, noon and afternoon

Lectures in Prague: 10–11 July

Sightseeing Prague/visit to the Geophysical Institute: 12 & 13 July

Final lectures in Prague or in Brno: Monday 14 July, Symposium close

Excursions: Tuesday 15 July–Thursday 17 July

An additional day (18 July) is presently held in reserve in case of the enlargement of the symposium and/or the excursions.

Estimated cost (inclusive of excursions): US\$400.

For further information, contact Dr Jan Kozák (Geophysical Institute, Czech Academy of Science, Coci 11/1401, 14131 Prague, Czech Republic; kozak@ig.cas.cz). INHIGEO Members will receive further information about this meeting by post. Non-Members are welcome to attend.

INHIGEO Meeting, Beijing, 2005: Cancelled

The proposed INHIGEO contribution to the International Union of History and Philosophy of Science–Division of History of Science's XXIInd International Congress on the History of Science has had to be cancelled because it was not found possible to have the one-day registrations that were desired by the Chinese INHIGEO Members. We sincerely regret that no satisfactory solution to this difficulty was found.

8th International Symposium: Cultural Heritage in Geosciences, Mining and Metallurgy; Libraries, Archives, Collections, 3–7 October, 2005, Schwaz/Tyrol/Austria

The conference will be devoted to the study of the history of mining and early geological exploration in the Tyrol. There will, at the time of the meeting, be an exhibition at the Salzlager Hall in Tirol and at the Alpinarium at Galtuer on 'The Future of Nature'. For details of the meeting, please contact Dr Christoph Hauser, Geologische Bundesanstalt, A-1031 Wien, Postfach 127, Austria. Tel. 43 676 329 7996; Fax 43 676 329 7993; email christoph@hauser.cc; website www.hauser.cc/schwaz.

BOOK REVIEWS

A French View of Jules Marcou

Michel Durand-Delga and Richard Moreau, *Jules Marcou (1824–1898): Précurseur français de la géologie nord-américaine*, L'Harmattan, Paris, Budapest and Turin, 2002.

Jules Marcou (1824–1898) is a fascinating figure in nineteenth-century geology. French by birth, he did significant geology in his native Jura Mountains but is probably best known for his impressive geologic map (1851, 1853) of the entire United States. Marcou's contributions to the Taconic controversy and to pioneering efforts in understanding the geology of the western United States may also be known to some readers. And, for some cognoscenti among you, the name may resonate in the context of mid-century verbal sword-crossing with James D. Dana (1813–1895), various American geologists, and with leaders of numerous scientific organisations in France and the United States. The gentleman is worthy of a closer look than he has received to date, and this small book provides some valuable insights into his life and times.

One interesting facet of Marcou's career is his life-long interaction with his contemporary and classmate, Louis Pasteur (1822–1895). Moreau is a biographer of Pasteur, and this book succeeds in showing the numerous tie-ins between Marcou and his more celebrated friend. The cover portrait of a youthful Jules Marcou is a pastel done by the multi-talented Pasteur when they both matriculated at the *Collège royal de Besançon*.

Throughout his life, Marcou crossed paths with a large number of significant people, sometimes in very positive contexts, as with Louis Agassiz (1807–1873), and sometimes in a quite negative manner, as was the case with Dana. Marcou's interactions with Alcide d'Orbigny (1802–1850), Albert Oepel (1831–1865), Joachim Barrande (1799–1883), and Ebenezer Emmons (1800–1863) are explored by the authors. Examples of individuals and institutions who found themselves on the pointed ends of Marcou's verbal barbs are provided throughout the text. Marcou may have been an innovator, even conceiving of a world geological map (1862, 1875), but his pugnacious and egotistical style alienated many of his contemporaries and may explain why his contributions have been little celebrated over the years.

The authors devote five of their eleven chapters to Marcou's family, youth, and early development. We learn a great deal about his home area of Salins and the factors that shaped his worldview. Marcou's roots in 'practical geology', focused on palaeontology and stratigraphy (stemming from the work of Smith, Gressly, Quenstedt, and d'Orbigny), are explored, as is his application of 'practical principles' to decoding the geology of the Jura Mountains. Two chapters then treat his pioneering work in North America and his involvement in the Taconic controversy. Readers anxious to understand details about Marcou's role in

the Taconic controversy will have to go elsewhere (e.g., Skinner, 1978), as the authors introduce the issues and personages in just a few pages.

The mid-century years were busy ones for Marcou. A key personal event of this period was Marcou's marriage, in 1850, to a wealthy American woman, Jane Belknap. Not only did this cement his American ties, it provided financial independence from French and American employers and institutions. Marcou travelled extensively in the United States, suffered periods of illness, and retreated to Europe for about six years (1854–1860), where he occupied the Chair of Palaeontology and Geology at the *École Polytechnique Fédérale de Zurich*. The authors are forthright in noting that numerous gaps exist in Marcou's life story, particularly during another extended sojourn in France in the period 1864–1875. Ill health throughout his life undercut his vitality and the level of his scientific contributions. Chapter 8 considers his geologic conceptions, placing him in the parade of significant contributors to the developing geological sophistication of the mid-nineteenth century. Chapter 9 looks at his critiques of scientific institutions, offering interesting insights into how and why Marcou railed against established (Establishment) groups such as the *Muséum d'histoire naturelle* and the *Académie des Sciences*. He wrote an entire book on *La science en France* that articulated his concerns about the overly conservative nature of institutions and individuals in the French hierarchy. Chapter 10 provides a picture of Marcou and the 'image of science', comparing and contrasting his visions of how science should be done with the views of contemporaries, especially his good friend Louis Pasteur. The final chapter summarises his last years as a long-bearded patriarch, rather isolated from the scientific mainstreams of both France and the United States. Given all the detailed information relating to his early life, it is a shame that so many gaps exist in the narrative of his middle and later years. After a quiet seventeen years in the Boston/Cambridge area, Marcou's journeys came to an end on 17 April, 1898, and he was buried at the famous Mount Auburn Cemetery in Cambridge, Massachusetts. At the very end of the book, after the Bibliography, Marie-Claude Fortier offers a four-page commentary on Marcou as Pasteur's last artistic model. A bibliography and helpful chronology of Marcou's life are provided. Lastly, a two-page index of names is appended. Alas, the index is limited to a single page citation per author and some citations (e.g., the p. 76 clue for Dana) do not lead to any mention of the person in question.

Given the rich amount of biographic detail offered concerning Marcou's formative and productive years, the historically attuned reader is justified in asking whether the title and prime thesis—Marcou as French precursor to North American geology and generator of "the first map of the entire United States"—are warranted. The answer depends on how fervently one accepts or rejects 'precursoritis' and how one defines 'first'. It seems fair to say that Marcou did contribute to American geology, doing fieldwork in the East and in the then-expanding American West. But he first arrived in the United States on 5 May, 1848, which postdates a great deal of significant investigation by a small army of naturalists, geologically informed physicians, and geologists proper, including pivotal early work of the celebrated New York Geological Survey. Reconnaissance fieldwork, detailed palaeontology, stratigraphic analysis, and considerable mapping had already been done by the mid-century (Aldrich, 2000; Merrill, 1924; Schneer, 1979). Some American critics felt that Marcou's conclusions ran far ahead of his field documentation, and were therefore counterproductive. Nonetheless, his reports and maps did become part of the geologic database of antebellum America. Marcou's maps of 1851 and 1853 are remarkable and do portray the entire country, but it is an overstatement to term them the first maps of the country. William Maclure's much earlier maps (1809; 1817) were limited to the eastern part of the country, but did cover what was *then* the entire United States. The point is not to become bogged down in quibbles, of either a scientific or semantic nature, but to observe that context truly is important, and historical contributions need to be understood in relationship to the complexities of their own eras. A nicely done rendition, in colour, of Marcou's 1855 map and cross-section is included with the book.

Thus, the picture that emerges is of an interesting but enigmatic person, whose contributions are noteworthy but perhaps not as pivotal as Marcou himself would have claimed. The book succeeds in providing many rich nuggets concerning the youthful Jules, but does not flesh out events from the murky later periods of Marcou's life. Also lacking in such a brief biographic overview are geological details of his extensive work in the Jura and on the North American continent. Elements of his upbringing and formative years are well covered, but we do not receive deep insight into the data and experiences that led Marcou to make the adamant and sometimes sweeping conclusions of his mature years. The targets of his sharp tongue were themselves fierce in their rebuttals, apparently because of antipathy to Marcou's methodology and self-righteous presentations.

A word to the Anglophone reader is likely to be in order. Sit near a good dictionary. The book seems to be targeted to a highly literate French audience. It is written in the *passé simple* tense and the authors use a rich but esoteric vocabulary that far transcends that of popular French writings or journal articles. Typographical errors appear to be rare, though American readers may be surprised to see (p. 153) the United States Geological Survey termed "Le Geological Survey of America". Illustrations are relevant to the narrative and are well-spaced throughout the book. Printing, paper quality, and binding are excellent. If you are comfortable with modern literary French and wish to learn more about the mysterious Monsieur Marcou, do delve into this interesting book.

References

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 Merrill, George P., *The First One Hundred Years of American Geology*, Yale University Press, New Haven, 1924.
 Schneer, Cecil J. (ed.), *Two Hundred Years of Geology in America*: University Press of New England, Hanover, 1979.
 Skinner, Hubert C. (ed.), *Jules Marcou on the Taconic System in North America*, Arno Press, New York, 1978.

Kennard Baker Bork, Granville, Ohio

Geoarchives

Gabriel Gohau, *Naissance de la géologie historique: la terre, des 'théories' à l'histoire*. Vuibert / ADAPT, 2003
 Gabriel Gohau is probably known to most anglophone historians and geologists only through his survey volume *Histoire de la géologie* (1987, translated 1990), which is useful particularly because it is unaffected by the anglocentric bias that characterises much of the historiography of the earth sciences. Historians who read French, on the other hand, know that he is one of the leading francophone historians of geology, and that his research spans the seventeenth into the early nineteenth centuries in an important published dissertation (1983), a substantial book (1990) and many ground-breaking articles. He is currently the

president of COFRHIGEO, the French body founded by François Ellenberger, which does much to maintain a lively interest in the history of geology not only in France but throughout 'old Europe' (the latter a cheap sneer that we Europeans have promptly adopted with pride).

Gohau's latest book synthesises several themes that he has discussed before, but perhaps never so succinctly or in such clear and elegant prose. His aim is to help reorient the historiography of geology away from the traditional lineage through Hutton and Lyell—so often presented as 'founders' or 'fathers' of the science—and away from an almost exclusive emphasis on causal explanation and the uniformity of physical processes through geological time. Gohau argues instead for the significance of the development of methods for reconstructing the history of the earth itself—in modern terms, *geohistory*—which turned out to have been, like human history, highly contingent and in effect irreversible. He therefore locates the decisive turning-point for the earth sciences in the late eighteenth and early nineteenth centuries, and he regards it as a scientific 'revolution' at least on a par with continental drift and plate tectonics in the mid-twentieth. Of course his argument is not wholly novel; but many earlier authors adopting it have equated 'historical geology', simplistically and anachronistically, with the 'stratigraphy' developed by William Smith, without noticing that Smith himself had almost no geohistorical insight at all.

Gohau begins by pointing to the paradox that a geohistorical approach—as opposed to traditional Aristotelian eternalism—only became conceptually possible as a corollary of the short timescale calculated by the seventeenth-century textual 'chronologers' (Ussher among them). The short timescale, usually deplored or derided as a religious 'obstacle' to scientific 'progress', in effect allowed naturalists such as Steno to treat strata and their fossils as natural 'archives' in parallel to—and presumptively coeval with—ancient human archives. But most of the early theorists, notably Descartes and Burnet, produced developmental stories that were not truly geohistorical because they were essentially deterministic, or what David Oldroyd years ago termed 'genetic': programmed sequences dependent only on initial conditions and the ahistorical laws of nature.

Gohau then outlines how, in the course of the eighteenth century, the consensual distinction between 'Primary' and 'Secondary' rocks or terrains was turned into a rudimentary sense of a global geohistory. That Primaries always lay below, and Secondaries above, was interpreted as a matter of earlier and later, more generally than for Steno and implicitly on a much longer timescale. Meanwhile, the idea that most of these rocks had been formed by an unrepeated sequence of chemical precipitations, from a global proto-ocean that had shrunk gradually to form our present seas, encouraged the belief that formations could be identified (and, in modern terms, correlated) from one region to another. This kind of Neptunist theorising (which long predated Werner) suggested a unique sequence of rock-types, and hence an unrepeated geohistory, that might be globally valid. However, Gohau argues that around the 1770s there was a significant shift, away from the global ambitions of all such theorising, whether linear or cyclic, towards research with a deliberately more limited and regional scope, as in the work of Pallas, Saussure, Soulavie and Faujas among others. To highlight the point, he puts the decisive change at 1779, with Desmarest's famous paper on the different 'epochs' of the extinct volcanoes of Auvergne. Unlike most of the theorists, Desmarest adopted a retrospective order of description and analysis, beginning in the present and moving by stages into the increasingly obscure past, eschewing any ambition to reach the earth's ultimate point of origin. But as is shown by his adoption of the chronologers' term 'epoch', Desmarest intended this retrospective method to be a heuristic route towards a goal that was unmistakably geohistorical. And for Gohau the turn from global 'Theories of the earth' towards regional monographs highlighted the differences between regions, and hence fostered the recognition of the sheer contingency that had generated those contrasts.

All this was geohistory reconstructed from what Gohau terms '*archives-structures*', with little or no aid from fossils: that came later, with fossils becoming '*archives-indices*'. He points out that several shrewd field observers (such as Arduino) noticed a correlation between fossils and formations long before Smith's earliest unpublished work, and that some of them (notably the much maligned Deluc) interpreted it geohistorically in a way that Smith never did. But for Gohau the decisive exemplar came with Brongniart's and Cuvier's joint fieldwork around Paris, and their interpretative claim (first published in 1808) that periods of marine and freshwater conditions had alternated in the course of a highly eventful and contingent geohistory. More generally, of course, Cuvier's work established the reality of extinction as a natural kind of event, thereby accentuating the irreversible character of geohistory, although it left another kind of event—the appearance of new forms of life to replace those becoming extinct—even more mysterious than before.

At this point, however, Gohau avoids the 'all roads lead to Darwin' syndrome, by showing how Élie de Beaumont's highly influential research of the late 1820s brought '*archives tectoniques*' into the geohistorical project. This work was made possible by the rapid progress of straightforward Smithian stratigraphy, in conjunction with intensive fieldwork on tectonics, both carried out in a fully international framework of collaboration. A sequence of apparently sudden episodes of crustal elevation, reflected in the local unconformities they generated within the pile of formations, was correlated with a sequence of apparently sudden and universal faunal changes (notably between Cretaceous and Tertiary), interpreted in Cuvierian style as global episodes of mass extinction. This combination of tectonic and palaeontological evidence produced what Gohau neatly terms '*double archive*'. Based on fieldwork on the regional level, though always with global synthesis as its ultimate goal, it accentuated the highly contingent character of geohistory, while showing that its reconstruction could be both detailed and reliable. And Hutton is brought back at this point, as it were out of turn, to highlight in retrospect the value of his emphasis on the dynamic power of crustal elevation, in place of the more passive conception of tectonics that had generally prevailed until the 1820s. (By contrast, the concept of unimaginably lengthy geological time had been a commonplace even before Hutton, while his steady-state cyclicality was found deeply implausible.)

Finally, Gohau sketches briefly the 'progressionist' biohistory that emerged in the 1830s on the back of Élie de Beaumont's kind of *double archive* (and, it might be added, in the face of Lyell's revival of Huttonian cyclicality and denial of any such progressiveness). Here Gohau supplements the familiar anglocentric story, usually focused on figures such as Murchison and Sedgwick, by also mentioning briefly the equally significant work of Barrande and d'Orbigny among others (a photographic collage of the latter's magnified models of forams gives the book an exceptionally beautiful cover). But by this point Gohau's main argument has already been set out: the earth sciences took a decisively fruitful turn during a few decades before and after 1800, by abandoning the steady-state or cyclic models of theorists such as Hutton, and adopting instead a directional model inspired by human historiography. Those who by the 1830s were calling themselves 'geologists' never lost sight of questions of

causal explanation, as the example of Élie de Beaumont shows; but they treated them as complementary to geohistory. Priority in every sense belonged to the reconstruction of geohistory, *wie es eigentlich gewesen*. Only after establishing the sheer historicity of certain unpredictable (or rather, unretrodictable) events in the deep past could one usefully enquire into their causes. The more recent history of the earth sciences, not least the story of continental drift and plate tectonics in the mid-twentieth century, bears out the continuing wisdom of that earlier strategy.

I find myself so wholeheartedly in agreement with the general direction of Gohau's argument that this review has been confined to a brief, but I hope faithful, summary of its main points, mainly for the benefit of those who cannot read the original. Although the book is slender, it is manifestly based on some very thorough historical spadework, which puts to shame most of the recent spate of books in English on the history of geology, aimed at the general public. Although unenforceable, an abstinence from any further heroic mythologising, and a moratorium on any further re-warming of Geikie or Adams, would be highly desirable, if the earth sciences are ever to be rescued from their present status as a historiographical Cinderella.

Martin Rudwick, Ely and Cambridge

A Valuable Hugh Miller Reprint

Hugh Miller, *The Cruise of the Betsey or A Summer Ramble Among the Fossiliferous Deposits of the Hebrides with Rambles of a Geologist or, Ten Thousand Miles over the Fossiliferous Deposits of Scotland*. Introduction by Michael A Taylor; Foreword by T. C. Smout, National Museums of Scotland, Edinburgh, 2003.

The nineteenth-century geologist and writer Hugh Miller has long been known and admired for his work on Old Red Sandstone fishes, and other palaeontological contributions; his popular geological writings, folklore, etc.; his travelogues and social commentaries; as well as his heroic efforts as editor of *The Witness* in Edinburgh. He is also remembered for the role that he played in Church politics in his day, his newspaper being the mouthpiece of the evangelical wing of the Church of Scotland, from which grew the Free Church of Scotland or the 'Wee Frees'. His efforts to reconcile the Christian history of the world with the emerging science of geology are also well known and (somewhat) notorious.

Miller's best-known work was *The Old Red Sandstone* (1841). This and most of his other book-length writings were reprinted several times in the nineteenth century and some of his books have been reprinted in recent years. Two of his most interesting productions—*The Cruise of the Betsey* and *Rambles of a Geologist* (issued in a combined volume in 1868)—are now reissued in facsimile, with an excellent introduction by INHIGEO Member Michael Taylor (a palaeontologist at the National Museums of Scotland), with useful glossary, bibliography, and index, in a well produced and decently priced volume.

Miller made many geological excursions round Scotland in his summer vacations, and the two works here reprinted represent his journey in the vessel the *Betsey* (which belonged to the Free Church and made possible an itinerant ministry), amongst the islands of the Inner Hebrides in 1844, while the *Rambles* refer to travels made in northeast Scotland in 1846. The works provide rich sources for understanding the social history and geography of the poorer and more remote parts of Scotland, as well as accounts of some important geological observations, such as the fossil wood underlying a lava flow on the island of Eigg.

Dr Taylor's introduction is informative and lucid. It situates Miller in his social, political, and theological milieu (which were anything but distinct), explains the intricacies of the conflicts of his day and age and the part(s) he played therein, and discusses his geological contributions and ideas. The book is furnished with maps, and no good library should be without it.

David Oldroyd, Sydney

(This book notice is also being published in *Metascience*.)

Obeisances to Hugh Miller

Lester Borley (ed.), *Celebrating the Life and Times of Hugh Miller: Scotland in the Early 19th Century Ethnography & Folklore, Geology & Natural History, Church & Society*, Cromarty Arts Trust and Elphinstone Institute of the University of Aberdeen, place of publication not stated, 2003.

The bicentenary of the birth in remote Cromarty, northwest Scotland, of the writer and geologist Hugh Miller in 1802 was celebrated from almost every possible perspective at meetings held in his place of birth in 1801 and 1802. *Celebrating* represents the published versions of twenty-six papers presented at the second conference, which was attended by some 150 persons. The papers were organised into an opening plenary session, then sessions on ethnography and folklore, geology and natural history, Church and society, and a closing plenary session. The findings of the different sessions were duly summarised, and these summations are also published in the volume. While the sections on folklore, Church politics, etc., were surely of interest to the participants—who were engaged in a fine expression of Scottish nationalism (a very proper activity)—I shall only comment here on the papers dealing with Miller's geological and general scientific work, and James Secord's remarks at the closing plenary session.

The ever-active Hugh Torrens spoke on the stratigraphic methods used by William Smith and their application in economic geology, especially coal prospecting. He has written on this topic extensively in the last few years, and at first I thought I had heard it all before. But not so!

In setting up his stratigraphic column, Smith considered strata that lay above and below the 'Oolite' rocks of the Bath region, where he had commenced his geological investigations. Torrens draws our attention to a passage in Miller's *Old Red Sandstone* where he stated that the Oolite was Miller's "meridian line", from which reference line his "geological scale had been graduated on both sides". Thus the geological autodidact Miller recognised in 1841 the significance of Smith's stratigraphy, how it worked, and how it might have economic significance so far as coal prospecting was concerned, as a way of distinguishing between strata at different stratigraphic horizons.

Torrens further discusses the history of early attempts at coal prospecting in Scotland, pre- and post-Smith, and the problems involved in the extrapolation of English stratigraphy to distant Scottish strata; or the arrival of the 'geological scale' in Miller's part of the world. The attempts at coal prospecting in the Cromarty area are discussed, with evidence from Miller's writings that he recognised that they had been, and were, doomed to failure. This recognition says much about Miller as a Smithian geologist; and seemingly he had become one largely by his own reading as an autodidact, coupled with his personal

recognition of the importance of palaeontology in geological investigation. Some years ago (1996) I published a paper on Miller's work as a geologist, which Torrens is kind enough to refer to as a 'masterful survey', but I now realise that I did not do the necessary footwork on Smith's geology that Torrens has undertaken, so that the *significance* of Miller's remarks on coal prospecting had escaped me.

My essay on Miller's work on fossil fish is also totally overshadowed by the contributions of the palaeontologists Nigel Trewin and Philippe Janvier of Aberdeen University and the *Muséum d'Histoire Naturelle* (Paris) respectively. Dr Trewin's essay discusses the relationship between Miller's thinking and that of Louis Agassis respecting 'Miller's winged fish', *Pterichthys (Pterichthyodes) milleri*, and he tells the reader many interesting facts about the modern understanding of the animal and its taphonomy.

Janvier's essay—which may properly be described as masterly—discusses in detail Miller's reconstructions of several Devonian fish-types, providing comparisons with modern interpretations. This takes us into the history of issues in fish classification and reveals the sophistication of Miller's drawings and fossil reconstructions. This is not whiggish work. The modern comparisons help understanding of what Miller accomplished. We also learn about the ideas of Miller and Agassis on the 'three-fold parallelism' of the development of embryos, the order of fossils in the stratigraphic record, and the 'natural system' of classification—a matter about which Robert Chambers rightly made much, disturbing many Victorian minds in the process.

Janvier brings forward a quotation from Agassis to the effect that the 'highest' fishes for any geological system appear first in the stratigraphic record. This idea was taken over into Miller's writings but I had not realised previously that it came straight from Agassis. However, for Agassis 'highest' meant 'most general' rather than 'most advanced'. So there was, for him, nothing essentially anti-evolutionary in this particular aspect of his thinking (though he was a fierce opponent of evolutionism). As for Miller, he grasped the idea and gave it a theological twist. He thought humans were 'fallen' or exhibited moral degeneration. Likewise the same tendencies (Nature's way) were manifested also in the stratigraphic record of Devonian fish! The big ones came first; and then the little ones! For all his erudition and palaeontological expertise, Miller was no modern.

John Hudson provides a first-rate account of Miller's work on the Isle of Eigg in the Inner Hebrides, which topic he has been studying from his days as a research student in the 1960s. His account focuses on Miller's understanding of the pitchstone that forms the highest hill on the island, and overlies the interesting fossil remains of a pine forest. And Miller's work on Jurassic fossils on Eigg, particularly his discovery of a Plesiosaur, is usefully analysed. Miller only found a few scattered remains, but recent study of the site has, we are informed, yielded enough pieces to enable a replica of the animal to be prepared for the National Museums of Scotland. Examining the Oolite fossils of Eigg, Miller also opined that the sandstones there were the products of estuarine deposition.

Simon Knell, who has made extensive studies of the history of collecting in Britain, naturally writes on Miller's work as a collector, discussing the how, where, when (not on Sundays) and the whyfore of his collection practices. He obtained such a quantity of material that he eventually established an annexe to his house in Edinburgh to serve as a private museum. Knell argues that Miller's motivation for collecting was not primarily linked to his religious concerns or beliefs but was related rather to his pleasure in outdoor activity, the scientific interest of his finds, the perception of the social advantages common in his day of having an extensive, well-presented collection. But Miller also came to 'use' his collections for the purpose of metaphysical argument. Importantly, they were purchased after his death and subsequently came to form the chief nucleus of the present collections of the National Museums of Scotland.

The paper by Alison Morrison-Low and R.H. Nuttall, two authorities on the histories of scientific instruments in the nineteenth century, is primarily about just *that*, and finds rather little to say about Miller's microscopes or precisely what he did with them. However, Professor Hudson mentions Miller's sectioning and examination of sharks' teeth found at Eigg. There is also quite a well-known photo-portrait of Miller using a hand-lens (though not in the approved manner with the lens held close to the eye), which is duly reproduced, but the authors fail to identify the microscope that Miller owned or used and the one on display at the Miller Museum in Cromarty is not, it seems, actually his. Miller did, however, report using a microscope to examine sections of the 'Eigg Pine', apparently being able to show with his instrument what was or was not a conifer.

Michael Collie, who has made extensive studies of the network of amateur naturalists of northwest Scotland in Miller's day, and the relations of their work to that of the 'big-shots' such as Murchison, and the assistance they rendered to such 'central' figures, covers this ground again, appropriately focusing this time on Miller. Though Miller contributed significantly to the supply of material to experts at the centres of learning Collie regards his chief accomplishment as being that of a geological writer, who, had he lived longer, would presumably have had to have changed his style to accommodate himself to the emerging professionalisation of science. But now that we have the benefit of Janvier's study, one may think that Collie somewhat underestimates Miller's concrete empirical and conceptual accomplishments in palaeontology.

The last paper in the geological section is by Ralph O'Connor, a research fellow at St John's College Cambridge, completing his PhD on 'Popular Geological Writing in Early 19th-Century Britain', presumably under the supervision of James Secord, for whom such a topic would be just the ticket. O'Connor discusses the dioramas and panoramas such as were popular in Victorian Britain, and shows how Miller's writings meshed well with these popular 'spectacles'. They provided word-pictures of the strange creatures of the world's past. We tend to take such odd creatures for granted today, but they were something strange, new and wonderful in Miller's time. Lost sea-monsters, and even Miller's strange 'winged fish' could be nineteenth-century counterparts of the dragons and such of bygone ages. But the newly discovered bones were undoubtedly *real*. And that reality could be displayed by a wordsmith such as Miller almost as well as by museum exhibits.

James Secord rounds off the geological components of the book, and ruminates effectively on the technological and social changes since Miller's day. Besides underscoring the importance of *writing* in Miller's overall contribution, Secord emphasises that for Miller the burgeoning problems of the emergent technology of the industrial revolution were not due to failures in economics or technology itself. Rather he thought that the future might be bleak because of a failure of faith. Secord refers to the ongoing professionalisation of science in Miller's day, such that Miller himself might not have flourished as a scientist in the modern world. But Secord rightly points out that there is an intercrossing of popular and professional science today just as much as ever there was in the Victorian era, which Miller exemplified and contributed to so well. But Miller's idea that all could be put

right by religious faith and observance has, I think, been shown by the modern world to be a grand delusion. But that is a topic for another and different book.

Meanwhile, the contributors have produced a fine collection of papers on Miller's geology, complemented by a useful appendix in the form of a "Hugh Miller Cromarty Trail", by means of which visitors to Cromarty may easily locate all the places in the town and its neighbourhood specifically associated with Miller. His countrymen remember him well, and not just as a heroic Scotsman, but as someone still to be studied and understood. This book, too, will repay study, and will promote understanding of the past and the present—the reciprocal 'keys'.

David Oldroyd, Sydney

Geology at Wrocław University

History of Geological Sciences at Wrocław University 1811–2003. Team monograph, edited by Andrzej Grodzicki. University of Wrocław Publishers, 2003 (in Polish, with English and German summaries).

In 2002, the University of Wrocław (or Breslau, in German) celebrated the 300th anniversary of its origin. It was an opportunity to publish several significant historical monographs. One of them is the work reviewed here, dealing with the history of mineralogical, geological, and palaeobiological studies nearly from the beginning of nineteenth century till 2003.

The book consists of two parts devoted to other universities. The first: German school; the second: the Polish one. The oldest period is described in the first two chapters. The first entitled 'Mineralogical and geological sciences at the Breslau University in the years 1811–1945'; and 'An outline of history of geosciences in the period 1811–1945' (authors: Michał P. Mierzejewski, Michał Sachanbinski, Zbigniew Wierzbicki) and 'Poles and Polish students of the geosciences in Breslau and at the Breslau University till 1945' (by Janusz Skoczylas). The former deals, among other matters, with the activities of such eminent scientists as Carl von Raumer, Ferdinand Roemer, Carl Hintze, Hans Cloos, and others. The latter refers to the rather negligible participation of the Poles who graduated from this German University.

The second part of this book consists of thirteen chapters dealing with the history of individual departments of different geosciences of the Polish Wrocław University after 1945. More detailed data refer to the departments of: structural geology and geological mapping (by M.P. Mierzejewski); mineralogy and petrography (by Ryszard Kryza); stratigraphic geology (by Joanna Haydukiewicz); physical geology (by Teresa Oberc-Dziedzic); hydrogeology (by Teresa Bochenska *et al.*); palaeobotany (by Anna Sadowska); applied and isotope geology—including geoecology (by Mariusz O. Jedrysek); economic geology and ore deposits (by Irena Wojciechowska); as well as the mineralogical museum and gemmology (by M. Sachanbinski); and the geological museum (by A. Grodzicki *et al.*). In addition, there are some data on the scientific student's circle (by Waldemar Sroka) and on the association of geologists (by Jacek Lubieniecki *et al.*), as well as a schema of education of geologists.

Whilst the German University of Breslau was formed after the Napoleonic wars, its reconstruction in 1945, in nearly completely ruined Wrocław, was extremely difficult. Apart from destroyed buildings, very few instruments, as well as geological–mineralogical and library collections were saved. In the place of the German population that were evacuated in 1945, including academic teachers, there arrived Polish scientists, mostly from Lvov University, earlier incorporated into Soviet Union. Thanks to the enormous efforts of such Polish pioneer professors as Józef Zwierzycki (till 1937 Director of the Geological Survey of the Dutch East Indies), Henryk Teisseyre, and their disciples, Wrocław University soon became one of leading scientific centres in Central Europe, but with work concentrated predominantly on complex studies of Lower Silesia. Geological and petrological investigations were carried out in cooperation with geoscientists of other countries, mainly from the Czech Republic, France, Germany, and Russia.

The reviewed book is written by specialists who, apart from Janusz Skoczylas, Andrzej Grodzicki, and Zbigniew Wierzbicki, are not experienced in the history of geosciences. However, they have based their articles on the available publications, particularly (so far as the first part of this book is concerned) on the German book by Hans Voelkel, entitled *Mineralogen und Geologen in Breslau (Geschichte der Geowissenschaften an der Universität Breslau von 1811 bis 1945)*, Bode Verlag, Haltern (2002). However, no preserved archival materials, particularly from the second half of 20th century, were taken into account.

The chapters are written in Polish, but with English and German summaries, which will limit the readership of this, unquestionably valuable book.

Recently, the anniversaries of academic geosciences have been celebrated by other jubilee editions, e.g. for Cracow and Warsaw Universities. The reviewed book can be considered as the best in this series.

Wojciech Narebski, Krakow, and Zbigniew Wojcik, Warsaw

The History of Biology and Geology seen from an Iberian Perspective

Amador, Filomena and Contencas, Paula, *História da Biologia e da Geologia*, Universidade Aberta, Lisbon, 2001.

História da Biologia e da Geologia (A History of Biology and of Geology), is a 253-page volume written by a geologist (Filomena Amador) and by a biologist who are members of the teaching staff of the Universidade Aberta ('Open University') of Lisbon. The book was prepared as a manual for graduate students of a discipline that bears the same name and is part of the curricula of several courses held in that university.

After the short 'Introduction'—where the authors write that the teaching of both disciplines in the framework of the history of science in the twentieth century allows for a better understanding of how knowledge is created and recreated—there are seven chapters, each of which deal with both biology and geology. The chapter titles (freely translated) are as follows: 'Natural History in Antiquity'; 'Natural Sciences in the Middle Ages'; 'The Study of Nature in the Renaissance'; 'Modern Science is Born'; 'Enlightenment and Rationalism'; 'The Vastness of Time and Evolution'; and 'Knowledge Again at the Crossroads'.

The book has didactic aspects and, apart from the 'Introduction', each chapter has its objectives clearly stated at the beginning and conclusion, and also has some questions to be answered by the reader. The shortest chapter is the first one, the two final ones being the longest: since the approach is chronological rather than topical, the lengths of the chapters increase as the authors deal with more recent periods, mirroring the increase over time of our scientific knowledge about our planet and about

life. For each period, a general picture of the political, economic, and social conditions is given. References to the history of natural sciences in Portugal, as a reflection of what was going on abroad, are common.

In the first chapter emphasis is given to natural philosophy in Athens (Plato, Aristotle, . . .), the relatively small scientific heritage from Rome being also pointed out. In the second chapter the role of lapidaries, and of Albertus Magnus, Avicenna and Jean Buridan in relationship to some natural phenomena are referred to. Mention is made of the influence of Duns Scot in the separation of faith from reason and of the importance of William of Occam in the study of Nature. The foundation of the first universities in Europe is given special mention.

A large part of the third chapter is dedicated to Leonardo da Vinci, Bernard Palissy, Georgius Agricola, and Conrad Gesner. This section is about science and technology: the source of springs and river water; the changing position of the coast lines; the origin of fossils; their occurrence in mountains; the origin and classification of minerals; ore exploitation, *etc.* The discoveries and their consequences in the development of natural history studies are accorded special mention.

Modern science (Chapter 4) is about the scientific revolution of the seventeenth century (Bacon, Descartes, Galileo, Newton); the first theories of the earth (Descartes, Thomas Burnet, Leibniz), and again the origin and distribution of fossils in relationship to the Noachian Flood (Nicolaus Steno and his seminal concepts derived from his studies of the geology of Tuscany) and the theories of earthquakes (Robert Hooke) and the question of the age of the earth.

In the fifth chapter, biology and of geology are dealt with in the framework of the Enlightenment (though the names biology and geology were not then in use). The two fields are set much more clearly apart than in the previous chapters. As for geology, references and comments are made to: the scientific travels of the French, the British, and the Portuguese, and their effects on botany, zoology and mineralogy/geology; the concepts of the Neptunists and the Plutonists on the origin of rocks (Abraham Werner and James Hutton); the Lisbon earthquake of 1755, and the related comments of Voltaire and Kant; Buffon's concepts on the history of our planet; and Linné's classification of minerals. As for Portugal, references are made to the foundation of the Lisbon Academy of Sciences and to the reform of the University of Coimbra, institutions that played an essential role in the progress of science and technology in that country.

'The Vastness of Time and Evolution' (Chapter 6) deals mostly with ideas prevailing in the nineteenth century on the relationship between time in the past and change of the living beings and also change of the earth's crust. Charles Darwin, Charles Lyell, Georges Cuvier, Alcide d'Orbigny and Johann Joachim Barrande are called in the context of change of the living beings, whereas Jean Baptiste Romé d'Isle, René-Juste Haüy, Johan Gottshalk Wallerius, Axel Cronstedt, Richard Kirwan, Jons Jacob Berzelius and James Dwight Dana (mineralogy, crystallography and petrography) and Jean Guettard, Nicholas Desmarest, Johann Gottlob Lehman, Georg Christian Fuchsel, William Smith, and Alexandre Brongniart (geological maps and sections) are called in the context of change of the earth's crust.

The last chapter is about geology in the twentieth century, with discussion of topics such as crustal deformation and the origin of mountain chains, continental drift and plate tectonics, as well as the chief scientists involved in the inception and discussion of theories.

There is a useful glossary, a reference-list of more than 110 titles and a set of short notes on books by Claude Allègre, François Ellenberger, Gabriel Gohau, Stephen Jay Gold, Anthony Hallam, M. Kraft, Rachel Laudan, Charles Lyell, Martin Rudwick, and Alfred Wegener, as far as geology is concerned, complete the volume.

The organisation of the book is good. Numerous black and white drawings after the original authors are given in the body of the text and on the page margins, and short marginal notes help to clarify concepts. The layout of the volume is pleasant.

The idea of writing a history of both biology and geology, linking concepts and contemporaneous scientists from both areas is an interesting one, though much easier to put into practice when dealing with early times, when 'naturalists' prevailed, than today. The chronological approach to the problem is probably the best one, if not the only one, to achieve the integration.

This is a valuable book where the essentials of the history of geology, presented in a synthetic, clear way, may be found. It is far from being a list of notable names in science. On the contrary, concepts are presented and discussed. It is more valuable because it has been published in a part of the world where books on history of science in general and on the history of natural sciences in particular are not abundant.

Manuel S. Pinto, Aveiro

Geology in the Lake District for Two Hundred Years

David R. Oldroyd, *Earth, Water, Ice and Fire: Two Hundred Years of Geological Research in the English Lake District*, The Geological Society, London, Memoir No. 25, 2002 (issued 2003).

At the risk of putting the cart before the horse I wish to refer to the concluding paragraphs of this remarkable book, for here is stated the author's overriding aim. He wishes to "recount, in as much detail as is reasonable here, what occurred over the first two hundred years of [the investigation of] Lakeland Geology, in an effort to understand the geological structures and history of just one small part of the globe".

Before embarking on what became a mammoth undertaking, David Oldroyd stated quite clearly that his six tasks were to trace the understanding of Lakeland geology, to show the development of British geology, geological theories, and geological methodology, and to explore the changing status of geologists from amateurs and academics to national surveyors and consultants. The history of the British Geological Survey and the study of a highly political situation that developed towards the end of the twentieth century were clearly-defined tasks; and woven throughout the book was the insightful study of the many geologists whose work contributed so much to our knowledge of this geologically very complex region.

Twenty chapters trace these themes, from 1709 to 2000 (but really beginning about 1800), in a detail that is awe-inspiring. The wealth of referenced material is invaluable to historians of science and present-day geologists alike. And yet all this material is woven into an eminently readable text with skill and clarity. The dovetailing of geological researches and findings with the human, physical, and social aspects is a joy to read.

The use of extensive footnotes on the relevant pages rather than at the end of chapter, or indeed of the book as a whole (which would have been a clumsy and irritating format for a book of this size) adds to both the readability and enjoyment. It enables the reader to select the 'human' details, or not, as desired, while allowing the account of the main thrust of the history of

the geological research to proceed uninterrupted. The format of the book, A4 with the text in two columns, demands that such footnotes are printed right across the page for ease of reading; and this is what the publishers have done.

Geological sections, modern and old, drawings and photographs are plentiful, good, and placed close to the relevant text. All this adds to the quality of the volume. The coloured maps at the beginning of the book are particularly useful and are well reproduced, given the constraints of page size, etc. Some indeed could be described as truly beautiful. Only one aspect of the format is, to my mind, problematical. The so-called topographic maps do not work well, probably because they are in black and white only. Using lines of two different thicknesses rather than differing textures, they are not easy to identify and interpret. I feel I know the Lake District reasonably well, but I found these maps, which showed only the village locations, the courses of rivers, roads, and some peaks, not easy to read. I had to have recourse to the Ordnance Survey maps to make sense of the topography. Contour lines do help! In the end, I ignored the included maps and concentrated on the O. S. maps to find locations.

To return to the content of the book. The overview of the Lake District investigations is very impressive. The history of this is smoothly dovetailed into the discussion of the geology itself, with geographical detail being particularly accurate. Here it was obvious that the author had visited the geological locations and tried to view them, as far as possible, through the eyes of the original workers. In an area as complex as the Lake District, where the rock outcrops are abundant and incredibly varied in a small area, and where a very small distance, even a few centimetres or so, can make a difference to an interpretation, the historical technique that the author has developed and employed extensively in this book, of tracing the original investigator's tracks as far as was humanly possible, strengthens the veracity of his findings and accounts of the theories.

In the chapters dealing with the nineteenth-century controversies I particularly liked the way in which the local, regional and international aspects were made relevant to one another: e.g. Barrande's Theory of Colonies, the origin of granite, and the tensions between the amateur and the professionals.

A strict chronological account was really not possible for an area like the Lake District, though the easier and peripheral areas were on the whole mapped first. The more complex ones were studied as geological techniques progressed. Wisely, Oldroyd does not attempt the wholly chronological approach in many chapters but has taken geologically based areas and examined the development of research in each of these: e.g. Skiddaw, Borrowdale, etc. For me, this clarified my knowledge of the geology. I felt I could go back to these areas and see and understand what I was looking at. In other words, the history of the investigations of a place leads to clarification of modern geological interpretations. The statement at the end of the book that "the past is the key to understanding the present" is truly exemplified here. But always the personal anecdote and human dimension lighten what might have become an overwhelming amount of geological data and argument. Our understanding of the geology always comes through human endeavour. The geologist is always the key to the investigation. He or she does not act in a vacuum. Geologists operate in a social, academic, geographical and uniquely personal situation.

Where a regional/location approach was not suitable, the thematic chapters take over. The application of plate tectonic theory I found particularly interesting. Initially teaching at a time when plate tectonics was emerging as a geological paradigm, there was an acute shortage of texts that applied this to the regional geology of Great Britain and the diagrams printed on page 143 (reproduced from a paper by Frank Moseley) would have been a god-send, post 1960!

There is always a tendency for enthusiasm for the geology itself to take over, to the neglect of the history of the geological research. At times this does happen. Chapter 10 on plate tectonics is a case in point, but eventually the history wins and the "tangle of theories" is skilfully unravelled, bringing clarity and order to the situation.

I particularly liked the chapter on "Tertiary Uplift". The work done by the investigators of the problem in their collection and interpretation of the evidence was masterly, and exciting future work within a global context was postulated, bringing together the British Geological Survey and universities, from Britain and beyond.

In conclusion, the reason for this book, as distinct from its aims, is stated on page 294 and needs quoting here. "Maps tell us a lot. They do not reveal 'the truth'. Beneath their surface lie controversies. The maps and stratigraphic subdivisions represent their best consensus that can be achieved or imposed. Modern controversies have to do with approaches or methods, just as much as theories—as was the case in earlier geology".

This book, spanning over two hundred years of geological work, makes us fully aware that the past and the present are inseparable and are mutually dependent, and that the nature of the subject has not changed in essence throughout the period.

Beryl Hamilton, New Galloway

In Honour of Endre Dudich

A Hungarian Humanist Polymath of the Twentieth Century: Dr Endre Dudich is 70 Years Old—Annals of the History of

Geology of the Hungarian Geological Society, Special Issue 8, p.104, Budapest, 2004 (in Hungarian)

On 28 January, 2004, the geological community of Hungary, in particular those geologists interested in the history of geological sciences, celebrated the seventieth birthday of Associate Professor Dr Endre Dudich at a session organised at the Hungarian Academy of Sciences. He has been exceptionally productive in various fields of the earth sciences, and Hungarian and international culture. Experts of the pertinent fields compiled a booklet about his life and *oeuvre*, which contains also a list of his scientific and other papers, compiled by himself. The introduction contains the addresses delivered by the representatives of the Hungarian Geological Society, the Count Kuno Klebelsberg Foundation, and the Esperanto Association of Hungary.

The remarkable life of Endre Dudich can be summarised as follows. He was born in Budapest, Hungary, on 27 January, 1934, the only son of Dr Endre Dudich, renowned Professor of Zoology at Budapest University, and Józsa Vendl, a grammar school teacher of Hungarian and French language and literature. Unfortunately, Endre's mother passed away very soon, and a year later his father married her elder sister, Maria Vendl, mineralogist and crystallographer, the first woman in Hungary to become a university professor. Both her brothers, Aladár Vendl and Miklós Vendel, were distinguished full professors of geology, at the Budapest and the Sopron Technical Universities respectively.

Endre Dudich (Jr) attended primary school in Budapest, and secondary school in Sopron and Budapest at the grammar schools of the Benedictine and Cistercian orders respectively. At the University of Budapest he graduated in geology in 1956, and in biology and chemistry in 1961. Already in 1956, he became Assistant at the Department of Palaeontology, and obtained his doctorate in 1959.

In October, 1961, due to his active religious activities, the Communist authorities 'advised' him to leave the University, but he succeeded in getting a job with the Hungarian Bauxite Exploration Company at Balatonalmádi. For some time, he worked as a mapping geologist. In 1965, he was charged with planning, organising, and directing the company's Central Laboratory. In 1968, he was invited to organise a Geological Information Team in the Geological Institute of Hungary (back in Budapest). He played a remarkable part in the success of the centenary celebrations (1969) and the jubilee publications of the Institute. In 1970, he was appointed Director of Archives. In 1970–1971, he was also a consultant for GEOMINCO (Geological and Mining Company), performing marketing trips, mostly in the Near East.

Frustrated by the non-acceptance of his repeated proposals for modernisation (computerisation), Dudich left the Institute at the end of 1975 and became Research Fellow at the Laboratory of Geochemical Research of the Hungarian Academy of Sciences, and soon was Head of the Organic Geochemistry Section. In 1978, he obtained the C.Sc. of Earth Sciences (Lithostratigraphy and Geochemistry of Eocene formations). Then in 1981, he was invited to return to the Geological Institute of Hungary by its new Director, to become his Deputy. He supervised the laboratories and the documentation, as well as most of the Institute's international relations. From 1980, he taught Faciology at the Department of Geology of Budapest University, and in 1983 he was granted the title of Titular Reader.

In 1986, Dr Dudich was selected for the post of Secretary of the International Geological Correlation Programme (IGCP) of IUGS/UNESCO and for six years he worked in Paris, with the Department of Earth Sciences of the UNESCO Secretariat, co-ordinating some fifty ongoing projects worldwide. In September, 1992, he returned to Hungary and was charged with managing the Institute's external relations. He also took care of the international relations of the Hungarian Geological Society.

Dr Dudich retired in 1994, on his sixtieth birthday, but started to teach geology to students of environmental engineering at the Department of Earth Sciences of the Western Hungarian University in Sopron. He also held various offices in the Hungarian Geological Society, and since 2000 he has been first Vice President. Additionally, he was a member of numerous scientific commissions, and on the editorial boards of geological journals in Bratislava, Budapest, Ljubljana, and Zagreb. He has been elected Honorary Member of the Hungarian Geological Society, the Hungarian Society for Karst and Cave Research, the Serbian Geological Society, and Correspondent of the Geological Survey of Austria. In 1993, he was Foreign Vice President of the Geological Society of France, and 1993–1995 President of the Association of European Geological Societies.

Dr Dudich has undertaken scientific research in various fields. His achievements in the study of bauxites, and Eocene lithostratigraphy and sedimentology are represented by separate chapters of the publication. (At the meeting that he was presented with a memorial medal "For Bauxite Mining".)

He has also accomplished remarkable work in the history of geology (over eighty papers in this field). He has been a Member of INHIGEO since 1976, and was Secretary General from 1984 to 1989, editing its *Newsletter*. From 1997 to 2003 he was President of the Geohistorical Section of the Hungarian Geological Society, succeeding Dr Gábor Csiky.

Dr Dudich's contributions in the management of international geological co-operation has been particularly appreciated, an exceptional gift being his wide knowledge of languages. He passed state examination in ten languages, can translate ten additional European languages, and has 'played' with seven other languages (Albanian, Arabic, Dakotan, Finnish, Hebrew, Mongolian, and Turkish!). He has visited seventy countries on four continents, doing geological work in Canada, Cuba, Iran, and Mali. Dudich was also one of the 'fathers' of the Philosophical Circle, founded at the Geological Institute of Hungary in 1973, and has been active in the fields of natural philosophy and the history of philosophy.

Esperantists are also proud of Dr Dudich. He made translations into Esperanto from twenty languages (including poems of Rabindranath Tagore and Salvatore Quasimodo), and has published over twenty papers in Esperanto, including a popular science book on geology (1983) and a science-fiction novel *The Light Eaters* (2003). In 1994–1998 he was Vice President of the Esperanto Association of Hungary.

Dr Dudich's interest in the life and culture of the North American Indians materialised in his participation in the summer camps of Hungarian Indian hobbyists since 1974 (the 'Prairie Association' since 1990); and he compiled a concise grammar and dictionary of the Dakota language.

The exceptionally varied and polyvalent career of Endre Dudich fully justifies the title of the booklet. The celebration was characterised by the wide appreciation of the most important feature of his character: his constant willingness to help anybody who might need his help.

Presenting the life and *oeuvre* of our exceptionally talented colleague, we wish him good health and much energy to continue his activities to the benefit of all of us.

Teresa Póka, Budapest

World's First Biography of Mary Anning, Published in Japanese

Soji Yoshikawa and Michiko Yajima, *Mary Anning's Adventure: The Fossil Woman who Opened the Door to the Palaeontology of Giant Reptiles*, Asahi Shimbun (Newspaper & Publishing Company), Tokyo, 2003.

The book is a vivid biography of Mary Anning (1799–1847), a fossil collector who was born and lived in Lyme Regis on the coast of southern England (Dorsetshire). There she set up a small fossil shop with her mother after her father's death in 1810, and they drew their livelihood by selling such fossils as ichthyosaurs, plesiosaurs, ammonites, crinoids, and shells found in the high and steep cliffs along the coast and on the foreshore. Recent historical work has shown that she sent many letters describing these fossils and sold them to prominent geologists and palaeontologists, such as Everard Home, Gideon Mantell, William Buckland, Adam Sedgwick, William Conybeare, Roderick Murchison, Louis Agassiz, Richard Owen, Georges Cuvier, and others. Many excellent fossils displayed at the museums in the United Kingdom, France, the United States, and other countries have been confirmed to have been collected by Mary Anning sold to them. Some of the fossils were the first specimens of their type to be described, so she contributed greatly to the progress of palaeontology in the nineteenth century. But we cannot find her name in any of the reports, so her work not been described much until recently in the history of geology and palaeontology.

The stratigraphic column for the Phanerozoic era was being established in Great Britain and European countries during Mary Anning's period. Cuvier insisted on catastrophism in earth history, which some scholars criticised severely. Darwin's *Origin of Species* was published twelve years after her death. The geologists who are mentioned above contributed much to

geology and palaeontology and appear in the book, in which we can enjoy reading about the 'heroic age' of geology and palaeontology.

Mary found *Ichthyosaurus*, a large marine reptile, in 1812, and another type *Plesiosaurus* in 1823. They were the world's first discoveries of such types of creature. She found a *Pterodactylus* in 1828, the first specimen to be discovered in the United Kingdom. And she also found coprolites, and identified the sepia of belemnites with that of cuttlefish, making comparisons with the results of the dissection of modern specimens.

The letters to Anning's customers describing her specimens show her knowledge of fossils and their anatomies. For instance, in a letter to Adam Sedgwick, she showed fossil fish *Squaloraia* to be an intermediate species between ray and shark. We can appreciate her talent from her letter, with its sketch of *Squaloraia*, which is reproduced in the book.

Sometimes Anning made a fair amount of money, but at other times she was in straitened circumstances, as she had to spend money employing people to collect fossils from the steep slopes along the coast. However, friends and people in her neighbourhood sometimes gave financial support. A retired officer, T.J. Birch, donated money, and sold her fossils at auction. The three Misses Philpot, who lived in the neighbourhood, bought many fossils from Anning's shop, which were exhibited at Lyme Regis in the 'Philpot Museum'. Buckland, a popular professor of Oxford University, persuaded his friends to buy her fossils, as well as purchasing specimens himself.

In her late years, Anning suffered from breast cancer and drowned her pain by drinking alcohol and taking opium. Her friends and supporters tried to recommend her as an honorary member of the Geological Society of London, granting an annuity; but it was in vain. It may be a slight consolation, however, in that Sir Henry De la Beche, a President of the Society and long-standing friend of Mary Anning, gave a memorial address.

Some of Mary's letters, remittances, claims, receipts, and memoranda were found in Richard Owen's documents, which had been collected by William Cole, Earl of Enniskillen, an ichthyologist and an old friend of hers. They revealed the fossils collected by Mary Anning. Her life in youth was clarified by the discovery of Anna Maria Pinney's diary, in which the young Anna wrote of Mary's life in youth. Jane Austen wrote notes on Mary's father, Richard, a furniture maker. Charles Dickens recorded Mary's searches for fossils and her serious disease. Hugh Torrens, who has studied these materials and other data, has called her the greatest fossilist the world has ever known.

The first author, Soji Yoshikawa, is a writer and producer. Michiko Yajima was formerly a palaeontologist who majored in the field of ostracods but now specialises in studies in the history of geology and palaeontology. The book is the first biography of Mary Anning to be published anywhere in the world. Her life is written against the background of the social history of geology and palaeontology in the nineteenth century. In addition to paleontological and geological contributions of many scientists, we can also enjoy reading about their personalities and characters.

Yasumoto Suzuki, Tokyo

A Notable New Zealand Geologist's Recollections

Maxwell Gage and Simon Nathan, *A Geologist Remembers: Recollections of Fieldwork*, Geological Society of New Zealand Miscellaneous Publication 102, PO Box 303 Waikanae, New Zealand, 1999.

This small, attractively produced and well-illustrated book serves a dual role. First, it records fieldwork in New Zealand during the middle part of the twentieth century, a period when major advances were being made in understanding the country's fascinating and complicated geology. Second, it commemorates the achievements of Max Gage, an outstanding geologist and teacher.

Max was born in Auckland, New Zealand, on 2 February, 1913. After attending universities in that city and the capital Wellington, he joined the New Zealand Geological Survey in 1936. In 1947, Max joined the staff of Canterbury University College (now University of Canterbury) when Brian Mason resigned and left for the United States and ultimately the Smithsonian Institute. Brian's contribution to science is documented in *From Mountains to Meteorites* by Brian Mason and Simon Nathan (also reviewed in this *Newsletter*). While at Canterbury, Max developed an international reputation in Quaternary geology. He retired in 1974 and he and his wife spent sometime in Nelson where he wrote a textbook *Reading the Rocks* before moving to Hawkes Bay. He died in Napier on 1 June, 2000.

A Geologist Remembers primarily concerns Max's early career with the Geological Survey. Initially he obtained summer fieldwork, assisting in the mapping of the Wairarapa and Hawkes Bay districts on the east coast of the North Island and which had a full succession of sedimentary rocks ranging in age from late Early Cretaceous to Recent. The presence of oil and gas seeps suggested that commercial deposits of hydrocarbons might be present. However, the east coast is tectonically complex, with numerous faults and folds, the latter commonly with one limb, some containing rocks as young as Pleistocene, overturned or faulted out. One fault scarp records the Wairarapa Earthquake of 1855, which at M8.2 is New Zealand's largest documented earthquake. The east coast had been cleared of forest in the nineteenth century for sheep and cattle farming so it was relatively easy to traverse. This meant that geologists could concentrate on the rocks and Max received from the somewhat eccentric Mont Ongley (who later became Director of the Survey) a thorough grounding in mapping complex geology. It was not until the advent of plate tectonics that the east-coast rocks were recognised as imbricated fore-arc and deformed basin sediments of the Australian Plate that overlies, at about 20 km depth, the westward subducting Pacific Plate.

In 1936 Max was appointed to the Geological Survey and sent to Reefton on the South Island's West Coast. As the name suggests, Reefton had been the centre of a major gold producing area, but production from the reefs, in mountainous terrain composed of Ordovician greywackes, had declined markedly and many mines had closed. Being on the weather side of the Southern Alps, Reefton has a high rainfall and the steep precipitous slopes are covered in dense forest. Staying in old mining camps, Max, under the guidance of another eccentric senior survey geologist E. O. Macpherson, elucidated the relationship of the quartz reefs to the folded and cleaved greywackes. It was also a period of innovative investigation as pioneering geophysical methods were perfected and utilised. Max's work was to culminate in the NZ Geological Survey's Bulletin No. 48: *The Geology of the Reefton Quartz Lodes*, published in 1948.

Following this work, Max moved down the coast to the coal mining town and river port of Greymouth. In Greymouth he was to become part of a team of innovative, lateral-thinking Survey geologists who were to advance New Zealand's and the

world's understanding of such things as strike-slip faulting and using coal rank as a metamorphic or depth of burial indicator. The Greymouth Coal Field comprises two sets of coal measures: the Paparoa and Brunner, of Late Cretaceous and Eocene age respectively. The coal measures are draped over the southern end of the rising Paparoa Range and were covered in dense bush and cut by mountain torrents. Fieldwork was far from easy but with the onset of the Second World War the mapping of the coalfield became of strategic importance. From a scientific viewpoint, the Greymouth mapping showed that the West Coast coal measures, and more particularly the overlying marine sediments, accumulated in fault angle depressions that developed along normal faults. In the Middle Tertiary, movement was reversed and the coal measures and the marine rocks were elevated so that they now extend to the crest of the Paparoa Range. Consequently the higher-rank coals, that also form the thickest seams, were at the highest altitude.

By now Max was influencing and mentoring a number of geologists, including Harold Wellman, David Kear, George Grindley, Fred Bowen, and Pat Suggate, who were to gain prominence in the post war years in one of the golden eras of geological research in New Zealand. Wellman, a former land surveyor, joined the Survey in Greymouth in 1943 and was an enthusiastic 'ideas person', who gained inspiration from both the outstanding West Coast geology and the company of geologists like Max. Harold was to recognise that the great Alpine Fault, which runs the length of the South Island and has 480 km of dextral strike-slip movement. In 1945 Max returned to Wellington and wrote up his coal work in a monumental bulletin: *The Greymouth Coalfield*. Deservedly this work, published in 1952, formed the basis of his being awarded a DSc by Victoria University of Wellington.

In Wellington, Max was assigned to map the Oamaru area on the east coast of the South Island, which contains one of New Zealand's classic Middle Tertiary sequences. This area also has a good Late Pleistocene history, dominated by glacial outwash deposits. It was while completing fieldwork on what was to become *The Geology of the Waitaki Subdivision*, published in 1957 as Bulletin No. 55, that the opportunity arose for Max to enter university life and eventually become, from 1966–1974, Professor of Geology at Canterbury. However, it is probably fair to say that Max never really left the Geological Survey and his career at Canterbury lies beyond the scope of *A Geologist Remembers*.

The book is accompanied by a selection of the more than eight hundred photographs taken by Max during his geological career. This remarkable collection is now lodged in the Alexander Turnbull Library in Wellington. For those wishing to find more about geological mapping in New Zealand in the middle part of the twentieth century, and one of its leading geologists, then this easily readable and fascinating small book is worthy of attention.

Mike Johnston, Nelson, New Zealand*

New Zealander Makes Good in America—and on the Moon

Mason, Brian and Nathan, Simon. *From Mountains to Meteorites*, Geological Society of New Zealand Inc., 2001.

"This lecture opened up an entrancing new field of surpassing interest, one that had never been mentioned in my courses in chemistry and geology". Thus, does Brian Mason describe his response, as a fourth-year undergraduate student at Canterbury College in Christchurch, New Zealand, when he discovered Victor M. Goldschmidt's 1937 lecture to the Chemical Society of London entitled: 'The Principles of Distribution of the Chemical Elements in Minerals and Rocks'. Mason checked *Chemical Abstracts* for additional papers by Goldschmidt, but found that all but one were in German journals not available in New Zealand. The sole exception was 'Rare Elements in Coal Ashes', and Mason found it, too, to be fascinating. Geochemistry, he decided, would be the key to combining his interests in chemistry and geology. After taking his degree, Mason received a Graduate Fellowship in chemistry for two years of study overseas. He immediately broke the tradition of studying in England and wrote to Goldschmidt in Norway asking if he could come to his institute and do research in geochemistry. Goldschmidt replied that he had never had a student from the antipodes, and Mason would be very welcome.

This booklet is a brief autobiographical sketch in which Mason, in an anecdotal style, recounts the highlights of his life story. It was issued at the urging of Simon Nathan, a much more recent student at Canterbury College, who compiled it from several sources, including a series of articles in the Historical Studies Newsletter of the Geological Society of New Zealand, edited by Brian's brother, Alan Mason, a member of INHIGEO. Nathan also worked from four successive articles entitled: 'My Life with Meteorites', that Brian published in 1996–1997 in the journal *Meteorite!* (which subsequently dispensed with its exclamation point). And Nathan, himself, taped a lengthy interview with Brian in 2000, and corresponded regularly with him while he condensed and edited these materials into the current text. He notes in the Preface that the booklet neither was planned nor written as a continuous narrative. Never mind! Readers will find it to be an engrossing account of Brian Mason's adventuresome life and his pioneering role in helping to establish both geochemistry and cosmochemistry as the fundamentally important disciplines they are today.

Brian began his professional career in 1938, exploring for oil in a remote area of New Zealand's North Island. His assignment was to stay in the office while his boss explored the rivers by boat. Once the boat was built, his boss fell seriously ill, so, suddenly, Brian was leading an expedition with two Maori assistants (both older than he was) into territory he knew nothing about. They carried onions, potatoes, and rice, and a .22 rifle with which to shoot wild game for food. Four pages of extracts from Brian's diary, supplemented with snapshots, tell the riveting the story.

Things did not go according to plan in Norway, either. In November, 1939, Brian sailed to San Francisco and then rode buses to Washington and New York to see as much scenery as possible and to visit geologists en route to whom he carried introductions. His story provides glimpses of some of America's most distinguished geologists sharing sandwiches and reciting limericks with Brian, or having him to Christmas dinner. Finally, he sailed from New York to Bergen and rode a train to Oslo. On the morning after he arrived, he went to the Geological Museum and received a warm welcome from Goldschmidt, who introduced him to his staff and students, gave him an office, and assigned him his thesis topic: the geochemistry of tellurium. At noon, Goldschmidt took him home to share a steak that covered most of a kitchen table. "Mr. Mason" asked Goldschmidt, "you

* Mike Johnston was taught by Max Gage as an undergraduate at Canterbury University. His PhD thesis on the geology of the Wairarapa district dealt with the same rocks that Max examined when he obtained his induction into geological mapping in the North Island.

cannot tell me from what beast this steak has been cut?" Brian, responded that, yes, he could: it was a whale steak. This started him off on a very good footing with his professor. Goldschmidt could not have guessed that Brian spent his early childhood near Dunedin, on South Island, the first and last port-of-call of the Norwegian whaling fleet for its summer season in Antarctic waters.

Before Brian left home, World War II had begun in September, 1939, with the German blitzkrieg into Poland, but there was a lull in action that made it seem safe to go to Europe. By April, 1940, Brian had made a good start on his thesis research (and broken his leg in a skiing accident) when he woke up one day to see German planes flying low over Oslo. He ate breakfast, made sandwiches, and went out to cash a check: "You always can use food and money in a crisis". As he sat in the spring sun, a friend came by saying they must leave town immediately—the Germans were just down the road. Brian threw his gear into his friend's car and they drove northward. At Hamar, 100 km away, they stopped to consider their options: (1) drive to the west coast and try to get England somehow; (2) go to a friend's cottage in the mountains and wait a week or two until the British expelled the Germans; or (3) drive east to Sweden. All three options seemed so good (!) that they tossed a coin. Providentially, the coin sent them to Sweden.

The story traces Brian through his PhD thesis in Sweden, on a topic in classical mineralogy instead of geochemistry, and his marriage there. There was a surprise visit with Goldschmidt, who had been spirited to Sweden by the Norwegian underground. In August of 1943, Brian and his wife took a midnight flight at 17,000 feet in an unheated, unpressurised DC3 carrying ball-bearings from neutral Sweden to Scotland. It goes on to describe his employment at the British Museum in London until he was hired by the Dominion Laboratory of New Zealand set up an x-ray laboratory down there. He arrived in New Zealand long before the x-ray equipment did so he took a position as Lecturer at Canterbury College. There, he developed a diversity of laboratory and field courses despite wartime shortages of transportation.

In 1947 Brian accepted a professorship at Indiana University and moved to the United States where he remained for the rest of his career. He presented a graduate seminar in geochemistry, which caught the attention of John Wiley and Sons, who wished to publish it. "Who would buy such a book?", asked Brian, when so few universities offer geochemistry. "That's our problem", said Wiley, "You write it; we sell it". Brian's book, *Principles of Geochemistry*, published in 1952, was the first geochemistry textbook (as opposed to handbook) in English. It took American universities by storm as it introduced faculty members and students to this new approach to earth science. The book went through four editions and was translated into German, Russian, Japanese, and Portuguese.

The following year, 1953, Brian moved to New York to become the curator of Mineralogy at the American Museum of Natural History, with an adjunct professorship at Columbia University. At the Museum he found that the meteorite collection had been packed into boxes and trays and transferred from the Hayden Planetarium to his department. As he checked each specimen against the catalog, he was astonished to learn of the great range of meteorite species—including the first carbonaceous chondrites he ever had seen—and the unsatisfactory status of their characterisation. To set things right, Brian devised a rapid method of classifying chondrites by the refractive indices of their olivines. He outlines the method in the book. Anyone who has access to a petrographic microscope and a set of four index oils can use it. Brian began carrying the four oils wherever he traveled and wound up giving uniform classifications to meteorite collections around the world. In 1961, Brian visited the University of Tokyo as a Fulbright Professor and presented an advanced seminar on meteorites. He then worked up his course notes into the book, *Meteorites*, published a year later. Once again, his was the first textbook in English on this subject and it appeared just when it was needed, early in the Space Age. It helped to lay the foundations for the new science of cosmochemistry.

In 1965 Brian moved to the Smithsonian Institution in Washington. Among the major research projects he undertook was the collecting of specimens and mapping the strewn field of the remarkable Allende meteorite that showered more than two tons of fragments on northern Mexico in February, 1969. It proved to be a carbonaceous chondrite with prominent white calcium and aluminum-rich inclusions (CAIs) that appeared to have formed in the primeval solar nebula. The shower provided a wealth of research materials just as laboratories everywhere were testing new microanalytical techniques to use on the lunar samples, soon to be returned by the Apollo Missions. Brian published analyses of the strange mineral assemblages in CAIs and, eventually, working with S. Ross Taylor in Canberra, Australia, determined six different distribution patterns of rare-earth elements in them. He points out that the Allende meteorite truly served as cosmochemistry's Rosetta Stone.

In September, 1969, Brian focused on analysing the samples he received from the Moon. With his colleague, William Melson, he coauthored, *The Lunar Rocks*, one of the earliest books about them. His final big project began in the latter 1970s when U. S. teams in Antarctica began collecting meteorites from patches of bare ice and sending them to the same laboratory in Houston that had received the lunar rocks. The stones had to be classified and Brian volunteered for the job. He received the first chip taken of each one and made a thin section of it for visual examination. His classifications were strictly preliminary, so he did no serious research except on samples he officially requested after their descriptions were published by NASA. However, in the course of classifying some 7,000 thin sections he got a magnificent overview of the materials available, including the first meteorite from the Moon to be recognised on the Earth.

Brian officially retired in 1984, but has since written a biography of V.M. Goldschmidt, collaborated on a mineralogy text, and carried on field work in Australia and New Zealand. He also has established a Trust Fund for support of research by the staff and students of Canterbury College. The book is rich in illustrations, mostly Brian's snapshots and map sections. It includes insets with quotations on various subjects, two pages of end-notes, and one listing selected items from his bibliography. It would be difficult to imagine where a reader could find a more fascinating account of a life history in so modestly-sized a book.

Ursula B. Marvin, Cambridge (Mass)

An Institution for the Teaching of Geology in New Zealand

A.G. Hocken, *Geology at the University of Otago: The First 100 Years*, New Zealand Geological Society, Miscellaneous Publication No. 115.

The Geology Department at the University of Otago, Dunedin, New Zealand, has long been a distinguished centre for teaching and research. To celebrate its first 100 years, the New Zealand Geological Society has published a book in quarto format by A.G. Hocken, fully referenced and with a number of illustrations.

The University Council decided to advertise for candidates for an inaugural chair in November 1869, with preference for a position in Natural Sciences—not surprising, given the importance of gold in the province. Dr Gow Black from Edinburgh began classes in 1872, covering chemistry, geology, and mineralogy. In 1874, Captain F.W. Hutton was appointed to assist. Hutton was a well-born Englishman, who served as a captain in the army in India and the Crimea. He was a largely self-taught scientist, but made significant contributions to New Zealand geology and palaeontology. He assumed the Chair of Natural Science at Otago in 1877, allowing Black to become Professor of Chemistry, and continue to conduct an analytical laboratory, servicing the mining industry. In those days, Hutton's salary was £600 a year. His students, numbering only a handful each year, took geology as amongst nine options, with Latin and Mathematics compulsory for all. Students wrote their examination papers, which were then mailed to England for marking—apparently institutions in New Zealand or Australia were not deemed good enough. This practice continued until the Second World War (1939–1945)!

Hutton moved to Christchurch as Professor in 1880. During the seventies, a School of Mines had been established in Otago, for which a very experienced Prussian, G.H.F. Ulrich, was head-hunted from the mining school of the University of Melbourne. Ulrich described ores and minerals important for gold, copper, antimony, and mercury, and, until his death in 1900, he oversaw the graduation of some excellent students. He had to struggle against the views of a skilled and populist politician, Dick Seddon, who was first Minister of Mines and then Prime Minister. Seddon did not believe that mining and geology should be taught in the hallowed halls of an ivory tower. He wanted men at the coal face—literally—to get a geological education.

James Park from Scotland, with only a year's formal training in geology, then became Director of the Otago School of Mines. He was very active in the pragmatics of mining, and diverse aspects of geology, which he pursued with both skill and public acclaim. One of his colleagues was Patrick Marshall, who had a degree in geology from Canterbury, and studied under Ulrich. Marshall was promoted to the inaugural Chair of Geology in 1908. He made a significant impact in many spheres of earth science, and was first to recognise the "Marshall Line": that line of volcanoes that defines the structural boundary of the western Pacific basin. Another distinction was his coining of the term 'ignimbrite' for consolidated *nuée ardente*. Despite his distinguished research, Marshall seems to have had ongoing battles with the University Council. He argued over geological matters with Park, considered he did not receive fair salary increase, and after he left in 1916, was denied any subsequent recognition by the University, though at the time of his death the University Council found "great pleasure" in belatedly conferring an honorary Doctorate of Science.

The continuing history of the department is faithfully recorded, with details of curricula, and synopsis of the many illustrious staff, such as W.N. Benson (1917–1949), N.E. Odell, F.J. Turner, C.O. Hutton, W.S. Fyfe, D.S. Coombs, and current and recent staff, including a marvellous photo of Richard Norris demonstrating the travails of fieldwork by perching on the hood of a field-vehicle half submerged in a river.

Hocken summarises his study: "It has been a demonstrably successful academic Department, emerging from the pragmatics of a colonial mining school". And indeed, as he concluded, the good work has continued.

Bruce Waterhouse, Oamaru, New Zealand

Truth as Strange as Fiction?

Doyle, Arthur Conan (edited and introduced by John Lavas), *The Lost World*, Collector's Anniversary Edition, Auckland, 2002 (available from John R. Lavas, PO Box 14–421, Panmure, Auckland 6, New Zealand; dearborn@ihug.co.nz).

It is ninety-two years since Doyle's classic novel was published and became a seminal work of the then relatively new genre of scientific fantasy. Although predecessors such as Verne and Wells had touched on animals of the prehistoric world, this was the first major work in English to take advantage of the growing body of palaeontological information and bring some of it to life for a lay audience. Eclipsed in popular view by his Sherlock Holmes stories, and in Doyle's own more serious historical fictions, *The Lost World* has nevertheless maintained an enthusiastic following among those children and adults who dream of what it would be like to encounter extinct animals in life. The book has been filmed many times, and 'pastiche'd', parodied, or brought up to date (depending on the view of the observer) in Crichton's books about dinosaurs and the movies based on them. It is no accident that the second of these unashamedly adopts Doyle's title—or, one commentator has put it: "Crichton paid his respects by appropriating his predecessor's title" (Desalle & Lindley, 1997).

The story is surely familiar to many in the earth science field—the young reporter Malone who blunders his way onto an international expedition, sent to ascertain the truth of Professor Challenger's reports of his travels in South America, the ill-assorted travellers being led by sportsman Sir John Roxton and the cynical Professor Summerlee. The expedition gets stranded on a plateau that turns out to be a home to dinosaurs and other reptiles, ape-men, and Indians, but after various adventures the group escape with their lives. In the finale, Challenger astounds a meeting of a London learned society by producing a live pterodactyl.

Writer/editor/illustrator John Lavas may also be known to INHIGEO members for his publications on the history of dinosaur hunting in Asia, including *Dragons from the Dunes* (Lavas 1993) and a chapter in *The Complete Dinosaur* (Farlow & Brett-Surman, 1997). He has put much care into the present edition. Hard-covered in landscape format, the familiar story occupies the second part of the book. Of unique value is a fifty-seven-page introduction that describes much of the literary, scientific, and historical background to the book—another 'lost world', as Zofia Kielan-Jaworowska points out in an appreciation. The work is abundantly illustrated by eighty-two photographs, paintings, maps, and drawings. Some of the illustrations are by the Czech painter of prehistory, Zdenek Burian, but many of the drawings are by Lavas himself.

The historical introduction contains the material that will be most interesting to scientific historians. An opening chapter discusses Doyle's education and career, and his twin passions of science (through his medical training) and fiction—his first contributions to both fields were published in the same month in 1879. Chapter 2 discusses selected scientific explorers, particularly of South America. Lavas shows that Doyle drew particularly from Wallace and Bates, both in the atmosphere of tropical travel and with regard to the scientific ideas that informed their search. However, another well-known South American traveller, Waterton, is not discussed here even though he went to the college later attended by Doyle. Chapter 3 presents a more detailed study of the exploration of the Roraima area, initially sighted by the German botanist Schomburgk and subsequently

climbed by a British expedition funded by three British scientific societies and including another botanist, Im Thurn, one of whose lectures was perhaps attended by Doyle.

Chapter 4 presents Doyle's fictional and factual brushes with prehistory and explains how his own experiences could have led to his writing *The Lost World*. In 1910, Doyle published a fictional adumbration of the book in his short story *The Terror of Blue John Gap*, in which a mysterious monster inhabiting a Derbyshire cave was considered to be a cave bear surviving from the Pleistocene. By this time, Doyle had already found dinosaur footprints in Sussex and was in correspondence about them with Arthur Smith Woodward of the British Museum. Doyle had casts of the tracks made and later featured them on the cover of a special edition of *The Lost World*.

I have always felt that Thomas Henry Huxley's love of controversy was one of the roots of Professor Challenger's ebullient character. Lavas plausibly suggests that the latter's name came from the *Challenger* oceanographic expedition. He also finds Doyle's character sources in William Rutherford (Doyle's instructor in physiology at Edinburgh University), George Budd (a doctor with whom Doyle shared a practice), and zoologist E. Ray Lankester of the British Museum, whose *Extinct Animals* of 1905 was one of the first popular books on fossil vertebrates, and one that provided information for Doyle. Professor Summerlee is less clearly 'identifiable', though three Edinburgh medical professors are suggested. Roxton is linked to the journalist Edmund Morel and to Roger Casement, both of whom laboured to end the slavery of peoples in the Congo, while Casement was also active in similar efforts in South America. Devotees of the novel will remember that it was Roxton's similar history that led to the party being stranded on the plateau. Both Morel and Casement were known personally to Doyle, who was active in the defence of the latter against the treason charges that ended his life. Another influence was Colonel Fawcett, notable for his zoological tall tales, such as a claimed sixty-two-foot anaconda.

It was just such reports—some real, some imagined—that fuelled the interest in strange animals in remote parts of the world a century ago. Lavas reminds us that the Siberian brown bear, the long-haired mountain gorilla, the okapi, the mountain nyala, the pygmy hippopotamus, and the Komodo dragon were all discoveries of the turn of the century. Lankester retired about the time Doyle began work on the book and Lavas shows, through their correspondence, how Lankester suggested specific animals that could inhabit his 'lost world'. The species chosen were well-known at the time, being drawn chiefly from Britain and South America. Doyle himself anticipated scientific discovery, for instance in his featuring of pterosaurs, remains of which were subsequently found in 1970 on another plateau in the region where his novel was set. Indeed, Doyle's role in popularising palaeontology has been acknowledged by the naming of one of the new pterosaurs *Arthurdactylus conan-doylei*.

Doyle originally presented his book as a quasi-scientific report. But it has also been suggested that Doyle was involved in a real scientific hoax, and Lavas presents an intriguing chapter on the Piltown forgery and the case for and against Doyle's involvement. From "circumstantial evidence and . . . the timing of the discovery", suggests Lavas, "it appears quite possible that the creator of the world's greatest detective character did have a hand in one of the most perplexing scientific frauds of the 20th century".

After publication, Doyle's book was welcomed by both children and adults. A University of Pennsylvania expedition was said in the press to be seeking the Lost World, though there is no evidence that this claim was made by the University. Nevertheless, *The Lost World* (and the movies based on it) has been an inspiration that encouraged a fair number of boys (and girls?) to become palaeontologists, and has retained a fond following in the profession. As an example, INHIGEO Member Philip Taquet describes being led to an African site where several dinosaur skeletons were exposed. "Leaping from the car", he says, "my heart pounding, I headed towards the best preserved of them. I had the exhilarating feeling of being in the skin of Professor Challenger in Conan Doyle's famous novel *The Lost World* as he discovered a herd of living Iguanodons in the heart of the Amazonian Forest" (Taquet, 1998). Others, such as Ray Bradbury and Canadian science writer Wayne Grady, have been similarly inspired to write about extinct animals (Grady, 2000).

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David Spalding, Pender Island, British Columbia

Falcogens: A Large-scale History of Large-scale Geological Phenomena

A.M.C. Şengör, *The Large-Wavelength Deformations of the Lithosphere: Materials for a History of the Evolution of Thought from the Earliest Times to Plate Tectonics*, The Geological Society of America Memoir No. 196, Boulder, 2003.

Our colleague Celâl Şengör from Istanbul has produced another truly remarkable book—which, as he tells the reader, grew rapidly from an initial paper into a massive tome. Just as Cuvier liked the idea of 'bursting the limits of time', so Professor Şengör has again 'burst the limits of a paper'!

Knowing where he is domiciled, one might think that Şengör would be writing on the history of some aspect of Alpine or Mediterranean geology, Asia, or the Near East. And of course he does do that to an extent in this book (especially in relation to the ancient world), but readers may be greatly surprised to discover that the text has chiefly (as far as detail is concerned) to do with the history of geology in the United States; for in large measure it is the result of a period of study-leave at the California Institute of Technology. We can only be astonished that such a massive tome could be produced in a relatively short space of time, though I doubt not that the general theme has been maturing in the author's mind for many years. And it is concerned with the history of tectonic theory, which is one of the author's (many!) specialities.

It has, needless to say, been a long-term problem for geologists to account for the uplift of mountains. By comparison, their 'decay' by weathering and erosion is a simple matter to understand. The 'craters of elevation' theorists of the early nineteenth century had the idea of 'blisters' appearing on the earth's surface due to volcanic action (and perhaps they have their modern counterparts in 'underplating' theorists?). For Élie de Beaumont and Suess, mountains were formed by crumplings of the earth's crust as it cooled and contracted. Hutton, Lyell, and Darwin had essentially random elevations and subsidences, but the *verae causae* of these were implausible or left unstated. Geosyncline theories followed (but see below). However, the cause of the change-over from subsidence and sedimentation in geosynclinal troughs to mountain formation was always difficult to comprehend (at least in the version that was expounded to this reviewer in undergraduate lectures in the 1950s). Modern plate-tectonic theory thinks it has the answers, supplementing the early versions of that theory with ideas about 'plumes'.

But even today most theories or theorists don't tell us much about the elevation of huge, and often quite high, plateau areas, where the strata are only very gently folded, or may appear horizontal at first glance. The strata around the Grand Canyon provide a paradigm example. How can such vast subsidence and subsequent uplift have occurred, with so little folding or disruption of the strata? How can there be these 'large wave-length deformations of the lithosphere'? This is a substantial problem for those interested in tectonics, and Professor Şengör tackles it in his characteristic fashion by tracing the whole history of the problem—though in the present case giving special attention to North America. Thus the stage is set.

Changing the metaphor, soon after setting sail on or in his book, Şengör proposes two new terms for the geological literature. He finds that the old terms 'epeirogeny', 'orogeny', and 'diastrophism' have become somewhat imprecise, being "loaded with all sorts of contradictory tectonic interpretations" (p. 5); and so he proposes the words *falcogenic* or *falcogens* to refer to long wave-length structures (from the Greek word *φάληξ*—or the bent rib of a ship—indicating bending of strata without fracture); and *copeogenic* or *copeogens* (from *κοπή*—meaning cut up/slaughtered—indicating small wave-length fractured or faulted strata). So intra-plate deformation is generally falcogenic, while plate boundaries typically exhibit copeogenic structures. The great plateau of the Grand Canyon is thus a falcogen; and Şengör's appointed task is to trace the history of ideas about falcogenic structures. I like the new terminology, and hope and trust that it will find its way into the literature and stay there (without becoming loaded with all sorts of contradictory interpretations!).

Well, in Şengör's style, to find out *all* that can be known concerning the history of ideas about falcogenic structures, readers are carried back as far as historical records can take us: to Sumerian, Akkadian, Judaic, and Grecian myths, which are carefully tabulated in chronological order, and set out in such a way that the elements of the different myths can be correlated with one another. Not only that, a huge supporting array of documentation is provided—which continues through the book, so that it ends up with no less than forty-two pages of comprehensive bibliography plus thirty-seven detailed pages of notes. On mentioning any topic, Şengör is not content with a supporting reference or two, but provides information about *all* the relevant secondary literature (or so it seems to this overawed reviewer). (In this regard, I am reminded of Michel Foucault's remarks about 'pre-Classical' or Renaissance scholarly work: an object was not just named or described, but all the things that had ever been said about the object were also stated, as if *they* were part of the object's 'nature'.) Yet, for all this, Şengör's book is not heavy reading, for the scholarly apparatus is mostly shipped off into the bibliography and notes, so that we simply have the name/date/page system of referencing, which does not clutter the text unduly. And he has a light touch with words.

So we have a grand history of theories of mountain building from earliest times almost through to the present. If you want to know how Descartes' theory worked, or Hall's, or Suess's, or Gilbert's, or Holmes', . . . this book will tell you what you need to know. This we might properly expect from Şengör. But I was astonished to find also a really detailed account of the history of geographical and geological exploration in the American West, with maps showing explorers' routes, along with numerous pictures from primary sources of the places where they went, and reproductions of their beautiful maps and sections (some so large that they have had to be 'pocketed' at the back of the book); also diagrams illustrating the 'mechanics' of some of the theories. The whole is another Şengör's *tour de force*!

I shall not try to describe all the details of this remarkable book, but I do feel moved to make some comments about the degrees of attention allocated to different topics. In particular, there is a lengthy exposition of the very early explorations and geographical work of the Spaniards. As Şengör has pointed out to me in correspondence, he put all this in because it is rather little known to historians of geology, and it is highly interesting material. Indeed it is, but it is not directly relevant to theoretical ideas about 'falcogens', or even their history. Father Escalante (after whom the Escalante Canyon—down which I once had the pleasure of walking—is named) did not, so far as I know, have significant theoretical thoughts about the causal origins of the mountain ranges through which he travelled. On the other hand, Şengör informs us that the early Spanish geographical data were earnestly perused by von Humboldt and used in his compilation of his map: *Carte de Mexique & des pays limitrophes située au nord et à l'est* (1811), which contained sufficient information to reveal the general outlines of the plateau areas of the Spanish/American West, thereby setting the geographical frame for the subsequent geological work.

Even so, I venture to suggest that the bulk of the Spanish material could have been omitted in favour of a considerably more detailed exposition of the history of plate tectonics and plume theory, which are now represented as providing explanations of the occurrence of falcogens. Chapter 15 (entitled 'J. Tuzo Wilson and the Mantle Plumes') offers only two pages—and there is only about one page of actual text! I raised this issue with Şengör in correspondence and he responded that he thought that such matters were generally well known. That may be so, but I think nevertheless that if all the attention lavished on the Spanish explorers had given way to even a relatively brief historical account of plume theory, then we should have a more useful book.

And let me carp a little further! One of the striking claims of the book is that there is a tectonic theory lying hidden in the text of Aristotle's *Meteorologica*. This was of special interest to me in relation to some work that I am currently doing on the history of cyclic theories in geology. As is well known, *Meteorologica* described the hydrological cycle, though he thought it was driven by the cycle of the seasons rather than daily weather activity. Aristotle accepted the ancient idea of the earth being porous, or having internal cavities and passages. Water could travel through these passages, thus accounting for the fact that the Aral and Caspian seas (for example) had rivers entering, but not exiting. Aristotle also thought that winds could blow through the internal passages, from time to time, causing earthquakes. Additionally, he accepted the evidence that dry land could be inundated, or seas be infilled by sediments, at least locally. Such changes are so slow that they would be forgotten over many generations. But they supposedly occurred in an "orderly cycle".

So deposition of sediment at place *A* could cause a marine transgression at some other locality (*B*). But if the rivers dry up at *A*, then the sediment there deposited may subsequently be inundated by the sea level rise caused by sedimentation elsewhere (*B* or *C*?). If such a process continues on a large scale over a great length of time, then the positions of the seas might 'wander'. Such changes could be driven by climatic changes occurring in different parts of the world. Additionally, Aristotle seemed to suggest that earthquakes are most severe near coasts, as the sea might drive escaping wind back into the earth, causing greater stresses.

Further, Aristotle distinguished between the earth's dry and moist exhalations. The latter were involved in the formation of rain, while the former were supposedly involved in the earth's internal winds, which caused earthquakes. Earthquakes were thought to be more severe where the sea currents were strongest and the earth below was hollow or porous. It was claimed that winds burst out of the earth when violent volcanic eruptions occurred and the "percussion" (friction?) caused the production of heat. If the wind causing an earthquake is opposed by one blowing over the sea, then a tidal-wave could be produced. So earthquakes were also supposed to be linked to periods of heavy rain or drought. If the earth's pores are filled with water there will necessarily be increased moist exhalation. Winds are supposedly strongest in drought periods.

On the basis of such considerations Şengör has proposed a general cyclic *tectonic* model for Aristotle, for which he provides a diagrammatic representation. A region subjected to heavy rain will have its pores filled with water, and there will be elevation of the land. An adjacent basin can develop, with closed pores due to a former period of drought and land collapse. This basin can come to be occupied by the sea, as heavy rain begins to fall in that area, which will then begin to swell and become elevated by the filling of the pores. By then, the former high land will be subsiding through the loss of water from its pores, due to exhalation, evaporation, and run-off. Thus there will be a kind of cyclic see-saw effect, involving the raising and lowering two adjacent areas. Earthquakes and volcanoes are concentrated in the region between the two.

So far as I know, Şengör offers the first attempt to develop an interpretation of the *Meteorologica* that yields an unending sequence of tectonic movements, with associated interchanges of land and sea. But while it is possible that Aristotle had some such theory in mind, or would have liked to develop one, we are, I think, offered an overly imaginative reading of the text and I am not convinced that Aristotle's theory of earthquakes and climatic changes, and interchanges of land and sea, can be so closely linked as Şengör suggests. He has told me, in his Popperian way, that his reading of Aristotle is based on an overall view of the text, and should be regarded as an hypothesis, subject to appropriate criticism and perhaps refutation. But this can hardly be done in such a case. We are engaged in hermeneutics, not empirical science, and it is hard indeed to *falsify* an interpretation, unless one can find contrary text (which I cannot do, as I have no access to possibly lost texts of Aristotle). I can merely say that the interpretation seems to run beyond the textual evidence in *Meteorologica*.

I apologise to the reader for concentrating so much on one issue. Let me in recompense, describe another important issue in the book, namely a discussion of ideas in the early work of Élie de Beaumont that 'presaged' the later geosyncline theory usually associated with the names of Hall and Dana, in what INHIGEO Member Robert Dott has called a 'made in America' concept. Şengör draws our attention to work done by Élie de Beaumont in the late 1820s, in which he noticed very thick deposits of sediments in the Alps, partly metamorphosed, which appeared, on palaeontological evidence, to have similar, but much less thick and unmetamorphosed, counterparts in the less elevated parts of France. This was accounted for in terms of the ideas that Élie de Beaumont then had about the early history of the earth. He thought that while young it had a very thin crust overlying a molten interior; but already at that early stage there were living organisms around, which were being deposited in shallow water sediments. But with the very thin crust, parts of it might begin to sink forming hollows that might fill up with sediments at about the same rate as the downwarping occurred. The lower portions of these sediments could approach the earth's hot interior and would thus (as we would say) be metamorphosed. Later, the earth would begin to cool and contract in its interior—and, as developed in Élie de Beaumont's somewhat later theorising, the resultant crumpling of the strata could result in uplift. With the cooling, the crust would thicken, and consequently metamorphism would not occur so readily at the bottom of basins. So later metamorphism would be that associated with igneous intrusions (in the formation of metamorphic aureoles, as we would say). Thus the 'style' of metamorphism was different for ancient and more recent strata. Şengör points out that such a misapprehension persisted well into the second half of the twentieth century.

But leaving that aside, we can (with Şengör's provided information) remark that Élie de Beaumont had a theory—stated early on in a usually overlooked footnote to a paper of 1829—whereby sediment basins could form, accumulate large thicknesses of sediment, and then be inverted to form "ridges and diverse tumescences". There do not seem to have been any statements about the trench-like form of the sediment basins. Nevertheless, one can argue that important elements of geosyncline theory were adumbrated by Élie de Beaumont well before the writings of the American geosyncline theorists. Şengör tells us that the Frenchman's theory, which was further developed in publications of 1848 and 1852 and taken up by Continental theorists such as Carl Bernhard von Cotta (1850, index: "Alps, once a basin"), was "imported to America" and "re-exported back to Europe". But that does not, in itself, show that the American geosyncline theorists derived their ideas from European sources. They could just as well have arrived at them independently, though the 'made in America' label should doubtless receive reconsideration.

One could pursue many further such interesting issues. But the book is so replete with fascinating and persuasive information that I have been forced to focus on just a couple of interesting and original features. I may, however, be permitted to add that the book suffers from what I call the 'Leibniz syndrome'. Leibniz, it will be remembered, was asked to write a history of a part of Europe, which would demonstrate the territorial claims of his aristocratic patron and employer. So he went back, and back, . . . and back, until he wrote a history of the origin of the earth, and the historical task he was supposed to perform didn't get done. PhD students are sometimes affected by this syndrome. (I know I was!) And I fear that there are symptoms of it in Şengör's book too. We would like to know in detail how plume theory came about and how it may explain tectonic phenomena. We have all the antecedent history, but the all-important dénouement is (for me) missing. I am sad!

David Oldroyd, Sydney

(This review will also appear in *Episodes* in a slightly modified version.)

A Record of Debates at the Geological Society of London in the 'Heroic' Period of the History of Geology

John C. Thackray (ed.), *To See the Fellows Fight: Eye Witness Accounts of Meetings of the Geological Society of London and its Club, 1822–1868*, The British Society for the History of Science, Monograph No. 12, Stanford-in-the-Vale, 2003.

John Thackray, former archivist to the British Museum of Natural History and the Geological Society of London, and a loyal supporter of INHIGEO, died at a relatively early age in 1999, mourned by many. Students of the history of geology who make use of the Geological Society's archives will find a very large quantity of manuscripts, all in good order, meticulously conserved by him, and recognisable by his distinctive clear handwriting on the folders or envelopes in which the documents are contained. We all owe him a great debt for his painstaking work.

At his death, John left behind a typescript, which has subsequently been electronically scanned and thereby transformed into the book noticed here. The necessary posthumous editorial work has been undertaken by his erstwhile friends Janet Browne, James Secord, and Hugh Torrens, and the technical task of preparing the book from the typescript has been performed by Peter Wigley and Geoffrey Bennett on behalf of the British Society.

Geology in the nineteenth century is notorious (or celebrated) for the occurrence of a number of significant controversies, several of which have attracted close attention from historians of science. The 'Geol. Soc.' was the main social focus for these debates, where papers were presented and vigorously discussed at its meetings. Discussions were often pursued in correspondence after the meetings, as they might be today by telephone or email. Thackray took the trouble to comb through twenty-three archives of leading GS Fellows, to find passages in correspondence relating to Society's meetings and debates. His transcriptions of these texts now become conveniently available in *To See the Fellows Fight*. There must necessarily be other relevant material in other archives. Even so, what is now published provides a wealth of useful information for future geohistorians interested in the heroic period of British geology.

This is not a book that anyone will be likely to sit down and read. Rather, it will serve as an invaluable 'source book', which provides a valuable glimpse into the manner in which the GS conducted its affairs, and the way in which issues were debated. The short subject index quickly reveals the topics that were exciting chief attention: the Cambrian–Silurian question; the Devonian Controversy; diluvialism, denudation—and then glacial theory; fossils (especially fossil reptiles); the Highland(s) Controversy and other aspects of Scottish geology; and volcanoes. The name index gives rapid access to the contributions of individual geologists (the members of the 'core set' being easily identifiable by the number of references they receive); and there is a good bibliography of the relevant secondary literature. The volume will probably only have a fairly small use in terms of 'page-turnings' per year, but it will be utilised, nevertheless, for many years into the future. It is highly satisfactory to INHIGEO that John Thackray's work is preserved and made readily available for future application. I should like to record here my thanks to John for the many times he assisted me when I happened to be working in London.*

David Oldroyd, Sydney

At last! A Thoroughgoing History of Igneous Petrology

Davis A. Young, *Mind over Magma: The Story of Igneous Petrology*. Princeton: Princeton University Press, 2003.

Professor Davis Young is the first person to have written a comprehensive history of igneous petrology, from antiquity to the end of the twentieth century. It is, in a way, analogous to von Zittel's classic *History of Geology and Palaeontology in the Nineteenth Century* (English edn, 1901). That is, it is accurate, broadly comprehensive, and written largely from an internalist perspective.

It may seem surprising that this major topic has remained neglected for so long. But the field is so vast and complex that it cannot be undertaken by anyone who has not spent a lifetime in the field. There have been scholars such as the Australian petrologist Thomas Vallance or the American experimental petrologist Hatten Yoder who could have tackled the task. But Vallance's talents were diverted into the history of Australian geology and he died relatively young. Yoder, too, has now passed away, and though he knew all about Young's topic he did not get further than writing his brief 'Timetable of Petrology' (1993) and a relatively brief account of the early history of work at the Geophysical Laboratory, Washington, where so much experimental work was undertaken, particularly by Norman Bowen, for whom Young has previously written a biography (1998).

Young's task is greatly magnified by the problem of languages. Much petrological work was written in German, French, and Russian, and to some extent in Japanese. A historian of the field must grapple with at least French and German (and Russian would be an advantage). In fact, there's an old Russian text on the history of petrology by F.Y. Loewinson-Lessing (English translation, 1954), but it was written from a scientific perspective that was even then rather dated; so the book did not serve as a successful precursor to putative histories of petrology by anglophone historians. Young has battled with the French and German, but that still leaves much relevant literature only accessible through secondary sources. However, he has surveyed a vast amount of secondary literature in the form of small-scale studies (probably *all* the relevant material available in English) and provides an account that successfully covers the broad sweep of the enormous field.

Young starts at the 'beginning': with ideas about volcanoes in the ancient world. From there he proceeds through the historiographically well charted territory of the Vulcanist/Neptunist controversy: Hutton/Werner and such. Thereafter, however, the going gets increasingly difficult for the scientists concerned, the historian, and the readers of Young's *magnum opus*. The scientific problems were essentially twofold. There's a vast number of different igneous rock-types, differing in chemical composition and texture. What is the *cause* of this diversity, and *how* are they to be classified (the latter problem forming the basis of the science of petrography)?

Igneous *diversity* is, then, one of the main foci of Young's attention, both in *Mind over Magma*, and in his earlier publications. Petrographic classification provides problems quite different from those in biology, ethnography, linguistics, etc. For the most part, igneous rocks are not related to one another genetically or evolutionarily. Thus they are not amenable to cladistic analysis. One can, moreover, find rocks of similar appearance with differing chemical composition; or rocks that have different appearances but similar chemical compositions. There is also the problem of customary usage. Old names such as basalt, granite, gabbro, etc., may need to be retained though it may be difficult to fit them into more fine-grained taxonomic

* This is a modified version of a book notice that is also appearing in *Metascience*. I thank the editor Stephen French for permission to use it here.

systems. For such reasons, philosophers discoursing on problems of classification (wisely) steer clear of igneous petrology. I don't recall any text that chooses this science to illustrate taxonomic conundrums. The leading text on the philosophy of geoscience (Engelhardt and Zimmerman, *Theory of Earth Science*, 1988) prudently discussed *sedimentary* petrology when considering taxonomic issues.

Matters were made worse by the fact that different authors developed quite different taxonomic systems, so that students of different teachers or schools learnt different systems. For myself, I was brought up in the 1950s on Alfred Harker's texts, blissfully unaware that there was almost as much diversity among igneous rock classifications as there is among igneous rocks themselves. I don't know how I would have survived if I'd tried to proceed to advanced work in this field. A text such as Young's would have been a wonderful crutch. But none such existed in those days.

So taxonomy is one of the main issues in *Mind over Magma*, which explains how things were eventually sorted out (more or less) in the 1970s by the International Union of Geological Science's Sub-Commission on the Systematics of Igneous Rocks. Young discusses its work and explains how it was preceded by the efforts of Albert Streckeison, who devised his own system, and in publishing it posed fifteen questions, to which he gave his own preferred answers; and invited comments. He received about eighty responses, and in this way the petrological community began to put its house in order, achieving a reasonable taxonomic consensus. It was a *social* process. Igneous rock classifications are not 'out there' waiting to be discovered: they are *constructed*.

But long before all this happened there was the old problem of the origin of granite, which entailed a lengthy dispute between 'neo-Vulcanists' and 'neo-Neptunists'. Linked to this was the nineteenth-century Continental geologists' liking for classifications based on the ages of rocks, along with texture and chemical composition: it was supposed that igneous activity generated different rock-types at different epochs. Thus (supposedly) there could be a kind of stratigraphy based on igneous rock types. This fallacy took a long time to die; and Young ably describes its long and painful demise.

Many people have supposed that geologists were thinking strangely in believing that granite (made of quartz, feldspar, and mica) could crystallise in some way from aqueous solutions, given that the rock is insoluble in water. The Huttonians had to be right! But, Young shows, things were not so simple. Quartz has a higher melting/freezing point than feldspars. So if granite were formed from a cooling melt "well-formed crystals of quartz should have imposed their faces on the form of subsequent[ly crystallising] feldspar rather than the other way round" (p. 82). This textural argument was difficult to counter, and it was advocated by a number of investigators, notably Theodor Scheerer (1847).

The old arguments were rehearsed in the twentieth century, the principal protagonists being Norman Bowen of the Geophysical Laboratory, Washington, and Herbert Read at Imperial College, London. Bowen and his co-workers had begun to determine experimentally what was going on in melts as they cooled and crystallised. The compositions of hot mixtures at different temperatures (and later at pressures) could be ascertained by the *sudden* cooling of samples and the chemical and mineralogical analysis of the 'quenched' samples. Hence the phase-equilibria of systems could be studied empirically. This provided the road to Bowen's famous 'reaction series', according to which, on cooling, even basic ('basaltic') melts might—after the settling out of various crystal types—yield material of granitic (acidic) composition. (The initially crystallising material could react again with the remaining fluid as cooling proceeded.)

Against Bowen *et al.* were Read and his London supporters, various Scandinavian geologists, and to some extent Arthur Holmes in Durham and Edinburgh, and his wife Doris Reynolds. They were all impressed by what they could *see in the rocks*, especially those exposed on the glacially polished Scandinavian coasts, the appearance of which suggested a 'granitisation' process occurring by the penetration of hot, water-bearing fluids, fluids between the layers of previously deposited rocks—the process known as 'migmatism' or 'metasomatism'. It was, then, in the contest between the 'magmatists' and 'migmatists' that Read uttered his famous aphorism: 'the best geologist is the one who has seen the most rocks'. The controversy had become one between the empiricist field geologists and the empiricist laboratory experimentalists.

The petrological 'core-set' eventually deemed that, for granite at least, the battle was won by the magmatists in a famous memoir by Tuttle and Bowen (1958) on their study of the albite—orthoclase—quartz—water system. Given the importance of this publication, I think Young could have explained its arguments in greater detail. (But he did this in his Bowen biography.)

Bowen's ideas can, in a sense, be traced back to Darwin's idea that the crystals first forming from a cooling melt will tend to fall to the lower part of the molten magma, in a process of 'gravity settling', so that when solidification is complete the compositions of the upper and lower parts of the igneous body differ. This principle was developed in the second half of the twentieth century, especially by Laurence Wager and his co-workers at Oxford. Wager's investigations at the Skaergaard Intrusion in Greenland (which became a frigid Mecca for igneous petrologists) were developed into a general account of *layered* igneous rocks, and Young shows how studies of recent years, using fluid dynamics, have provided models for the sequential deposition of crops of crystals in a magma chamber, arising from convection currents in the cooling melt.

Here I have picked only a few of the themes in this heroic volume. I might also have discussed such topics as igneous provinces, the forms of igneous intrusions, the 'space problem' for the accommodation of intruded magmas, the relationship of plate tectonic theory to igneous petrology, the study of lunar rocks, the contributions made by international collaborations, experimental work with the polarising microscope, modern instruments for chemical analysis such as the electron micro-probe, . . . The list could be extended almost indefinitely.

I would, however, take issue with some of Young's choices of topics. Metamorphism and mineralogy *per se* are necessarily excluded from anything more than passing mention. But some account of high, or ultra-high, pressure studies would have been worthwhile. To make room, I think that moon rock studies could have been left aside, and likewise the 'tokenistic' page or two on women's contributions. Ultra-high pressure work has revealed the existence of a form of silica (coesite), which only exists at immense pressures, and thus only forms naturally at great depths. Yet it is found near the earth's surface contained *within* other crystals, which have allowed the maintenance of the high-pressure form in a low-pressure environment. Diamond is similar, though it does not quickly revert to the form of carbon that is stable at atmospheric pressure (graphite). So diamonds and coesite have presumably been brought to the surface rather rapidly. How so? And how is it that some of the carbon of diamonds appears (on isotopic evidence) to be of organic origin and to have been buried deep by subduction processes?

Such matters take us into the field of geodynamics, problems of the constitution of the earth's interior, and activities at the boundary between the earth's fluid core and its surrounding 'solid' mantle. So what about controversial 'plume theory' as the explanation of the transmission of magma from the core to the crust? Young tends to treat the formation of magma as lying outside his remit. That is, to be sure, a defensible position for a petrologist, but I'm reluctant to accept magma as a *deus ex machina*. I think these problems would have been more relevant to Young's account than moon rocks.

This said, I must reiterate my admiration for the author's accomplishment. A collection of essays on the history of igneous petrology would *inevitably* have been disjointed, incomplete, and ultimately unsatisfactory. Young's effort allows the whole picture to be seen as a whole. The book is essentially written for petrologists. It assumes knowledge of basic chemical, mineralogical, and petrological information. It could not be otherwise, given the topic and the task. But the figure captions should have been more informative. Also the subject index is anorexic and doesn't do justice to the book.

Such comments notwithstanding, I think the book stands as a *major* contribution to geoscience historiography. We now have a map of the terrain, accurately delineated. It remains for others to add details, and fill in the contours. Larger-scale maps of parts of the whole are now invited.

David Oldroyd, Sydney

Thatcherised Geology

Peter Allen, *A Geological Survey in Transition*, The British Geological Survey, Occasional Publication No. 1, Keyworth, 2003. The British Geological Survey (BGS) is a venerable and distinguished institution, founded in 1835 under Henry De la Beche. It has already been the subject of two book-length historical studies by retired directors John Flett (1937) and Edward Bailey (1952). There have also been two recent 'official' in-house histories by the recently retired director Peter Cook (1998) and by Dennis Hackett (1999), the latter being of the 'names and dates' variety (always useful!). Additionally, we have a light-hearted institutional 'story' by a retired staff member Harry E. Wilson (1986). The first two items tell readers a good deal about the history of British geology *per se*. All highly desirable. But Peter Allen's book is something entirely different.

Allen is a recently-retired Assistant Director of the Survey. Having spent his career with the organisation, he lived through (or survived) the last two decades of the twentieth century with it, when it was undergoing an on-going bureaucratic nightmare. Just as students have, since the 1970s, learnt how to handle 'continuous assessment', so some government bodies in Britain and elsewhere have had to endure 'continuous restructuring' (and assessment!)—so much so that, so far as the BGS was concerned, one would hardly know whether to laugh or cry, judging by Allen's account.

Mind you, BGS did to some extent bring its troubles on its own head . . . ! A Survey is a curious kind of scientific research organisation. Its *prime* task has traditionally been to map a country to the highest possible standards, accumulating and accurately recording specimens in the process. But standards and techniques necessarily change over time. So is the mapping process to be endlessly repeated? What happens to a survey when its country is mapped? Is the organisation to be disbanded? Is it sensible to break up a major research institution?

So far as the United Kingdom was concerned, the country, apart from parts of Scotland, was largely mapped by the end of the nineteenth century, but at a somewhat rudimentary level and to various degrees of precision (as inspection of the old surveyors' field-slips reveals). There was, of course, a tendency on the part of some staff to spin out the work for the purpose of job security—or at least that was the perception in some critics' minds at the time.

There was re-mapping to higher standards of some areas of special economic importance in the first half of the twentieth century, but the two wars caused grievous disruptions to work. By the second half of the twentieth century, the Survey was taking on a fair amount of work related to engineering geology, etc. But, one may suspect, there was some foot dragging. Various reforms were proposed, but not fully implemented. Professor Bernard Leake of Glasgow University chaired a 'Visiting Group' in 1982–1984, and found it a problem even to ascertain what the real back-log of work was. Some was, to all intents and purposes, abandoned, because the authors had died! It was found that the most recent Survey map (out of print, of course) for the Tewkesbury area had been issued in 1856! Several of the latest (and only once published) Survey sheets did not even use the Ordovician! In all, twenty 1 : 50,000 maps and fifty-two memoirs were found to be in the back-log of work (i.e. surveyed but not published) and significant parts of the mountain regions of Scotland were still awaiting the completion of basic survey. It was evident that 'nationalised' geology was not delivering the goods satisfactorily, though already by the 1980s the Survey had been seriously side-tracked into fee-for-service work, separate from its prime objective.

The Government's remedy was an incoherent programme of semi-privatisation, with the Survey having to find ever-increasing amounts of its funding by tendering for external contract work, including work for underdeveloped countries. Meanwhile, there were constant changes of Government ministers, Survey Directors, and organisational structures, with some bureaucratic changes being reversed after only a few years.

From Allen's intimate personal knowledge of the inner workings of the Survey, he has been able to put together a readable and authoritative account of all the chopping and changing, taking advantage of the opportunity he was granted to have access to the BGS's brimming administrative files—though he was obliged (he has informed me) that he had to pedal softly on some issues and not all discussable matters were discussed (perhaps for the commonly asserted reason of being 'commercial in confidence', I hypothesise).

In reading the book, I could not easily perceive the philosophical direction that Allen was 'coming from', though the statement made in the foreword by the present director, David Falvey, that Allen had been a union official gave some clue. Anyway, my impression was that he was a dedicated civil servant, with some 'leftish' views, but also very much a 'company man'—even before BGS almost became a quasi-company.

It is impossible here to summarise all the twists and turns that the Survey's financial and bureaucratic arrangements made in the 1980s and 1990s, and the Byzantine politics of it all. Certainly the organisation had to try to fend for itself in the market place to an ever increasing degree. Some staff members, I gathered, took to this like ducks to water and built themselves mini (or maxi)

empires and became as gung-ho as corporate raiders in the private sector. Others were dismayed to find the even tenor of their lives disturbed: they had been taken on as geologists, not entrepreneurs, and did not take kindly to the changes.

I have some personal knowledge of two of the Survey's attempts to make itself acceptable to the paymasters and to those in the wider community who wanted to see the mapping completed. One of the edicts from Leake's 'Visiting Group' was that the Survey must speed up its mapping and publication; and one of the experiments tried was to enter into collaboration with universities, by having PhD students collaborating with Survey staff on map-work. The students would provide data for the Survey, and would receive first-rate field training and doctorates to boot. Sometimes such collaborations were a success, sometimes not. The desired end-products were not one and the same: a scientific problem successfully solved, or a nicely finished rectangular map. (Of course, the two were not necessarily separable or incompatible.) Some students were given dreary areas to map, where there was insufficient grist for the PhD mill. Theoretical differences sometimes developed between the university people and the Surveyors. Who had the final say? There were some fireworks . . .

Also, not all the BGS's commercial ventures proved successful. It obtained a lucrative contract to advise on the geological structure, stratigraphy, geochemistry, and hydrogeology of a site in Cumbria for the burial of nuclear waste, but the project collapsed in the face of environmentalists' opposition to the scheme. This was not, of course, the fault or the responsibility of BGS. But the reverse led to several experienced and valuable BGS staff losing their jobs.

However, Allen's book is primarily focused on the endless series of bureaucratic changes, corporate plans, management schemes, and political directives. The problems lay, in part, in the rather odd location of the Survey in Britain's overall administrative structure. It operates under the aegis of the National Environment and Research Council (NERC), rather than being directly responsible to a Minister of Science. This has meant that there has not been a Minister batting directly for the Survey in Whitehall and Westminster. The NERC position seems to me a somewhat anomalous one. I should be interested to know how many other national surveys, if any, are similarly situated.

Anyway, Allen, having lived through the Survey's administrative anarchy and mayhem of the last twenty years of the twentieth century, assures us that the organisation has emerged from it all leaner and fitter, and able to cope with the challenges that may lie ahead. Much of its future work will be contractual in character, and endless cycles of revisions and re-issues of maps will not be necessary in the future, as digitised maps makes minor and on-going revisions relatively simple.

The book will be of enormous interest to students of institutional history, the ways in which bureaucracies function (or fail to function), and the honourable British tradition of muddling through. It also provides a refreshingly honest insight into the workings of government science. Many other surveys have had to make analogous adjustments in the face of the corporatisation of government science. This book should be an object lesson in how not to proceed in bureaucratic restructuring, but it probably comes a little late as a weapon to point at the heads of other would-be reformers. So much water has already flowed under the world's bridges.

David Oldroyd, Sydney

Geology in the West of Ireland

Paul Mohr, *Wind, Rain and Rocks: The Discovery of West Connacht Geology, 1800–1950*, privately published, Galway, 2000. To box an Irish compass is to encounter several geographical Irishisms. 'The North', for instance, actually means the northeast; 'the East' in all probability implies Dublin; while 'the West' encompasses far less than the nine western counties. In fact, 'the West' indicates little more than the two western counties of Galway and Mayo. Paul Mohr's little book is about the west of Ireland in what might be termed the *sensu stricto Hibernicus*. Should such syntax jar upon a finely tuned classical sensibility, then in mitigation I may only release upon the scene an Irish bull bearing the suggestion that had you stopped reading before you encountered such infelicity, then there would have been no problem.

Counties Galway and Mayo are two of the most scenic and tourist-visited of Ireland's thirty-two counties. Within them, cirque-fretted uplands are disjoined from each other by moraine-strewn lowlands, while at the coast, to paraphrase the words of an eminent Irish geologist (Grenville Arthur James Cole (1859–1924)), one of the frayed ends of Europe encounters the fury of the Atlantic. The landscapes are those depicted upon the canvases of Paul Henry (1876–1958). And those canvases the world loves. On 24 September, 2003 his *Connemara* came under the hammer in Dublin's best-known saleroom; the estimated sale price was €50–80,000. The vendor was not disappointed.

Now geologists—most of them—are only human. They prefer to pursue their science amidst landscapes which the Romantics would have adjudged to be 'picturesque' or even 'sublime'. True, duty has resulted in many a geological hammer being plied in the shadow of grimed satanic mills, but, accorded their freedom, most geologists would choose to grapple with problems in regions where larks sing and exposures are washed by sparkling mountain torrents rather than effluent from power-stations and sewage-farms. In the country spread between Galway Bay and Clew Bay—Mohr's West Connacht larks most certainly sing as torrents rush to meet trout-filled lakes. 'Tis a region whence geological generations have heard a siren-call. There the landscapes are indeed memorable; there the contorted Lower Palaeozoic rocks are challenging; and there are to be tested hypotheses of wide ramification. Any drawbacks? Some. Essentially meteorological. Creeping Atlantic mists. Tearing winds. Horizontal rain. But of golden, azure-skied days the memory will live for ever. I recollect one such day in the summer of '78 . . . Ah yes! Nostalgia.

Paul Mohr came to this region almost thirty years ago to assume the chair of geology in the local college of the National University of Ireland at Galway. He has worked upon the igneous intrusions which puncture the region's ancient rocks, but as well as harkening to the summons of Pluto and Vulcan, Professor Mohr has also heard the call of Clio. In his adopted land, history is alive. The Irish past is an essential component within the Irish present. Scratch an Irish skin and the blood of history flows. To Clio, Paul Mohr has already paid generous tribute. Many historical papers have flowed from his pen. He is the author of a 700-page biography of John Birmingham (1816–1884) the County Galway astronomer and geologist. And readers of this notice will doubtless recollect that Mohr's bibliography of works relating to the East African Rift (1830–1950) was published by INHIGEO in 1999 (ISBN: 0-646-36806), the Rift being an overseas research area to which he has applied himself through many decades.

In the small volume presently under review, Mohr, in easy style, traces the history of geological investigation in counties

Galway and Mayo down to 1950. The two counties may be peripheral within Europe, but such was the magnetism of this region that it drew thither many of the iron men of geology's Heroic Age. Noted international players are the *dramatis personae* upon Mohr's Irish stage.

Richard Kirwan (1733–1812) is here. A County Galway man by birth, he coined the title 'Plutonic theory' (1794) in apt description of James Hutton's interpretation of the origin of granite. It was Kirwan's 1793 critique of Hutton's theory that needed the author into the completion of his two-volumed *Theory of the Earth* of 1795, while Kirwan's own *Geological Essays* (1799) played its part in the bestowal of a name upon an infant science. Sir Charles Lewis Giesecke (1761–1833) was born in Augsburg, Bavaria. Although a mineralogist in Greenland and Ireland, his most famed achievement is the libretto for Mozart's *Die Zauberflöte* (*The Magic Flute*). Sir Frederick M'Coy (1823?–1899), later the doyen of Australian science, was a son of the man who held the chair of *materia medica* in Galway from 1849 to 1873. Robert Mallet (1810–1881) was the founder of modern seismology. The *Oxford English Dictionary* credits him with the coining of ten words bearing the prefix 'seism', between 1850 and 1859. Sir Richard Griffith (1784–1878) is 'the father of Irish geology', and the author, in 1839, of a magnificent pioneering quarter-inch (1: 253,440) geological map of his native land. The Wollaston Medallist of 1854, he is one of the towering figures of Ireland's nineteenth-century history. Sir Roderick Murchison (1792–1871), the 'King of Siluria', in 1851 paid a state visit to County Galway in inspection of his palaeontological subjects. A geological section of the region is on page 169 of *Siluria* (1854). Joseph Beete Jukes (1811–1869) is today remembered as a geological pioneer in both Newfoundland and Australia, but as Director of the Geological Survey of Ireland he was also responsible for the mapping of much of the ground which Mohr here brings to our attention. On 7 September, 1856 Jukes tried to fight his way northwards along the road heading from Killarny Harbour to the shores of Clew Bay, but driving rain forced him back to Leenaun. Down that very same road, in the spring of 1889, there worked a truly redoubtable pair: Sir Archibald Geikie (1835–1924), surely the most renowned British geologist of his day, accompanied by Benjamin Neeve Peach (1842–1926), who, when coupled with his Scottish Survey colleague, John Horne (1848–1928), was in 1912 hailed by Albert Heim (1849–1937) as being one of the 'Investigator-Twins, such as I never have seen before in my life'. And deeply do I wish that much more recently another party might have been able to wheel that same route down to Leenaun. On 22 July, 2003, INHIGEO's Irish excursionists bound from Sligo to Galway would certainly have been shown that scenic traverse had the exigencies of timetable not otherwise decreed.

This work is more about the people who have wielded hammers than it is about the rocks that they hammered. The figures of Mohr's text serve to make the point. Seven of them are maps or sections; two are representations of landscape; and twenty-eight are portraits of geological stalwarts. Such a human bias will win for the volume many a reader untutored in the geological science. These will find no difficulty in understanding the story here unfolded, and the comprehensive bibliography may well serve as an encouragement to further exploration. What the book lacks is a satisfactory denouement involving some EUREKA moment. But for that deficiency our author can in no way be held responsible. He is clearly constrained by the facts of scientific history. As we reflect upon this matter, I invite you mentally to rejoin the INHIGEO Irish excursion of 2003. I invite you to accompany me into a graveyard.

On 22 July, 2003—by special request—the INHIGEO party paused at Drumcliff in County Sligo to pay homage at the grave of William Butler Yeats (1865–1939). The Ireland into which Yeats was born was an Ireland where for almost one hundred years Irish scientists had been making notable contributions to the vast tapestry which is international science. But Yeats was a poet, a dreamer, a mystic, a nationalist. The Ireland of his day shared with the poet of *The Lake Isle of Innisfree* a far closer empathy than it felt for the men whose creativity had given us Siluria and Cambria. After 1880, Irish science in its entirety went into a sad decline. One of his chapters Mohr justly titles 'Between the two Wars: The Lean Years'. But that is all past. The hiatus is over. Since 1960 Irish science has experienced vigorous revival. Perhaps Paul Mohr will continue the story which here he has begun. The second course would prove to be a rich feast gently baked in the South Mayo Trough and then ladled onto plates eagerly thrust.

Gordon L. Herries Davies, Nenagh

NOTES AND QUERIES

IUGS/Geological Society of London Publication Scheme

The IUGS has signed a memorandum of understanding with the Geological Society of London Publishing House regarding the publication of books on geological topics. This means, in effect so far as INHIGEO is concerned, that the publisher is happy to receive proposals for publication from INHIGEO, it being one of the IUGS's Commissions. The books may take the form of Special Publications (an edited collection of related papers on some theme or topic); Memoirs (large-format treatments of key Earth science subjects); Special Reports on British stratigraphy (not really relevant to INHIGEO); Professional Handbooks (not really relevant to INHIGEO); Earth in View (a series covering subjects of interest to a broad non-specialist Earth science audience); Other Titles ('one-off' topics—which could allow scope for INHIGEO publication). The Society has previously published three Special Publications arising from history of geology meetings that INHIGEO has been associated with, and one substantial Memoir. For further information, contact the Secretary-General in the first instance.

Future International Geological Congress

It is anticipated that the location of the 33rd International Geological Congress in 2008 will be Oslo in Norway, but this will only be ratified at the the 32nd Congress in Florence. Australia (Brisbane) and India (Hyderabad) have expressed interest in bidding for the 34th IGC in 2012.

Free Copies of IUGS Publications

All existing copies of various publications produced by IUGS before 2002 will be distributed free of charge to interested individuals in Florence during the 32nd IGC in August 2004. Please visit the IUGS Booth during the Congress to obtain your own copies. Free copies of Episodes back to 1998 are now available free of charge in pdf format from the *Episodes* website (www.episodes.org). New material is being added one year after publication to ensure that paid subscriptions receive precedence.

A special issue on the geology of Italy was published in September 2003 in support of the forthcoming 32nd IGC. Please access the IUGS website (www.iugs.org) and respond to the questionnaire which is evaluating the journal *Episodes*.

52nd Executive Committee Meeting of IUGS

The IUGS Executive Committee held its 52nd meeting in Oslo, Norway, 15–19 March, 2004, under the auspices of the Norwegian National Committee of IUGS. Prior to the meeting, the Nordic Bidding Committee for the 33rd International Geological Congress (2008) sponsored a field trip to Spitsbergen, Svalbard, where the EC was introduced to various aspects of arctic geology, energy resources, and geoenvironmental problems. Details and outcomes of the EC meeting appear on the IUGS website (www.iugs.org), but specific queries can be immediately addressed through the IUGS Secretary General (janwer@cc.geolba.ac.at). Minutes from previous IUGS business meetings are currently available on the IUGS website.

International Year of Planet Earth

IUGS organised a high-level meeting regarding the upcoming International Year of Planet Earth in Paris in February, 2003, in cooperation with UNESCO. Over 180 individuals participated in this event providing overwhelming support to the proposed Year. Official delegates of 58 UNESCO member countries attended including the Director General of UNESCO. China, Russia, Brazil, Argentina, Italy and Jordan gave an immediate and positive endorsement for the activity that is to be tabled by China at the UN General Assembly later this year. For the latest information on the Year please check the website (www.esfs.org).

GEOSEE

The IUGS and IGU have combined forces to promote an umbrella focus group/consortium that will deal with various aspects dealing with the identification, preservation, protection, sustainable development, exploitation and research/education of geoscience heritage. The aim is to limit and reduce duplication of efforts by various groups. Presently a variety of efforts exist including UNESCO's geoparks, ProGeo, European GeoParks, IUGS Geosites, various National Conservancies, geotourist groups, etc. These all have unique goals and objectives but share a common interest regarding geoscience heritage. The first official meeting for this new group will be held in Beijing, China on the occasion of the First International Conference on Geoparks, 27–29 June, 2004. For more information regarding the collective initiative, contact pbobrows@mrcan.gc.ca; and for information regarding the conference contact dic@cags.net.cn or Chinageoparks@hotmail.com.

Martin Guntau's 70th Birthday

On meeting Martin Guntau, one does not see his seventy years. Mentally still extremely active, he continues to participate in conferences at home and abroad, gives lectures and writes expertly-researched articles and books. He is able to do all this with the help of his wife Brigitte, whom he has known from the time when she was a student.

Professor Guntau was born in Gilgenau (East Prussia) in 1933, into a family of teachers. After qualifying for entrance to university, he studied mineralogy and geology at the *Bergakademie Freiberg* in Saxony and at the Humboldt University in Berlin, from 1953 to 1958.

Guntau can properly be regarded as the spiritual father and initiator of the institutionalised study of the history of geology in the German Democratic Republic (GDR), and he is known as such well beyond the borders of Germany. Early in his career, he cultivated scientific contacts at home and abroad, through his frequent attendance at conferences, his lecture tours, and periods of foreign study. As a result of his many initiatives, geohistorical research in the GDR took on a previously unimagined depth and breadth, which is still valued today and has wide international resonances.

From 1963, Guntau taught History and Philosophy of Geosciences at Freiberg Academy, initially as an assistant and from 1975 as a lecturer in History of Science. He habilitated in 1976 at Humboldt University, Berlin, with a thesis on 'The Foundation of Geology as a Scientific Discipline in History'. That year, the Faculty of History at Rostock University appointed him to a lectureship in History of Science, and in 1981 he was promoted to full professor and stood at the helm as Director from 1986 to 1989. He authored over 170 scientific papers, published in national and international journals, and has been the author of nine books, some translated into several languages.

For many years now, Guntau has been an active Member of INHIGEO. He was one of the founding Members in 1967, was Secretary-General from 1976 to 1984, and President from 1989 to 1992. He has also been a member of various other international organisations and has received national and international honours, including the History of Geology Award of the Geological Society of America and the Sue Tyler Friedman Medal of the Geological Society of London. He was a co-founder of the Circle for History and Philosophy of Geosciences in the GDR, and is a Member of the German Society for the History of Medicine, Science and Technology and other scientific groups.

In 1992, Guntau had to take early retirement. However, he remained loyal to history of science. He was a founding Member of the Leopold von Buch Berlin–Brandenburg Geo-historical Society and in 1993 he founded the Ernst Alban Society of the Mecklenburg–Pommernian History of Science and Technology, serving as its President until 1997.

Professor Guntau's friends and 'comrades-in-arms' warmly congratulate him on the occasion of his 70th birthday and wish him all the best, and above all good health, for the future. We look forward to his further contributions to researches in the history of the geosciences.

Peter Krüger, Berlin

Hans Ertel (24 March, 1904–2 July, 1971): Pioneer in Meteorology and Geophysics

In 2004 we celebrate the 100th birthday of Hans Ertel, formerly Professor of Geophysics and Theoretical Mechanics at the Humboldt University in Berlin. He was also Director of the Institute of Meteorology and Geophysics and Vice-President of the German Academy of Sciences in Berlin, and a founding member of the Alexander-von-Humboldt Commission. Under his leadership and in co-operation with other German academies, a comprehensive collection of letters to and from Alexander von Humboldt was assembled and edited. Ertel was a founding member of the Society for Geological Sciences and was much interested in questions to do with the history of geological sciences. From time to time papers concerned with historical topics in

geology were published in the journal *Forschungen und Fortschritte*, which he edited. For several years, Ertel was also Chairman of the National Committee for the International Geophysical Year and for International Geophysical Cooperation (1957–1959).

From 1948 to 1971 Ertel was Director of the Institute for Physical Hydrography of the German Academy of Sciences. He played an important role as editor of scientific journals, e.g. *Forschungen und Fortschritte*, *Deutsche Literaturzeitung*, *Gerlands Beiträge zur Geophysik*, *Zeitschrift für Meteorologie*, and *Acta Hydrophysica*. He was also a member of the editorial boards of *Geofisica e applicata* and *Idöjaras [Weather]*.

Ertel's main research crossed the boundaries of the theoretical meteorology, theoretical hydrodynamics (geophysical fluid dynamics), oceanography, physical hydrography, theoretical geomorphology, and various areas of geophysics more generally. His name is associated with *Ertel's potential vorticity*, *Ertel's commutation theorem*, the *Ertel–Euler equation*, *Ertel's potential theorem*, the *Ertel–Rossby theorem* and the *Ertel–Koehler theorem*. His main contribution was the application of hydrodynamical methods to geophysical and meteorological problems, both in detail and in general.

Ertel's mastery of science encompassed not only geophysics in general but also the associated physical disciplines, following his education under Max Planck, Erwin Schrödinger, Max von Laue, Heinrich Ficker, Julius Bartels, and his association with Albert Einstein.

This year we pay tribute to a distinguished scientist and a leading exponent of our geophysical disciplines.

Wilfried Schröder, Bremen-Rönnebeck

A New History of Science Website for Latin America

An excellent new website has been established, dedicated to the history of science in Latin America. It is designed as a bulletin board where scholars and graduate students can post news, articles, and links to their own pages. It is sponsored by the *Instituto de la Ciencia y la Tecnología en América Latina* (ICTA). The web address is: <http://www.ictal.org>

A New Website for the Austrian Society for the History of Science

Die Österreichische Gesellschaft für Wissenschaftsgeschichte macht auf ihre neu eingerichtete Homepage aufmerksam: <http://www.wissenschaftsgeschichte.ac.at>. Leider ist unter "Symposien" keine Ankündigung unserer 4. Arbeitstagung für die Geschichte der Erdwissenschaften in Klagenfurt zu finden. Mit freundlichen Grüßen, T. Cernajsek

Geological Survey Websites

A full list of website addresses may be found from: <http://www.uni-mainz.de/FB/Geo/Geologie/GeoSurv.html>

Geological Work in the Himalayas

A book in French on the history of sciences and geology, describing 'Higher Asia as they Saw it: Explorers and Scientists, from 1820 to 1940' has been published by A. Baud, Ph. Foret & S. Gorshenina, *La Haute-Asie telle qu'ils l'ont vue: Explorateurs et scientifiques de 1820 à 1940*, Editions Olisane, Geneva, 2003 (144 pages, 17 colour plates, 102 photographs). Price: 29 €. The book can be ordered through www.olisane.ch or www.amazon.fr.

The aim of this book, which accompanied an exhibition of the Geological Museum in Lausanne (Switzerland), is to present the history, techniques, methodology, and results of the surveying of 'Upper Asia'. European scholars and travellers explored the ill-defined areas of the Himalayan kingdoms, Tibet, Xinjiang, and western China during the Victorian era and through to WW II. National prestige was at stake in the scientific conquest of the heart of Asia, though this was not the only consideration. The systematic collecting of evidence in the Pamirs, Himalayas, and Taklamakan played a part in dramatically changing our understanding of our planet's geology, while the discovery of the Silk Road civilisations has made us all aware of the significance of transcontinental exchanges between the Europe and Asia.

The challenging topic is approached with an emphasis on the human aspects of scholarship instead of a more abstract institutional history. Personality cults and the glorification of science present dangers that are avoided by placing scientific results within the context of their time, and by including representatives of different scholarly disciplines, from archeology to geology, and of diverse countries: from the UK, France, Switzerland, Sweden, Germany, Austria-Hungary through to Russia.

A Book on the History of Mining Education

Please note the publication of: Fathi Habashi, *The Beginnings of Mining and Mining Education*, Métallurgie Extractive Québec, Québec, 2003. The volume has over 600 pages and 350 illustrations, 73 in colour. Price Can\$80.00. Part 1, General; Part 2, Schools of Mines in the Great European Empires; Part 3, Schools of Mines in other European Kingdoms; Part 4, Schools of Mines in the Americas and the Far East; Part 5, Epilogue and Appendix. Distribution: Laval University Bookstore (martine.tardif@ul.ca).

Brazilian Gearchives

Dear colleagues:

I am pleased to inform you on the new initiative taken by the Ministry of Science and Technology in Brazil to support the Preservation of Scientific and Technological Memory of Brazil. The full text of this initiative can be consulted at the following website: Website: <http://ppp.unipiv.it/dhs>. This can be seen as part of a regional effort to support a much wider campaign of preservation of scientific documents which the DHS as organisation has been addressing through the 'World History of Science Online: databases of bibliographical and archival sources'. I would like to encourage our affiliated members to pursue and explore similar opportunities in their regions with views to articulating efforts to contribute to this important task of preserving our scientific heritage.

Sincerely,

Prof. Dr. Juan José Saldaña, Secretary-General, International Union of the History and Philosophy of Science, Division of History of Science, Apartado Postal 21-388, 04000 Mexico D.F., MEXICO. dhs@servidor.unam.mx. Fax: (5255) 55446316

Announcement and Call for Papers: Zhu Kezhen Award

The International Society for the History of East Asian Science, Technology, and Medicine (ISHEASTM) would like to announce the creation of the Zhu Kezhen Awards and to solicit nominations for the award. The Zhu Kezhen Award and the Zhu Kezhen Junior Award were both established in 2002 through the generosity of the Institute of the History of Natural Science, Chinese Academy of Sciences.

The Award consists of a medal and a cash prize of US\$1000. It is the highest honour awarded by the ISHEASTM for an essay of original scholarship in the history of science, technology, and medicine in East Asia. The two Junior Awards, consisting of a certificate and a prize of US\$500, are awarded for an essay written by a young scholar in the history of science, technology, and medicine in East Asia. All three prizes are awarded once every three years at the plenary conference of the ISHEASTM.

The Zhu Kezhen Award Committee, appointed by the Board of the ISHEASTM, will determine the essays to be considered for the awards by reviewing lists of recently published essays and soliciting nominations from members of the ISHEASTM. Members may nominate their own essays. Essays in English, Chinese, Japanese, Korean, or Vietnamese, published less than four years prior to the deadline for nomination, will be considered. Essays in other Asian languages will be considered if they are accompanied by an English language translation. For the Zhu Kezhen Junior Award, the author should be a graduate student or a scholar who received his/her doctoral degree less than five years prior to the deadline for nomination. Nominations, accompanied by a copy of the nominated essay, should be submitted to the Zhu Kezhen Award Committee. To ensure fair evaluation, it is advised that all essays in East Asian languages should be accompanied by an English translation.

The deadline for acceptance of submission is September 30, 2004. All nominations should be sent to the Zhu Kezhen Award Committee secretary, Dr. Sun Xiaochun, Institute for the History of Natural Science, Chinese Academy of Sciences, 137 Chao Nei Street, Beijing 100010, China. An electronic version is welcome and one hard copy of the offprint is required.

100th Anniversary of the V.V. Dokuchaev Central Museum of Soil Science

A decision about organisation of the Central Museum of Soil Science was made in April 1902 by the Russian Liberal Economic Association. Founded in 1904 by the famous Russian scientist, V.V. Dokuchaev, the Central Museum was the first soil-geographical museum in the world. From its beginning, the Museum was a unique research and educational centre of soil science, not only in Russia, but worldwide. It displayed all scientific achievements in soil science of that time and the fine collections of soils and soil-forming rocks sampled by scientific expeditions. Professors L.S. Berg, N.I. Vavilov, K.D. Glinka, B.B. Plynov, L.I. Prasolov, I.V. Turin, A.E. Fersman took part in updating the museum collections. To celebrate Dokuchaev's centenary in 1946 the Museum of Soil Science was reorganised into a research institution of the USSR Academy of Sciences and named the Dokuchaev Central Museum of Soil Science. Since 1961 it has been part of the Academy of Agricultural Sciences.

In the Museum activities, Dokuchaev's ideas about the harmonious combination of education and scientific research were realised. In 1930, the Museum showed the participants of the 2nd International Congress of Soil Science Society the successes of Russian soil science in the theory, practice, and methodological basis of soil science. A notable contribution to the development of the Museum was made by Z.Yu. Shokal'skaya, who was its Director for many years.

Research on soil microbiology received wide acclaim. T.V. Aristovskaya was the founder of this new field of study. V.V. Ponomareva was the leader in biochemistry of organic matter. A large contribution to the development of the theory of soil formation was made by the Museum employees A.A. Zavalishin, A.I. Marchenko, V.V. Nadezhdin, V.K. Pestryakov, T.A. Plotnikova, T.A. Rozhnova, and E.B. Rubilin.

At present, the Museum is a large scientific and educational centre. It occupies the ancient building constructed by the architect Lukin in the middle of nineteenth century, located in the historical centre of St Petersburg and part of the 'gold ring' of the city's museums.

The museum exhibits consist of monoliths and soil samples, maps and monographs, documents, and pieces of art. The first exhibit was the Dokuchaev Collection, which was demonstrated at Russian and international exhibitions.

The varied and rich finds have been collected for almost a century. The most important are the soil monoliths, numbering more than 1600 units. The oldest of these is the monolith of *Chernozem* from Veliko-Anadolya, collected by N. Vysozkyi. A number of monoliths were accessioned in 1908, 1909, and 1911 by participants of the Transmigratory Control expeditions: Prokhorov, Nikiforov, Kchainskei. The monolith of *Chernozem*-like soil of the Fergana valley was collected by S.S. Neustruev in 1911. The Museum displays soils from all natural zones of the earth: from Franz Josef Land, Severnaja Zemlya islands, Chukotka, Carpathians, Crimea, Caucasus, Central Asia, Syria, Cuba, New Zealand. The collections of soil monoliths are of unique scientific value for monitoring of environment.

A new soil-ecological exposition was opened in 1996 in connection with the 150th anniversary of Dokuchaev's birth. It was devoted not only to the variety of Russian soils and soils from the world, but also to the Soil as a whole, which is the fourth empire of nature, a mirror of landscape. Special emphasis is laid on the evaluation and description of the land resources of the country, and on the problems of soil fertility and the crisis of soil resources.

Modern society has appeared unreceptive to problems of soil degradation and future ecological consequences for world community that connected with soil destruction, their pollution, loss of fertility. Thus a priority task of the Museum is the creation of technology for the continuous ecological education in the area of soil science, for children of preschool age and upwards.

In the framework of the education programme since 1997, there have been the Dokuchaev Student Scientific Conferences. A new edition of *Materials of Russian Soil Studies*, based on the *Materials . . .* by AV. Sovetov and V.V. Dokuchaev, which was issued in 1885, was issued. Also, a section on 'Memorials of a History of Soil Science' was introduced into the programmes of these conferences since 1999.

In soil science education, an important place is given to audiovisual techniques. During the years 1996–2001, a series of popular scientific videos about soil science has been created: 'V.V. Dokuchaev: For the 150th Anniversary of his Birth', 'The 2nd Congress of the Soil Science Society of Russia', 'The Fourth Empire of Nature', and 'Soil: The Mirror of a Landscape'.

Before the centenary anniversary the Museum undertook researches for the projects: 'Life in an Underground Empire'; 'The Red Book of Soil of the Leningrad Region'; 'The Soil Landscape—An Ethnographic Atlas of the Leningrad Region'.

Boris Aparin, Head, Dokuchaev Soil Science Museum (soil@ba5289.spb.edu; www.soilmuseum.by.ru)

How to Winchester

Members of INHIGEO may have seen the acclaimed book by the journalist Simon Winchester on William Smith—*The Map that Changed the World*—in airport bookshops and other places of high repute. One of our Members, who has a special interest in Smith, has noticed the following interesting item in the excellent British satirical rag *Private Eye* (28 November, 2003):

The Meaning of Everything: The Story of the Oxford English Dictionary

Simon Winchester

(Oxford University Press)

Winchester n. and vb. t. & i. Relentless prolific author of short, popular works on serious subjects: "You've written another book? You'll be turning into a Winchester."

Winchester treatment, given the (of book publishing) [S]omewhat slight work benefiting from scholarly reputation of publisher.

Write like Winchester, to Prose style of extreme banality, featuring much use of redundant phrases such as "as it happened", "it is worth remembering" and "as already mentioned"[,] in which quarrels "smoulder for some years" before "bursting into the open" in a "torrent of abuse". "This won't do at all boy. You're starting to write like Winchester."

Winchester effect, the Delusion, affecting pred. American critics, whereby weak, derivative book is acclaimed as a work of genius. "Winchester is an extraordinarily graceful writer. He may be the world's greatest crafter of smooth transitions, and he has the good sense never to resist an irresistible digression"—*Time Magazine*.

Publications on Hugh Miller and William S. Bruce

Michael Taylor writes: The proceedings of the 2002 bicentenary Hugh Miller conference in Cromarty have been notably and pleasingly rapidly published by Lester Borley, the main organiser and Secretary of the Cromarty Arts Trust, with papers by several INHIGEO members, as L. Borley (ed.), *Celebrating the Life and Times of Hugh Miller. Scotland in the Early 19th Century, Ethnography and Folklore, Geology and Natural History, Church and Society*, Cromarty Arts Trust, Cromarty, and Elphinstone Institute of the University of Aberdeen, Aberdeen, 2003 (see p. 41). This is a most important new source on Miller, and fully justifies the remarks in the *INHIGEO Newsletter* (2003 for 2002) 35, 13–18, on the re-evaluations promoted by the conference.

National Museums of Scotland (NMS) Publishing have produced a facsimile reprint of the first edition of Hugh Miller's 1858 *Cruise of the Betsey, with, Rambles of a Geologist*, with a preface by Professor Chris Smout and an introduction and notes by Mike Taylor (see p. 41); publisher's details on <http://www.nms.ac.uk/bookshop/index.htm>. Miller's book is a fascinating and characteristically complex mixture of geological foraging in the Devonian and Jurassic of northern and western Scotland, with journalistic fact-finding and vigorous polemic on the social and religious issues of the day, such as the Highland Clearances. The eponymous *Betsey* was the leaky old yacht on which the Free Church Minister of the Small Isles of Inverness-shire had to live, denied a suitable place for a house by the landlords of the parish.

Miller is also unusual amongst geologists in having 'his' own play! Stewart Conn's play *Hugh Miller: A One-man Play* is now published by Diehard (Callander, Scotland: <http://freespace.virgin.net/colin.will/diehard.htm>). This is the first publication of Stewart's play, which was revived for the bicentenary in 2002 after its original award-winning performance at the Edinburgh Festival Fringe in 1988. It is set on the last night of Miller's life.

To coincide with the centenary exhibition *William Speirs Bruce and the Scottish National Antarctic Expedition 1902–1904* (see United Kingdom report for details) NMS Publishing produced a new biography by Peter Speak, *William S. Bruce: Polar Explorer and Scottish Nationalist* (see: <http://www.nms.ac.uk/bookshop/index.htm>) and Mercat Press has reprinted *The Voyage of the Scotia*. In addition a suite of educational materials has also been published.

Michael Taylor, Edinburgh

Websites, Magazines, and Scottish (and other) Geology

Michael Taylor writes: www.edinburghgeolsoc.org, as mentioned in the last *Newsletter*, is the website of the Edinburgh Geological Society, and often has material of historical interest, for instance in the back numbers of the Society's informal magazine *Edinburgh Geologist*, such as Diarmid Finnegan's interesting reassessment of the role that Miller and others played in the early popularisation of glacial theory: http://www.edinburghgeolsoc.org/z_40_02.html.

The new www.scottishgeology.com is a gateway to Scottish geology by a consortium of several public organisations (Scottish Natural Heritage, the main Scottish Government agency tasked with conservation of nature; Dynamic Earth, the visitor centre in Edinburgh; the National Museums of Scotland; the Hunterian Museum, University of Glasgow; British Geological Survey). It is aimed more at the general public than specialists, and although current geology is its main aim, it pays due regard to the history of the science.

The 'geological and landscape conservation' magazine *Earth Heritage* is published free, twice a year, by the British Government agencies dealing with nature conservation. It is naturally primarily concerned with the current scientific, educational and recreational values of sites, and the issues involved in their preservation, but it does not neglect historical aspects. A sample issue, which is, at least at the time of writing, the current one, can be seen on <http://www.seabury.salmon.dial.pipex.com/earth.html>.

Michael Taylor, Edinburgh

Other Edinburgh news

NMS Publishing has recently published two books of potential interest to INHIGEO members *Minerals of Scotland: Past and Present* by Alec Livingstone, former curator of mineralogy at National Museums of Scotland, which has much of historical

interest as well as many lovely photos of the specimens themselves; and *Audubon in Edinburgh and his Scottish associates* by John Chalmers—this time not so much on the earth science front but with much on the general Edinburgh natural history scene of the time. More details in <http://www.nms.ac.uk/bookshop/index.htm>.

Michael Taylor, Edinburgh

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COUNTRY REPORTS

Australia

David Branagan

David Branagan completed the text of a large monograph, a biography of the Welsh-born Australian geologist, Sir T.W. Edgeworth David, which will be published by the National Library of Australia in 2004. A short biographical note on William Keveral McIntyre, son-in law of David, was published in *Record*, the journal of the University of Sydney's Archives office.

In March–April 2003, David spent some weeks at the University of Oklahoma as a Postdoctoral Fellow in the History of Sciences under an award from the Andrew Mellon Foundation. He completed a manuscript on the 'History of Geology from 1900 to 1962', which has been accepted for publication in Elsevier's forthcoming *Encyclopedia of Geology*. While at OU he presented a paper on 'Geological Connections between Australia and North America', and attended a number of symposia.

His two papers presented at the INHIGEO meeting in Portugal in 2002 were published in the *Proceedings*, which appeared in 2003.

A discussion on Late Pleistocene glaciation, including some historical aspects, was contributed to the *Australian Journal of Earth Sciences* (2003) in response to a paper on the geology of the Ballarat Goldfield.

Lectures were presented at the University of Sydney ('Edgeworth David to 1914') and at the University of New England, Armidale, NSW ('Early Geological Work in the New England Region').

A paper on 'The First Ten Geological Years at Broken Hill' was presented at the History of Mining Conference (Australian History of Mining Association), held at Broken Hill in July, 2003.

Articles were completed on Samuel Stutchbury (for the Thoenes volume on nineteenth-century British scientists) and Joseph Thompson and Joseph Campbell (for the *Australian Dictionary of Biography Supplement*).

Research continued on nineteenth-century French contributions to Australian geology, and on geology in Mediaeval and early Renaissance art.

David Corbett

It is with great regret that we record the resignation of David Corbett from the Australian contingent of INHIGEO. This is due to responsibilities arising from his wife's illness, which are preventing him from doing more historical work.

Barry Cooper

Barry Cooper's main historical preoccupation during 2003 has been the historical use of building stone in South Australia, with visits to interstate Australia and internationally as opportunity has allowed. He has a developing comprehensive photographic coverage of stone-use in South Australia, with significant coverage in Victoria and New South Wales, and some in Queensland. Internationally, he visited Europe again during the past year and has been able to follow up his studies in Portugal (during the INHIGEO meeting), France and the Channel Islands in 2001 with trips around Belgium, Austria, the Czech Republic and Armenia. When planning to visit to Armenia, he attempted to make contact with INHIGEO Member Edward Malkhassian, only to discover that he had regrettably passed away. Nevertheless his son Gourgen, also a geologist, was most helpful in arranging meetings with building-stone experts in Armenia.

Barry mostly photographs and notes the nature of stone-use as well as the stone itself and researches the origin and history of the use. There is an infinite variety of building stone, which varies in terms of rock type, colour, jointing, weathering, and lithification, as well as varied use in paving, roofing, and interior use, in addition to the more recognisable applications for walling and monuments. From the author's geological experience, it was particularly interesting over the past twelve months to see the use of conglomerate for building during a one day visit to Salzburg, Austria, and the extensive use of volcanic tuff in a wide variety of colours in Armenia for carving and building. Any INHIGEO member wishing to discuss the historical use of stone anywhere is most welcome to contact Barry by email.

Barry also maintains a strong interest in the history of South Australia geology and has several long-standing projects, which deserve to be completed for publication. In Adelaide, he belongs to the local History of Science Technology and Ideas Group. In addition, a group entitled 'Friends of Mawson' has recently been established by the South Australian Museum to assess and remember the work of Professor Sir Douglas Mawson (1882–1958), Antarctic Explorer and well-known Australian geologist. The organiser is Dr Mark Pharaoh who can be contacted on pharaoh.mark@saugov.sa.gov.au. Details and recent newsletters are also on the web at www.mawson.sa.gov.au/fom.htm.

Tom Darragh

Most of Tom Darragh's time has been taken up with assisting with the new edition of the *Geology of Victoria*, proofreading and working on illustrations for Chapter 25: a history of geological investigation in the State, written in conjunction with David

Branagan. Tom continues to work on a history of the production of the Geological Survey of Victoria quarter-sheet maps. Publication: Darragh, T.A. & Branagan, D.F., 'History: Colouring the Map', in: Birch, W.D. (ed.), *Geology of Victoria*, Geological Society of Australia, Special Publication No. 23, pp. 671–685.

David Oldroyd

David is completing his 8-year stint as INHIGEO Secretary-General this year. In addition to his regular duties, he has taken responsibility for the editing of contributions by INHIGEO Members to the Elsevier *Encyclopedia of Geology*; 'Classic Papers' for *Episodes*; and papers on the history of individual International Geological Congresses for the same IUGS journal. He attended the INHIGEO meeting in Dublin, and presented a paper on the geological work in Australia of the early explorer and Surveyor-General for New South Wales, Thomas Mitchell.

His book on the history of geology in the English Lake District, scheduled for publication in 2002, eventually appeared in 2003: *Earth, Fire, Water and Ice: Two Hundred Years of Geological Research in the English Lake District*, Geological Society of London, Memoir No. 25, 2002 (see p. 44). He has now begun work on a book on the history of cyclic theories in geoscience. Other publications:

'The Geological Work in China of Bailey Willis', *Annals of Science*, 2003, 60, 1–37 (with Yang Jing-Yi).

'A Chinese Geologist, Ma Ting-Ying (1902–1979): From Coral Growth-Rings to Global Tectonics', *Episodes*, 2003, 26, 19–25 (with Yang Jing-Yi).

'Fossils in the Airport Lounge' (survey review of five popular books on the history of geoscience), *Metascience*, 2003, 12, 25–36.

'Cambridge Historians on Cambridge Scientists', *Metascience*, 2003, 12, 183–189.

'A Manichean View of the History of Geology' (essay review of A.M.C. Şengör, *Is the Present the Key to the Past or the Past the Key to the Present? James Hutton and Adam Smith versus Abraham Gottlob Werner and Karl Marx in Interpreting History*, 2001), *Annals of Science*, 2003, 60, 423–436.

'The Extinction of the Australian Megafauna', in: M. Serrano Pinto (ed.), *Proceedings of the 26th Symposium of the International Commission on the History of Geological Sciences . . .*, Centro de História e Filosofia da Ciência e da Técnica & Universidade de Aveiro, Aveiro, Portugal, 2003, 325–348.

'The Earth Sciences', in: D. Cahan (ed.), *From Natural Philosophy to the Sciences: Historiography of Nineteenth-Century Science*, Chicago University Press, Chicago & London, 2003, 88–128.

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Review of J. Bennett, M. Cooper, M. Hunter, and L. Jardine, *London's Leonardo: The Life and Work of Robert Hooke*, Oxford University Press, Oxford, 2003, in: *Nature*, 2003, 423, 384–385.

Review of J. Repcheck, *The Man who Found Time: James Hutton and the Discovery of the Earth's Antiquity*, Perseus Publishing, Cambridge (Mass), 2003, in: *Nature*, 2003, 423, 920–921.

Review of K.S. Deffeyes, *Hubbert's Peak: The Impending World Oil Shortage*, Princeton University Press, Princeton, 2001, in: *Metascience*, 2003, 12, 349–351.

Tasmania

Carol Bacon spent much time preparing a concise statement about the history of mining in Tasmania for publication in a volume *A Companion to Tasmanian History* and Max Banks was kept busy producing similar statements on Tasmanian Geology and Geologists and on Charles Gould, first Geological Surveyor of Tasmania, for the same volume. Later in the year, activity was directed towards organising a session on the History of Geology in south-eastern Australia in the nineteenth century, and preparing historical excursions for the 17th Australian Geological Convention in February, 2004.

Austria (2002–2003)

The following report from Austria to the INHIGEO *Newsletter* on the main activities in the years 2002 to 2003 mainly refers to programmes of our working group on 'The History of Earth Sciences in Austria' among the Austrian Geological Society.

According to the resolution of the executive board of the working group in the year 2000, special symposia should be held in a biennial cycle. In June, 2002, the working group held an extraordinary meeting during the "PANGEO AUSTRIA" in Salzburg, where six papers on different issues were presented. Also, during June 2002, an exhibition devoted to the geological mapping of Lower Austria, organised by the Geological Survey of Austria in cooperation with the Library of Lower Austria, took place in St Poelten. The well received exhibition was accompanied by a small catalogue with documents on more than 175 years of history of geological mapping in this part of Austria (Cernajsek, T. & Gottschling, P., 2002).

In 2003, the fourth symposium on the "History of Earth Sciences in Austria" (22 to 25 October, 2003) in Klagenfurt was well organised by the Austrian Geological Society, the Regional Museum of Carinthia, the Carinthian State Archive, the Austrian Society of History of Mining and Metallurgy, the Austrian Society for the History of Science, and the Geological Survey of Austria. The symposium comprised nineteen lectures on various topics, mostly concerning the history of earth sciences and mining in Carinthia. The abstracts were published in *Berichte der Geologischen Bundesanstalt* (2003), Vol. 64. A publication of the Proceedings is also planned.

From 13 to 23 October, 2003, a special exhibition during the "International year of water 2003" was dedicated to the famous Austrian geologist Eduard Suess (1831–1914) on the occasion of the 130th anniversary of the construction of the first water reservoirs and the municipal water network of Vienna. The travelling exhibition was organised by the Geological Survey of Austria, the communal Institute of National Education, and the Waterworks of Vienna, starting in a historical water supply building in Vienna (Cernajsek, T. & Seidl, J., 2003b).

The last noteworthy event in the year 2003 was an exhibition at the University Library in Graz dedicated to the Austrian geologist Robert Schwiner (1878–1953), one of the forerunners of plate tectonic theory. The exhibition was organised by Professor Hubmann (University of Graz) using previously unknown documents from the estate of Schwiner (Hubmann, B. & Fritschl, E., 2003)

The list of publications on the history of earth sciences in Austria between 2002 and 2003 comprises more than 100 titles. For a complete listing of all publications, please visit the home page of the Geological Survey of Austria with the special database GEOLIT (<http://www.geolba.ac.at>).

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Tillfried Cernajsek and Albert Schedl, Vienna

Belarus

On 30–31 January, 2003, an International Scientific Conference, 'Stratigraphy and Paleontology of the Geological Formations of Belarus', was held at the Geological Sciences Institute of the Belarusian Academy of Sciences. It was dedicated to the 100th anniversary of Corresponding Member of the Belarusian Academy of Sciences and Professor of Geology and Mineralogy, Alexander Fursenko (1903–1975), who in the 1950s was the founder of the Palaeontological Laboratory at the Institute of Geological Sciences. He also established the school of Belarusian palaeontology and stratigraphy, and laid the foundations of the stratigraphy of the sedimentary formations of Belarus. Scientists from Belarus, Russia, the Ukraine, Lithuania, and Poland participated. A book, *Stratigraphy and Paleontology of Geological Formations in Belarus* (Minsk: Institute of Geological Sciences, 2003, 304 pp.), was specially published prior to the Conference.

On April 10, 2003, the fourteenth session of Scientific Readings was held at the Geological Sciences Institute of the Belarusian Academy of Sciences. The Readings were in commemoration of the prominent scientist and Academician of the Belarusian and USSR Academies of Science, and BSSR State Award Laureate: Gavril Ivanovich Goretski (1900–1988). A manuscript written back in 1967, 'Reminiscences about Piotr Nikolayevich Chirvinski (1880–1955)', by this outstanding geologist, was published for the first time in *Lithosphere* (No. 1, 2003).

In May, 2003, the Belarusian geological community celebrated the 70th anniversary of the leading research officer at the Geological Sciences Institute of the Belarusian Academy of Sciences, and a Corresponding Member of Petrovskaya Academy (St Petersburg): Vsevolod Yevgenievich Bordon. He worked on the geochemistry and crystallography of metallogenesis.

In June, 2003, the Belarusian geological community celebrated the 70th anniversary of senior research officer at the Geological Sciences Institute of the Belarusian Academy of Sciences: Professor Roman Yefimovich Aisberg. He has worked in the fields of tectonics, regional geology, and oil geology and is a Corresponding Member of the Academy of Sciences of Belarus, and is recipient of the State Award of the BSSR Laureate.

Being among the leading geoscientists in Belarus, these scientists are highly respected in the scientific world.

In November, 2003, a meeting held at the Geology Department of the Belarusian State University was dedicated to the 125th anniversary of the Belarusian geologist, and founder of the Geology Department, Professor and Academician of Belarusian Academy of Sciences, N.F. Blioduh (1878–1935). Scientists from Belarus, Russia, Poland, and Lithuania attended and the materials of the meeting have been published.

The journal *Lithosphere* (Vol. 19, No. 219, 2003) published an article by Y.I. Anoshko devoted to the first Belarusian female geologist, Anna Missuna (1868–1922), a specialist in Quaternary geology, who was a disciple of Professors V.I. Vernadsky and V.D. Sokolov.

In the same journal, an essay by V.A. Ermolenko was published, devoted to the 75th anniversary of death of the prominent Russian revolutionary at the end of the 19th century: the geologist Iosif Lukashevich (1862–1928), who was born in Belarus. In his fundamental work, *Inorganic Life of the Earth* (1909–1911), he put forward the theory of the zonal metamorphosis of layers and explained the genesis of mining layers, depending on their position in the Earth's crust. He also showed the role of vertical Earth's crustal movement in mountain-forming processes. Lukashevich was founder and first Director of the Geography Institute in St Petersburg (1918) and published nine books.

Valerij Ermolenko, Minsk

Bolivia

During January and February, I performed an interesting work, concerned with the inventory of the galleries and pitheads at the Rich Mountain in Potosi. The San Bartolome project wants to exploit and benefit the waste materials that are stored near the Silver Mountain (heaps of rock extracted, ores and other secondary materials on the periphery of the Rich Mountain, which contain silver and tin). Moreover these works had to be classified as to whether they are of the Colony or the Republic. Coordinates were used in the inventory task, along with the digital photographic register and its corresponding location. The other task was more difficult, since the labours performed during the Republic were superimposed on those of the Colonial era. However, in some cases it was possible to find works that were reinforced with stone, a practice characteristic of the Colonial era.

Several authors have referred to the fact there were more than five thousand pitheads to the workings. Our approach has only revealed about five hundred, but it is possible that some pitheads may be covered by waste materials, and their original number may be great because most of the waste material was taken away to be treated by means of the cyanide process.

In short, the San Bartolome project represents a new development strategy for the study of the history of mining, in relation to the challenges and opportunities of the 21st century. In this project the Coeur d'Alene and the mining cooperatives are partners along with Comibol. In this way, the mining cooperatives will have access to technologies and working capital, the lack of which has hampered the possibility of their getting the benefit of the mineral resources over which they have rights. The project has the

commitment to promote, together with other local initiatives, the economic diversification on the region. The work will not risk the environmental sustainability of the area, and it will not adversely affect the condition of Cultural Heritage of Mankind of the Rich Mountain and the city.

The project covers 1649 hectares of mining rights, with joint venture contracts with seven cooperatives, the Comibol areas, and the concessions acquired by Manquiri.

During May, June and July, 2003, I made a study trip to Spain, Italy, France and Germany. The following were my chief activities:

7 May 7. Lecture at the Technical School of Mines, Madrid, organised by Dr Eng. Octavio Puche on: 'Mining, Health and Environment' (in Colonial Potosi). After the lecture there was an interesting exchange of opinions about the contents of the lecture.

14 May. Invited lecture at the University of Monza, on 'Health in Colonial Potosi'. The research for this topic was financed by 'Italian Cooperation' in Potosi, whose main activity has been the reconstruction of the main hospital in the city.

26–30 May 26 I participated in the XIIth International Conference on 'Heavy Metals in the Environment', ICHMET–Grenoble. On the 29th, I presented, jointly with Dr Alain Gioda (IRD): 'Potosi, Mining and Heavy Metals in Bolivia: A Large History (16th–21st centuries)'.

4 June. Lecture at *La Maison des Sciences de l'Eau*, of the University of Montpellier, sponsored by the CNRS and the IRD. The lecture was on: 'Origines et consequences de la pollution minière à Potosi (Amérique Latine) depuis le XVI^e siècle' ('Origins and consequences of the mining pollution in Potosi (Latin America) since the XVIth century').

8–13 June. I took part as a professor in the first conference on 'Sustainable Development, Environment and Industry' by invitation of The International University of Andalucia (Latin-American Campus, Santa María de la Rabida).

More properly, my activity was focused on the module of complementary training: 'Technological Challenges of the sustainable development', comprising the following subject: 'Colonial mining technology and Colonial metallurgical technology'. The following case-studies were considered: water storage and piping; and Diseases due to mining and metallurgical processes in Potosi and pollution and health problems in the Colony.

17 June. I took part in the gathering-round table: 'Almaden-Potosi' (Cities with World-wide Mining Heritage) organised by the Director of the Polytechnic University School of Almaden, Dr Eng. Luis Mansilla, and with the participation of the University authorities, academicians, the press, and students, and visited the Mining Historical Museum, Fco. Pablo Holgado.

7 July. Visit to the Latin-American Institute in Berlin, and an exchange of opinions with Professor Bernd Hausberger (Free University of Berlin).

11 July. Lecture on 'Mining in Potosi' at the Freiberg Mining Academy (Institute of ore dressing), organised by Dr habil. Dr Eng. Klaus Graichen und our Director, Professor Gert Schubert.

In September Professor Hausberger and twelve students from the Free University of Berlin visited Potosi. Apart from their study activities it was possible to organise two lectures for them: the Tomas Frias University Lecture, delivered by the Vice Rector and another on 'Music in the Andes', delivered by the Belgian, Professor Arnaud. The visitors liked both subjects.

Carlos Serrano, Potosi

Brazil, 2002

During 2002, Silvia Figueirôa spent a fruitful sabbatical year in Paris, researching at the *Centre Koyré d'Histoire des Sciences*. This was a unique opportunity to strengthen research links both with COFRHIGEO and INHIGEO colleagues, and with those at the *Muséum National d'Histoire Naturelle* (MNHN) or the *École des Hautes Études en Sciences Sociales* (EHESS). At the COFRHIGEO session in June, she delivered an oral presentation: 'Les rapports scientifiques entre le Brésil et la France au XIX^e siècle dans le domaine des sciences géologiques'. Her leave also provided the opportunity for her to cooperate with Pietro Corsi, Pierre Savatton, and Alice Ingold in one of the research seminars of the *Centre Koyré*, entitled '*Administrer les ressources: eaux, mines au XIX^e siècle*'. Her presence in Paris allowed her to participate in the INHIGEO Symposium on Alcide d'Orbigny (July, 2002).

The 7th master's dissertation on the history of geosciences was completed in June 2002 at the Department of Geoscience Education/UNICAMP, by Rachel Pinheiro (see below).

The principal publications follow (quoted in the original languages):

Figueirôa, Silvia F. de M., 'Ciência, Mineralogia, Mineração', *Revista do Instituto Histórico e Geográfico Brasileiro*, 2002, 416, 287–293.

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Gonçalves, Pedro W., 'Por qué la calisa fué considerada una roca magmática?', *Actas XII Simposio Sobre Enseñanza de la Geología*, Spain, July, 2002, 154–157.

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Monteiro, Rosana H.; Figueirôa, Silvia F. de & Velho, Léa, 'Brazil, 1833: The Discovery of Photography Revisited', in: Michel Bougard (ed.), *Alchemy, Chemistry and Pharmacy*, Brepols Publisher, Turnhout (Belgium), 2002, 129–135 (*Proceedings of the XXth International Congress of the History of Science*).

Pinheiro, Rachel, 'As histórias da Comissão Científica de Exploração (1856) na Correspondência de Guilherme Schüch de Capanema' Institute of Geosciences/UNICAMP, Campinas, 2002 (Master's dissertation).

- Sicca, Natalina & Gonçalves, Pedro W., 'História da química e da geologia: Joseph Black e James Hutton como referências para educação em ciências', *Química Nova*, 2002, 25, 689–695.
- Silva, Clarete P., *O desvendado do grande livro da natureza: um estudo da obra do mineralogista José Vieira Couto, 1798–1805*, Anna Blume/Fapesp/Unicamp, São Paulo, 2002.

Silvia F. de M. Figueirôa, Campinas

Brazil, 2003

During the year 2003, activities related to the history of geological sciences in Brazil took place under the aegis of two important scientific events: the Brazilian bi-annual History Symposium, which assembles historians of all specialities; and the 9th Brazilian Congress of the History of Science and Technology. Also, Silvia Figueirôa attended the INHIGEO symposium in Dublin in July, presenting a paper in co-authorship with two of her PhD students.

It is also important to mention that Márcia Helena Alvim has successfully completed the eighth master's degree dissertation on the history of geosciences at the Department of Geoscience Education/UNICAMP, in April, 2003.

The main publications follow:

Journal articles

- Brice, William R. & Figueirôa, Silvia F. de M., 'Charles Frederick Hartt—A Pioneer of Brazilian Geology', *GSA Today*, March 2003, 13, 18–19.
- Figueirôa, Silvia F. de M., 'À propos de l'enseignement, des livres et des échantillons: les sciences géologiques dans les rapports entre le Brésil et la France au XIXe siècle', *Archives internationales d'histoire des sciences*, 2003, 53, 62–80.
- _____, 'Les rapports scientifiques entre le Brésil et la France au XIXe siècle dans le domaine des sciences géologiques', *Travaux du Comité Français d'Histoire de la Géologie (COFRHIGEO)*, 2002, 16, 79–94 (issued in 2003).
- Lopes, Maria Margaret & Silva, Clarete Paranhos da, 'Investigações em história natural no Ceará: os estudos do naturalista João da Silva Feijó (1760–1824)', *Revista Ciências Humanas*, 2003, 9, 69–75.
- Pinheiro, Rachel & Lopes, Maria Margaret, 'Aspectos das produções textuais nas Viagens Científicas', *Revista triplov*, 2003, no volume number, 1–6.
- Tavares, Giovana G. & Figueirôa, Silvia F. de M., 'Una "casa del saber" en la region árida del Brasil: El Instituto Histórico y Geográfico de Goiás (1930–1979)', *MONTALBAN*, 2003, 36, 209–224.

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- Figueirôa, Silvia F. de M., 'História das ciências e ensino de (geo)ciências: relatos de algumas experiências', in: Ana M^a R. de Andrade (ed.), *Ciência em perspectiva: estudos, ensaios e debates*, Rio de Janeiro, Museu de Astronomia e Ciências Afins & Sociedade Brasileira de História da Ciência, 2003, 151–156.
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- _____, 'Museus e educação na América Latina: o modelo Parisiense e os vínculos com as universidades', in: Gouveia, G., Marandino, M. & Leal, M.C., *Educação e museu: a construção social do caráter educativo dos museus de ciências*, Rio de Janeiro, 2003, 63–82.

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- Figueirôa, Silvia F. de M. Review of: Cipriani, C., Nepi, C. & Poggi, L. (eds), *Opusculi e schede mineralogiche—manoscritti e lettere di Ottaviano Targioni Tozzetti: conoscenze naturalistiche a Firenze tra sette e ottocento*, Firenze, Leo S. Olschki, 2000. In: *Archives internationales d'histoire des sciences*, 2003, 53, 103–104.
- _____, Review of: Julian G. Peard, *Race, Place and Medicine: The Idea of the Tropics in Nineteenth Century*, Duke University Press, Durham, 1999. In: *Revista manguinhos*, 2002, 9, 715–716 (issued in 2003).
- _____, Review of Helmut Waszkis, *Dr. Moritz (Don Mauricio) Hochschild 1881–1965—The Man and His Companies: A German Jewish Mining Entrepreneur in South America*, Berlin, Berliner Lateinamerika-Forschungen, 2001. In: *Isis*, 2003, 94, 174–175.

Proceedings

- Figueirôa, Silvia F. de M., Silva, Clarete P. & Pataca, Ermelinda M., 'Investigating the Colonies: Local Geological Travelers Within the Portuguese Empire in the Transition of 18th–19th centuries', in: 28th INHIGEO Symposium, 2003, Dublin. *Abstracts*, Dublin, 2003, 21.
- _____, Clarete P. & Pataca, Ermelinda M., 'Aspectos geológicos das "viagens filosóficas" pelo território Brasileiro na transição do século XVIII para o século XIX', in: 9^o Seminário Nacional de História da Ciência e da Tecnologia, *Abstracts*, Rio de Janeiro, 2003, 61.
- Gonçalves, Pedro Wagner, 'Analysis of Contents of History and Philosophy of Science in Textbooks of Geosciences: Presence or Absence of References to James Hutton (1726–1797) and Charles Lyell (1797–1875) in Brazilian Books of Introductory Geology', in: *Earth Science for the Global Community (GeoSciEd IV)*, 2003, Calgary. Oliver, Graciela de S. & Figueirôa, Silvia F. de M., 'Agronomical Engineers in Brazil (1870–1950): Four Schools and Four Different Profiles?' In: International symposium, *Les enjeux identitaires des ingénieurs: entre la formation et l'action*, 2003, Évora, *Abstracts*, Évora, 2003, 10.
- Pinheiro, Rachel & Lopes, Maria Margaret, 'A Comissão Científica de Exploração (1856) e as propostas das instruções de viagem da seção geológica de Guilherme Schüch de Capanema', in: *XXII Simpósio Nacional de História, João Pessoa*, 2003, *Abstracts*, 91.
- Silva, Clarete Paranhos da, Lopes, Maria Margaret & Figueirôa, Silvia F. de M., 'João da Silva Feijó (1760–1824): diligências filosóficas no ceará', in: *XXII Simpósio Nacional de História, João Pessoa*, 2003, *Abstracts*, 70–71.

China (2002–2003)

*Anniversaries**Celebration of the 80th Anniversary of The Geological Society of China*

The 80th Anniversary of the Geological Society of China (GSC 1922–2002) was held in Beijing, from 16 to 19 October, 2002, having as its major topic ‘Geosciences and Society’. The celebration ceremony was inaugurated in the Great Hall of the People on the morning of 16 October. Professor Sun Shu, Chairman of the Earth Sciences Section, Chinese Academy of Sciences, gave his Presidential Address entitled ‘The Past, Present and Future of Earth Sciences in China’. Subsequent sessions were held in a restaurant, and more than five hundred geologists, domestic and overseas, participated in the conferences. More than seventy papers were presented orally. Academician Professor Wang Hongzhen, President of HGGSC, was the first speaker in the plenary session, with the title of ‘A Brief Retrospect of the Development of Stratigraphy and Paleontology in the Past Eighty Years in China’. Professors Zhai Yusheng and Yu Guang, Vice Presidents of HGGSC, gave interesting talks (Zhai, ‘On the Study of Metallic Ore Deposits’; and Yu *et al.*, ‘A Brief Retrospect and some Ideas about Advanced Geological education in China in the Twentieth Century’).

Celebration on the 50th Anniversary of the China University of Geosciences

The China University of Geosciences (Beijing) celebrated its 50th Anniversary (1952–2002) during the year. The University was founded under the name of Beijing College of Geology through the higher education reforms of 1952. Renowned geologists from home and abroad assembled for the celebration in Beijing from the 5th to 6th of November. In the past fifty years some 70,000 graduates have attended the University, and up to the present forty-one have been elected Members of the Chinese Academy of Sciences or the Chinese Academy of Engineering.

*Scientific Meetings**The 16th Annual Meeting of HGGSC*

The 16th Annual Meeting organised by HGGSC was held at the China University of Geosciences (Beijing) from 23 to 24 November, 2003. The major topic of the meeting was ‘Studies of Celebrated Persons in Geosciences’ and sessions in memory of the 110th anniversary of the birth of the late Professor Yuan Fuli and the centenaries of the births of the late Professors Xie Jiarong, Feng Jinglan, and Wang Yuelun were also held. Professor Liu Dongsheng, the famous Quaternary geologist, who has long been editor of the *Earth Science Volume* of the *Biography of Specialists in Science and Technology of China*, sponsored by the China Association for Science and Technology, was invited to give a keynote address on ‘Strengthen the Study of the History of Earth Sciences and Enhance the Study of Renowned People in Earth Sciences’. Some eighty veteran scholars and specialists of different fields, including petroleum geology and metallurgy, from the Chinese Academy of Sciences and various universities, attended the meeting, and some university undergraduates were also at times present. Altogether 41 papers were submitted, of which 34 were presented orally.

Second Symposium on Earth Material Sciences

The second symposium on the development of Earth material sciences was organised by HGGSC in November 2002, as a continuation of the first such meeting, held in 2002. Professor You Zhendong of CUG (Wuhan) presented a paper (coauthor Zhai Yusheng, MCAS) entitled ‘Progress in Science and Technology and the Development of Earth Material Sciences’. It contained a discussion of six stages, covering the time-range from the mid-19th century to the 1980s. Critical problems such as the mutual collaboration and merging of different disciplines, scientific ethics and administration, creative thinking and the ‘realistic’ approach to geology, were also discussed. The talk aroused wide interests among the participants.

*Publications (2002–2003)**Books*

Editorial Board, *The 80th Anniversary of the Geological Society of China: Commemorative Papers*, Geological Publishing House, Beijing, China, 2002.

This is a large volume, published in celebration of the 80th Anniversary of the GSC. It consists of four parts: reviews of disciplines; the development of geoscience careers; research results in various regions of China; and reminiscences of the past. The book gives a thorough retrospect of the role played by GSC in the development of geoscience through recollections of a number of veteran Chinese geologists, including some members of HGGSC.

Wang Mili (chief editor), *The 80th Anniversary of the Geological Society of China: Chronicle and Events*, Geological Publishing House, Beijing, 2002.

Geological Society of China from 1922 to 2002, including academic activities, domestic and abroad; the publication of periodicals, monographs and books; awards to distinguished personnel; the scientific popularisation of geology; and the main changes of the organisation of the GSC in the past eighty years.

Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publication House, Beijing, 2002.

This is a special issue of the non-periodic publication of HGGSC dedicated to the 80th Anniversary of GSC, which includes fifty-two papers about recent studies of the history of geology in China, the history of geological disciplines, ancient geological thought in China, and distinguished geoscience persons in China. The leading article is a retrospect of the development of geological sciences in the twentieth-century in China, mainly of the development history of the geological disciplines in China.

Shi Baoheng (ed.), *A Compilation of the Results of Petroleum Studies in China*, Geological Publishing House, Beijing, 2003.

This book contains thirty-seven essays representing the main results in the history of petroleum research, mainly based on the achievements of the China National Petroleum Corporation (CNPC) in the past thirty years.

Wang Dezi (ed.), *The History of the Department of Earth Sciences of Nanjing University*, Nanjing University Press, Nanjing, 2003.

The Department of Earth Sciences of Nanjing University, formerly the Department of Geology of The National Central University, was founded in 1930, and is one of the most distinguished geology departments in China. In the past seventy-odd years the Department has attracted a number of renowned professors and has produced some 8000 graduates, including the world-famous figure Professor Kenneth Hsu. Twenty-one of them have been elected members of CAS.

Yang Guangrong, Hu Xiangkui, Zhu Xinguo *et al.* (compilers), *Excellent Education for Fifty years: A Short History of the China University of Geosciences*, China University of Geosciences Press, Wuhan, 2002.

In this commemorative volume, published for the 50th Anniversary of the China University of Geosciences, includes more than five hundred photographs of historical interest and a number of precious historical materials. It is a well-documented and comprehensive account of the University.

Articles

- Ji Chuanmao, 'The St Petersburg College of Mining', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 382.
- _____, 'Problems in Sustaining Utilisation of Underground Water Reservoirs', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 291–294.
- Li Erong, 'On the Age of Usage of the Terms 'Coal' and 'Stone-carbon'', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 319–324.
- _____, 'The Locality Locus of the Development of Mining Industry in China', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 334–336.
- Liu Ruixun, Yu Guang, Yang Guangrong, 'A General Account of the Development and Reform of Higher Geological Education in China', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 195–199.
- Pan Yuntang, 'A Perspective of the Development of Palaeontology and Stratigraphy in China', in: *The 80th Anniversary of the Geological Society of China: Commemorative papers*, Geological Publishing House, Beijing, 2002, 10–14.
- _____, 'A Profound Career in a Short Life—In Memory of Professor Zhu Sen', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 151–156.
- Tao Shilong, 'Popularisation of Geological Knowledge and Social Progress in China', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 354–360.
- _____ & Li Erong, 'Germination of Geological Thinking in Ancient China', in: Wang Hongzhen (ed.), *Contributions to the History of Geology (4)*, Geological Publishing House, Beijing, 2003, 309–315.
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WANG Hongzhen, ZHAI Yusheng, YANG Guangrong, YOU Zhendong, Beijing

Costa Rica, 2002–2003*

Several papers dealing with the history of geological sciences have been published through 2002 and early 2003. Some papers that were omitted from previous reports are also listed.

In February 2003, the volume *Ciencia y Técnica en la Costa Rica del Siglo XIX (Science and Technology in Costa Rica in the 19th Century)* was published, edited by the geologist Giovanni Peraldo. Of the twelve papers included, four deal with geological matters, and among the fifteen authors six are geologists. The geological papers are: on scientific thought and geological teaching in Costa Rica (Peraldo); the beginnings of geology in Costa Rica (Alvarado and Peraldo); the contributions of William Gibb to geology (Denyer & Soto); and the management of hydrological resources during the 18th and 19th centuries (Vargas). Another paper, authored by a geologist, considers the philosophical background to the production of scientific knowledge (Cárdenes).

INHIGEO Member Gerardo Soto, who was away from Costa Rica in Japan for four years, returned in September 2002 (see his new address in the Membership list). He published two short notes in Japan in 2002 and a note on the return to Costa Rica of a piece of the Heredia Meteorite, which is presently exhibited in the School of Geology at the University of Costa Rica. Soto has started a 'campaign' of communication with other historians of geology in Latin American countries, with the intention of achieving a broader participation in INHIGEO from that part of the world. Contacts have already been made in Mexico and Venezuela.

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Vargas, Asdrúbal, 'Al Manejo Histórico de los Recursos Hídricos en Costa Rica con Énfasis en el Período Indígena y en los Siglos XVI, XVII, XVIII y XIX', *Anuario de Estudios CentroAmericanos*, 2001, 27, 59–81.

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Czech Republic (Prague)

The activities of the Czech INHIGEO Members in Prague in 2003 are summarised as follows:

The main activity has been the preparatory work associated with organising the INHIGEO meeting in the Czech Republic (Prague and Brno/Mikulov) for 2–12 July, 2005.

A Local Organising Committee (LOC) was established, the members of which prepared a preliminary programme for the meeting, including symposium lectures, oral and poster presentations, and seven complementary field excursions into regions interesting from the viewpoint of their geological, geohistorical, or geophysical importance. By the end of 2003 the Symposium Program was drafted in its final version and shortly afterwards was distributed to the INHIGEO members as a first circular. The Members of the LOC are:

Ph Dr Doc. Josef Haubelt, Svojsicka str. 10/2834, Sporilov, 140 00, Prague 4, 420 272 762 531, haubelt@pohoda.com .

Rer. Nat. Dr Ondrej Jaeger, Sochanova str. 1133/3, 163 00, Prague 6, 420 274 822 017 (H), 420 311 681 713 (W),

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Rer. Nat. Dr Michal Pondelicek, Plzenska 695/70, 26601 Beroun, Czechia 420 311 621 281 (W), 420 311 681 713 (H),

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Rer Nat Dr, PhD, Jan T. Kozak, Kubelikova 7, 13000 Prague 3, 42 222 718 008 (H), 420 267 103 018 (W),

kozak@ig.cas.cz

In March–April 2003, a specialised exhibition was prepared and thrown open to the Prague public, entitled *Severe Historical Earthquakes in Old Engravings*. One hundred and two rare, attractive and informative original 15th–19th-century prints of some of the world's major earthquakes were exhibited (for details see nisee.berkeley.edu/kozak).

* We apologise for the omission of the Costa Rica Report in *Newsletter* No. 35.

The opening of the exhibition in the Prague Carolinum (Charles University Palace of 1352) was attended by some three hundred guests, including representatives of Charles University, the Academy of Sciences, and the Czech Fulbright Commission. The exhibition was most favourably received by the Czech radio and the daily press.

Among the papers and monographs published in 2003 those related to the study of the history of geosciences were: Kozák, J. (2003) *150 Jahre Meteorologie und Geodynamik in Oesterreich*, C. Hammerl et al. (eds), Graz, Austria 2001 (review), *Studia Geophysica et Geodaetica*, 47, 715–717.

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& Rybář, J. (2003), 'Pictorial Series of the Manifestations of the Dynamics of the Earth, 3. Historical Images of Landslides and Rock Falls', *Studia Geophysica et Geodaetica*, 47, 221–232.

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Other activities of Prague INHIGEO Members.

Two geologists, Jiří Litochleb (Prague) and Petr Morávek (Jilové by Prague) prepared and published an extended book entitled *Jilovské zlaté doly (Gold Mines of Jilové)*, Regional Museum, Jilové, 2002. In the book the history of gold mining in the region in question is given, from the period of Celtic settlement in the 3rd century, B.C. The book played an important role during preparation of the specified Symposium on the subject *Jindřich Ladislav Barviř, petrograf, montanista, geolog* (J.L.B., petrologist, mining geologist) held at the Jilové Museum of Gold Mining in May 2003. The principal talks at the symposium were presented by Jiří Litochleb, Petr Morávek, Ferry Fediuk, Dalibor Velebil, and Josef Haubelt.

A series of important talks was presented at the annual symposium 'Hornická Příbram ve vědě a technice' ('Scientific and Technological Aspects of Mining in the Příbram Region'), held in Příbram from 14 to 18 October, 2003, in the fields of geoethics and the memorials and traditions of the geognostic evolution of the region. On the basis of the symposium, a book prepared by a wide collective of authors was issued: *Rudné a uranové hornictví v České republice (Ore and Uranium Mining in the Region of Today's Czech Republic)*, Anagram, Ostrava, 2003. Among the contributors, Koloman Iványi, Ladislav Jangl, Miroslav Palas, Vladimír Pruner, Vlastimil Staněk, and Pavel Suček should be given particularly favourable mention.

At the regular annual symposium on the history of mining, organised by the National Technical Museum in Prague in December, 2003, two lectures were given by Josef Haubelt: on 'Mining leitmotifs as represented in orographic maps of the Cheb region (Egerland) prepared by Franz Ambros Reuss at the turn of the 18th century' and 'Jöns Jakob Ferber and his study of silver extraction by amalgamation'. Dr Haubelt also presented a critical analysis of the book by the Jesuit scholar Jan Kořinec (1626–1680) *Staré paměti Kutnohorské (Ancient Memoirs of Kutná Hora)*, Prague 1675 (new edition Prague 2000), pointing out the limited value of Kořinec's book as a source of factual information.

France

As usual, the French Committee on the History of Geology held three meetings in 2003. Presently, its secretary is still trying to collect the last contributions for the annual volume of *Travaux*, the contents of which is expected to include:

Michel Dubois, 'Les grandes étapes du développement de l'étude des inclusions fluides'.

Ion Argyriadis, 'Les connaissances géologiques chez les anciens Grecs'.

Jean Gaudant et Geneviève Bouillet, 'Hommage à Johann Friedrich Blumenbach (1752–1840) à l'occasion du bicentenaire de la publication de son essai d'*Archéologie de la Terre* (1803)'.

Françoise Legré-Zaidline, 'Présentation d'ouvrage: Alcide Dessalines d'Orbigny (1802–1857)'.

Pierre Savaton, 'Les cartes géologiques départementales: des cartes avant la Carte'.

Philippe Pinchemel, 'Souvenirs d'un géographe chez les géologues'.

Pierre Routhier, 'La première synthèse d'envergure sur les provinces pétrolifères par un grand maître méconnu: Louis Barrabé (1895–1961)'.

Jean-Paul Schaer, 'La géologie à Neuchâtel entre deux révolutions: de la dérive des continents à la tectonique des plaques'.

Jean Vogt, 'Bref historique des enquêtes macrosismiques en France, dans leur contexte, avec quelques exemples de pays voisins'.

Lydie Touret, 'Présentation d'ouvrage: H. Bots & R. Visser: *Correspondance 1785–1787 de Petrus Camper (1722–1789) et son fils Adriaan Gilles Camper (1759–1820)*'.

Additionally, an excursion was organised in June 2003 to some historical places in which had been discovered and interpreted the volcanic history of Auvergne. Jean Mergoïl, a former geologist of Clermont-Ferrand University has planned and organised the two-day field programme most perfectly. During the occasion, a small meeting was held in the small château built by Montlosier, who was a protagonist of the beginnings of volcanology in Central France. Some of the contributions are expected to appear in our *Travaux*:

Pascal Richet, 'Nicolas Desmarest et l'origine volcanique des basaltes: une découverte d'une importance insoupçonnée'.
 Jean Gaudant, 'Un naturaliste clermontois méconnu: l'abbé Paul-François Lacoste (1755–1826) et les volcans d'Auvergne'.
 Gabriel Gohau, 'Du Puy de Dôme au Cantal: la théorie des cratères de soulèvement'.
 Also of interest is *L'essor de la géologie française*, coordinated by Jean Gaudant, which was published in December 2003 (issue No. 88) by the journal *Géochronique* (coedited by *Société géologique de France* and BRGM), a 27 page folder devoted to French geology during the 19th century.
 Finally, in December 2003, a book by our President, Gabriel Gohau, *Naissance de la Géologie Historique: La terre des "théories" à l'histoire*, was published (for review, see p. 39).

Jean Gaudant, Paris

Germany

Meetings

The history of meteorology group held its annual meeting on September 25–26 at Potsdam with a symposium on 'The Development of Meteorology in 19th Century', organised by Cornelia Lüdecke and Hans Volkert. At the Institute for the History of Science of the University of Munich, INHIGEO member Bernhard Fritscher, together with Andreas Kühne and Menso Folkerts, held an international symposium on 'Astronomy as a Model for the Sciences in Early Modern Times' on March 21–23 at the Munich Center for the History of Science and Technology. With the support and the participation of German INHIGEO Members a commemoration on the 150th anniversary of the death of the German geologist Leopold von Buch (died 4 March, 1853) was held at his birthplace, Stolpe (near Angermünde, Uckermark), on 3–4 March. The meeting was organised by the *Verein Berlin-Brandenburgische Geologie-Historiker 'Leopold von Buch'* and the German working group on the history of earth sciences of the *Gesellschaft für Geowissenschaften*. The papers are published in *Geohistorische Blätter*, Vol. 6, No. 2 (2003) (www.geohistorische-blaetter.de).

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- _____, Review of: Waszkis, Helmut: *Dr Moritz (Don Mauricio) Hochschild 1881–1965. The Man and His Companies. A German Jewish Mining Entrepreneur in South America* (Berliner Lateinamerika-Forschungen, Bd. 14), Frankfurt a. M.: VERFUERT Verlagsgesellschaft und Madrid: Iberoamericana, 2001; *Internationale Zeitschrift für Geschichte und Ethik der Naturwissenschaften, Technik und Medizin (NTM)*, n.s., 2003, 11, 60.
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- ____, Review of *National Geographic Expeditionsatlas. Die größten Abenteuer unserer Zeit. Hamburg: National Geographic Deutschland 200, Berichte zur Wissenschaftsgeschichte*, 2003, 26, 69–70.
- ____, Review of David Thomas Murphy, *German Exploration of the Polar World. A History, 1870–1940*, University of Nebraska Press, Lincoln and London, 2002, in: *Polar Record*, 2003, 39, No. 210, 258–260.
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- Schröder, Wilfried, 'Leuchtende Nachtwolken: Geschichte, Entwicklung, Beobachtungen' ('Noctilucent Clouds'), *Beiträge zur Geschichte der Geophysik und kosmischen Physik*, 4 (2), Arbeitskreis Geschichte der Geophysik und Kosmischen Physik, Potsdam, 2003.
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Lectures

- Fritscher, B., 'Mineralogisch-meteorologische Modelle in der Naturphilosophie Schellings und Hegels', Padua, Universität Padua, Jahrestagung des Hegel-Arbeitskreises "Naturphilosophie: Schelling und Hegel im Vergleich" (23–24 May) (23 May).
- ____, 'Naturforschung im Geiste Alexander von Humboldts: Alexander Keyserling und die Entwicklung der Geologie in Rußland', Tartu (Dorpat), Universitätsbibliothek, Symposium *Hier ist woanders: Das baltische Weiterleben der Keyserlings* (18–21 September, 2003) (19 September).
- ____, 'Die internationale meteorologische Kooperation (1901–1904) südlich von 30° S. Eine Phase intensiver Beobachtungen in der Tradition von M.F. Maurys Anregungen', 4th *Symposium of the German History of Meteorology Group, Potsdam, Geoforschungs Zentrum* (25 September, 2003).
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- ____, 'Beginn der europäischen Wirbelsturmforschung—Ein Ergebnis von Alfred Wegeners Tätigkeit während des ersten Weltkrieges', *Kolloquium im Münchner Zentrum für Wissenschafts- und Technikgeschichte, München* (10 November, 2003).
- ____, 'Die deutsche Polarforschung unter dem Einfluß von Erich von Drygalski', 3. *Münchner Workshop zur Hochgebirgsforschung, Symposium zu Ehren des 100-jährigen Jubiläums der ersten deutschen Südpolar-Expedition unter der Leitung Erich von Drygalskis, Geographisches Institut der Ludwig-Maximilians-Universität, München* (28 November, 2003).

Further Activities

A special issue of the *Geologisches Jahrbuch* was dedicated to the 125th anniversary of the Prussian Geological Survey: '125 Jahre Preußische Geologische Landesanstalt und ihre Nachfolger -Geschichte und Gegenwart', Klaus-Dieter Meinhold (coordinator), ed. by Bundesanstalt für Geowissenschaften und Rohstoffe und den Staatlichen Geologischen Diensten in der Bundesrepublik Deutschland. It included a description of the foundation of the Survey in 1873, short biographies of the leading geologists of the new institution, and valuable archival materials from the years 1770 to 1869 concerning the institutionalisation of geology in Germany.

Geologisches Jahrbuch Reihe G, No. 10, Hannover 2003, Issue No. 14 of *Nachrichtenblatt des Arbeitskreises Geschichte der Geowissenschaften* was edited by Oskar Burghardt in 2003.

Cornelia Lüdecke presented a series of posters at several meetings: 'International Co-operation in Antarctica 1901–1904 and German Base Station at Kerguelen' 2 posters, 'Aboard *Marion Dyfrene*', Mauritius, August 2003 & 'Exploring the Unknown: History of the First German South Polar Expedition 1901–1903'; (6 posters, '9th International Symposium on Antarctic Earth Sciences, Potsdam, Technische Universität, 8–12 September, 2003'; 'Die Kerguelen als Stützpunkt für die deutsche Südpolarforschung (1901–1903) und als heutiges Kulturdenkmal' (1 Poster, '21st International Polar meeting, Kiel, Geomar', 17–22 March, 2003).

And Bernhard Fritscher, supported by a research fellowship of the *Arbeitsgemeinschaft Alpenländer (ARGE Alpen-Adria)*, had the opportunity to do some archival work on the history of earth sciences in Austria, with the cooperation of Austrian colleagues at the University of Klagenfurt.

The help of the German members of INHIGEO in the compilation of this report is much appreciated.

Bernhard Fritscher, Munich & Martina Koelbl-Ebert, Eichstätt

Hungary

The Geohistorical Section of the Hungarian Geological Society elected a new Board in February, 2003. The outgoing President Endre Dudich, having served two three-year terms, was not eligible for continuation in the office, and Secretary József Hála declined renomination. The undersigned Tereza Póka was elected President and Peter Papp as Secretary. (Dr Póka is geochemist, Senior Research Fellow in the Laboratory for Geochemical Research of the Hungarian Academy of Sciences, and an INHIGEO member since 1976. Peter Papp, geologist, is a Research Associate of the Geological Museum in the Geological Institute of Hungary [MAFI].) Professor Emeritus Vilma Széky-Fux was elected life-long Honorary President of the Section.

The year 2003 was marked by the centenary celebrations of Professor Elemér Szádeczky-Kardoss (1903–1984) was Professor of Petrology and Geochemistry at the ELTE (Budapest University), and also held chairs at the universities of Sopron

and Miskolc. He was a Full Member of the Hungarian Academy of Sciences and was twice awarded the Kossuth Prize (the highest distinction for intellectual achievement in Hungary). His work was commemorated in a series of scientific meetings organised by the Hungarian Academy of Sciences, the Geohistorical Section of the Hungarian Geological Society, and the ELTE University, where his bust was unveiled in the lobby of the main building of the Faculty of Sciences. This series of events was crowned by the publication of a 200-page memorial volume by the Earth Sciences Department of the Hungarian Academy of Sciences, entitled *Geonomy after the Turn of Millennium*. In this work, edited by Dr Dudich, ten distinguished authors presented and updated the pioneering ideas on integrated (not only geoscience) proposed by Szádeczky-Kardoss in his *Geonomy* in 1974 (see the book review in this number of *INHIGEO Newsletter*, p. 45). Its abridged English-language version is now being edited. Dr Dudich plans to submit a paper on the work of Szádeczky-Kardoss to *Episodes*, with relevant quotations from his works.

A remarkable *Memorial Book* was published in the town of Kalocsa on the work of Professor József Szabó, the 'Father of Hungarian Geology', whose exceptionally dynamic personality and multidisciplinary oeuvre are discussed and nicely illustrated by a team of authors. Szabó maintained a wide network of international relations and played an important part in the overall development of geology in the second half of the 19th century.

Dr Gabor Papp (one of Hungary's eight *INHIGEO* members) was awarded the J. Szabó Memorial Medal (the most prestigious distinction of the Hungarian Geological Society) for his monograph *On the History of Minerals, Rocks and Fossil Resins Discovered in the Carpathian Basin* (2002).

Irma Dobos hydrogeologist, Eurogeologist, and member of *INHIGEO*, was elected Honorary Member of the Hungarian Geological Society.

The Geohistorical Section held eight meetings in 2003, with altogether eighteen presentations. It also contributed lectures to four meetings of other institutions.

The Section is dealing also with the history of geology in Transylvania, Romania. (Most regrettably Romania has no member in *INHIGEO*.) In 2003, we invited Eva Hubbes to deliver a lecture on the hitherto unknown heritage of Ferenc Benkő, author of the first Hungarian-language textbook of mineralogy, and to project the TV movie presenting his life. Our members contributed with lectures to the commemorative session on the work of Professor Zoltán Török, which took place in Kolozsvár / Cluj.

Some selected themes dealt with were:

Mineralogical and hydrogeological comments in the Old Testament (by Mihály Nagy and György Vitális, respectively)

Magnus Andreas Dudith—a Hungarian humanist of the 16th century (by Endre Dudich, whose family honours him as their (however hypothetical!) ancestor)

More case-histories of subsurface water exploration were presented by Irma Dobos and Béla Csath

In connection with the end-of-year meeting of the Section, an exhibition was arranged in memory of the loess researcher, Pál Kriván, by his disciple Miklós Szónoky of Szeged University under the title 'Natural Sculptures' ('fancy-shaped' concretions from Neogene sandstones and loess).

On January 28, 2004, the Section convened a meeting at the headquarters of the Hungarian Academy of Sciences to congratulate Endre Dudich, former Secretary General of *INHIGEO*, on his 70th birthday, with more than 120 attendants. In Special Issue 8 of the *Annals of the History of Hungarian Geology*, the family background, the many-sided activities and achievements of Dr Dudich ('A Hungarian humanist polymath of the 20th century') have been summed up. (See the Book Reviews of the present *Newsletter*, p. 45).

Fourteen geohistorical studies were published in Hungarian in 2003. The books on historical topics published in the previous year were:

J. Hála & I. Romsics (eds), *'A legnagyobb magyar geológus' Szabó József-émlékkönyv (tanulmányok)* Kalocsai Múzeumbarátok köre, Kalocsa, 2003 ('The greatest Hungarian Geologist', *József Szabó Memorial Volume*).

E. Dudich (ed.), *Geonómia az ezredforduló után*, Magyar Tudományos Akadémia, Geonómiai Albisottság, Budapest, 2003 (*Geonomy after the Millennium*, Hungarian Academy of Sciences, Subcommittee on Geonomy).

T. Póka (ed.), *Egy XX. sz.-i humanista polihisztor. Dr. Dudich Endre 70 éves*, A Magyarhoni Földtani Társulat Kiadványa, Budapest, 2004 (*A Twentieth-Century Hungarian Humanist Polymath: Dr. E. Dudich is 70 years old*).

Tereza Póka, Budapest

India

Professor K.R. Murty has completed his work for *INHIGEO* on the location of geoarchives. He was honoured by receiving the 'Outstanding Teacher Award' of the Faculty of Science, Nagpur University and the Institute of Science (Government of Maharashtra) at the Nagpur Tricentenary Celebrations in December, 2003.

Ireland

The major event of the Irish history of geology calendar was the 28th *INHIGEO* Symposium, held at Trinity College, Dublin, in July (see report p. 11). This meeting attracted 49 delegates and 19 accompanying members from 17 countries. The post-Symposium trip was led by Patrick Wyse Jackson, and visited various sites of interest to historians of geology such as the Giant's Causeway, as well as places of scientific and cultural interest. The group was joined by Paul Mohr at Richard Kirwan's house near Galway and by Gordon Herries Davies and Jean Archer at Cappoquin. There, and at various sites in the vicinity, Gordon explained the paradox of the bend of the River Blackwater.

Gordon Herries Davies was elected an Honorary Senior Member of *INHIGEO* at its Business Meeting in Dublin. He is continuing to work on a history of the Geological Society of London, which will be published during its bicentenary celebrations in 2007. A review of Paul Mohr's book *Wind, Rain and Rocks: The Discovery of West Connacht Geology, 1800–1950* can be found on p. 57.

Patrick Wyse Jackson has been elected Editor of *Earth Sciences History* and takes up his editorial reins in January 2005. He is completing a book on the age of the Earth, and is currently editing the proceedings of the Dublin meeting. He will be on

sabbatical in Pennsylvania between July and December 2004 and may be contacted at the Department of Geology, PO Box 1773, Dickinson College, Carlisle, PA 17013-2896, USA (e-mail: wysjcknp@tcd.ie).

The chemist and geologist Richard Kirwan was the subject of the annual lecture of the National Committee for the History and Philosophy of Science, given in Dublin in December. An accompanying booklet by Professor D. Thorburn Burns is available from the Royal Irish Academy, 19 Dawson Street, Dublin 2.

Publications

Burns, D.T., *Richard Kirwan, the Dublin Philosopher*, Annual Public Lecture National Committee for the History and Philosophy of Science, Royal Irish Academy, Dublin, 2003.

Lalor, B. (ed.), *The Encyclopaedia of Ireland*, Gill & Macmillan, Dublin, 2003, pp. xxxv + 1218.

Includes: 'Wynne, Arthur Beavor', p. 1154 (by Martyn Anglesea); 'Ball, Valentine', p. 64; Close, Maxwell Henry', p. 213; 'Colby, Thomas', p. 218; 'Cole, Grenville Arthur James', p. 218; Fitton, William Henry', p. 392; 'Ganly, Patrick', p. 428; 'Giesecke, Sir (Karl Ludwig) Charles Lewis', p. 438-439; 'Hardman, Edward Townley', p. 472; 'Hull, Edward', p. 507; 'Kilroe, James Robinson', p. 592; 'King, William', p. 593; 'Portlock, Joseph Ellison', p. 888; 'Royal Geological Society of Ireland', p. 947; 'Sollas, William Johnston', p. 1005 (by Jean Archer); 'Committee for Quaternary Research in Ireland', p. 224; 'du Noyer, George Victor', p. 329; 'Evans, E. Estyn', p. 365; 'Farrington, Anthony', p. 377; 'Geological Survey of Ireland', p. 435; 'Griffith, Sir Richard John', p. 460; 'Grubb, Sir Howard', p. 462; 'Grubb, Thomas', p. 462; Mitchell, George Francis (Frank)', p. 730 (by Gordon L. Herries Davies); 'Cole, William Willoughby, Third Earl of Enniskillen', p. 218 (by Kenneth W. James); 'Apjohn, James', p. 36 (by Susan McKenna-Lawlor); 'Joly, John', p. 569-570 (by Norman McMillan, Norman); 'Birmingham, John', p. 94 (by Paul Mohr); 'Charlesworth, John Kaye', p. 184; 'Kiltorcan Old Quarries', p. 592 (by Christopher Moriarty); 'Haughton, Samuel', p. 478 (by Charles Mollan); 'Kinahan, George Henry', p. 592 (by Matthew A. Parkes); 'Hamilton, Rev. William', p. 469 (by Geoff Warke); 'Ball, Sir Charles Bent', p. 63; 'Geology', p. 435; 'Geophysics', p. 435-436; 'Kane, Sir Robert John', p. 575; 'Museum of Irish Industry', p. 753; 'National Soil Survey of Ireland', p. 770; 'Royal College of Science for Ireland', p. 945; 'Speleology', p. 1011 (by Patrick N. Wyse Jackson)

Wyse Jackson, P.N., 'Grenville Arthur James Cole (1859-1924) the cycling geologist: tours in Ireland and Continental Europe', *Abstracts. 28th INHIGEO International Symposium on 'Geological Travellers'*, Trinity College, Dublin, 2003, 57.

_____, 'Professionals in India: the lives and friendship of Charles Æmilius Oldham (1831-1869), geologist, and Thomas Hardinge Going (1827-1875), railway engineer', *Abstracts 28th INHIGEO International Symposium on 'Geological Travellers'*, Trinity College, Dublin, 2003, 58.

_____, Buttler, C.J. & Sharpe, T., 'Bryozoans and corsetry: the palaeontological work of George Robert Vine (1825-1893) of Sheffield', *Proceedings of the Geologists' Association*, 2003, 114, 339-344.

Patrick Wyse Jackson, Dublin

Israel

The International Union of Soil Sciences (IUSS) is planning a Symposium at the International Geological Congress in Florence in 2004 (Functions of Soils) at which I expects to co-author a paper on pedological and geological relations in soil mapping, taking responsibility for the historical aspects of the topic. The History of Soil Science Commission within the IUSS, which is a joint Commission with DHS continues to be active. A brief article on the history of soil classification appears on p. 18, as a preliminary to a more detailed treatment of the large topic, to be published elsewhere.

Dan Yaalon, Jerusalem

Japan

The Japanese Association for History of Geological Sciences (JAHIGEO) held ordinary meetings at Hokutopia, Tokyo, on 14 June and 23 December, 2003, and an evening meeting at the time of the annual meeting of the Geological Society of Japan, at Shizuoka University, on 21 September.

The following presentations were made at the general meeting in June.

Masae Omori, 'The geological and palaeontological contributions of Yoshiaki Ozawa'

Hakuyu Okada, 'On the history of Japanese sedimentology'

Toshio Kutsukake, 'Dowser and Japanese mountaineering ascetic's stick'

Yoshiaki Ozawa (1899-1930), an Associate Professor at Tokyo University, made pioneering investigations in Japanese geology, showing the inverted structure in the Palaeozoic strata of southwest Japan, and dividing the Carboniferous and Permian formations into four zones, on the basis of their foraminiferal assemblages, thereby establishing the approximate geological history of the Japanese islands in the Palaeozoic and Mesozoic.

The following two lectures relating to Shizuoka University were presented at the evening meeting at the university.

Arata Sugimura, 'A Note on Professor Katsumi Mochisuki's diary'

Ryuichi Tsuchi, 'History of the Geosciences Department, Shizuoka University'

Katsumi Mochisuki (1905-1963) was Professor at Shizuoka Junior College, the predecessor of the present Shizuoka University. He was admired as a fine teacher of geosciences, writing several excellent textbooks on geology and mineralogy. He also published the pioneering work, *History of Geoscience in Japan*, in 1948.

The following three lectures were given at the general meeting in December.

Nobuyuki Aida, 'A short history of Chinese geology'

Masanori Kaji, 'Vernadski and Jun'ichi Takahashi—the introduction of geochemistry to Japan'

Naomoto Komatsu, 'Japanese oil prospecting in northeastern China'

Jun'ichi Takahashi (1887-1959), Professor of Petroleum Geology at Tohoku University, made a significant contributions in the 1920s by his hypotheses concerning the kerogen origin of petroleum and the genesis of glauconite. He translated Vernadsky's *Geochemistry* into Japanese (published in 1933).

Seminars on the history of geosciences were held on four occasions under the leadership of some of the younger members of the Association on 22 March, 21 June, 4 October, and 20 December, at Aoyama, Tokyo. The following presentations were made:

Michiya Inomata, 'Impression from geological surveys in China and Korea' (March)

Toshifumu Yatsumimi, 'Benjamin Hobson's activities in East Asia' (June)

Shigeo Kato, 'Geological studies at the Shanghai Institute of Natural Sciences during World War II' (October)

Yukinori Takahashi, 'Gravity measurement and survey by Aikitu Tanakadate' (December)

Benjamin Hobson (1816–1873) was an English Protestant missionary who stayed in China, where he translated textbooks of natural and medical sciences into Chinese. His textbook of natural science was used in Japan in schools and in feudal clans in the Edo Period and in elementary schools in the Meiji Period.

Aikitu Tanakadate (1851–1952), Professor of Physics at the University of Tokyo, carried out reconnaissance surveys of gravity and geomagnetism in Japan. He was one of the founders of the Imperial Earthquake Investigation Committee and the Geodetic Commission, prior to World War II.

The Association published Nos 20 and 21 of its *Bulletin* in May and December and *Newsletter* No. 5 in April.

Yasumoto Suzuki, Kyoto, and Kenzo Yagi, Sapporo

Lithuania

Short articles have been published devoted to following topics:

Grigelis, A., 'Alexandr Vasilievich Fursenko and Modern Micropalaeontology', *Stratigraphy and Palaeontology of Geological Formations of Belarus*, Institute of Geological Sciences, Minsk, 2003, 40–46.

_____, 'Department of Mineralogy of Vilnius University: 1803–1832', *Geology in Vilnius University*, Vilnius Universitetas, 2003, 18–37.

_____, 'Roman Symonowicz—Pioneer of the Lithuanian Mineralogy', *Science and Life*, No. 10, 2003, 20.

_____, '110 year jubilee of Academician Juozas Dalinkevicius', *News of the Lithuanian Academy of Sciences*, No. 3–4, 2003, 24.

_____, 'Vytautui Juodkaziui—75', *News of the Lithuanian Academy of Sciences*, No. 5, 2003, 10.

_____, '200th Anniversary of the Department of Mineralogy of Vilnius University', *Geological Horizons*, No. 2, 2003, 6–13.

_____, 'Palaeontologist Valentina Karatajute-Talimaa: The Academician Juozas Dalinkevicius Prize', *Geological Horizons*, No. 2, 2003, 66.

'Report of the Foreign Travel of Roman Symonowicz in 1803', translated from Polish by A. Grigelis, *Geological Horizons*, No. 2, 2003, 14–17.

'Letter of Roman Symonowicz to Adam Jerzy Czartoryski, 1810', translated from Polish by A. Grigelis, *Geological Horizons*, No. 2, 2003, 17–18.

International Conferences

'Centenary of the Micropalaeontologist, Professor A.V. Fursenko' (Minsk, Belarus, 30–31 January, 2003).

'110th Year of Geologist Academician J. Dalinkevicius' (Vilnius, 12 June, 2003).

'The Department of Mineralogy in Vilnius University, 1803–1832' (Vilnius, 8–9 October, 2003). The Conference was supported by INHIGEO. See Report, pp. 15–17.

Other activities

Since 4 December, 2002, the Lithuanian Ignotas Domeika Society has been chaired by Prof. Grigelis, who has also been elected President. The annual meeting was held in Vilnius on 19 March, 2003. An *International Yearbook on Geology of the Baltic Sea "Baltica"*, Vol. 15, was published in English by A. Grigelis in December 2003.

A paper on Ignacy Domeyko's work 'A View of the Chilean Cordilleras', originally published in Polish in 1878, is being prepared in collaboration with Professor Mudis Salkauskas (Vilnius, Academy of Sciences) for publication in *Episodes*.

An *International Yearbook on Geology of the Baltic Sea "Baltica"*, Vol. 15, was published in English by A. Grigelis in December, 2003.

Algimantas Grigelis, Lithuania

Malta

Heritage Malta, the National agency for Museums and Cultural Heritage, has organised an Exhibition celebrating the centenary of the setting up of the first national museum. This is entitled '100 Years of Heritage 1903–2003—A history of State Museums and heritage sights in Malta'. The Exhibition is running till the end of August 2004. An accompanying guide book has also been published.

George Zammit-Maempel, Malta

New Zealand

Research into history of geology in New Zealand continues to be energetically pursued. Three sizeable biographies of geologists are in the final stages of completion; a translation of Hochstetter's Sixth Diary is being made ready for publication; and a range of articles have appeared in the Geological Society of New Zealand's *Historical Studies Group Newsletter*. Two of the biographies concern nineteenth-century geologists, Alexander McKay and Edward Hydelbach Davis, authored by Graham Bishop and Mike Johnston respectively. McKay was a self-taught geologist who, unencumbered by the European training of his contemporaries, made a number of major observations. He recognised that New Zealand's mountains were very young and that the Tertiary cover-rocks within their valleys predated uplift. They were therefore much more extensive in the past than at present. After an earthquake in 1888, McKay was the first to observe horizontal offsetting on what would later be described as a strike-slip fault. Davis was recruited to the Geological Survey in 1870, but because of his death by drowning the following year his

contributions to New Zealand geology were limited. Nevertheless, he made some important observations that helped advance understanding of the Late Palaeozoic–Mesozoic rocks.

The third biography is Simon Nathan's account of Harold William Wellman. Harold, the subject of an international TV documentary entitled *The Man who Moved Mountains*, was the first to recognise that the Alpine Fault, which traverses the length of New Zealand's South Island, has distinctive belts of rock, including the Dun Mountain Ophiolite Belt, dextrally offset by 480 km. The fault is now identified as the propagation of the boundary between the Pacific and Australian plates through the continental crust of what was eastern Gondwanaland. Simon Nathan is well placed to write this biography, having previously co-authored accounts of Professor Maxwell Gage (see p. 47) and meteorite researcher Brian Mason of the Smithsonian Institute (see p. 48).

Heather Nicholson of Auckland has just completed a doctoral thesis at University of Auckland on the complexities in the understanding by geologists of the Late Palaeozoic–Early Mesozoic rocks, many of which are commonly referred to as 'greywackes'. It was not until the advent of plate tectonics that it was realised that the belts of such rock comprise narrow parallel terranes that were accreted to the margin of Gondwanaland.

A number of researchers are concentrating on aspects of the life of Sir James Hector, the first Director of the New Zealand Geological Survey. Hector, a graduate of Edinburgh University, was appointed doctor and geologist to the Palliser Expedition to western Canada. It was from his encounter with a horse that Kicking Horse Pass is named. Subsequently, in 1861, he was appointed geologist to Otago Province in southern New Zealand, which at the time was producing large quantities of alluvial gold. With the founding of the New Zealand Geological Survey four years later he was first Director and was to be the dominating figure in New Zealand science for the remainder of the nineteenth century. Amongst those working on Hector are Alan Mason of Auckland, Daphne Lee of Otago, and Tony Hocken of Dunedin. Tony Hocken has also just had published his history of the Geology Department of the University of Otago (see p. 49). The University of Otago is the oldest in New Zealand and for many years had a school of Mines modelled on the Royal School of Mines in London.

Another nineteenth-century geologist, who had a major influence on New Zealand geology although he was only in the country for a few months in 1859, was Ferdinand von Hochstetter of the Austrian *Novara* Expedition. Hochstetter's Sixth Diary has recently been discovered. It deals largely with the latter part of his stay in Nelson Province in the north of the South Island. It was while in Nelson that Hochstetter recognised at Dun Mountain the olivine rock that he named dunite. The Diary, translated and illustrated by Leonore Hoke, in conjunction with James Bade of the University of Auckland, will include explanatory notes and illustrations. There will also be a German version of the diary, prepared in collaboration with Austrian researchers, for the 150th anniversary of the *Novara* expedition. Professors Douglas Coombs and Bruce Waterhouse are respectively delving into the history of zeolite studies and New Zealand Permo-Triassic research.

The Historical Studies Group *Newsletter*, under the editorship and guidance of Alan Mason, continues to provide an excellent medium for the publication of short articles on the history of geology. Two issues (Numbers 26 and 27) appeared in 2003. They include articles on Max Gage at Canterbury University, Edward de Courcy Clarke, co-author of a number of what are now classical New Zealand Geological Survey bulletins, and the eccentric Survey Director, Mont Ongley.

Mike Johnston, Nelson

Norway

In 2002 I published a volume in the series 'Norwegian History of Ideas', which detailed the development of Norwegian science between 1850 and 1920, with emphasis on, among many other themes, palaeontology and the theory of evolution, the significance of chemistry for materialist doctrines, etc. (Bliksrud, L., Hestmark, G. & Rasmussen, T. 2002, *Vitenskapens Uifordringer 1850–1920*, Norsk Idéhistorie. Vol. 4, Aschehoug & Co., Oslo).

An English version of my 890-page biography of the Norwegian geologist W.C. Brøgger (1999) is under consideration.

I am currently completing a large paper on Charles and Mary Lyell's visit to Norway in the summer of 1837. In addition, I have just completed a manuscript on Norwegian polar research before 1905, which will appear in the second volume of a three-volume work in the autumn of 2004: *Norsk Polarhistorie*. It contains much geohistory.

Geir Hestmarck, Oslo

Poland

As in previous years, the centres of studies on history of geosciences in Poland have been the Museum of the Earth, the Polish Academy of Sciences, and the Museum of the State Geological Institute in Warsaw, as well as several universities (Cracow, Wrocław, Warsaw, Poznan, Gliwice, and Sosnowiec). Moreover, the Commission on the History of Sciences of the Polish Academy of Arts and Sciences in Cracow has been very active. In Wrocław, the celebrations of 300th anniversary of the origin of the local university were accompanied by the edition of voluminous work *History of Geological Sciences at the Wrocław University 1811–2003* (for a review, see p. 43).

The Archival-Historical Laboratory of the Museum of the Earth, and the Laboratory on the History of Polish Geology, organised and led by Stanislaw Czarniecki, are collecting and offering to the public materials relating to the history of geosciences.

Apart from the aforementioned monograph on the history of geosciences in Wrocław, the most important editorial event was the bilingual Polish–Spanish volume *Ignacy Domeyko's Year 2002*, by Zdzislaw J. Ryn, edited by the Jagellonian University in Cracow and summing up all the celebrations related to the 200th anniversary of the birth of this eminent Polish geoscientist, who was active in Chile in the nineteenth century. With reference to this anniversary Wojciech Narebski and Zbigniew Wojcik have published two papers: 'Homage to Ignacy Domeyko (1802–1889) at the 200th anniversary of his birth' (*Annales Societatis Geologorum Poloniae [Yearbook of the Geological Society of Poland]*, 2003, 73, 1–26), and 'Ignacy Domeyko (1802–1889)—the 200th anniversary of his birth', published in the *Proceedings of the Russian Mineralogical Society—Zapiski VMO*, Volume 132, No. 3. The former contains a possibly complete list of about 180 chemical analyses of minerals and rocks, as well as about 50 of mineral and potable waters, carried out by Domeyko, who was one of pioneers of chemical mineralogy.

Jan Dowgiallo has published a paper 'Polish Hydrogeology up until World War I: An Outline' (*Organon*, 2003, 31, 255–266), being the first part of an advanced study of the history of hydrogeology in Poland. Also, Antoni S. Kleczkowski has edited

a book (in Polish): *The Formation of the Chemical Composition of the Quaternary Underground Waters in Cracow in the Years 1972–2002: The Tendencies of Successive Changes* (JAK edition, 2003, 131 pp.).

A voluminous work by Andrzej Wojcik should also be mentioned: 'Mining and Mining Geology in Western Region of the Polish Kingdom in the Years 1815–1869', accepted as a PhD thesis by the Institute of History of Science of the Polish Academy of Science.

Among the papers published by Polish historians of geosciences abroad, worth mentioning are: the synthetic article by Z. Wojcik, 'Earth Sciences', included in the book *The Polish Cultural and Scientific Heritage at the Dawn of the Third Millennium* (Polish Cultural Foundation, London, 2003, pp.440–450, edited by E. Szczepanik). He was also the author of a biographic book *Aleksander Patkowski: Pioneer of Tourism in Poland* (Radom, 2003, 145 pp., in Polish with English abstract).

Polish historians of sciences have participated in the celebrations of 200 years of lectures in geology at the Vilnius University, reported elsewhere in this *Newsletter*. The lecture of Wojciech Narebski and Zbigniew Wojcik, 'The mineralogical-petrographical school of Stanislaw Malkowski at the Stefan Batory University', was published in the Lithuanian periodical *Geologija* (2003, No. 44, 22–30).

The 400th anniversary of birth of Jan Jonston (1603–1675) was celebrated by a scientific session entitled 'European idea and scientific output of Jan Jonston after four centuries', the proceedings of which were published under the same title. They contain a paper by Janusz Skoczylas 'Jan Jonston and initial stage of geology in Greater Poland'.

Stanislaw Czarniecki has remembered the 60th anniversary of the death of the eminent geologist Bohdan Swiderski in a paper published in the periodical *Przegląd Geologiczny (Geological Review)*.

Every second year the 'Staszic Meetings' are organised in Pila: the birthplace of Stanislaw Staszic (1755–1826), author of geological synthesis of central Europe (1815). This year several geological lectures were presented which will be published shortly: Stanislaw Czarniecki, 'On S. Staszic's society in Galicia (southern Poland)';

Antoni S. Kleczkowski, 'On Staszic's studies in France'.

Janusz Skoczylas, 'Staszic's legend in Greater Poland'.

Zbigniew Wojcik, 'New materials on Staszic's biography'.

Zbigniew Wojcik, Warsaw & Wojciech Narebski, Krakow

Portugal

1. Miscellaneous matters

In May, 2003, a workshop was held in Braga, at the University of Minho, on 'Geological Heritage—International Challenges and Experiences', that included two talks, one by W. Wimbledon (University of Reading) on 'Sound Bases for Practical Conservation of our Geological Heritage—National and International Methods' and another one by T. Todorov (Geological Institute of the Bulgarian Academy of Sciences) on 'Geoconservation in Bulgaria and other SE European Countries: The Geosite and Geosite-Framework Approach'.

The Geological Congress of Portugal, that was held at Monte de Caparica, near Lisbon, in June, 2003, had a session on 'History of Geology' where several presentations were made.

Portuguese members of INHIGEO, Ana Carneiro and Manuel S. Pinto, participated in the 28th INHIGEO meeting on 'Geological Travellers', held in Dublin in July, 2003. Both attended the INHIGEO business meeting held during the conference.

The 2nd Portuguese–Brazilian Congress of History of Science and Technology was held in Rio de Janeiro in October, 2003, and several presentations were made about the history of mineralogy and geology of Portugal.

The *Proceedings of the 27th INHIGEO Meeting* held in Lisbon and Aveiro in June, 2001, were published in March, 2003, with the support of Gulbenkian Foundation, Lisbon and the University of Aveiro.

In order to commemorate a study on giant ammonites from Conducia, Mozambique, made by Paul Choffat in 1902, a Swiss geologist who worked for forty years for the Geological Survey of Portugal, the Museum of the *Instituto Geológico e Mineiro* (formerly the Geological Survey of Portugal) made an exhibition of these extraordinary fossils, which belong to the Museum collections, in April, 2003.

A talk was delivered by INHIGEO member Antonio S. Andrade on 'Patterns of Life Development in the Archaean, the Proterozoic and the Phanerozoic: from Oparin to Schopf' in the course of a workshop on 'Modern ideas on Earth and Cosmos', held in April, 2003, at the University of Aveiro.

Collaboration with Brazilian Colleagues goes on, concerning in part Alexandre Rodrigues Ferreira and the great expedition to Brazil (1783–1792) promoted by the Portuguese Government and led by him; we have obtained new (or forgotten) data that show the discovery of the famous Cretaceous fishes from CEARÁ, Brazil, is indeed due to a Portuguese–Brazilian scientist in late 18th century, well before Austrian and other expeditions to that country. Nodules with fishes were sent to Lisbon in 1800, and some are preserved in the ACL's Museum collection.

2. Publications

Aires-Barros, Luis, 'Stones, Monuments and History', in: Manuel S. Pinto (ed.), *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp.9–37.

Amador, Filomena, 'Analyse comparative des textes scolaires et scientifiques portugais, centralisé dans l'étude des dinosaures et d'autre megafaune (1850–1950)', in: Manuel S. Pinto (ed.), *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp. 89–97.

_____, 'Abductive Reasoning and Representation of Megafauna in the History of Geology', in: Manuel S. Pinto (ed.), *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp. 99–106.

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- Andrade, António A.S., 'André Schneider: Pioneering Mobilistic Ideas about the Iberian Segment of the Variscan Orogen', in: Manuel S. Pinto (ed.), *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp. 107–114.
- Antunes, Miguel T., 'The Earliest Illustration of Dinosaur Footprints', in: Manuel S. Pinto (Ed.) *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp. 115–123.
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- Areias, Maria das Dores, 'Rocks'n Roll': The Contributions to African Geology of the Portuguese Travellers Malheiro and Andrade', in: Manuel S. Pinto (ed.), *Proceedings of the 27th INHIGEO Meeting "Geological Resources and History"*, Centro de Estudos de História e Filosofia da Ciência e da Técnica da Universidade de Aveiro, Aveiro, Portugal, 2003, pp. 143–150.
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- _____, 'Estudos geológicos e mineralógicos setecentistas em Portugal. Alguns aspectos', VI Congresso Nacional de Geologia, Monte de Caparica, Portugal; *Ciências da Terra (UNL)*, Special issue, pp. J52–J56, 2003.
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Manuel Pinto, Aveiro

Russia

Publications

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- Bessudnova, Z.A., 'The Collection of Meteorites in the Vernadsky State Geological Museum of the Russian Academy of Science (19th–20th Centuries—The History of its Origin and Study)', in: *VII International Symposium "Cultural Heritage in Mining, Geology and Metallurgy: Libraries–Archives–Museums"*, Leiden, 2003, p. 7.
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- Soloviev Yu. Ya., 'The Outstanding Russian Geologist and Geographer: Traveller Vladimir A. Obruchev (1863–1956)', *Abstracts: Geological Travellers–28th INHIGEO International Symposium, Dublin, 14–18 July 2004*, pp. 46–47.
- Starodubtseva, I.A., 'Trautschold's Collections in the Vernadsky State Geological Museum of the Russian Academy of Science', in: *VII International Symposium "Cultural Heritage in Mining, Geology and Metallurgy: Libraries–Archives–Museums"*, Leiden, 2003, p. 32.

Georgi Khomisuri, Moscow

In addition, Andrei Lapo has sent the following items:

V.I. Vernadsky, "'I was born in St.Petersburg, in Millionaya Street'", *Noosphere*, 2003, No. 16, 4–7.

'Bibliography of Works by V.I. Vernadsky Published since 1991', in: K.A. Stepanov and G.B. Naumov (eds), *V.I. Vernadsky: A Life for the Welfare of Russia*, Moscow, Noosphere Publications, 2003, 161–172 (compiled by A.V. Lapo).

Other activities

Presentation at the Anniversary Conference of the St Petersburg Natural History Society on March 12, 2003: an interview with R.L. Berg concerning her recollections of V.I. Vernadsky. The interview was conducted by me in Paris in 2002 (see *INHIGEO Newsletter*, 2003 for 2002, No. 35, p. 79).*

Arranging, in the All-Russian Geological Library of St Petersburg, an exhibition: 'Publications by V.I. Vernadsky with his Inscriptions' (from the stock of the Library and my private collection).

Other publications:

'Elena Sergeyevna Korzenevskaya', in: V.D. Dibner, E.M. Krasikov, D.V. Semenevsky (eds), *On the Way to the Arctic Bowels*; Okeangeologia Press, St Petersburg, 2003, 151–164 (written with I.N. Drozdova, A.V. Pavlov, T.K. Sotnikova).

[All items were published in Russian, except the one identified by an asterisk.]

South Africa

During the year Gerry Levin, the archivist of the Geological Society of South Africa, unearthed a geological map in colour of the Cape Peninsula. The map by Jules Itier, who visited the Cape in 1844, is the first in colour of any portion of Southern Africa.

The Johannesburg branch of the Society found a number of almost forgotten and long-lost sites of historical interest connected with the early days of gold exploration on the Witwatersrand. They also held a successful excursion to a few sites.

During the year, a few boxes of old photographs, documents, and even an academic gown, once belonging to the notable South African geologist Alex L du Toit, were donated to the South African Museum in Cape Town. This cache, which is now being sorted and catalogued, has not been studied since the death of Du Toit in 1948. The photographs were taken during Du Toit's travels in South America and Russia.

Johan Look completed writing an article on Du Toit for the Elsevier *Encyclopedia of Geology*.

Johan Look, Bloemfontain

Spain

During 2003, the most important meeting has been the one organised by the SEDPGYM (Spanish Society for the Conservation of Geological and Mining Heritage) with the cooperation of the City Hall of Utrillas (Teruel), an old brown-coal mining town. The meeting, the IV International Congress on Geological and Mining Heritage was held over three days in September, with several field trips by the zone. One of the topics covered was the sociology and anthropology of mining; also geological parks.

Probably the most important publications have been two devoted to Charles Lyell. Carmina Virgili published the first biography of Lyell in Spanish in a full illustrated edition, and the *Instituto Geológico y Minero de España*, the Spanish Geological Survey, published a hard-cover facsimile edition of the *Elements of Geology* of Lyell, translated into Spanish in 1847 by Joaquín Ezquerro del Bayo, author of the first geological sketch of the Spanish peninsula, published in 1850 in Stuttgart (Germany).

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- _____, 'El Diluvio Universal bíblico y la extinción de las especies biológicas', *Proyección, Granada*, 2003, 210, 235–254.
- _____, 'En 2004 se conmemorarán los 200 años del fallecimiento de Antonio José Cavanilles (1745–1804)', *Boletín de la Comisión de Historia de la Geología de España*, 2003, 21, 13–18.
- _____, 'Las celebraciones de centenarios en ciencias como recurso didáctico: sugerencias para el año 2003', *Atambique*, 2003, 35, 108–112.
- _____, 'Las raíces de la Geología. Nicolás Steno, los estratos y el Diluvio Universal' *Enseñanza de las Ciencias de la Tierra*, 2003, 10, 217–244.
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- Hernández Ortis, F., 'Rodalquilar: Geología, Minería, Metalurgia y Patrimonio Minero', Escuela Técnica Superior Ingenieros de Minas de Madrid, 2003.

Turkey

Professor Şengör has published a major book, *The Large-wavelength Deformations of the Lithosphere: Materials for the History of the Evolution of Thought from the Earliest Times to Plate Tectonics*, Geological Society of America Memoir No. 196, Boulder, 2003 (see p. 51). Going back to the ideas of the ancient world, and coming through to recent times, it provides detailed discussions of many aspects of the history of tectonics, with much attention given also to the geological exploration of the American West in the nineteenth century. He has also recently completed a book (in Turkish) on the idea of the evolution of life till the end of the Darwinian period.

David Oldroyd

United Kingdom

History of Geology Group

Following recent moves to systematise the relationships between the Geological Society of London (GSL) and all its Specialist Groups, of which the History of Geology Group (HOGG) is one, it was recommended that the HOGG now becomes an Affiliated Group of the GSL (which means that members of the HOGG who are not members of the GSL may become HOGG officers). This proposal was unanimously ratified by a postal ballot of those HOGG members who are also Fellows of the GSL. HOGG membership currently stands at 107.

About 150 people attended the '200 Years of British Hydrogeology' meeting (December 2002), held jointly by the HOGG and the Hydrogeology Group of the GSL. This reviewed the history of hydrogeology in Britain, from the pioneering work of William Smith, 200 years ago, to the introduction of modern technology in the latter part of the 20th century. The following papers were presented at the meeting:

Hugh Torrens, 'The hydrogeological work of William Smith'; Michael Price, 'Dr. John Snow and an early investigation of groundwater pollution'; William George, 'William Whitaker (1836–1925)—father of English hydrogeology?'; John Mather, 'Joseph Lucas (1846–1926)—Victorian polymath and a key figure in the development of British hydrogeology'; John Tellam, 'Nineteenth century studies of the hydrogeology of the Permo-Trias of Lancashire and Cheshire'; Martin Preene, 'Robert Stephenson (1803–1859)—The first groundwater engineer'; Paul Younger, '"Making water"—the hydrogeological adventures of Britain's early mining engineers'; Ted Rose, 'The contribution of UK military geologists and engineers to the development of groundwater'; Dick Downing, 'Groundwater development in the UK between 1935 and 1965—the role of the Geological Survey of Great Britain'; Andrew Mackenzie, 'Exploiting groundwater—evidence from the British geological Survey National Well record Archive'; Mike Edmunds, 'Bath thermal waters—400 years in the evolution of ideas in hydrogeochemistry and hydrogeology'; John Fuller, 'Chalybeate springs near Tunbridge—site of a seventeenth century New Town'; John Lloyd, 'British hydrogeologists in north Africa and the Middle East—an historical perspective'; Robin Hazel, 'British hydrogeologists in West Africa—an historical evaluation of their role and contribution'; Tim Atkinson, 'Hair singed off by the fires of Hell—The development of groundwater tracing in Britain'; Howard Headworth, 'Reflections of a golden age—the groundwater schemes of Southern Water, 1970 to 1990'; and Rick Brassington, 'Developments since 1974—bringing the story up to date'.

These papers, together with some additional contributions, will be published as a Geological Society of London Special Publication, edited by John Mather.

To the surprise, and regret, of the HOGG committee, our proposed meeting on the History of Geophysics, scheduled for March 2003 (INHIGEO Newsletter 34, p. 31) had to be cancelled, owing to lack of interest. It was replaced by a Members' Meeting in May 2003 which gave HOGG members an opportunity to talk on their favourite topics:

John Fuller, 'The unpublished manuscripts of John Strachey, FRS'; Neville Haile, 'Buckland at Stonehenge—Haunted by the Deluge?'; Stuart Baldwin, 'Encouragement to amateur geologists and palaeontologists by scientific societies and professionals'; Anthony Brook, 'Dr. Dixon and the Geology of Sussex'; Richard Wilding, 'A short history of Mt. Vesuvius'; Richard Howarth, 'From petrologist to mining geologist—Frederick Hatch in Southern Africa'; and Martin Rudwick, 'Bursting the limits of time—the reconstruction of geohistory in the age of revolution'.

John Fuller's talk was subsequently presented at the INHIGEO 2003 meeting in Dublin and Martin Rudwick's talk gave us a fascinating preview of his new book, to be published by Chicago University Press in 2005.

Hugh Miller—more news

Michael Taylor writes: As reported in the last issue of this *Newsletter* (no. 35), 2002 was the bicentenary of the birth of Hugh Miller. Its consequences in the form of exhibitions and publications have run on into 2003.

The temporary exhibition *Hugh Miller—Local Hero* at Groam House Museum in Rosemarkie, created in cooperation with the National Museums of Scotland (NMS), was so successful that its run was extended till April 2003. (Rosemarkie is near Cromarty, Miller's birthplace, and Eathie, another major Miller fossil site; all are just north of Inverness.)

In Cromarty itself, the National Trust for Scotland is now going ahead with the new Hugh Miller Museum, in Miller House, the fine stone house which his father built next door to the thatched Cottage where Hugh himself was born. (But when Miller senior died, the family were forced for financial reasons to stay in the cottage; Hugh himself only moved into Miller House many years later, when he married.) The new exhibitions in Miller House will also permit the removal of the exhibitions currently occupying the top floor of the Cottage, and the return of the Cottage more nearly to its original state. Miller House is due to open in spring 2004. Further information, and updates, can be seen on the Hugh Miller website run by Martin Gostwick, the Property Manager, on www.hughmiller.org, which also has some of the articles and comment which the 2002 anniversary has stimulated. See under Notes and Queries for news of related publications.

William Speirs Bruce and the Scottish National Antarctic Expedition 1902–1904

Michael Taylor writes:

From March to the end of May 2003 the National Museums of Scotland (NMS) staged the exhibition 'William Speirs Bruce: The First Polar Hero' (lead curator Geoff Swinney). The exhibition formed part of the *Scotia* Centenary Celebrations, organised by the Royal Scottish Geographical Society, which marked the centenary of the Scottish National Antarctic (*Scotia*) Expedition,

1902–1904, organised and led by Bruce. Bruce was inspired by the town planner and visionary polymath Patrick Geddes in his holistic approach to scientific exploration and in his strongly held sense of Scottish identity. Bruce had, until this year, been something of a forgotten figure, probably because he was successful, and was not reckless with his and his companions' lives.

The centenary has prompted a new interest in the man who did much to kick-start the 'Heroic Age of Polar Exploration' and who, by establishing the first permanently manned research facility in Antarctica, set the pattern for the modern scientific exploration of the great southern continent and its surrounding seas. Most of the surviving geological specimens are in NMS, for instance the Falklands Islands fossils that had implications before their time for plate tectonics as discussed by Phil Stone on http://www.edinburghgeol Soc.org/z_41_03.html, and some of the rest are in the Hunterian Museum in Glasgow.

The centenary events were many and varied (and there are yet more to come—for details, and more information on the SNAE itself, as well as some charming pictures, see <http://www.geo.ed.ac.uk/~rsgs/touring.html>). Events so far have included the unveiling of a plaque on the building in which Bruce established the Scottish Oceanographical Laboratory, the performance of specially commissioned music, now available on CD, and Scottish country dances inspired by Bruce's exploits, and the naming of one of Virgin Trains' new fleet as 'William Speirs Bruce'.

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United States

Activities of the Geological Society of America and the History of Earth Science Society

At the meeting of the GSA in Seattle, Washington, 2–7 November, the History of Geology Division and HESS convened two sessions and joined with other organisations to sponsor three more. On Monday morning they held their topical session of invited papers discussing: *Signs of Life: the Role of Paleobiology in the History of Evolutionary Theory and our Attempts to Understand the Changing Nature of the Biosphere*. Concurrently, the two organisations helped to sponsor a Monday morning session titled: *M. King Hubbert at 100: the Enduring Contributions of Twentieth-Century Geology's Renaissance Man*. Their Monday afternoon session of contributed papers covered a wide range of historical subjects, including an account of the wagon loads of gear carried by the well-equipped 17th century field geologist, and the question of who created the hardness scale: Moh or Werner? On Tuesday afternoon, the HoG Division and HESS joined the GSA Hydrogeology Division and the National Ground Water Association in presenting: *Henry Darcy's 200th Birthday: Fundamental Advancements Through Observations and Analysis*. Finally, the two organisations joined the GSA Engineering Geology Division and the US Geological Survey in sponsoring the blue-ribbon Pardee Symposium titled: *The Science of Lewis and Clark: Historical Observations and Modern Interpretations*. The year 2003 was the 200th anniversary of the outset of the Lewis and Clark Expedition, authorised by President Thomas Jefferson to explore the newly-purchased Louisiana Territory, to follow the Missouri River to its headwaters, and to identify a passage to the Pacific Ocean. The Symposium included historians, scientists, and science policy-makers in discussions of the lingering impacts of the expedition, subsequent changes in scientific interpretations, and in Government support of science. (Incidentally, in 2003 a beautifully preserved bear-claw necklace, returned by the Expedition, was discovered, mislabelled, in a storage room of the Peabody Museum at Harvard University. Its provenance has been verified and the necklace is now on display at the Museum.)

Inasmuch as no HoG Division field expedition preceded the meeting, the annual luncheon and business meeting was convened Sunday noon by Roger D.K. Thomas, Chair. After reports by the Secretary–Treasurer, and the Nominating Committee, Thomas introduced Michele Aldrich the citationist for Ellis L. Yochelson, who received the History of Geology Award. Yochelson, an invertebrate palaeontologist, spent much of his career with the US Geological Survey in an office located in the Smithsonian's National Museum of Natural History. This arrangement aroused his interest in the histories of both organisations and led to his publication in 1979 of 'Images of the United States Geological Survey', and in 1985 of 'The National Museum of Natural History'. In recent years, Yochelson has published two major biographical works on the pioneering palaeontologist, Charles Doolittle Walcott (1850–1927), a remarkable scientist-administrator who served as the third Director of the US Geological Survey for thirteen years and then, after retiring in 1907, became the fourth Secretary of the Smithsonian Institution. Yochelson's two volumes are: *Charles Doolittle Walcott, Paleontologist* (1998) and *Smithsonian Institution Secretary, Charles Doolittle Walcott* (2001). They run to 510 and 589 pages, respectively. Michele's citation has not yet been published, but Yochelson's highly original response is on the NET. He listed the alphabet backwards with a remark for each letter. For a few examples: Z—for Karl von Zittel, a chronicler of history of geology; Y—for three Yochelson kids, an investment which has paid grandchild dividends; V—for varied, as in my publication record (also eclectic or disorganised); U—for USGS for which I worked hard, but also stole time to do important things; T—for Taylor, Ken, an exemplar for any history of science graduate student who aspires toward earth sciences; H—for History of Geology Division and what more can I state other than THANKS!! Plus 18 more (see, www.geosociety.org; click Grants, Awards and Medals; click GSA Awards; click Division Awards; click History of Geology Division—at last!).

After Yochelson's talk, Roger Thomas recessed the meeting until Monday evening when it reconvened at the annual HoG Division/HESS Reception which was attended by about 100 people for refreshments, good company, and door prizes. As the first order of business, Roger announced that the Division had received a bequest of \$86,000 from the estate of Mary Rabbitt. Mary made her career at the USGS where she published papers on various historical topics while serving as a staff assistant to the Director. After her retirement, she published three volumes of a planned four-volume history of the management of public lands, Federal mapping policies, and development of mineral resources from the founding of the USGS in 1879 to 1939. A former member of INHIGEO, Mary received the HoG Award in 1984. The Division plans to honour her by using the income from her gift by expanding and enhancing its programmes in the history of geology.

Sally Newcomb presented a plan for a Division award of \$500 to encourage students to present papers at the HoG sessions at GSA meetings. It was approved by acclamation. Roger then handed the gavel to the new Chair, Charles Byers of the University of Wisconsin, who announced that the 2004 Symposium will discuss the Layer-Cake Concept in stratigraphy.

Communications from Members

Victor R. Baker began serving as Book Review Editor for *Earth Sciences History*. He conducted research on the contributions to earth science and philosophy by the nineteenth-century pragmatist Charles S. Peirce. Baker has been invited to give one of the dedication talks for the First Order Grid Marker, constructed as a memorial to Peirce for his service to the US Coast Survey (now the Coast and Geodetic Survey), by developing innovative pendulum measurements of gravity. The dedication will take place on 2 April, 2004, in Indianapolis.

Baker has been preparing a defence of the logic and reasoning of geology (in a historical context) for the upcoming Dutch Philosophy of Geoscience Symposium in Utrecht on 16 April, 2004. He also worked with Mentorn of London, producers of science programmes for NOVA (PBS), National Geographic, Horizon (British television), and the Canadian Broadcasting Corporation (CBC), on a programme dealing with the catastrophic late Pleistocene Missoula floods. Although they initially developed the production around the historical context of J Harlan Bretz and the 'scabland' controversies of the 1920s, the TV people changed the format to emphasise modern scientific research on the problem. The programme is currently in production and will probably air on NOVA in the fall of 2004.

Kennard B. Bork spent the first half of 2003 teaching the final semester of his academic career, finishing his term as past-president of HESS, and participating in activities relating to his retirement. He then spent the second part of the year moving things home from his office and generally trying to mentor his new colleague. Amidst the uproar, he found time to write one major paper, a double-book review, and an essay.

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Albert V. Carozzi continued his studies of the manuscripts of Horace-Bénédict de Saussure. In May 2003, he published with John K. Newman, a distinguished Latinist, a book titled: *Lectures on Physical Geography given in 1775 by Horace-Benedict de Saussure at the Academy of Geneva*. The book consists of four parts: de Saussure's original lecture notes in Latin kept by one of his students; de Saussure's personal class-notes in French; the annotated translation into English of the above two documents; and a review of the evolution of the term "physical geography" from the eighteenth century until today. This trilingual volume of 528 pages, published by Editions Zoé in Geneva, makes one of the rarest academic documents of the eighteenth century available to geologists and historians of science.

Carozzi is currently under contract with the Editions Slatkine in Geneva for the preparation of a new biography of de Saussure. The last one was written by Douglas W. Freshfield in 1920 and has become obsolete in the light of the many new studies of de Saussure's manuscripts that have been made in recent years. In particular, there was Carozzi's discovery of de Saussure's hypothesis of 1784 that horizontal overthrusts are the chief mechanism for the formation of the Alps and other major mountain ranges.

Carozzi's activities during 2003 included writing a biographical article on the famous French sedimentary petrographer Lucien Cayeux (1864-1944), published in the *Encyclopedia of Sediments and Sedimentary Rocks* edited by Kluwer Academic Publishers.

Robert H. Dott, Jr has been writing historical vignettes relating to the Department of Geology at the University of Wisconsin. In 2003, he completed an early version of: 'Two Remarkable Women of the 1920s'. The two were Katherine Fowler and Emily Hahn, who met as students at the University of Wisconsin in the academic year 1925-1926. Both women had strong, self-sufficient personalities and adventurous spirits. Both challenged conventions and successfully competed in a man's world. They formed a fast friendship that lasted throughout their lifetimes: Kay (1902-1997), Emily (1905-1997).

In 1929, Kay earned her PhD in geology from Columbia University for a thesis on the Laramie Mountains of Wyoming, a remote area she mapped and sampled with only her small dog for company. In the early 1930s she spent three years directing African field crews in searches for iron ores and gold deposits in the reaches of Sierra Leone. She went there to prove something about gender equality when the British Colonial Service sent her geologist husband, Jock Lunn, to work in the Gold Coast (Ghana) and forbade him to take her with him. She tells her story in *The Gold Missus*, by Katherine Fowler-Lunn, published in 1938 by W.W. Norton. Some years after she and Jock parted, Kay married Marland P. Billings, the professor of structural geology at Harvard University. While raising a son and daughter, Kay conducted field work in New England and taught geology at Wellesley and Tufts College. (UBM: In the summer of 1946 I was fortunate to be her field assistant in the Monadnock Quadrangle of southern New Hampshire.)

Emily Hahn entered the University of Wisconsin to take a liberal arts degree, but when she tried to fill a science requirement by signing up for a highly reputed chemistry course, the Dean told her that course was for engineering students only—and, no, she could not ask for special permission. Enraged, Emily transferred to the College of Engineering—the first woman ever to do so. She had intended to transfer back to liberal arts after taking the course, but when her engineering faculty advisor told her that "the female mind is incapable of grasping mechanics or higher mathematics or any of the fundamentals of mining" she vowed to stay in engineering. Emily persevered through calculus, drafting, surveying, and several geology courses. In fact, she excelled. She also took up cigar smoking after a challenge by a senior geologist who told her she could not become an engineer without smoking. Emily and Kay nearly exploded with suppressed laughter when a dean asked Kay if she would act as Emily's chaperone on a field excursion.

After graduation, Emily worked briefly for a mining company, but left because she was confined to the office. She moved to New York City and taught geology at Hunter College while revelling in the literary and social circles of Manhattan. She began travelling back and forth to Europe and sending letters home. When her brother-in-law submitted some of the letters to *The New Yorker*, he jump-started her long and distinguished career as a journalist. Over the years, *The New Yorker* published 181 of Emily's articles, and she also wrote 52 books. Emily travelled alone to remote parts of the world, describing the scenes and conducting interviews. In Hong Kong during World War II, she fell in love with a married British intelligence officer and had a daughter out-of-wedlock. He was interned, and she was evacuated with her infant, but they were reunited and married after the War. Bob Dott has submitted his article on these two distinguished women to *The New Yorker*.

Gregory Good attended the INHIGEO meeting in Dublin, where he presented the paper 'Geophysical Travellers: The Magneticians of the Carnegie Institution of Washington'. He also attended a meeting of the History Committee of the American Geophysical Committee in Philadelphia, the Geological Society of America conference in Seattle, and the History of Science Society meeting in Cambridge, Massachusetts, to seek authors for *Earth Sciences History*. He edited Volume 22, Numbers 1 & 2 of *ESH*, including eight articles and eighteen book and essay reviews. He wrote an essay review of *The Oxford Companion to the History of Modern Science* and *The Oxford Companion to the Earth*, reviewed Bill and Merri Sue Carter's *Latitude: How American Astronomers Solved the Mystery of Variation*, and published the articles 'Atmospheric Electricity', 'Ionosphere', and 'Lightning' in *The Oxford Companion to the History of Modern Science*. He has been invited to present a keynote address at the 2005 INHIGEO meeting in Prague and to write several articles for a forthcoming encyclopedia on geomagnetism.

Léo F. Laporte uploaded his web site on George Gaylord Simpson onto the Internet in February, 2003 (see <http://people.ucsc.edu/~laporte/simpson/index.html>). Léo reports that he is now studying Italian in anticipation of the meeting in Florence next August. Meanwhile, he is raising Sauvignon Blanc grapes in the salubrious climate of California and learning to be a docent at Stanford's Jasper Ridge Biological Preserve.

Ursula B. Marvin presented the keynote address titled, 'Meteorites in History: an Overview', at a meeting on 'Fireballs and Stones from the Sky', held on 3 December, 2003, by the History of Geology Group at the Natural History Museum in London. The talks will appear as chapters in a book planned for publication in 2005.

On 12 October, Marvin convened a 'Celebration of the Career of Clifford Frondel', an afternoon and evening of talks and reminiscences by colleagues and former students at the Department of Earth and Planetary Sciences, Harvard University. Much honoured for his contributions to mineralogy, Professor Frondel also published articles on the history of mineralogy. One of his least known papers, tracked down by a librarian for this occasion, was titled: "Benjamin Franklin's purse and the early history of asbestos in the United States." In it he reports that on Franklin's first trip to London, as an impecunious lad of nineteen, he carried a small coin purse woven of asbestos fibers. Frondel concluded that the most likely source of the asbestos was the mine called the Devil's Den in colonial Newbury, Massachusetts, about 30 miles north of Boston. In 1725, Franklin sold the purse to Sir Hans Sloane, whose extensive collection of objects formed the core of the British Museum at its founding in 1753. For its 250th anniversary in 2003, the Museum exhibited a number of items dating from its opening. Franklin's purse was considered but not chosen for display. Hence, when Marvin asked to see it during her visit to London, she was ushered to the office of the curator, Peter Tandy. The purse is roughly constructed of coarse gray fibers that are twisted and/or braided and woven together to make a tubular bag about 7 cm long and 3 cm across. A drawstring at the top is badly frayed. A remarkably good likeness appears as Figure 1 in Frondel's article in *Archives of Natural History*, 1988, 15, 281–287.

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Clifford M. Nelson has continued working toward the completion of the fourth volume (1939–1979) of the history of the US Geological Survey, of which the first three volumes were written by his colleague, the late Mary Rabbitt. He has shelved all other research and writing until this project is completed.

Cecil J. Schneer reports that in the past year he has completed the graphics work on a full scale (>6feet x ~9feet) reproduction of William Smith's great map. At smaller scales the map can be read only with the aid of a magnifying glass. The original sheets making up Smith's map are engravings hand-painted in water colours that are weakened by every exposure to light. Therefore, they are not often displayed. Approximately 100 copies of Smith's original map are believed to be extant. Schneer's reproduction, protected by an ultra-violet screening laminate, is presently destined for the stairwell wall facing the main entrance to the Earth Sciences Department at the University of New Hampshire. As far as Schneer knows, this will be the only place in North America where a full size replica is on open display. He started this enterprise with the assumption that all geologists were familiar with William Smith's achievements, but very few ever have seen his map. Schneer says that he owes the good fortune to having viewed about four different copies of it to his longtime association with INHIGEO and HESS. He started this project more than three years ago. In the early part of last year, he worked on it day and night. In between such stretches, he had to wait for months for photo services to deliver scans, to rescan what they missed, or to change the resolution. It was a nightmare, now completed but bogged down in University red tape. It may take skilled picture hangers at least an hour to put it up. Cecil remarks that his experiences with INHIGEO were among the most memorable and pleasurable of his life.

Kenneth L. Taylor attended the INHIGEO Symposium in Dublin, where he presented a paper on 'Geological Travellers in Augvergne, 1750–1800'. In collaboration with Kerry Magruder, he wrote two articles, 'Geology' and 'Theories of the Earth' for the new six-volume reference work *Europe 1450 to 1789: Encyclopedia of the Early Modern World*, edited by Jonathan Dewald and published by Charles Scribner's Sons. At Iowa State University Taylor lectured on "'Mountains that vomit fire": Volcanoes as viewed in the 18th century'.

Ursula B. Marvin, Cambridge (Mass)

Uzbekistan

In 2003, there were several basic events bearing relation to the history of geology:

1. The Mirzo Ulugbek National University's 85th anniversary;
2. The 60th anniversary of Academy of Sciences of Uzbekistan (22–24 December).

In this connection, according to the Republic of Uzbekistan's President's decree of 18 December, 2003, L.N. Lordkipanidze was awarded the *Dustlik* [= Friendship] Order, and the head of laboratory of the Mavlyanov Institute of seismology, A.R. Yarmukhamedov, was awarded the *Shukhrat* [= Honour] Medal.

One of the most important events in Uzbekistan was the International Scientific and Practical Conference called 'Problems of Ore Deposits and Increase in Prospecting Efficiency' (21–24 October), in which scientists from USA, China, Russia, and other countries participated. Although there were no reports concerning the history directly, some reports reflected certain elements of the history of discovery and prospecting of deposits.

Academician F.A. Usmanov was awarded the Kh. M. Abdullaev Gold Medal for his series of investigations on 'Theoretical Fundamentals of Statistical Metallogenic Analysis' (23 December).

Publications

Abdullaev, K.N. 'History, basic achievements and ways for the development of the seismological science in Uzbekistan', *Geologiya va Mineral Resurslar*, 2003, 6, 11–13.

Lordkipanidze, L.N. 'Earth Sciences in the Academy of Sciences of the Republic of Uzbekistan', *Geologiya va Mineral Resurslar*, 2003, 6, 3–4.

____, 'Creating the Present, He Took Care of the Future (dedicated to Kh. M. Abdullaev)', *Pravda Vostoka*, No. 295, December, 2003.

Maksudov, S. Kh., Lordkipanidze, L. N., Nurtaev, B. S. 'The contribution of the Kh. M. Abdullaev Institute of Geology and Geophysics, Academy of Sciences of the Republic of Uzbekistan, to the Development of the Geological and Geophysical Sciences over 60 Years', *Geologiya va mineral Resurslar*, 2003, 6, 4-10.

Reports

Lordkipanidze, L.N., 'Report devoted to the memory of Academician I. Kh. Khamrabaev, on the 1st anniversary of his death on 5 May, 2003'

Dr Lordkipanidze also participated in the event devoted to the memory of Professor V.V. Tikhomirov on the 10th anniversary of his death (Moscow, 13 January, 2004).

Lora Lordkipanidze, Tashkent

HONORARY SENIOR MEMBERS

Professor Gordon Craig, United Kingdom
 Professor Gordon Herries Davies, Ireland
 Professor Efgenji Milanovsky, Russia
 Professor Emile den Tex, The Netherlands

Professor Wolf von Engelhardt, Germany
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GROUP PHOTOGRAPH: INHIGEO EXCURSION, IRELAND, 2003



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Foster, Mike, *Strange Genius: The Life of Ferdinand Vanderveer Hayden*, Roberts Rinehart Publishers, Niwor (Colorado) and Schull (West Cork), 1994.

For journal articles:

Author(s), 'Title [Capitalised]', *Journal Title [Not Abbreviated, Capitalised, Italicised]*, date, *Volume number [italicised]*, page numbers.

E.g.

Rudwick, Martin, 'Cuvier and Brongniart, William Smith, and the Construction of Geohistory', *Earth Sciences History*, 1996, 15, 25–36.

(Note that volume numbers only, not issue numbers, are needed.)

For chapters in books:

Author(s), 'Title [Capitalised]', in: Book editor(s), *Full Title and Subtitle [Capitalised and Italicised]*, Publisher, Place, date, page numbers.

E.g.

Briggs, John C., 'Mass Extinctions: Fact or Fallacy?', in: William Glen (ed.), *The Mass-Extinction Debates: How Science Works in a Crisis*, Stanford, Stanford University Press, 1994, 230–236.

For book reviews:

Author of review. Review of: Author of Book, *Title of Book*, Publisher, Place of publication, date. In: *Title of Journal*, date, *Volume number*, pages.

E.g.

Sarjeant, William A.S. Review of: Jerry MacDonald, *Earth's First Steps: Tracking Life Before the Dinosaurs*, Johnson Books, Boulder (Colorado), 1994. In: *Earth Sciences History*, 1996, 15, 84–85.

Please use single inverted commas.

Please do NOT make ANY abbreviations; and do NOT capitalise the names of persons (except in the case of Chinese or Japanese names, where capitalisation of family names is helpful). In articles and reports, *etc.*, please supply 'given' ('Christian') names where possible, and (as a general guideline) use them in the main body of a text for their FIRST mention ONLY. Thereafter, just give the family name, without the given name(s) or initial(s).

