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INHIGEO Secretary-General**

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The INHIGEO Board for 1996–2000, as Confirmed by the IUGS Council in Beijing, August, 1996

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REPORTS

Retiring President's Ramblings

I pass the job of helping to run INHIGEO over to our Portuguese colleague Manuel Pinto with some regret, but in complete confidence. Times are a-changing and some new non-Anglo-Saxon blood is clearly needed. My confidence in the future of INHIGEO is high, since I can honestly say I have never worked with a more competent, helpful, and hard-working secretary than David O. and since he continues in office, I know that his wonderful work will continue. An Iberian view onto the world of history of geology will greatly help, I believe, in INHIGEO's main crusade—that of giving the history of geology an even more international relevance and interest than it has already.

Besides, I hope to discover from Manuel, what exactly are the 'old Spanish customs and practices' which British workers are supposed to have indulged in to such an extent (and which seem to be having such a terrible effect on our motor manufacturing industry just as I write this). An enquirer wrote to the journal *Notes and Queries* in 1922 (13 Feb., p. 122) asking if anyone could enlighten him as to the origin of this saying, but I have not yet managed to discover if his query was ever answered! While on the subject of Iberia, I may as well admit to having once been attacked by a 'Portuguese Man-of-War' (only to have questions asked as to why my then girl-friend had to be so very active with her whip . . .).

2000 has, so far, been an interesting year for the History of Geology, at least as I perceive it. In the midst of our current millennialism I have never been so busy talking about history. 'The Age of the Earth' meeting that Cherry Lewis has so well organised for us (see p. 18) for June is much looked forward to. Other tasks, speaking on the value of the history of geology, await me at the 'Earth Alert 2000' meeting at Brighton for the Geologists' Association (which I joined in 1956 aged 15) and a similar meeting of the British Open University Geological Society. But much of this interest seems to be only token. Only apparently in 2000 is it thought that the history of geology might have some value. I hope we do not have to wait until the year 3000 before a similar interest is repeated.

I have been recently reading a fascinating lecture given by Herbert Harold Read (1889–1970) and first published in 1952. In this, Read made the interesting claim that "the best geologist is, other things being equal, he[*she*] who has seen most rocks, so that the experience of a geologist in fieldwork is of fundamental importance". His lecture was first published as 'The Geologist as Historian' in *Scientific Objectives: A Selection of Lectures Given at Imperial College, London 1949–1951* (London, 1952). Read rightly pointed out what a wonderful school subject geology should be, and urged how vital it is that geologists view their subject as being the history of the earth. So much has since changed. The computer has

* A poisonous kind of jelly-fish that leaves marks on the skin. We fear that at times Professor Torrens's jokes may be rather obscure to non-Anglophones (Ed.).

rapidly (and supposedly) rendered field experience 'merely expensive', the history of the earth is seen as much less important than an understanding of the processes which the earth has, and continues to, undergo, while geology itself is in serious trouble as a university-level subject in Britain, let alone any improvement being observable in its status as a school subject.

Other problems in British universities are even more serious. Individual scholarship, at least when carried out in science departments, seems now forbidden. One can only survive in a Research *Group* (the larger the better) and bent to the will (or mischief) of a Research *Group Leader*. Trying to be a lonely historian of science under such circumstances is virtually impossible. Yet only historians can point out the stupidity of some of the above attitudes or that both the Darwins (whether Charles or Erasmus) never had to work under such circumstances. All this reminds me only of Nikolai Gogol's Government Inspector.

Such inspections for appraisal, assessment, and attempted quantification of every academic activity in Britain encourage a reluctance in academic circles to think that the study of the past can have any value. The decision of the Geological Society of London not to publish our so much missed John Thackray's final *magnum opus* on the early meetings of that Society was the saddest example of 'reluctance' that I came across recently.

However, it must be said that the Society is now taking a much more positive view of history of geology, with, to my knowledge, at least four books in the field planned for publication. These include Gordon Herries Davies's bicentennial history of the Society, currently in preparation, and a collection of papers on the history of 20th-century geology, which will provide a permanent record of the lectures on that theme to be given at the Symposium being organised by INHIGEO for the Rio International Congress. This is all to the good, especially considering the fact that the general public interest in studies of the past has never been greater. Dava Sobel's 1995 book *Longitude: The True Story of a Lone Genius who Solved the Greatest Scientific Problem of his Time* (Walker, New York) on the horologist John Harrison (1693–1776) has inspired a lot of imitators and I have been very busy trying to improve two popular books on the history of geology in only the past few weeks.

Anyway, I hope some warm Iberian sunlight will have a stimulating effect on INHIGEO and its future activities. I'm sure it will. I end by wishing Manuel and David and the other members of the new Board all the very best for their terms in office.

Hugh Torrens, 22 March, 2000

Secretary-General's Report

1999 was again a busy one for yours truly, but enjoyable—and I believe fruitful. I am most grateful to all those who have kept in touch with me, and to those who have provided the numerous interesting and useful contributions to the present *Newsletter* and the one that preceded it.

Members will already have received the ballot papers for the new INHIGEO Board and for new Members of the Commission. Regarding the former, you will see that it entails a rather peculiar kind of 'democratic' process: one nominee for each position. But I suppose you can all vote against the 'Government' if you wish! Anyway, I understand that the procedure adopted for the present ballot is essentially the same as that used in earlier years—except I have sent out no proxy forms. They were used initially when only Full Members could vote,* when ballot papers were not sent by mail, and elections were held solely at INHIGEO Business Meetings. Any Full Member who could not attend a meeting could deputise another one to cast a proxy vote for him or her. But each Member present at a Business Meeting could proxy for only *one* absent Member, so the President and S-G were commonly designated as proxies for several persons, all but one of whom thereby lost their votes. This situation was obviously undesirable and unsatisfactory and is obviated by the use of postal votes.

In fact, the Board has decided to initiate a process whereby the use of proxy votes is formally terminated, and it is intended that we shall place this matter on the agenda of the Council Meeting of the IUGS in Rio de Janeiro. A sheet setting out the proposed change, as recommended by the Board, with information explaining the reasons for the proposed change more fully, together with a voting slip, is enclosed with this *Newsletter*. Please return the form to me by May 31, so that we may (I hope) approach the IUGS about a change of one of our Bylaws with the backing of the INHIGEO Membership.

I have also thought it a good idea to establish a data-base about Members' interests; and accordingly I have also prepared a questionnaire on this matter, which is enclosed herewith. It will be greatly appreciated if you would be so good as to return this document to me also. The possession of such information should be most useful for the improved functioning of the Commission.

In relation to those persons retiring from the Board this year, we should like to say a large 'thank you' to Franco Urbani, Wang Hongzhen, and David Branagan for all the work they have done. I should say that I have never had the opportunity to meet Professor Urbani, but hope to do so in Rio this year. I have met Professor Wang three times in Beijing and have been warmed by his gracious hospitality on every occasion. You will enjoy reading about some aspects of his remarkable career elsewhere in this *Newsletter*. That man of the Enlightenment, David Branagan, is a fairly close neighbour, whom I can easily contact when I don't know what to do. My wife and I attended his 70th birthday recently (on April 1, a significant date in some calendars). Now that he has got INHIGEO burdens off his back, I am sure he will make it to his 80th, and I hope we shall be invited to another party in 2010. I am very disappointed that Professor Torrens has to disburden himself of some of his commitments as a result of his early retirement. But thank you Hugh for all your help. We

* Formerly, there was only one Full Member (with a vote) for each country, plus up to ten Corresponding Members (without votes). Now there may be up to eleven Members, all with the same voting rights.

have been in close communication for about four years. Indeed, the links appear to be so strong that there is confusion in some quarters as to who actually is who. (I should like to thank whoever it was at Freiberg that congratulated Hugh about a book that I had written! This must say something about something. But what?)

But to be serious, Hugh has been a wonderful leader for INHIGEO, and indeed for history of geology worldwide. We shall miss him, but fortunately not entirely, as he remains on the Board for another four years, *ex officio*.

Regarding the new nominations, I am particularly pleased to see that our membership is likely to be resuscitated in Sweden; that we have our first nomination from Estonia; and that there is another proposed representative from India. I wish to thank those who have taken the time and trouble to organise nominations. Also, I am gratified that we shall, this year, put into effect the decision to create a new vice-presidency representing Europe.

Regarding INHIGEO activities in 1999, the highlights were the Mary Anning meeting in Lyme Regis, and the large Werner meeting in Freiberg. On these, please see the reports elsewhere in this *Newsletter*. The Freiberg report appears also in *Episodes*. I understand that the *Bergakademie* at Freiberg will be publishing about thirty of the best papers presented at the Symposium. Also, I believe that a temporary full-time position is to be (or has been?) established at Freiberg to examine, edit, and publish the major unpublished Werner papers (which will, I suspect, refute the old accusation that Werner was averse to writing!).

Quite a lot of work has gone into the preparation for the meeting in Brazil. In the event, it was decided to abandon the proposed session on 'End-Millenniumism', and establish a double session on 'Some Major Developments in Geology in the Twentieth Century'. Ten speakers have been invited for this, and, together with perhaps four or five additional contributions, their papers are to be published as a Special Publication of the Geological Society of London. We also look forward to the session on 'Geology in the Tropics', and to a 'history of geology' field excursion in Brazil, led by our resident local expert Dr Silvia Figueirôa.

I should like to take the opportunity here to thank Dr Martina Koelbl-Ebert from Germany (not as yet a Member) most sincerely for preparing an invited poster exhibition, on behalf of INHIGEO, for the Rio Congress. By agreement with the Business Meeting in Freiberg, she has chosen as her theme the history of the role of women in geology.

A modest amount of money has been made available by the International Union for the History and Philosophy of Science to help Members get to Rio. If you wish to get your hand into this SMALL pot of gold, please contact me immediately.

At the invitation of the IUGS, INHIGEO plans to organise the publication in *Episodes*, about twice a year, of extracts from major pivotal, or 'turning-point', papers in geology, with commentaries. We are thinking about establishing a sub-committee of some kind to put this initiative into effect. If Members have any favourite 'turning-points', I should be grateful if they would contact me.

The *Newsletter* continues to grow, and I thank all contributors who are helping it do so, particularly those who have undertaken the arduous task of preparing country reports. **Nearly everyone—but NOT everyone!—has now got the idea that I don't like abbreviations. My preferred reference style is also reluctantly, gradually, slowly, hesitantly, but definitely, coming into favour. Thank you all.** It has again been my pleasure to assist the Japanese Members publish an English-language *Newsletter* (enclosed herewith). I am sure many people will find the bibliography in this year's issue particularly useful, and I commend it to readers' attention.

On the question of archives, I have still not been able to get any information from Russia about the whereabouts of Professor Tikhomirov's papers, or a suitable contact person. **I should be most grateful for information from Russia on this important question.** Further on archives, the Business Meeting in Freiberg was most pleased to accept Professor Murty's noble offer to do what he could, worldwide, to collect and co-ordinate information about the existence, preservation, and establishment of geoscientific archives. **I urge all Members to give Professor Murty every assistance possible in relation to this daunting task.** (Please see p. 21.)

Looking to the future, I am delighted to be able to inform Members that it is planned that we shall meet in Portugal in late June, 2001, with the nominated incoming President, Professor Manuel Pinto, in charge of proceedings and with dinosaurs featuring largely on the intended programme. Please make a firm note of this for your planning for next year. For preliminary details, please see p. 20. Further information will be posted to you soon. INHIGEO will have as its main activity in 2002 participation in the 'd'Orbigny meeting' in France and South America, organised by COFRHIGEO with Professor Philippe Taquet as master of ceremonies. It is still expected that we shall voyage to Ireland in 2003 to discuss the theme of 'Geological Travellers', and presumably the INHIGEO meeting in 2004 will be in Italy or Austria, according to where the IGC is held that year. **If other countries are desirous of hosting meetings, I should be grateful if they would contact me so that suggestions can be discussed in Rio.**

For reasons various (chiefly advancing age), Mssrs Regnéll (Sweden), Portmann (Switzerland), Trümpy (Switzerland), and Cooper (UK) have decided to resign from INHIGEO. A special word of thanks is due to Professor Trümpy for co-organising our splendid Swiss meeting two years ago. In his most recent letter, he candidly *admitted* that he enjoyed himself as much as we did, and I am greatly delighted to know that this was so. Professor Regnéll was one of the founding Members of INHIGEO. We say farewell to the four of you with much regret.

During the last year, we have also suffered the deaths of three Members and obituary notices are published on pp. 51–55. I should like to add my personal note of sorrow to these admirably phrased remembrances.

This said, I look forward to the coming year with pleasure, and to renewing old acquaintances and making new ones in Rio. Best wishes to all.

David Oldroyd, Sydney, 15 April, 2000

Minutes of the INHIGEO Business Meeting, held at Freiberg, Thursday, September 23, 1999

1. The meeting opened at 7.30 p.m., with the following persons present and with the President, Professor Hugh Torrens, in the chair:
Members: D. Oldroyd (Australia), J. Haubelt (Czech Republic), J. Gaudant (France), M. Guntau (Germany), B. Fritscher (Germany), W. von Engelhardt (Germany), K. Murty (India), T. Kutsukake (Japan), E. Vaccari (Italy), M. Pinto (Portugal), E. Milanovsky (Russia), E. den Tex (The Netherlands), H. Torrens (UK), K. Taylor (USA).
In attendance: M. Kölbl-Ebert (Germany), K. Histon (Ireland), S. Newcomb (USA), R. Silliman (USA).
2. The Minutes of the previous meeting, published in *Newsletter* No. 31 (1998/99), were taken as read. There were no matters arising.
3. The President reported that he planned to resign from his position in 2000, but would be willing to continue if no person could be found wishing to take over the Presidency.
4. The Secretary-General (S-G) stated that a ballot for new Members of the Commission and of the Executive Board would be held in 2000. He would write to all Members of the Commission in November, 1999, inviting nominations. The election would, in accordance with previous determination, be conducted entirely by post. There would be a new post of Vice-President (Europe).

The S-G further stated that he had been requested by the IUGS to respond to a questionnaire seeking information about the Commission's activities. (Such a questionnaire had been sent to all of the IUGS's Commissions.) This followed a meeting in Vienna at the beginning of the year at which Professors Torrens and Guntau had met with the IUGS Board, with Dr Vaccari in attendance. However, so far as was known, there had been no complaints about INHIGEO's work, other than that it was requested to co-operate more with other related societies and Commissions, and make more contributions to *Episodes*. The S-G stated that he would publish his responses to the IUGS questionnaire in the next *Newsletter*.

5. There was extended discussion of the arrangements for future meetings. There had been no recent communication from Professor Sengör about the proposed meeting in Turkey, but it was thought that he might well be too busy prepare a submission for the proposed GSA/INHIGEO field forum, because of his work-load arising from the recent severe Turkish earthquake[s]. The S-G was requested to communicate with Professor Sengör, ascertain the situation, and formulate contingency arrangements.

Regarding the Rio Congress, it was explained that the planned symposium on 'End-Millenniumism' had been abandoned, but an enlarged session on 'Some major Developments in Geology in the Twentieth Century' was being developed successfully. Professor Pinto said that he had been unable to communicate with his Brazilian colleagues about the arrangements for the 'Geology in the Tropics' Symposium, and this too might possibly have to be abandoned. Were this the case, the 'Twentieth-Century Geology' programme might be further expanded.

Details of a large meeting concerning the work of Alcide d'Orbigny, planned for 2002 in France and South America, were tabled by Dr Jean Gaudant, who encouraged INHIGEO to participate in the envisaged meeting. This attractive offer was accepted, though in so doing it conflicted with some other possible plans. It was recalled that a meeting in Ireland had earlier been planned for 2001, but had been postponed because of the suggested meeting in Turkey. Were the Turkish meeting postponed or abandoned it would be necessary to ask Dr Wyse-Jackson (Dublin) whether he might reconsider the option of holding a meeting in Ireland in 2001 on the originally-planned theme of 'Geological Travellers'. If, then, INHIGEO were to meet in Ireland in 2001 another invitation—to Estonia—could only be accepted in 2003. Other possible meeting places listed on the agenda (Israel, Portugal, Norway, Mexico) were not discussed. It was noted that the IGC for 2004 would be held either in Austria or Italy. Both these alternatives would be agreeable to INHIGEO.

6. Regarding publications, the S-G reported that some of the papers from the Liège Congress were now appearing in *Annals of Science*, but according to Professor Taylor's understanding only four had been both submitted and accepted for publication. According to information received from Professor Schaer in Switzerland, some ten papers from the Neuchâtel meeting were likely to be published in *Eclogae Geologicae Helveticae*, and Professor von Engelhardt mentioned that his paper had already appeared. The S-G reported that the organisers of the Freiberg meeting were planning to publish about thirty of the best papers presented at the Werner Symposium, from those submitted for publication. The S-G also reported that the Geological Society, London, had written to him indicating that it would be interested in publishing the papers that were to be organised by INHIGEO for the part of the Rio meeting concerned with major developments in geology in the twentieth century. His offer to act as editor for the publication was accepted by the meeting.
7. The President spoke to the matter of the preservation of archives, for which the assistance of INHIGEO had been sought by the archives group of the IUHPS. Professor Torrens pointed out the severe problems in this area, exacerbated by the recent deaths of Peter Schmidt and John Thackray. However, he also drew attention to a pamphlet that had been produced in Britain, which could be sent to the relatives of deceased geologists of note, which asked them to arrange for the deposit and preservation of documents, etc. He also pointed to the work of Ilse Seibold in Germany as a model as to what could or should be done.

There was a suggestion that some co-ordinating person from INHIGEO was needed to assist in the matter, and Professor Murty kindly offered his services in this regard—which offer was gratefully received. He would endeavour to ascertain what was being done in different countries, and would draw up a list of the principal repositories for each.

Further on archives, Professor Guntau tabled a document showing photographs of all the Commission's founding Members. The S-G requested that a copy be made, which he would like to publish in the next *Newsletter*, and that the original be sent to Trondheim for safe keeping.

8. As a matter without notice, the S-G drew the attention of the meeting to a request from the IUGS that the Commission should present a poster display at the Rio Congress on the theme of 'Geology and Society'. It was remarked that the request was worded somewhat ambiguously and could therefore be interpreted in several different ways. However, Dr Martina Kölbl-Ebert, who was to be nominated by the German National Committee in the 2000 ballot, had kindly offered to prepare a poster. It would give a summary account of INHIGEO's activities, and specifically would concentrate on the history of the role of women in geology (given that the theme 'Geology and Society' was far too large to be treated in a single poster display. Dr Kölbl-Ebert's offer was gratefully accepted.
9. Professor Torrens moved a motion of thanks to the Freiberg hosts for their "splendid work" in organising the recent symposium, which motion was carried with acclamation.
10. The meeting closed at 8.30 p.m., following which Dr Gaudant spoke to the plans being developed in France and elsewhere for the establishment of a new European journal for the history of geology. He tabled the replies received from INHIGEO Members in response to his questionnaire about the proposed journal. He also gave estimates he had received regarding likely publication costs (for an issue of 500 copies of 128 pp. on good-quality paper, the best being: 14,000 French francs = 4130 DM = £1550, inclusive of postage). The proposal received a positive response from those present, and a decision was made to establish a steering committee to endeavour to establish the journal. It was to consist of the President and S-G of INHIGEO, and representatives of the national committees of France, the UK, Germany, Spain, Italy, the Netherlands, Austria, and Hungary. Dr Gaudant would act as convenor and secretary of the committee, which would communicate by e-mail. It was provisionally envisaged that articles might appear in the journal in French, German, Italian, Spanish, and English. The question of the languages to be used for abstracts was left open for future discussion.

D.R. Oldroyd, Secretary-General, INHIGEO

Report on the Project to Establish a *European Journal for the History of Geology* (Meeting held at Freiberg, 23 September, 1999)

The decision to study the possible launch of a *European Journal for the History of Geology* was taken at Neuchâtel, in September 1998. A questionnaire was sent out in May, 1999, to European INHIGEO members, concerning the future status of any such Journal.

Main Results of the Inquiry

The last question of the questionnaire was vital to our purpose, as it concerned the possibility of coming to some conclusions on this project during the INHIGEO meeting in Freiberg. The result was: 24 Yes; 3 No; 7 Don't know.

Following this, we came to some decisions following answers made to other questions.

1. Are you in favour of the creation of a *European Journal*?
32 out of 40 answers supported the project; 6 were negative (some because many scientific journals currently have economic problems).
2. Are you likely to subscribe (45 to 60 Euros/year)?
Out of 30 answers from people supporting the project, 24 were positive.
3. Future status of the Journal.
Three possibilities were proposed. A clear trend appeared to favour an independent status:
 - The Journal should be totally independent: 20 Yes; 4 No.
 - The Journal should emanate from National European committees: 11 Yes; 9 No.
 - The Journal should be published by a European Society still to be formed: 2 Yes, 13 No.
4. Should representatives of these National Committees be statutory members of the Editorial Board? This question received 18 positive answers and 6 negative ones.

Main results of this inquiry:

- 1. The project should continue with the aim of launching an independent *European Journal for the History of Geology* in 2001.
- 2. National Committees or Groups should supply statutory members of the Editorial Board.
- 3. A provisional Steering Board should set up the project.
- 4. A final decision should be taken during the Millennium "Age of the Earth" Symposium (Geological Society, London, June 2000).

Composition of the Steering Board:

After examining several possibilities, it was decided that this Steering Board should have a small number of members. The proposal is that 5 national groups (France, Germany, Italy, Spain and the United Kingdom) will have one representative each. Additionally, the current INHIGEO President and Secretary-General will be members of the Board. The national representatives are: Gabriel Gohau (France), Gottfried Hofbauer (Germany), Simon Knell (United Kingdom), Ezio Vaccari (Italy), and an as yet un-named representative from the *Comisión de Historia de la Geología de España*. Jean Gaudant (France) will continue as co-ordinator of the project.

Proposals for an Editorial Policy of the European Journal:

In order to reduce potential competition with the American-based journal *Earth Sciences History*, it is proposed to open this European Journal primarily to manuscripts dealing with the History of European Earth sciences, the activities of

European geologists all round the world and to epistemological approaches to all major improvements in geological and mineralogical theory and practice.

As the *European Journal* plans to publish papers written in five languages (English, French, German, Spanish and Italian), the Editorial Board should be managed by a Chief Editor assisted by 4 or 5 Assistant Editors (one for each language).

Before making any final decision, the economic aspects of the project must be carefully considered. Several financial estimates for printing costs were submitted. The best proposal so far is from the Italian printer Brigati Glauco, Genova. According to this estimate, the price for 500 copies of a 128-page volume, printed with half-tone figures on good quality paper, is around 2150 Euros (=1450 £; 4130 DM; 14 000 FF). Mailing expenses and postage should be added.

In order to make the finances balance, the necessary minimum number of subscribers should be around 200, with a subscription rate of only 25 Euros (=15 £; 45 DM, 150 FF). During the first few years, the *Journal* will only have one annual 128-page issue (until a consolidated financial balance is secured).

We propose to organize next spring, through national committees, a preliminary subscription to see if we can find 200 subscribers for the *Journal*. We expect to issue its first number before the end of 2001 (subscribers will have only to pay in 2001).

Additionally, a search will be made for an eventual grant from the European Union bearing in mind the multilingual character of the project.

Jean Gaudant (co-ordinator), 17 rue du Docteur Magnan, F-75013 Paris, France (<gaudant@ipgp.jussieu.fr>)

Response to IUGS Questionnaire Prepared by Peter Cook

[The following responses were made by the Secretary-General, after consultation with the Members of the INHIGEO Board, to a questionnaire posted to all Commissions of the IUGS.]

B1 How successful has your organization been over the past five years in achieving its mission?

We believe that we have been most successful in the following ways, and have a highly respectable 'track record':

1. Co-ordinating information about what is going on in the study of the history of geology world-wide, through the issue of an annual *Newsletter*. INHIGEO is the only international body doing work of this kind, and other activities as detailed below.
2. Encouraging the development of studies of the history of geology world-wide (e.g., publishing and distributing, along with our own *Newsletter*, an English history of geology *Newsletter*, on behalf of the Japanese community of historians of geology).
3. Organization of significant thematically-focused international congresses, on a regular basis.
4. Publishing substantial books of essays on the history of geology from papers presented at INHIGEO conferences, or facilitating publication in regular history of science or science journals, viz:
 - Geological Sciences in Latin America: Scientific Relations and Exchanges*, 402 pp. (*Proceedings of Brazil Conference*, 1993).
 - Useful and Curious Geological Enquiries Beyond the World: Pacific-Asia Historical Themes*, 358 pp. (*Proceedings of Sydney Conference*, 1994)
 - Volcanoes and History*, 755 pp. (*Proceedings of Naples, Aeolian Islands, Catania Conference*, 1995)
 - 'History of Geology' (pp. 147-306 of Volume 26 *Proceedings of 30th International Geological Congress*, Beijing, 1996)
 - Papers from the INHIGEO session at the International Congress of the History of Science in Liège, 1997, are now appearing in *Annals of Science*.
 - Papers from the INHIGEO Conference at Neuchâtel, 1998, are currently being reviewed for publication in *Eclogae Geologicae Helveticae*. A volume (J.-P. Schaer, *Les géologues et le développement de la géologie en pays de Neuchâtel*, 81 pp.) was specially prepared for this Conference and published by the Muséum d'Histoire Naturelle, Neuchâtel.
5. Publication on occasion bibliographies such as: P. Mohr, *A Bibliography of the Discovery of the Geology of the East African Rift System (1830-1950)*, INHIGEO, Sydney, 1999, 24 pp.
6. Promotion of interdisciplinary studies and facilitating links between geologists and historians of science. In this regard, INHIGEO provides opportunities for historians of science to travel to historically important geological sites in the company of geological experts; and for geologists or geologist-historians to have the benefit of communicating with professional historians, which is particularly valuable since geology is chiefly an historical science.

B2. What are your 3 or 4 most important goals over the next 5 years?

1. To hold the following conferences:
 - 1999: meeting in Freiberg to commemorate 250th year of the birth of Abraham Gottlob Werner.
 - 2000: presentation of three symposia and various poster displays at the IUGC in Rio de Janeiro and to encourage publication of the invited papers (hopefully in *Episodes*).
 - 2001: a 'Field Forum', led by Professor Celâl Sengör and in conjunction with The Geological Society of America, in eastern Turkey, studying the relationship between the geology of the region and the first development of Greek science. (The collaboration of archaeologists and perhaps classicists will also be sought.)

2002: a meeting in Ireland on 'Geological Travellers'; and participation in the major series of conferences organized by French historians of geology on the work of Alcide d'Orbigny and biostratigraphy.

2003: plans have not been made at this stage, but very tentative offers of meetings have been made by Israel, Estonia, Norway, and Portugal.

2. To encourage and co-ordinate preservation of important geological sites, archives, and geological collections.
3. To continue publication of the Commission's *Newsletter*, which serves as a site for exchange of information, and critical reviews of work in the history of geology, as well as reporting activities in the history of geology world-wide, and the Commission's own activities.
4. To encourage work in the history of geology in Africa and the Muslim world, and the Indian sub-continent (but we are not too sanguine about success in this).
5. To encourage submission of historical articles to *Episodes*. For example, INHIGEO might consider nominating what is deemed to be the best conference paper at any given meeting for consideration for publication by *Episodes*, if this were agreeable to the Editor.
6. To be closely associated with the foundation in 2000 of a new European journal devoted to the study of the history of geology.
7. To facilitate collaborative work between historians of science and geologists or geologist/historians.
8. To publish occasional bibliographies or guide books to localities of historical importance.
9. To facilitate collaborative work between historians of geology from different countries where local geographical, cultural or geological knowledge and/or language skills may be required for historical research to be undertaken (e.g. study of the work of Roderick Murchison in Russia, or Bailey Willis in China).

B3 *Number of participating countries*

35 (153 Members)

B4 *Size of governing committee*

6

B5 *Number of meetings per annum*

1 to 3

B6 *Annual budget*

a) *Direct grants:*

US\$2000 (IUGS).

Occasional grants (of the order of \$1000) from the International Union of the History of Science.

b) *Indirect funding:*

At present the Commission is able to obtain mail services *gratis*, courtesy of The University of New South Wales. At a rough estimate this input is worth about US\$2000 p.a. (possibly more) considering the rates charged by Australia Post.

In addition, the host countries for conferences run the finances of these meetings autonomously.

Generally they have been able to obtain grants from local sources and have used university facilities without charge, while the main cost of attendance is born by those actually attending. INHIGEO has no information about the magnitude of local funding for conferences—but to date we have no conference losses (or profits!) to report.

We have also, on occasions, received subventions for publications. The large *Volcanoes and History* volume was published commercially by a Genoese publisher with the help of Italian subvention. (N.B.: INHIGEO was able to put in a modest amount of money, courtesy of a grant received from the IUHPS.)

Office bearers of the Commission largely have to meet their own expenses to attend conferences, and apart from the Secretary-General they pay for their own postage, etc.

B7 *What would be the impact on geoscience if your "organization" were to be abolished?*

All the good things described above would cease to occur. Presumably local/national meetings would continue—but probably less effectively, as there would be less dissemination of information and encouragement, internationally, of research on the history of geology. What is, we believe, an active and burgeoning field would no longer burgeon.

B8 *What would be the impact if IUGS funding to your "organization" were to be doubled?*

We should be able to help students and people from developing countries to attend our meetings. Or, in the event that we no longer had access to "free" mailings, we should be able to carry on as at present. (N.B., the INHIGEO budget has been halved in the last few years. Without the present hidden subsidies from The University of New South Wales—which may be expected to continue only as long as the present Secretary-General holds office—the Commission would not be viable, or would have to reduce its activities dramatically.)

B9 *What would be the impact on your "organization" if IUGS were to be abolished?*

Most likely INHIGEO too would be abolished.

- E1 *How effective do you feel IUGS is as an organization?*
To my knowledge it is active and efficient and has stimulated interest in geology and the history of geology round the world.
- E2 *What are the strengths of IUGS?*
I am not in a position to comment on this in an informed way for matters in general; but I am an atypical member of INHIGEO, being primarily an historian of science, not a professional geologist. I am aware, of course, of the Union's international reach in meetings and its widespread support for many aspects of geology, including the history of geology. (I have only attended one International Geological Congress, but greatly enjoyed and benefited from that.)
- E3 *What are the weaknesses of IUGS?*
It is, no doubt, likely to have them, but I am not aware of what the weaknesses may be.
- E4 *What should be the future role of the IUGS?*
To continue and expand the best of its current activities and programmes, with a close look at which ones are the most rewarding and which might be terminated.
- E5 *What should be the future priorities of IUGS?*
Always keeping abreast of the newest developments in geoscience and giving them wide publicity. Also, increasing its funding base—perhaps through carefully chosen corporate sponsorship. (I have heard that the USA has recently agreed to pay its United Nations dues. Possibly this will eventually change the financial situation of the IUGS for the better.)
- E6 *What role should IUGS have in future IGCs?*
A central role, I would have thought.
- E7 *How do you see the role of IUGS vis-à-vis other national and international bodies?*
That of liaison with similar international bodies for other sciences; co-ordinating and financing the activities of its working groups, boards, commissions, etc.
- E8 *What organizational and financial changes should be made to IUGS to make it into a more effective organization?*
I am not in a position to comment in an informed way on this, but see E5.
- E9 *Should IUGS aim to have a higher profile, or is it about right?*
It appears to me to be about right.
- E10 *Do you have any general rules on how funding should be apportioned between the different IUGS entities?*
Not really. I do not know how much money is distributed to each of the Union's constituent bodies, or how effectively it is used by them. (But there is no wastage in INHIGEO. A vast amount of unpaid work is done by the Commission's Board, and the various conference organizers.)
- E11 *Is this answer your own or that of part or all the Committee?*
My own, after consultation with Board Members.
- E12 *Any other comments and suggestions regarding IUGS?*
None, except that INHIGEO fully appreciates the advantages it enjoys as a commission of the IUGS and hopes for the continued support of that body.
- E13 *Do you subscribe to Episodes? Or do you receive as a consequence of your position or involvement with the IUGS?*
I receive it gratis in my capacity as Secretary-General of INHIGEO. Other Board Members either subscribe or read it in libraries.
- E14 *Do you read it regularly?*
Yes. I look out for historical articles, and scan it for items that may help me to keep up with advances in geological theory. Other Board Members, and INHIGEO Members more generally, read it for advances in geology, as well as reports of new historical research.
- E15 *Do you think it contains useful, interesting articles and other material?*
Yes, certainly. Many of the articles are newsworthy and scientifically informative and the calendar and reports of meetings are useful to many people.
- E16 *What, in your view, is the most valuable or useful information contained in Episodes?*
It is hard to choose, but some Board Members particularly like the detailed reviews of the topics covered in large meetings, such as the Beijing Congress, where any one person can only attend a few of the many papers on offer.
- E17 *What suggestions can you offer for improving Episodes and making it more valuable and useful as the scientific journal of the IUGS and also more relevant to your work and needs?*
Have more book reviews (or essay reviews where appropriate), perhaps with more bite to them, and with authors having the opportunity to reply where substantial criticisms have been made. A 'Notes and Queries' section and a correspondence column might be considered.
- E18 *What would be the impact on you, your work, or your organization if Episodes ceased to be published?*
It would have little direct effect on my work, but it would be a regrettable termination of a useful outlet for the publication of historical articles, which can reach practising geologists directly. INHIGEO is seriously interested in urging members to offer more historical papers to the journal. It may be noted that the valuable paper by Köbl-Ebert in the March 1999 issue was originally presented at the INHIGEO conference in Switzerland in 1998.
- E19 *Do you see and use other IUGS publications (Monographs)?*
No; but many INHIGEO Members do so.
- E20 *Do you find IUGS monographs useful or relevant to your work or relevant to the needs of geosciences in general?*

They are rarely relevant to my own research as I am an historian of science. But they are relevant to the needs of many Members of INHIGEO and to geoscientists in general.

E21 *What suggestions can you offer to improve the visibility, vitality, and utility of IUGS monographs?*
I have no specific suggestions.

E22 *Do you visit the IUGS web-site (www.iugs.org)? If so, how frequently?*
Occasionally, and chiefly in regard to INHIGEO matters.

E23 *Do you find the information on the web-site interesting and useful?*

Yes. For example, the present web site has the historical perspective on the first IGC, written by François Ellenberger, a topic that is of interest to many INHIGEO Members.

E24 *Do you think that the information on the web-site gives you a proper sense of the scope and effect of IUGS activities?*

Yes, I think it does. In fact, it usually provides more information than I can use.

E25 *What suggestions can you offer for improving the web-site (content or presentation) and making it more useful and relevant to the information needs of your work or the work of your organization?*

I have no specific suggestions—but whoever chose the Ellenberger article was doing something right!

E26 *Would it matter to you if the web site ceased to exist?*

As an atypical Member of INHIGEO (being an historian of science rather than a geologist proper) I could survive without it, but there is no doubt that other INHIGEO Members, and geoscientist more generally, would miss it.

D.R. Oldroyd

PROVISIONAL AGENDA FOR THE BUSINESS MEETING OF THE COMMISSION, TO BE HELD IN RIO DE JANEIRO, AUGUST, 2000

1. Apologies
2. Arrangement of agenda
3. Minutes of previous meeting (published in the present *Newsletter*, pp. 4–5)
4. President's Report
5. Matters arising
6. Secretary-General's Report
7. Matters arising
8. Arrangements for future meetings of INHIGEO, including offers from different countries to host meetings of the Commission
9. Archives, and assistance to Professor Murty in this regard
10. Contributions to *Episodes*
11. Business without notice
12. Completion of ballot for new INHIGEO Board and election of new Members
13. Votes of thanks to Brazilian hosts

(If Members wish to make additions to this Agenda, please communicate with the Secretary-General as soon as possible.)

CONFERENCE REPORTS

The 'Freiberg-Fest': An Antipodean Perspective

In September 1999 INHIGEO Members were privileged to have the opportunity to participate in the excellent symposium organised by the Institute for the History of Science and Technology, of the Technische Universität Bergakademie Freiberg, in collaboration with our Commission, and financially and morally supported by several academic and commercial organisations. The meeting, held to commemorate the life, work, and times of the German scientist Abraham Gottlob Werner on the occasion of his 250th birthday, was to have been organised by INHIGEO Member Peter Schmidt, Librarian at the T.U. Freiberg, but following his untimely death early in 1999 the administration of the meeting was kindly taken over by Helmut Albrecht and Roland Ladwig of the History of Science and Technology Institute. INHIGEO is deeply indebted to them for their excellent work.

Not surprisingly, the meeting was largely supported by German historians of science and about two-thirds of the papers and most of the (numerous) speeches were in German. Hence your correspondent, being culpably ignorant of this admirable language, provides a necessarily 'blinker'd' view of the events of the conference. He is grateful, therefore, to colleague Wolf von Engelhardt for providing a note about our field excursion to the celebrated Scheibenberg.

The conference opened with a largish number of speeches of welcome, including one from the local mayor, resplendent in a uniform reminding us of the traditions of the Saxon mining administration. It included the insignia of crossed mining tools, a motif that appears frequently on the buildings, postcards, souvenirs, university logo, etc., in the Freiberg region. Our President Professor Torrens was also one of the opening speakers, trying to fly the flag for INHIGEO. He properly spoke of the great traditions of the Freiberg region, and emphasised the international character of INHIGEO's activities. There was a minute's silence during the opening address by Professor Albrecht to pay respect to the memory and work of Peter Schmidt.

The first academic presentation was given by the Werner scholar Alexander Ospovat, who regarded Werner as the founder of modern mineralogy and geology. What discussions this view may have generated later in the week I cannot say, as they were mostly conducted in German, but some people felt that Professor Ospovat's address set a somewhat hagiographic tone for the meeting as a whole.

A first-rate violinist performed works with piano accompaniment by Haydn, Mozart, and Beethoven during gaps in the speeches. I, and perhaps others, supposed at first that this was the way things were done in Germany—having a high-quality cultural accompaniment to an academic meeting. And very likely this admirable practice is indeed the norm (sadly it is not so in Australia). But I, and again doubtless others, were both surprised and delighted to learn that the fine young musician was none other than Professor Ospovat's grandson!

I leave aside any attempt to give an account of the papers presented, for as said most were in German. (I am informed, however, that it is planned that some thirty of them will be published by the Bergakademie in due course, so Members will then have the opportunity to judge their merits or otherwise.) Here I shall chiefly consider the 'visible' (and occasionally audible) aspects of the meeting.

The first thing to notice is 'East' Germany itself. It must have been badly dilapidated before the re-unification, for the contrast between those buildings restored and some of those not yet refurbished was/is truly astonishing. However, so far as Freiberg is concerned the task of reconstruction seems to be about 80% complete, and refurbishment of basic infrastructure seems to be almost finished through the parts of 'East' Germany where I travelled. I should suppose that the whole task will be completed in 5–10 years. Yet the world of the East is still quite different from that of the West. It remains *very* quiet everywhere: it is as if all the people are still 'asleep'. There are few folk on the streets, particularly after dark and on Sundays, when all shops are closed. But traditional courtesies are much to the fore, and it is said that there is little or no crime (at least in Freiberg). No police are to be seen, but pedestrians obey traffic signs, *etc.*, religiously. The food is excellent, and the prices moderate. I should like to live in Freiberg—a beautiful mediaeval town emerging as a wonderful place after years of neglect.

The Donatsturm, Freiberg (mid 15th century), with Town Wall and Jakobskirche in Background
(Sketch by Eugeni Milanovsky)



As to Werner, we visited his wonderful (spectacularly so) mineral collections, which form the basis of the present TU Bergakademie Freiberg mineralogical and petrological collections, which must be some of the world's finest. We were present at the wreath-laying ceremony at his grave site, just outside the walls of Freiberg's *Dom*. There was a kind of guard of honour of local men, wearing traditional miners' uniforms (but early 19th century, as I would judge) and bearing 'arms' corresponding to miners' tools. Their flambeaux in the darkness gave a memorable effect. The pride in the mining tradition is everywhere evident in Freiberg, even though the silver ores, which gave such wealth to the district, are now exhausted and the mines closed. (The Bergakademie is now a 'high-tech' institution.) Judging by the opulence of the ancient houses in and around Freiberg, the mines must have paid well, and merchants, and administrators did very well out of the operations. Whether the miners themselves did I could not judge, as their houses have seemingly disappeared. However, one may hazard that the miners were not grievously impoverished and browbeaten, as were the colliers in Scotland for example. (Do not the miners pictured in Agricola look quite energetic and cheerful? Or was this just an example of the author's 'rhetoric' for the Saxon mining industry?)

It was interesting to note the symbol atop Werner's elaborate grave—it resembled the Star of David. Was Werner Jewish? By no means! It was in fact an emblem of the Freemasons. The importance of this movement in German/Austrian cultural history was again recalled in the performance of Mozart's *Magic Flute* at the charming little Freiberg opera house, constructed in the eighteenth century and now beautifully restored and refurbished, and perfect for Mozart productions. Masons formed the male chorus and on one occasion held their hands to their heads at an angle thus —symbolising their use of the mason's compass. Thus music and Werner were linked a second time during the symposium. I may add that though some of my (West) German friends opined that the production and performance were a little 'naive' I personally enjoyed it for its authenticity and intimacy much more than recent productions that I have seen in the celebrated Sydney Opera House (which has a ludicrous orchestral pit, such that the players have to wear ear-plugs!).

Other cultural accompaniments were provided by a reading of works by Novalis and an organ recital; but I did not attend these, the first because of my linguistic ineptitude and the second because it clashed with the INHIGEO business meeting. I did, however, enjoy an evening tour of the streets of Freiberg, where one could see various interesting emblems and plaques on houses, and the residences of some of the great names of geognosy and early mineralogy, such as Henckel, Gellert, Charpentier (a Huguenot), etc. I was much interested to learn that Charpentier, the first person to represent different rock lithologies on a published map by means of colours, was possessed of a daughter (Julie) of great pulchritude, whose charms had attracted the attention and devotion of Novalis. I am informed by Professor von Engelhardt that they became engaged in 1798, but the poet died in 1801 before they could marry. Stricken with consumption, he was cared for by Julie in his last illness.

A visit to Dresden was also memorable. The recent reconstructions there have been truly remarkable, and the city is well set to be, once again, one of the great tourist attractions of Europe. Many wonderful buildings are to be seen, but we spent time chiefly at the magnificent 'Zwinger' palace and the royal treasury. We were privileged to have a private viewing of the extraordinary jewellery collection of 'Augustus the Strong' in the 'Green Vault' treasury—Saxony's response to the world of Louis XIV. The miraculous workmanship of the court jeweller Dinglinger had to be seen to be believed. Whether it is right that such wealth (derived from the silver that the Freiberg foundry had to sell exclusively to the Elector's administration) should exist anywhere is doubtful—but it has its modern counterparts in the likes of Bill Gates, I suppose. There is a notable mineral collection in Dresden too, which city sought to rival Freiberg in matters mineralogical, but unfortunately it was not available for inspection on the day of our visit.

Dresden: Catholic Cathedral and Kurfürst Castle (left)
(Sketch by Eugeni Milanovsky)



As historians of geology will know, Werner died in Dresden. What they may not know is that it has been suggested that he went there deliberately, shortly before his death in 1817, so that he could have a grand funeral procession back to Freiberg.* The cortege stopped at the outskirts of the city to hand over the coffin from the Dresden to the Freiberg authorities. This site was marked in former times by an impressive memorial stone and plaque decorated by basalt columns, symbolising Werner's 'Neptunist' doctrines. We could trace the various vicissitudes of the memorial in several old illustrations reproduced in the excursion guide. Over the years the basalt columns disappeared, reappeared, and disappeared again, and most of the plaque went too. The stone now stands rather forlornly, but we were informed that the site was to be restored at some future time.

The day visit to Werner's school and birthplace, Wehrau, Silesia (now Osiecznica, in Poland, but in Werner's day part of Prussia), was exceedingly interesting, enabling one to compare the current economic and social situations in Poland and 'East Germany'. There is significant economic development evident in Poland, but the reconstruction is way behind that in Germany because of the lack of infusion of money from 'West German' taxpayers. The fine autobahn from Dresden to the border gives way in Poland to a modest two-way road (in good condition). Several seemingly derelict factories appear, but as we discovered when we visited the ironworks at Lawzova (Lorenzdorf) near Osiecznica, where Werner's father had been the ironworks inspector, one at least is still working. We were appalled at the Dickensian work-conditions. (But things are much worse in the Ukraine, two Poles told me, because there the labourers sometimes don't even get paid for their work.) Very likely conditions were actually better in the ironworks of Lorenzdorf in Werner's day than they are at present.

However, the factory *was/is* producing iron, and casting it into useful things like drain covers, for export to western Europe. Werner's house was well preserved and a plaque to his memory on the outside wall was unveiled. There was much speechifying (said to be a practice inherited from Communist times), and a few uninterested military men were present for no good or evident reason. Such 'hangers-on' make no appearance in Germany today, that I could see.

After the ceremonies, we walked down by the neighbouring shallow valley of the River Kwisa along part of a newly established geological trail, which had excellent descriptions of the geology at various stopping points, and described Werner's observations there. The main point for me was that one could see in the region of his youth what he meant by *floetz* rocks. As a youngster, he must have seen the massive plant-bearing layered quartzites (Oligocene) and soft lignites (Miocene) in the river valley. We did not go very far, of course, but a geological map of the area provided on a notice-board at one of the stops on the trail suggested that the region possessed some features of Werner's well-known sequence of rock types, though admittedly Werner did not in fact say much about the district in his published work.

Informed by our new knowledge of the Wehrau/Osiecznica sections, we then walked to a local hall, where a splendid meal was provided—a great culinary work of art that was rapidly demolished by a swarm of hot, hungry, and thirsty historians of geology, local dignitaries, and the military 'hangers on'—and more speeches were made.

The return journey was made without incident, and everyone got back thinking that they knew substantially more about the world, past and present, than when they set out in the morning.

David Oldroyd, Sydney

Excursion to the Scheibenberg, Erzgebirge, September 19, 1999

Guided by D. Leonhardt from the Geological Survey, Freiberg, and H. Sennewald from the Ingenieurgesellschaft in Freiberg, the excursion left Freiberg, heading south on the famous 'silver road' (*Silberstraße*), on which, from Mediaeval times, silver ores used to be transported to Freiberg from Marienberg, Annaberg, Geyer, and other mining towns in the Erzgebirge. Dumps along the roadside, now largely covered by bushes and trees, reminded one of formerly flourishing silver mines, which exploited veins in the 650 Ma Freiberg orthogneiss. At Hartmannsdorf, we passed *Grasser Teich*, a large artificial lake that formerly provided water power for the mines of the Freiberg area. Continuing in a southwesterly direction, the excursion left the metal-rich Freiberg gneiss and entered the regime of the Erzgebirge mica schist. Leaving Wolkenstein, the road followed the narrow Wiesental valley and passed the spa of Wiesenbad, where thermal springs rise from a fault zone in granite.

By a detour around Annaberg, the excursion reached the old mining town of Scheibenberg, southwest of Annaberg. Immediately east of the town, the tabular Scheibenberg hill, 807 metres above sea level, overlooks the surrounding plain. At its western side a sand pit and a basalt quarry, in Werner's time exposed a section showing about 40 metres of fluvial sands and gravels with some clay (later recognised as Upper Eocene age), below a 20 metre thick blanket of columnar basalt (augite nephelinite), with a layer of basalt blocks at its base. Because the operation of the sand-pit ended in 1935, the lower part of the profile is now covered in dense vegetation. Only the approximately 20 by 1.5-metre columns are well preserved, in the abandoned quarry at the top of the hill.

At the end of the eighteenth century, the Scheibenberg profile played an important role in the debates on the origin of basalt. In 1789, Abraham Gottlob Werner published a description of the Scheibenberg profile in the journal *Intelligenzblatt der Jenaer Allgemeinen Literaturzeitung*, defending his Neptunist theory that basalt was formed by precipitation. He interpreted the sands, gravels and clays, the layer of basalt blocks (called *Wacke*) and the basalt blanket, as a sequential order of sediments, which were deposited from the waters that once covered the whole region. [For a translation of this text, see below. (Ed.)]

Lunch was served in a picturesque woodland scenery at the 'Waldhotel', near Crottendorf, south of Annaberg. In an outcrop close by we observed granite and gneiss pebbles in a 570 Ma old paragneiss.

* The claim was made by F.W.H. von Trebra, *Oberberghauptmann* at Freiberg, in a letter to Goethe dated August 5, 1817. I thank Wolf von Engelhardt for this information.

The last stop was at the Shreckenberghill, southwest of Annaberg, where cobalt and silver were formerly mined and where, after 1945, a uranium mine was operated for some years. A fine view from this point on Annaberg, where the once rich mining district was founded in 1496, concluded the excursion.

Wolf von Engelhardt, Tübingen

[Professor von Engelhardt has kindly provided the following English translation of an important Werner text concerning the Scheibenberg locality, the German original of which was reproduced in the Symposium *Excursion Guide* (pp. 3–4). Ed.]

'A New Discovery'

The following rather unexpected observations that I made last summer on the relationship between the basalt and the underlying rocks at the well-known basalt hill of Scheibenberg will be highly significant to all impartial and enquiring geognosts, now that the question of the nature and origin of basalt is once again attracting attention.

On passing the aforementioned basalt hill—about a quarter of an hour's journey south of the town of Scheibenberg—I saw a dump of white material at its summit, which I had already seen from afar. On enquiry, I was informed that the dump was a sand-pit from which the town had obtained its sand ever since its foundation. The idea of a sand-pit at the top of a basalt mountain seemed very odd to me, so I determined to climb the hill and investigate the sand-pit mineralogically.

I observed from a distance that the summit of the hill had been dug away so that there was an almost vertical section. I therefore expected to be able to see something of the basalt mountain's interior, and I was not disappointed, as we shall see. I expected to find a layer of sand surrounding the basalt prominence, similar to the sand and clay around the hill of Pöhlberg, near [the adjacent town of] Annaberg, as interpreted up till then. How surprised I was, then, when on my arrival I observed: a thick bed of quartz sand first, overlain by layers of clay, then a layer of wacke [*Wackenschicht*], and on top of that basalt! I remarked that the three beds extended horizontally below the basalt, forming its 'basement'. The sand became finer upwards, passing into clay, the clay into wacke, and eventually the wacke passed into basalt. In short, there was a most perfect transition here, from pure sand into clayey sand, from that into clay, from [ordinary] clay through several gradations into 'greasy' clay, then into wacke, and finally into basalt.

As will happen to any expert who may observe this phenomenon in the future, I was quickly and forcibly struck by the following ideas. Basalt, wacke, clay, and sand all belong to one and the same formation. They were all generated by 'humid' precipitation [*nasser Niederschlag*] from the same water that formerly covered the area. The water first floated sand [into position], next deposited clay on the sand, and then little by little altered its precipitation into wacke, and eventually into true basalt.

To this observation I can add the following remarks. The basalt in this section is fairly well jointed into perpendicular and separate columns. The joints between the columns go down as far as the wacke, and even through it to some extent. For the most part, the wacke has a fairly slate-like aspect. The bottom or base of the sand layer cannot be seen, as it is covered by the dump, but the sand becomes coarser downwards and changes into gravel [*Grus*] or coarse pebble-sand [*Kieselsand*]. The gneiss of the surrounding ground [*Gebirge*] makes its appearance immediately below the sand-dump.

Space does not permit me to say anything further on this very remarkable observation. I shall, however, without fail provide a more detailed description in one of our journals. Well! What will the majority of mineralogists who are prepossessed of the idea the volcanic origin [*Vulkanität*] of basalt have to say about this?

Regarding basalt generally, I am now firmly of the view that all basalts are of 'humid' origin and are of a singular and very recent origin. At one time, basalts formed a continuous, widely extended, and thick layer (covering several Primary and *Flötz* formations), which was subsequently destroyed over time, and of which all the basalt prominences are the remnants.

The public will shortly have my detailed theory concerning the nature and origin of basalts, with my proofs [of the theory].

Freyberg, 20th October, 1788

Werner

From: *Intelligenzblatt der Allgemeinen Literaturzeitung* (Jena), 1788, pp. 484–85.

(Werner's further publications on basalt were:

1. Reprint of the article of 1788 (above), with explanatory footnotes, in: *Bergmännisches Journal*, 1788, 1, 845–55.
2. 'Ueber das Vorkommen von Basalt auf Kuppen vorzüglich hoher Berge' ['On the Occurrence of Basalt on the Summits of Specially High Mountains'], *Bergmännisches Journal*, 1789, 2, 252–60. [In summary: basalts on mountain summits are the remnants of a basalt cover, partly destroyed by erosion.]

*Remains of Nephelinitic Lava Flow, with Columnar Structure, Scheibenberg, at site described by Werner
(Sketch by Eugeni Milanovsky)*



Виды на лавовую котловину Непелинитов № 1 с кристаллической структурой на горе Шейбенберг
в предгорьях запад. Печенгского гор.

**The History and Philosophy of Mineralogy: 2nd International Mineralogical Seminar,
Syktyvkar, Russia, October 4-8, 1999**

- (Organisers: Russian Academy of Sciences, Institute of Geology of the Komi Science Centre of the Uralian Division of RAS, Russian Mineralogical Society; Chairman of the Organising Committee, N. Yushkin, Deputy Chairman, A. Askhabov; Scientific Secretary, G. Lysiuk.)

The first seminar on the history of mineralogy was held in St Petersburg in 1995. It had the status of an international seminar, but the attendance was chiefly made up of scientists from the countries of the former Soviet Union.

Eighty-four papers were submitted to the second seminar in response to the invitations distributed to all countries of the world; their abstracts, many both in Russian and English, were published as a separate book. The seminar was attended by 88 participants.

The seminar handled three main groups of topics: philosophical-methodological; historical; and mineralogical-archaeological. The sessions were opened by plenary lectures: 'Historical and Methodological Investigations in Mineralogy' and 'The Path and the Ideological Contribution of Mineralogy to the Third Millennium' (N.P. Yushkin); 'The Quaternary Generalisation of the Theory of Phase Transitions' (A.M. Askhabov); 'Archaeological Mineralogy: Objects and Objectives' (E.A. Savelyeva); 'Modal and Virtual Aspects in Geochemistry and Mineralogy' (Ya.E. Yudovich); and 'The History and Philosophy of the Mineralogy of Water' (Yu.A. Kolyasnikov).

The group of philosophical-methodological papers embraced all vital mineralogical issues including analysis of the general problems of the philosophy of mineralogy (S.G. Badalova; A.Kh. Turesebekova, N.P. Yushkin's presentations); the position of mineralogy in the hierarchy of structural levels (L.V. Nikishina, I.V. Rozhdestvenskaya); the implications of chemical and physical paradigms (V.V. Gavrilenko); and new ideas about phase formation and crystal genesis (A.M. Askhabov; V.A. Petrovsky). The discussion concerned the various concepts of mineral substance individualisation and the existence of individuals (M.P. Pokrovsky, V.A. Popov; Ye.P. Makagonov); the concepts of aggregation and mineral aggregates (R.L. Brodskaya, Yu.L. Gulbin); and paragenetic mineral proportions (Yu.A. Tkachev). Yu.L. Voitekhovskiy's reflections on constitution and origin, time and space, form and structure as well as O. Esterle's concept of integrated natural science, attracted considerable interest. A large series of papers was devoted to specific methodological problems and separate directions in mineralogy.

The most numerous group of papers were historical, being devoted to different aspects of the origin and development of mineralogical knowledge as a whole, and specific mineralogical concepts. Popular topics were those related to the historical aspects of new directions such as biomineralogy (A.K. Potiyenko; S.S. Potapov, V.I. Katkova, etc.); technogenic mineralogy (S.S. Potapov); and the development of ideas about minerals and their origins (B.V.

Oleinikov, O.B. Oleinikov; Yu.P. Barashkov; A.B. Makeyev; A.B. Kozlov; Yu.I. Pystina; S.K. Kuznetsov; G.N. Lysiuk; I.V. Kodanov, V.I. Rakin; V.I. Silayev, A.A. Bogdasarov, *etc.*).

Papers discussing the history of regional mineralogical investigations dealt with those in many countries of the world, but the main attention was naturally focused on the history of mineralogical research in Russia and the former Soviet Union.

Russian mineralogy, with its three hundred-year history, during which time it has developed in co-operation with world science, has made a significant contribution to human knowledge about the mineral kingdom. The very number of mineral species discovered on the Russian territory (over 500) accounting for about 15% of the world's minerals—is in itself an indication of this contribution.

A distinctive feature of mineralogical investigations in Russia at all stages of their evolution has been the close links with Western (and particularly German) mineralogists, but also with Italian, English, Scandinavian, and, in the 20th century, American scientists. Russia has exerted a considerable influence on the evolution of world mineralogy, this influence being dictated by: the unique mineralogical material provided by the vast Russian territory; extensive use of Western experience and progressive ideas, when disparate techniques were developed into a methodological procedure (the 18th century was particularly noteworthy in this respect); and the development of valid approaches and novel ideas. Studying the history of mineralogy in Russia, its influence on world mineralogy, and, *vice versa*, its enrichment by, first of all, Western mineralogy, is of great interest.

The Soviet period stands out in the history of Russian mineralogy. The integration of many schools with different research traditions (from Central Asia to Western Ukraine), close cooperation with mineralogists from socialist countries (from Eastern Europe to China), the vast research range of more than one sixth of the world's landmass, industrially-oriented investigations, constantly-sought research results, dynamism, rapid information exchange, and co-ordination of research at a time when the whole mineralogical community could be quickly mobilised in order to solve urgent problems—these were but a few features of mineralogical investigations in the Soviet period. Studying the history of mineralogy now, when the memory is fresh, is not only topical, but absolutely necessary. An example of such an investigation is a wonderful book by the well-known crystallographer and historian of science (and a former INHIGEO member), Professor I.I. Shafranovsky (died in 1994) *Crystallography in the USSR: 1917-1991*, Nauka, St Petersburg, 1996 (in Russian). (For a review see: *Newsletter*, 1997, 29, 31).

The historical aspect of the mineralogical links between China and Russia was discussed by professor Chen Guangyuan; Paul Groth's career was elucidated in B. Fritscher's paper; and Albert Einstein's work related to mineralogy was tackled by A.M. Askhabov.

A focus of rather detailed discussion was the history of mineralogy and development of well-known mineralogical schools in the former republics of the Soviet Union:

Ukraine—B.A. Pirogov: the Krivoy Rog Mineralogical school; O.I. Matkovsky, Yu.M. Melnik: the Lvov school)
Tadzhikistan (A.R. Faiziyev)

Belorussia (A.A. Bogdasarov, M.A. Bogdasarov)

Other regions of Russia (G.N. Galyanin, K.A. Lazebnik, V.I. Samusikov; V.D. Ignatyev, A.M. Pliakin, S.T. Popov, A.A. Belyaev, Yu.V. Denisova, T.A. Gubina, *etc.*).

The role of museums and mineralogical collections in preserving and developing the ideological traditions of different research schools was convincingly shown in the presentations by L.R. Zhdanova, S.I. Ploskova; A.A. Bogdasarov; O.V. Koroleva, K.A. Lebzik, *etc.*

Syktvykar mineralogical meetings traditionally consider the issues of the history of mineralogy in association with the issue of minerals in the cultural history of ancient peoples, so *archaeological mineralogy* was one of the foci of attention at the 1999 seminar. A number of papers were devoted to the analysis of general issues and basic concepts of archaeological mineralogy, considering its objects and goals, and its history (L.F. Bushmakina; A.A. Bogdasarov, M.A. Bogdasarov; Ye.M. Zaverkina, A.V. Tabarev, *etc.*). The application of geochemical, mineralogical, and petrographical techniques to archaeological investigations was discussed by A.I. Bazhenov, T.I. Poluektova, K.L. Novoselov; A.V. Volokitin, T.P. Mayorova; V.N. Kalikov, and I.Yu. Vaskul. But the major focus was on mineral and metal uses in Europe, the Urals, and Asia from the Stone Age to the Middle Ages and on ancient technologies (Yu.B. Serkov; L.I. Ashikhmina, O.I. Ulyashev; S.A. Grigoriyev; A.A. Golyeva; Ye.I. Gelman, B.L. Zalishak, V.A. Pakhomova; O.B. Belikova, S.I. Konovalenko; A.G. Bakirov; A.A. Kazdym, *etc.*). Special interest was aroused by K.S. Koroleva and E.A. Savelyeva's paper about minerals in the culture of the *komi-zyryan* ancestors, in that it summarised the vast archaeological data from the Perm Vychegodskaya region, and also because of the location of the seminar: Syktvykar is the capital of the Republic of Komi.

A field excursion to the historic places of the Vychegda basin, the villages of Seregovo and Ust-Vym, was organised for the participants of the seminar, with a short guide* published specially for the excursion.

The village of Seregovo appeared as a centre of salt mining on the basis of salt springs and a salt-dome with vast salt resources (over 5 bln tons). The first records about salt production date back to the 12th century, and advanced drilling and salt evaporation techniques were used as early as in the 16th–17th centuries. The essentials of those technologies have been preserved to the present.

* Nesanelis D.A. and Lysiuk G.N., *The Ancient and Industrial Centres of the Komi Region*, Geoprint, Syktvykar, 1999 (7 pp. + map, in Russian).

Ust-Vym has been traced back archaeologically to the early Middle Ages (6th-10th centuries AD), and the Vym basin became populated not later than in the Mesolithic (7th-6th centuries BC). Ust-Vym became widely known in 1383 as the centre of the Christian faith in Komi, where worked Stephan Permsky, the founder and first bishop of the Perm bishopric, Ust-Vym being its capital. There are still many historical monuments there and a splendid historical museum.

One of the outcomes of the seminar was an attempt to understand the general evolutionary tendencies in mineralogy and their implications/perspectives for the third millennium. The situation can be summarised as follows:

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|--|---|
| <ul style="list-style-type: none"> - III millennium BC - II millennium BC
 - I millennium BC + I millennium AD
 + II millennium AD
 + III millennium AD | <p>Practical knowledge of stones</p> <p>Accumulation of knowledge about the nature of stones, their composition, attempts to summarize data about fossil bodies</p> <p>Primitive scientific concepts, first generalizations</p> <p>Formation of the scientific system of mineralogy, broad practical use of minerals</p> <p>Multilevel analysis of the mineral world, insights into the constitution, composition and properties of minerals, shaping of mineralogy as a fundamental science, its differentiation</p> <p>Insights into the composition, structure and evolution of the mineral world; synthesis of mineralogical knowledge; 'geologisation' of mineralogy; synthesis of the living and mineral worlds</p> |
|--|---|
- Three fundamental tendencies will obviously play a dominant role in the mineralogy of the third millennium:
 - transition from differentiation of mineralogical research and mineralogical science to integration, synthesis of mineralogical knowledge, broadening of research areas, 'geologisation' of mineralogy, development of mineralogy as a component of metageology and entire natural science (which will be made possible by harmonious unity of human and artificial intelligence, electronics *etc.* memory mediums);
 - return from the study of structure or microworld of minerals to the study of the mineral world as a whole, and to the investigation of the structure and evolution of the mineral world;
 - transition from using minerals principally as raw materials, from utilisation and exploitation of the mineral world to interaction and harmonious 'intergrowth' of man and minerals (creation of biocomplementary mineral systems, implants, *etc.*).

Nikolai Yushkin, Syktyvkar

Mary Anning, 1799–1847, and Her Times: The Discovery of British Palaeontology, 1820–1850. A Bicentennial Celebration in Honour of the First Woman Geologist*

On 2–4 June 1999 in Lyme Regis, England, some one hundred and fifty persons from seven countries gathered to reconstruct 'a picture of Mary Anning's life, work, and times . . . situated in the historical and social context of early Victorian England. [The intention was] to explore who Mary Anning was, what her contributions meant to the science of her time, and her role in society in an age of simultaneous liberation and constriction'. For this attendee the foregoing purpose of the conference, as articulated by the organizers, was indeed achieved. In our current age of rampant political correctness, one might be justified in suspecting that an obscure, provincial, uneducated collector and seller of fossils was being apotheosized merely because she was a woman. However, as the conference made abundantly clear, despite the initial disadvantages of social class, Mary Anning made truly important discoveries of marvelously preserved Jurassic marine organisms, including echinoderms, belemnites, ammonites, and most particularly ichthyosaurs and plesiosaurs. The continual mass wasting and tidal washing of the interbedded shales and limestones along the south coast of England yielded then—and still provides today—a treasure trove of fossils.

The conference program included twenty-one presentations that not only provided biographic details of Anning's life and scientific achievement, but also dealt with varied yet related topics including the role of other provincial collectors like Mary Anning, the preservation and conservation of Anning's specimens in museum collections, the differential acknowledgment by the scientific community of the collectors of fossils versus those who bought them and subsequently donated them to museums. There was also discussion of the contemporary cultural milieu of religious belief, of the conventions for illustrating fossils, of women in the geological sciences, of scraps of correspondence between Anning and Gideon Mantell, and of Lyme Regis itself as a watering place. The organizers wisely inserted several intervals that permitted the attendees to discuss at some length a number of issues raised in the presentations. There was also a formal conversation with John Fowles, local resident and distinguished author (*e.g.*, *The French Lieutenant's Woman*). Sir Crispin Tickell, Mary Anning's great-great-great nephew, was the formal convener of the conference and remained in prominent attendance, offering both opening and closing remarks for the meeting.

The conference ended with several afternoon excursions, including a tour in Anning's footsteps around the village of Lyme Regis; geological examination of the cliffs near the village where some of Anning's fossils were discovered; and

* For another report, see: J. McCall, 'Mary Anning and her Times: The Discovery of British Palaeontology 1820–1850', *Geoscientist*, October 1999, 4–6.

two walks that described how the past development of Lyme Regis has been closely related to its geologic setting and the prospects for 'geo-tourism' along the Dorset coast.

Additional highlights of the conference included a reception in the newly renovated Philpot Museum, housed in a charming building just above the sea-wall protecting the town. The displays emphasize local geology and paleontology, relevant historical events, and literati who frequented the village. All the displays are attractively displayed and intelligently labelled.

For this attendee the site, scale, and focused subject made this conference a great success, and the organizers—Hugh Torrens (Keele University) and Kevin Padian (University of California, Berkeley)—deserve sincere thanks.

Léo Laporte, Redwood City, California

International Symposium 'Abraham Gottlob Werner und seine Zeit 19–24 September 1999, at Freiberg/Sachsen (Germany)

On September 19, 1999, the History of Meteorology Specialist Group of the German Meteorological Society organised a session on meteorology in Werner's time. During this era natural researchers very often were interested in geology as well as meteorology, so the talks of our group mostly presented geologists who were also important in the development of meteorology. The first two papers dealt with the meteorological investigations of Jean-André Deluc (1727–1817) and Horace-Bénédict de Saussure (1740–1799). Both were well known for their geological findings and both also invented meteorological instruments. Deluc constructed a barometer and a hygrometer with whalebone as hygroscopic material. De Saussure invented a cyanometer to determine the colour of the sky, a heliothermometer to measure the force of the radiation of the sun and a hair hygrometer, the principle of which is still in use today. Referring to Deluc Stefan Emeis talked on changes in ways of thinking and observing in natural science. Cornelia Lüdecke showed the correlation between geology and meteorology, taking Saussure as her example. Christian Hänsel introduced Werner's colleague at Freiberg, Wilhelm August Lampadius (1772–1842), professor of chemistry and mining. Lampadius became famous for his *Atmospherology* printed in 1806. It is regarded as the first German meteorological textbook and a milestone in the development of a new discipline. The last two papers dealt with Johann Wolfgang von Goethe's concept of atmospheric layers (paper by Karl-Heinz Bernhardt); and the meteorological observations and recordings in the dukedom of Sachsen-Weimar-Eisenach from the second half of the 18th century to the establishment of a national observing network at the beginning of the 19th century—for which Gisela Nickel showed preliminary sources for the first time.

Cornelia Lüdecke, Munich

Meteorological Education Day of the German Meteorological Society, Leipzig Branch

The Leipzig Branch of The German Meteorological Society together with the History of Meteorology Specialist Group arranged a meteorological education day at Leipzig on November 10, 1999, the topic being 'Meteorology in Middle-Germany in the Time of Goethe'. Christian Hänsel started with a description of the development of meteorology until the beginning of the 19th century. Cornelia Lüdecke followed with a paper on the change from measurement to abstraction at the turn from the 18th/19th century. After lunch, Gerhard Kluge presented weather observations of the dukedom of Sachsen-Weimar-Eisenach from the period 1770–1832. Michael Börngen talked on the biography of the astronomer, physicist and mathematician, Heinrich Wilhelm Brandes (1777–1834), who constructed the first synoptic map of pressure distribution for some days in December 1821. Besides the oral papers, a small poster exhibition prepared by Börngen demonstrated the correlation between Goethe and earth sciences.

Cornelia Lüdecke, Munich

The VIIIth International Flint Symposium in Bochum, Germany

Since 1969, there have been several international meetings of early flint-mining investigators, petrologists studying flint (and other siliceous rocks suitable for chipping in prehistory), and specialists trying to chip flint the way it was done in the Stone Ages. The first three symposia were held in 1969, 1975, and 1979 in Maastrich (The Netherlands). The next ones were in Brighton (1983, England), Bordeaux (1987, France) and Madrid (1991, Spain). The Seventh International Flint Symposium was held in Warsaw and Ostrowiec Swietokrzyski (Poland, 1995), and the most recent one took place from 13 to 17 September, 1999 in Bochum (Germany).

Sessions of the symposium were held in the German Mining Museum (*Deutsches Bergbau-Museum*). Since its foundation in 1930, the Museum has been the largest one of its kind in the world, with 12,000 square metres of exhibition place and 2.5 km of underground corridors in the old coal mine directly beneath the museum building. About 150 participants in two main sections discussed problems of flint-mining, flint distribution and technology, and the geology, petrography, and geochemistry of raw materials of the Stone Age. Recently, more than 250 prehistoric mines and quarries have been registered in Europe, mostly from the Neolithic to Eneolithic, but some were already in use in the Palaeolithic. Flint was the chief raw material for chipped artefacts, especially in the areas of its natural occurrence, namely southern England, the Netherlands, Belgium, northern France and Germany, and Poland, where extensive flint-mines produced huge amounts of artefacts, part of which were distributed to the south. On the other hand, the central part of Europe (Czech Republic, Slovakia, Austria) has no occurrences of flint, so varieties of local cherts were used and unusual raw materials (some of which were mined) such as rock crystal, citrine, smoky quartz, jasper, siliceous weathering products of serpentinites (plasma, opal), porcellanites, silicified woods, and the local tektites (moldavites). These data reveal an excellent Neolithic-Eneolithic knowledge of the occurrence of raw materials in the regions inhabited by our prehistoric

ancestors. It would appear that there were specialists for the protection and mining of raw materials. In fact the earliest 'geologists' in Europe.

On the occasion of the symposium, a 3rd edition of *5000 Jahre Feuersteinbergbau: Die Suche nach dem Stahl der Steinzeit (5000 years of Flint Mining: Looking for the Steel of the Stone Age)* was published—the 'Bible' of the prehistoric flint-mine explorers. Besides papers on geology and petrology of flint, and the history of modern exploration in some famous prehistoric mines, it contains an important catalogue of European prehistoric mine-sites.

The VIIIth International Flint Symposium was accompanied by an excursion to several prehistoric exploitation sites: the chert quarry on the Lousberg near Aachen in Germany (3600 to 3200 BC); the flint-mines at Valkenburg (2390 to 2240 BC) and Rijckholt (ca 3150 BC) in the Netherlands; and at Petit-Spiennes near Mons in Belgium (2450 to 2650 BC). We also visited a recent chalk quarry (with so-called Valkenburg flint) in the Netherlands, and the impressive subterranean quarry for phosphatic chalk at La Malogne (near Mons). An unforgettable experience was the party on the final evening, held in Celtic-Roman style in the Archaeological Park, 'Archéosite', at Aubéchies (Belgium).

The symposium and excursion were excellently organised by a team of workers from the *Institut für Montanarchäologie* at *Deutsches Bergbau-Museum* in Bochum and their colleagues from The Netherlands and Belgium under the leadership of Professor Dr Gerd Weisgerber.

Antonin Prichystal, Brno

FORTHCOMING MEETINGS

William Smith Millennium Meeting: Celebrating the Age of the Earth (June 28–29, 2000) Geological Society of London

Britain's History of Geology Group is holding a two-day interdisciplinary symposium on geological time, under the auspices of The Geological Society's William Smith Lecture meeting. The objective of the meeting is to re-create in modern times the atmosphere of interdisciplinary discussion that prevailed at the end of the 19th century, when geologists, biologists, physicists, chemists and astronomers came together to hotly debate the Age of the Earth. Accordingly, we have invited geologists, geochemists, historians of science, a biologist and an astrophysicist to contribute to this special occasion.

Keynote Address: Professor Aubrey Manning on 'Time, Life and the Earth: A Biologists' View'

William Smith Lecture: Professor Hugh Torrens on William Smith.

Other speakers: John Fuller, Ezio Vaccari, Kenneth Taylor, Martin Rudwick, Jack Morrell, Joe Burchfield, Stephen Brush, Cherry Lewis, Gerry Wasserburg, Stephen Moorbath, FRS, Al Hofmann, and Sir Martin Rees (Astronomer Royal)

Hugh Torrens will lead a time-related field trip to the Wealden area on June 30.

For further information, contact Dr Cherry Lewis, Wells Cottage, 21 Fowler Street, Macclesfield, Cheshire, SK10 2AN, England (clewis@aol.com)

International Symposium on the History of Mineralogy, Mineralogical Museums, Gemmology, Crystal Chemistry, and Classification of Minerals, St Petersburg, June 26–30, 2000

St Petersburg University, Institute of Earth Crust, Faculty of Geology and Department of Mineralogy invite you to attend the International Symposium on the History of Mineralogy, Mineralogical Museums, Gemmology, Crystal chemistry, and Classification of Minerals to commemorate the 200th anniversary of the famous mineral collector, Archbishop Nil. (Official languages: Russian and English)

Topics to be covered will include: *Scientific investigations in the Mineralogical Museums; Museums and the fundamental sciences; Gemmological collections in the museums; History of Mineralogy, and Mineralogical Museums; Teaching of Mineralogy, Crystallography and Gemmology; Crystal chemistry, mineral classification and mineral databases.*

For further information, contact: Galina F. Anastasenko or Vladimir G. Krivovichev, Faculty of Geology, St. Petersburg University, Universitetskaya Emb., 7/9 St. Petersburg 199034, Russia. Tel.: (812)-328-94-81; E-mail: <dept@aa5709.spb.edu>.

5th International Symposium: Cultural Heritage in Geosciences, July 24–28, 2000

The 5th International Symposium Cultural Heritage in Geosciences, 'Mining and Metallurgy Libraries—Archives—Museum—Mining History' will be held at the Colorado School of Mines, on the theme of the cultural heritage of the mining history of the American West and the world. There will be field excursions to Clear Creek Mining District, Dinosaur Ridge, and the Rocky Mountains National Park. For further information, contact: Joanne Lerud, Arthur Lakes Library, Colorado School of Mines, Golden, Colorado, USA 80401. Fax: 303-384-2179. E-mail: <jlerud@mines.edu>; or <space@mines.edu>. Home-page: <http://www.mines.edu/Outreach/Cont_Ed>

31st International Geological Congress, Rio de Janeiro, Brazil, 6–17 August 2000

This large meeting, with numerous field excursions, has two symposia organised by INHIGEO (on August 8 and 9). The first will deal with the theme of 'Geology in the Tropics', and the second with 'Some Major Developments in Geology in the Twentieth Century'. According to the decision of the Congress organisers, most of the papers will take the form of poster presentations. There will, however, be one keynote address for the 'Geology in the Tropics Session', and for the second session the following speakers have been invited. The two symposia will be held on August 8 and 9.

Gregory Good (USA), 'From Terrestrial Magnetism to Geomagnetism: Disciplinary Transformation in the Twentieth Century'.

Richard Howarth (UK), 'From Graphic Display to Dynamic Model: Mathematical Geology in the Earth Sciences in the Nineteenth and Twentieth Centuries'.

Simon Knell (UK), 'Palaeontology in Twentieth-Century Cultural Context'.

Homer Le Grand (Australia), 'The Plate Tectonics Revolution: Thirty Years On: Retrospect and Prospects'.

Cherry Lewis (UK), 'Arthur Holmes: Father of the Geological Time Scale'.

Ursula Marvin (USA), 'Geology: From Earth to Planetary Science in the Twentieth Century'.

William Sarjeant (Canada), 'Aspects of Micropalaeontology'.

Eugene and Ilse Seibold (Germany), 'From Single Particles to Recent and Past Environments'.

Hugh Torrens (UK), 'Stratigraphy in the Twentieth Century'.

Davis Young (USA), 'Norman Levi Bowen and Igneous Rock Diversity'.

(N.B. These papers will form the basis of a book to be published by The Geological Society of London as one of its Special Publications. Some five additional topics will be covered by papers that will not be presented orally at Rio.)

In addition to the above, Dr Martina Koelbl-Ebert (Germany) has, at the invitation of the organising committee, prepared a poster presentation on the history of women in the geosciences, on behalf of INHIGEO ('On the Origin of Women Geologists by Means of Social Selection'), and some brief information about the history of the Commission and its work. There will also be a field excursion after the Congress, led by Brazilian Member Dr Silvia Figueirôa, to areas of importance for the history of geological work in Brazil.

For further information on the Congress, contact: 31st International Geological Congress, Av. Pasteur 404, Casa Brazil 2000, Urca Rio de Janeiro, RJ, Brazil 22290-240. Tel. 55 21 295 5847; Fax 55 21 295 8094; E-mail <31igc@31igc.org>; web-site <www.31igc.org>.

Conference on the History of Geologic Pioneers, August 2000

This meeting will be held in North America, the homeland of our geologic pioneers, from August 3-5, 2000, and will combine theme-oriented and volunteer papers with visits to their favourite exposures. The field-trip will include ceremonies at the graves of founders of the Geological Society of America, The American Association for the Advancement of Science, and the American Association of Petroleum Geologists. Memorial plaques will be installed at several sites.

The meeting is being hosted by the Rensselaer Center of Applied Geology, located at 15 Third Street in (downtown) Troy, New York (see below). This centre has been named in honour of Jeremias Van Rensselaer (1783-1871), respected geologist whose book *Lectures on Geology* (1825) popularized the science.

Please send titles for theme-oriented or volunteer paper/posters to: Dr Gerald M. Friedman, Rensselaer Center of Applied Geology (c/o Brooklyn College of the City University of New York, Brooklyn, New York), 15 Third Street, P.O. Box 746, Troy, NY 12181-0746. Fax: 518-273-3249. <gmfriedman@juno.com>

GSA Meeting, Reno, Nevada, 9-18 November, 2000

The 2000 Annual Meeting of the GSA at Reno, Nevada, will feature a Pardee Session Symposium on 'Lamont and Plate Tectonics'. Organised by Gerald M. Friedman, this symposium will include talks by Jack Oliver, Neil Opdyke, James Heirzler, Lynn Sykes, Manik Talwani, Marie Tharp, Heinrich Holland, Karl Turkeian, Jason Morgan, Naomi Oreskes, and William Glen. For further information, contact Professor Friedman as above.

Industrial Engineering, 1850-2000. 150th Anniversary of the School of Barcelona (1851-2001).

International Symposium on the History of Engineering: Barcelona, 18th-19th September, 2000

For further information, contact: Centre de Recerca per a la Història de la Tècnica, Escola Tècnica Superior d'Enginyeria Industrial, Av. Diagonal, 647, 08028 Barcelona (Spain). Tel.: 93 401 66 29; 93 401 66 33; 93 401 65 51; Fax 93 401 17 13; E-mail: <crht@etsib.upc.es>

Pacific Circle Meeting on 'The Museum Idea in the Pacific', Vancouver, 1-5 November, 2000

Themes: European discovery and collection in the 18th century; and the role of the museum in the post-colonial Pacific. For further information contact Professor Roy MacLeod at Department of History, The University of Sydney (<roy.macleod@history.usyd.edu.au>; fax: +61-2-9351-3918).

International Conference of Mineralogy and Museums, Melbourne, 4-8 November, 2000

A conference dealing with mineralogical collections, mineralogical research, and new methods of display (various issues) will be held in Melbourne, Australia, at the Museum of Victoria. There will also be field excursions both before and after the Conference. For further information, contact: Dr Bill Birch, Museum of Victoria, G.P.O. Box 666E, Melbourne, Victoria 3001 (Fax 61 3 9663 3669; E-mail <bbirch@mov.vic.gov.au>).

Origins and History of Hydrology, Dijon, May 2001

A colloquium, *Origines et Histoire de l'Hydrologie-OH₂*, will be held in Dijon. It will be concerned with the historical evolution of ideas, concepts, and tools that have developed in this field from Antiquity to the present, with emphasis on the relationships between geology and hydrology. The meeting has various sponsors, including the International Union of History and Philosophy of Science and COFRHIGEO. For further information, visit <www.cilea.it/history/DHS/Oh2.htm>;

enquire from <oh2@biogeodis.jussieu.fr>; or write to Laboratoire de Géologie Appliquée, J.P. Carbonnel, Case 123, 4 place Jussieu, F-75252 Paris cedex 05.

INHIGEO Meeting in Portugal, late June, 2001

The principal INHIGEO meeting for 2001 will be held in Portugal, by invitation of the President-elect, Professor Manuel Pinto, of the University of Aveiro. The proposed main themes will be: 'From Stones to Dinosaurs'; and 'Mineral Resources and History'. The field excursions will show participants some of the most interesting and important Portuguese (geo)monuments (including dinosaur tracks), from pre-history to Roman times, to the Arab period, through the Middle Ages, etc., to the modern era, stressing the importance and use of stone throughout. The first session will be based in Lisbon and the second in Aveiro. Travel in Portugal is no problem since the country is small.

Further details will be posted shortly, but Members are requested to make a note of this meeting now, and to try to make plans to enable them to attend.

IAAGA-IASPEI Congress, Hanoi, Vietnam, 18-30 August 2001

INHIGEO Member Dr Wilfried Schröder is organising a session on the history of Aeronomy and Geomagnetism. It will address the possibility of a comprehensive synthesis of studies across the several related disciplines. There will be oral and poster sessions, with biographical studies, studies of the roles of international research programmes, institutional histories, and geophysical instrumentation. Interested persons are invited to contact Dr Schröder at the Geophysical Institute, Hechelstrasse 8, D-28777, Bremen-Roennebeck, Germany; or The Institute of Geophysics, Box 411 Buu Dien Bo Ho, Hanoi, Vietnam (iaga-iaspei@fpt.vn).

XXIst International Congress of History of Science, 2001

The XXIst International Congress of History of Science's web page (www.smhct.org) is now available, which can be accessed to enable one to consult the First Circular, as well as the registration forms. Additionally, you will obtain access to information about the Mexican Society for the History of Science and *Quipu*, the Latin American Journal of History of Science and Technology. Printed material may be obtained from: Professor Juan José Salda at: Apartado Postal 21-873, 04000, Mexico D.F.; or fax 525 519 98 10.

International Colloquium on the Occasion of the Bicentenary of the Birth of Alcide d'Orbigny (1802-1857), June-August, 2002

This meeting will have three parts:

1. A meeting in La Rochelle (France), at d'Orbigny's birthplace, on 'Alcide d'Orbigny: l'homme, ses origines, sa famille, et la société de son temps' (late June/early July)
2. Main meeting in Paris on 'Alcide d'Orbigny *savant naturaliste, le paléontologue et le géologue*', during the first fortnight in July
3. A meeting of four days in Santa Cruz, Bolivia, on 'Alcide d'Orbigny, *le voyageur et l'américaniste*' (second fortnight in August).

INHIGEO will be associated with this international colloquium, and will hold its Business Meeting in Paris in 2002. For further information, contact Professor Philippe Taquet, Laboratoire de Paléontologie, 8 rue Buffon, Paris, 75005, France (<taquet@mnhn.fr>).

THE DRESDEN PAPERS

Papers presented at the 16th INHIGEO Symposium, Dresden, 9-15 September, 1991 'Museums and Collections in the History of Mineralogy, Geology and Palaeontology'

As reported in *Newsletter* No. 31 (p. 3), the publication of the papers presented at the INHIGEO meeting in Dresden in 1991 was eventually abandoned because of the untimely death of the editor Dr Peter Schmidt in 1999. The papers were thus returned to their authors by Martin Guntau, and we may hope that some of them at least will have now been published. (Professor Yagi's paper, for example, appears in the *JAHIGEO Newsletter* No. 2, which is distributed with the present *Newsletter*.) Persons interested in obtaining copies of one or more of the Dresden papers are advised to contact the author(s) concerned. (Professor Guntau may be able to assist in this matter on request.) A list of the papers follows.

Guntau, M., 'Museums and Collections in the History of Mineralogy, Geology and Palaeontology'.

Schmidt, P., 'Posthumous Works in the Earth Sciences—National and International Aspects as the Run of the Millennium'.

Torrens, H.S., 'The Importance of Geological Specimens and Collections as Sources for the History of Sciences'.

Musil, R., 'Collections of Geological Science and their Importance'.

Roberts, G.K., 'The Use of Artefacts and Film for Teaching the History of Geology; Mining for Science, a Programme on the Context of the Work of A.G. Werner'.

Branagan, D.F., '19th-Century Australian Geology Collections: their Educational and Cultural Significance'.

Alvarado, G.E. and Soto, G.J., 'Collections and Archives on Geology in Costa Rica and their History'.

Hoffmann, F., 'The Mineralogical Collection of the Freiberg Mining Academy as a Basis for Mineral-Systematic and Regional Investigations: History and Presence, Problems and Projects'.

Weber, W. and Massanek, A., 'A.G. Werner's Geoscientific Collections'.

Lopes, M.M., 'Geological Sciences in Latin American Museums during the 19th and Early 20th Century'.

- Narebski, W. and Wojcik, Z., 'Warsaw: Museum of the Earth of the Polish Academy of Sciences—Its Role in Geological Museum Management and Collectorship in Poland'.
- Davidson, P., 'A Statistical Evaluation of the Geological Collections of the National Museum of Scotland'.
- Nelson, C.M., 'National Geological Surveys and their Museums: The American Experience'.
- Pätz, H., 'Ideas for the UNESCO Museum of Oil and Gas Utilisation'.
- Hamilton, B.M., 'The Lapworth Archives—Collections within a Collection'.
- Czarniecki, S., 'On the Sense of Existence of Geological Museums—Commemoration of Stanislaw Malkowski'.
- Cooper, M.P., 'Bruce McMudro Brice—Mineralogist, Geologist, Conchologist'.
- Marvin, U.M., 'Meteorites in Collections at the Turn of the 19th Century'.
- Touret, L., 'Some Historical Collections of Crystal Models at the Beginning of the Scientific Mineralogy'.
- Birch, W.D., 'Early German Influence on Australian Mineralogy and Museums'.
- Roeser, H., Schürmann, K., and Tobschall, H.J., 'The importance of the Mineralogical Museum at the Mining School of Ouro Preto as a Research Resource: The Au-Pd Minerals of Central Brazil'.
- Wang Guofang, 'The Establishment and Early Development of the Museums of Geology and Mineral Resources of the Geological Survey of China'.
- Symes, R.F., 'The Mineral Collections of the Natural History Museum, London—The Way Forward'.
- Schevchenko, N.V., 'The Museum of Mineralogy and Petrography at Gomel University'.
- Papp, G., 'The History of Mineral and Rock Collections of the Hungarian Natural History Museum—Episodes and Trends'.
- Szakall, S. and Miskolc, H., 'The Necessity of National Mineral Basic Collection after the Example of the Hungarian Basic Collection'.
- Francis, C.A., 'Multiple Roles for the Harvard University Mineral Collection'.
- Wyse Jackson, P.N., 'The Knox Mineralogical Collection in the Geological Museum, Trinity College, Dublin, Ireland—An Example of a fine 18th-century Collection'.
- Fritscher, B., 'The "James Hall collection" at the British Museum (Natural History)'.
- Crook, D.N. and Torrens, H.S., 'A Surviving Representation of the Wernerian Stratigraphy: The Cornish Geological Society's Geological Pillar of 1818'.
- Faninger, E., 'Baron Sigmund Zois—His Work and Mineralogical Collection'.
- Dieguez, C. and Montero, A., 'The Associated Documentation of the Palaeontological Collections and the Increase of its Use for Non-Taxonomic Goals'.
- Darragh, T., 'Significant European Fossil Collections in the National Museum of Victoria'.
- Yagi, K., 'The Excavations at Lake Nojiri, Nagano Prefecture, Japan, and the Nojiri-Museum'.
- Moreno-Perez, J., 'Fossil Collections in the Development of the Geological Map of Spain'.
- Regnell, G., 'Palaeontological Research and Palaeontological Collections in Sweden'.
- Rodda, P.U., 'The Hall of Life through Time: Presenting Evolution in a Public Museum'.
- Yochelson, E.L., 'Growth of United States National Palaeontological Collections 1867–1896'.
- Dean, D.R., 'The Museum and Collections of Gideon Algernon Mantell (1790–1852)'.
- Urban, J., 'The Setting-up of the Geoscientific Writings and Archives in the Present'.
- Mathé, G., 'Geologists' Archives at the State Museum of Mineralogy and Geology in Dresden—A Brief Account'.
- Riparbelli, A., 'The Scientific and Cultural Relevance of Italian Mining Archives of Abbadia S. Salvatore (Siena), Montecatini Val di Cecini (Pisa), Massa Marittima (Grosseto) for the History of Geological and Mineral Sciences for the Planning of Mine-Parks'.
- Newcomb, S., 'The Rare Book Collection, United States Geological Survey, Reston, Virginia'.
- Taylor, K.L., 'Resources for History of Geology in the University of Oklahoma's History of Science Collections'.
- Vaccari, E., 'The "Giovanni Arduino" Collection of Manuscripts: A Case of Recovery and Reorganisation of Unpublished Sources for the History of the Earth's Sciences in the Second Half of the 18th Century'.
- Figueirôa, S.F.M., 'The Writings of Orville Adelbert Derby (1851–1915) and their Meaning for the History of the Geological Sciences'.
- Wang Genyuan, Chen Baoguo, 'Professor Zhang Hingzhao's Posthumous Things and their Historical Significance—The collections in the Museum of the China University for Geosciences (Wuhan)'.

GEO-ARCHIVES

The International Union of History and Philosophy of Science (Division of History of Science) is very much interested in the preservation of archives relating to twentieth (and now twenty-first)-century scientific achievements, which outnumber those of all previous centuries put together. Its Commission on Bibliography and Documentation is therefore undertaking a world programme that aims to make the scientific community aware of the importance of preserving contemporary scientific archives.

The Commission has requested the assistance of the International Commission on the History of Geological Sciences (INHIGEO) in collecting information about the location of geoarchives and the encouragement of the preservation of the papers of notable geologists, geological organisations, and geological institutions.

At its meeting in Freiberg in September, 1999, INHIGEO nominated Professor K.S. Murty (India) to act as co-ordinator of information on the preservation of geoarchives. He will require the co-operation not only of Members of

INHIGEO, but also of geologists, geological societies, and geological organisations all over the world, who can pass on to him relevant information concerning geoarchives in various countries.

Professor Murty may be contacted at 101 Sneh Chaya Apts, 28 Hindustan Colony, Amaravati Road, Nagpur 440 010, India (Tel. 91 712 557 984; Fax 91 712 549 521; E-mail <ankush99_99@yahoo.com>). Please send him names and addresses of contact persons (e.g. archivists), locations of significant geoarchives, the names and appropriate addresses of recently deceased important geoscientists whose papers should be preserved, and information about books or other documents that list geoarchives in any parts of the world.

In addition, information on the following aspects of the preservation of geoarchives is requested:

1. Names and addresses of the key organisations involved in Earth Heritage Conservation;
2. Techniques being used to preserve the archival materials;
3. Details of catalogues, etc., pertaining to geoarchives;
4. Information about plans to produce further information of such a kind (item 3).

AWARDS

Le Prix Wegmann 1999 à Albert V. Carozzi^{*}

Albert Carozzi est d'abord un géologue. Mais il est aussi historien de sa discipline. Et c'est cet aspect de son œuvre qui a motivé le choix de la Société géologique de France. Né en 1925, à Genève, il y a commencé sa carrière scientifique. En 1948, il présente sa thèse sur la pétrologie des calcaires d'eau douce du Jurassique supérieur du Jura. Maître de conférences dans sa ville natale de 1953 à 1957, il quitte ensuite l'Europe pour les Etats-Unis où il est successivement professeur associé (1957-59) puis professeur, et, depuis 1989, professeur émérite à Urbana, Université de l'Illinois. De 1983 à 1986, il est invité au Brésil, puis à Poitiers. Il a reçu la citoyenneté américaine.

Parmi ses ouvrages de géologie, on rappellera sa *Pétrographie des Roches Sédimentaires*, Lausanne, 1953, qui est dans toutes les mémoires. Il y présentait son premier cours donné à l'Université de Genève. Mais il a publié, essentiellement en langue anglaise, vingt autres ouvrages. Retenons notamment son *Microscopic sedimentary Petrology* en 1960, réédité en 1972. Et la publication, en qualité d'éditeur, de *Sedimentary rocks, Concepts and History*, en 1975. Et, pour donner une référence récente, une *Sedimentary Petrography*, en 1993, ainsi qu'un CD-Rom intitulé *Carbonate Petrography: Grains, Textures, and Case Studies*, en 1997.

En matière d'histoire des sciences, Albert Carozzi a traduit en anglais de très nombreux livres. D'abord, l'ouvrage de Werner *Sur les caractères externes des minéraux*, d'après un exemplaire annoté de l'auteur, paru en 1962. Puis *l'Hydrogéologie de Lamarck*, en 1964; les *Etudes sur les Glaciers d'Agassiz*, en 1967; le *Telliamed* de Benoît de Maillet (travail remarquable, qui est sans doute le chef d'œuvre d'Albert Carozzi, car sa traduction est complétée d'un appareil critique et de commentaires très documentés) en 1968. Viennent ensuite *l'Histoire naturelle du globe terrestre* de Raspe, précédée d'une étude sur la vie de cet auteur, souvent méconnu, en 1970; les *Roches carbonatées* et le célèbre ouvrage sur les *Causes anciennes et causes actuelles en géologie*, tous deux de Lucien Cayeux, en 1970 et 1971; la *Tectonique de l'Asie* d'Argand, accompagnée d'une introduction en 1977. Et, plus récemment, la *Théorie de la Terre*, de Pallas, traduite de l'allemand, avec la réaction d'un contemporain: H.-B. de Saussure, en 1991. Un an après avoir traduit, avec son épouse Marguerite, ma petite *Histoire de la géologie*. Auxquels s'ajoutent de multiples articles, qu'il est impossible de citer.

En 1984, en collaboration avec D.C. Ward, il publie, sous le titre *Geology emerging*, le catalogue commenté du fonds géologique ancien de la bibliothèque de l'Université de l'Illinois à Urbana-Champaign. Dix ans plus tard (1994), il publie, dans les *Mémoires de la Société de physique et d'histoire naturelle de Genève*, avec Gerda Bouvier, le catalogue annoté de la bibliothèque scientifique de Saussure. Et, l'année suivante, dans la même revue, un *H.-B. de Saussure: Forerunner in glaciology*, avec John K. Newman.

Pourtant, son travail le plus considérable de la dernière décennie, paru lui aussi dans les *Mémoires de la Société de physique et d'histoire naturelle de Genève*, dans son volume 45, en 1990, reste sans doute son *Histoire des sciences de la terre entre 1790 et 1815 vue à travers les documents inédits de la Société de physique et d'histoire naturelle de Genève*, ouvrage de plus de 400 pages grand format, où il met en parallèle des manuscrits, des articles de l'époque et les observations modernes correspondantes. Ce volume sans équivalent, centré sur trois protagonistes: Marc-Auguste Pictet, Guillaume-Antoine Deluc (frère de Jean-André) et Jean Tollot, fait appel à sa triple connaissance: de la région genevoise, de la géologie contemporaine et de son état à la fin du XVIIIe siècle. Ce qui permet de dire qu'Albert Carozzi possède les qualités qui ont fait attribuer à François Ellenberger le premier prix Wegmann, en 1984, celles d'un géologue de réputation capable de comprendre les observations de nos lointains prédécesseurs.

Ajoutons, pour coller à l'actualité, qu'il a organisé à Genève en 1998 une très belle exposition sur Horace-Bénédict de Saussure, destinée à préparer la célébration du bicentenaire de sa mort, et qui a donné lieu à un colloque et à un ouvrage, qu'il a codirigé avec Bernard Crettaz et David Ripoll, sous le titre *Les plis du temps, mythe, science et H.-B. de Saussure*.

Ses collègues de l'History of Earth Sciences Society en ont fait leur président en 1984, et la Geological Society of America lui a décerné son prix d'histoire de la géologie en 1989. Il est aussi conseiller étranger du Comité français d'histoire de la géologie (COFRHIGEO). A ce titre il a préfacé *l'Hommage à François Ellenberger*, publié par la Société géologique de France, à l'occasion des quatre-vingts ans du fondateur du COFRHIGEO, et participé à l'autre ouvrage d'hommage à notre ami, intitulé *De la géologie à son histoire*, que le Comité des travaux historiques et scientifiques (CTHS) a publié en 1997.

* Previous recipients have been François Ellenberger (1984) and Gabriel Gohau (1994) (Ed.).

A ses travaux d'histoire s'ajoutent des traductions en langue anglaise d'ouvrages éducatifs, en partie d'origine française, faites avec le concours de sa femme Marguerite, à qui l'on doit par ailleurs une très belle étude sur l'attitude de Voltaire envers la géologie.

Le prix Wegmann, décerné pour la troisième fois, l'a été jusqu'ici à des Français. En l'offrant, cette année, au plus francophone des historiens américains de la géologie, qui a beaucoup fait pour faire connaître les géologues de langue française aux Etats-Unis... et qui, d'origine, est Suisse comme Wegmann, on ne pouvait mieux honorer la mémoire d'Eugène Wegmann, ni mieux souligner le caractère international de ses préoccupations.

Gabriel Gohau, St Cloud

Reply.

Monsieur le Président, Chers collègues, Mesdames et Messieurs,

A mon grand chagrin, un problème de santé m'empêche d'assister à cette cérémonie de la remise des prix de la Société géologique de France et je le regrette vivement. Mon cher ami Gabriel Gohau a très aimablement consenti d'accepter d'être mon représentant et de lire ces quelques lignes dont je le remercie vivement.

Je suis très reconnaissant à la Commission des Prix de la Société géologique de France de m'avoir choisi comme lauréat du Prix Wegmann 1999. Ce choix flatteur semble de prime abord mettre en évidence l'ensemble de mes traductions commentées en anglais des théories de la Terre des naturalistes européens des 18^e et 19^e siècles, tels que Werner, Raspe, Lavoisier, de Maillet, Pallas, Lamarck, Agassiz. Mais je suppose que la raison fondamentale réside dans les trente ans de labeur nécessaires pour découvrir la véritable contribution géologique de Horace-Bénédict de Saussure à travers ses manuscrits. Cette contribution s'exprime par son concept fondamental des refoulements horizontaux en sens contraires dans la formation des grandes chaînes de montagnes: base de la tectonique tangentielle moderne.

Je me suis toujours astreint dans mes recherches à atteindre quatre objectifs, qui par ailleurs sont aussi ceux de mon estimé collègue François Ellenberger:

1°. Le retour aux sources primaires, en particulier les manuscrits, sans égard au temps, à la patience, et à la fatigue des yeux que cette entreprise exige.

2°. Le travail de contrôle sur le terrain des observations originales faites il y a plus de deux siècles. Recherche fascinante et indispensable pour se "mettre dans la peau" des observateurs anciens, mais souvent entravée par la disparition des affleurements, victimes de l'urbanisme, des autoroutes et des changements du couvert végétal.

3°. L'insertion des observations anciennes dans le contexte historique, sociologique, politique et scientifique de leur temps. Je pense en particulier aux documents accessibles, tels que bibliothèques et cabinets d'histoire naturelle, correspondances, difficultés de voyages, et bien d'autres avatars des naturalistes-voyageurs du 18^e siècle.

4°. La comparaison, qui me semble d'importance fondamentale pour comprendre l'évolution de l'histoire de la géologie, des interprétations anciennes dans leur contexte et des interprétations modernes dans le cadre de nos idées courantes. Naturellement, sans sombrer dans des critiques ou des louanges complètement anachroniques.

Je crois qu'un travail de ce genre exige un climat de liberté de recherche tel qu'il m'a été offert depuis plus de quarante ans par le Département de Géologie de l'Université d'Illinois et sa vaste bibliothèque de livres rares. Il ne faut pas oublier qu'un tel outil de travail aurait peu de valeur sans les manuscrits de la Bibliothèque publique et universitaire de Genève qui recèle en particulier tout le trésor des archives de Saussure.

J'avoue avoir fait le choix astreignant d'être un chercheur solitaire, très astreignant vis-à-vis de moi-même, assez peu enclin à fréquenter les congrès et les colloques, mais très reconnaissant aux nombreux collègues qui ont bien voulu me conseiller tout au long des années. Ils m'ont fait profiter largement de leur expérience en me fournissant des renseignements inédits sur des problèmes locaux ou même en allant visiter pour moi des affleurements dans des terres lointaines et inaccessibles pour moi.

Parmi ces conseillers, il semble de prime abord étonnant de retrouver Eugène Wegmann, le pionnier suisse solitaire des chaînes précambriennes de Scandinavie. En effet, j'ai eu avec lui une longue correspondance et de nombreuses rencontres personnelles aux Etats-Unis et en Suisse depuis 1947 jusqu'à son décès en 1982. Nos lettres, suivant ses vœux, sont préservées à la Bibliothèque publique de Neuchâtel.

D'abord, nos discussions concernaient la tectonique du Jura. Je préparais alors ma thèse de doctorat sur le Purbeckien qui montrait des traces évidentes d'une phase orogénique contemporaine en zones anticlinales et synclinales embryonnaires, affectant clairement la distribution des microfaciès laguno-lacustres. Wegmann, qui connaissait admirablement toutes les facettes de l'orogénèse, était le seul à m'apporter son soutien face au rejet catégorique des géologues suisses. Le concept a finalement prévalu par l'effet de son influence et d'autres observations apportées par les géologues français.

Ensuite, nos contacts scientifiques se sont poursuivis au fil des années mais alors dans différents domaines de l'histoire de la géologie, ses lettres toujours remplies d'encouragements et de conseils sagaces. C'est dire que l'attribution du Prix Wegmann 1999 a pour moi une double signification.

Il me semble opportun de terminer par deux extraits des publications d'Eugène Wegmann montrant sa profonde compréhension de la nature de la géologie, en particulier le jeu de l'observation sur le terrain et les hypothèses, et qui d'une certaine manière s'appliquent bien à ma propre expérience:

Il écrivait:

Faudrait-il toujours rester dans une ornière? ('Notes sur quelques problèmes de tectonique superposée', Bull. Comm. géol. Finlande (1947), No. 140, pp. 223-238 [237]).

Ensuite:

*Quand, revenant de ces régions lointaines [Groenland], on se trouve impliqué dans une discussion des problèmes généraux, on se sent souvent comme un homme qui, rentrant de son travail, pénètre dans une société en fête où tout le monde se sent placé au-dessus des contingences de la vie journalière et parle un peu plus haut que nécessaire. Il est alors difficile, dans une atmosphère enthousiasmée par les synthèses, de parler d'observations sur le terrain, sans avoir le sentiment de déranger et de porter atteinte à un édifice magnifique ('Sur un contrôle géologique de la dérive des continents', *Bull. Société neuchâteloise des Sciences naturelles* (1943), pp. 97-104 [99]).*

Faudrait-il toujours rester dans une ornière?

Merci de l'honneur que vous me faites par l'attribution du Prix Wegmann 1999.

Albert V. Carozzi

History of Geology Award, The Geological Society of America, October 1999 Citation for David Oldroyd

When David Oldroyd entered Emmanuel College, Cambridge, in 1955, he spent almost as much time playing his cello as he did studying chemistry, his major subject, or geology, the one he enjoyed the most. After receiving his BA in 1958, he taught chemistry for four years at a school in Harrow.

In his second year there, he attended a teachers' conference at Oxford during the heady days of C.P. Snow's "Two Cultures". As speaker after speaker declared that the history and philosophy of science could serve as a bridge between the sciences and humanities, the thought struck David that, as a science teacher with musical proclivities, he, personally, might help to bridge the gap. His enthusiasm grew when he learned how interesting the history of science can be. Presently, David enrolled in evening classes at University College, London, to work toward an MSc in History and Philosophy of Science--a tall order while teaching full time, playing the cello in orchestras and string quartets, starting a family, and rebuilding a house.

Then came 1962, the year his life would change dramatically. While walking past New Zealand House, David noticed a posting of teaching positions; with travel expenses paid, housing provided, and belongings transported. In due time, David and his wife, Jane, with their two young children, a fine 18th-century cello, and 50 pounds in their pockets, sailed for the antipodes.

The following year, David passed the written examination for the MSc at University College and selected a thesis topic he would have to work on in New Zealand without an advisor. The next seven years were BUSY. While teaching full-time, David began holding down a second teaching job and working on his thesis, which involved reading early texts and examining the geology of both the North and South Islands. He also took odd jobs harvesting crops and pruning pine trees. Meanwhile, Jane ran the household, looked after the children, and spent long hours cutting asparagus, and picking beans and fruit. Later on, Jane earned an MA in English Literature and now serves in an administrative position at Macquarie University in Sydney.

In 1967, David received his MSc for his dissertation: 'Geology in New Zealand prior to 1900', which he now describes as very unsophisticated and excessively Whiggish. Be that as it may, it made him eligible for a university position, and in 1969 the Oldroyds moved to Australia, where David accepted a lectureship in the School of History and Philosophy of Science at The University of New South Wales. Once there, he chose a PhD topic: 'The Influence of the Chemical Revolution on Mineralogy'. The Head of the School approved, and recommended that he consult the work of T.S. Kuhn. David remembers looking up 'Coon' in the library, but he soon straightened that out and embarked on a thesis which expanded to: 'From Paracelsus to Hatty: the Development of Mineralogy in Relation to Chemistry', for which he received his doctorate in 1974.

In his teaching and writing David Oldroyd has distinguished himself, internationally, for his remarkable breadth of interests and depth of understanding. He has authored five books, two of which have been translated into Spanish, Italian, German, Turkish, and Chinese. He also has edited three books, written eleven book chapters, and served on the boards of five journals. He has published nearly 60 refereed articles, plus more than 130 essay reviews, book reviews, and encyclopaedia articles, mainly on geology and chemistry but also on the history of music and other wide-ranging topics. His best-known work to date is *The Highlands Controversy* (1990). David was the first historian of science to be elected a Fellow of the Australian Academy of the Humanities.

I first became acquainted with David in 1976 at the International Geological Congress in Sydney. In 1995, as I was completing my term as Secretary-General of the International Commission on the History of Geological Sciences, I discussed my possible successor with the other officers. We agreed that it should be someone from a far country and, given the economics of the situation, someone with a word processor and e-mail and, if possible, institutional support for mailings and travel to meetings. I hoped it would be someone who would get as much fun as I had out of the position. No one seemed better fitted, so, with his permission, the INHIGEO Board nominated David. He was elected to the office in 1996.

Since then he has served as Secretary-General with outstanding success. One of his first actions was to get an ISSN number for the annual INHIGEO Newsletters. By now he has issued three of these, packed with meeting reviews, book reviews, country reports, and much besides, with each one filling nearly 80 pages of larger size and finer print than I ever used.

David retired from his full professorship in 1995 to devote his time to research and writing. Since then he has published two books *Thinking About the Earth: A History of Ideas in Geology* in 1996, and *Sciences of the Earth: Studies in the History of Mineralogy and Geology*, in 1998. He is currently researching the history of geology in Britain, delving

into archives and visiting key outcrops in the field. We look forward to his next volume, *Fire, Water, and Ice: The History of Lakeland Geology*, scheduled to appear in 2001.

David has presented several named lectures and served as a Distinguished Visiting Scholar at Concordia University in Montreal. In 1993, he was the first member of the Faculty of Arts and Social Sciences to receive the degree of Doctor of Letters from The University of New South Wales. In 1994 he received the Sue Tyler Friedman Medal of the Geological Society of London. I understand that he is still getting much pleasure from playing his beautiful old cello at home and in concerts.

Mr Chairman, I am immensely pleased to present the name of David R. Oldroyd for the History of Geology Award.

Ursula B. Marvin, Harvard-Smithsonian Center for Astrophysics Cambridge, Massachusetts

Reply

I greatly regret that I'm unable to be present today, to accept in person the award for which I have been so generously and unexpectedly, and I suspect undeservedly, named. The reason for my absence is rather extraordinary. I expect that, at about the time of this ceremony, I shall be riding on a dromedary near the edge of the Gobi Desert, along with a Chinese lady cellist friend of mine! Yes, I'm telling the truth! Perhaps you can understand, then, why I pleaded a previous engagement when I was invited to Colorado to accept this award—an occasion that I should naturally be loath indeed to miss under normal circumstances.

But I'm not usually quite so extravagantly exotic. I pen these lines from the charming town of Freiberg in Saxony, where INHIGEO is, this week, enjoying the wonderful hospitality of our German hosts, who are celebrating the 250 birthday of their patron saint, Abraham Gottlob Werner. And I'm in Freiberg because, for the last fifteen years or more, I have restricted my intellectual work chiefly to the study of the history of geology; for this is the thing I love doing most. So an opportunity to visit Freiberg was certainly not to be missed.

The point of it all for me is that it takes one to wonderful places and enables one to meet wonderful people—like, for example, Dr Ursula Marvin, who has been immensely encouraging and wise in her counsel over the last few years. I do thank her so much, therefore, for her kind words. Believe me, they are greatly appreciated; and I should say, perhaps, what a delight and an honor it has been to take over the baton from her in regard to the work of INHIGEO.

I seem to be getting into a peculiar situation these days, and one that I never dreamed of when, long ago, I had to make the easy career choice between science teaching, coal mining, or being a soldier for two years of national service after completing my degree. That is, I seem to have become the beneficiary of what the distinguished American sociologist R.K. Merton called the Matthew Effect: "Unto every one that hath shall be given, and he shall have abundance".

Well, it is a happy state to be in, and naturally one may wonder how to get into it. It is quite simple: ask a good, informed friend to read anything you have written before you attempt to publish it. Always ask your friends to give your work a thorough scrutiny. This formula I have found to be infallible. Thus, for example, an INHIGEO colleague, well-known to those present here—Kenneth Taylor—recently improved a paper of mine immeasurably by his careful reading of the text. Ursula Marvin did likewise with the typescript of my book *Thinking About the Earth*, saving me from some execrable solecisms about matters meteoritic. So, I suggest, having good friends is the secret of gaining acceptance of one's work in the world of academe. I commend everyone to cultivate good friends, and make use of them unashamedly! Amongst such friends I should mention, for example, Robert Gascoigne, David Miller, Kenneth Taylor, Gordon Herries Davies, Thomas Vallance, Hugh Torrens, David Branagan, the aforementioned Ursula Marvin, and many others besides.

However, I suppose there is something a little bit distinctive about the work I've done. Of late, it has always been an accompaniment to a holiday—in attractive parts of Britain. Thus, I have made for myself a modest cottage industry concerned with the history of geology in my home country—in northwest Scotland, in Wales, in the Inner Hebrides, and most recently in the Lake District. This self-indulgent practice started because I always had to get away from Australia during periods of study leave, to enable me to get on with my work undisturbed. Another consideration is the fact that distances in Britain are relatively short, the maps are excellent, and local experts are thick on the ground and not in the head. Thus I believe my historical work, such as it is, has a certain freshness because it grows from my own experiences and not just library or museum enquiries. Of late, I've been trying my hand at oral history, with what success remains to be seen.

My Australian friends do not approve. They complain that I don't write about the history of Australian geology. But for me, wandering in a desert does not have the charm of the conveniently placed cosy pub in The Lakes. And we only have ordinary one-humped camels, not the convenient two-humped kind, in Australia. So, as you will gather, I'm a self-indulgent man in the matter of my chosen field of work. That it should attract the approbation of the Geological Society of America is, I confess, a matter of genuine surprise to me. However, I do have good friends, and this must surely be the explanation. I shall be thinking of all of them with affection as I bounce on the back—or will it be the front?—of a camel.

My warmest thanks, then, for your approbation, appreciation, of my self-indulgent habits.

David Oldroyd, Freiberg, 22 September 1999

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The Richardson Award and the Krumbein Medal

The Richardson Award of the Geologists' Association has gone to Richard Howarth (UK) for his paper 'Measurement, Portrayal and Analysis of Orientation Data in Structural Geology (1670–1967)' (*Proceedings of the Geologists' Association*, 1999, 110, 273–309), judged to be the best research-based paper in the 1999 volume of the *Proceedings of the Geologists Association*. Professor Howarth has also been awarded the Krumbein Medal of the International Association for Mathematical Geology, and will present the Keynote Address to the relevant Section of the IUGC in Rio de Janeiro in August, 2000.

The Bernal Prize

Martin Rudwick (United Kingdom) was awarded the Bernal Prize of the Society for Social Studies of Science, for 'distinguished contributions to the field'. Making the award at the Society's 1999 meeting in San Diego, California, the President, Michel Callon (Paris), referred particularly to the great influence of Rudwick's *The Great Devonian Controversy* (1985) on the understanding of the practice of science, at the present day as well as in the past.

The Bigsby Medal of the Geological Society

This medal, recognising outstanding work done by geologists under the age of 45, was awarded to Turkish Member, Ali Mehmet Celâl Sengör, in 1999. Though the medal is not specifically related to work in the history of geology, Professor Sengör's citation made special reference to his being a 'notable historian of geoscience in Eurasia'. For the citation and reply, see *Geoscientist*, June 1999, 10–11.

The Sue Tyler Friedman Medal for the History of Geology

To our knowledge, the Geological Society made no award of this medal in 1999.

ARTICLES

Natural-Scientific Views and Knowledge of the Earth in Mediaeval Armenia, with special reference to the work of Anania Shirakatsi

Because of its geological structure, the Armenian plateau is considered to be one of the most interesting and richest corners of the world, with natural resources that have been used since ancient times. During the early period of human history, Armenia was a country with a highly-developed culture. It was a country with both stone and bronze ages. Scientists also consider Armenia to be one of the first producers and processors of gold and silver.

During the 3rd–4th centuries AD mining-geology flourished, especially in the areas of Metsamor, Haghartsin, Lechashen, Zod, etc. Thereafter there was a decline in mining as a result of the troubled political situation in the country at that period.

There was, however, some revival in the spheres of economy and politics at the end of the 6th century and the beginning of the 7th. This marked a new stage of industrial development: new towns came into existence; there was some increase in trade and a significant development in the economic and cultural life of the nation. Lively trading and a economic activity in their turn stimulated the development of science, culture, and literature. There were a number of significant scientists such as Sebeos, Moses Kaganghatyatsi and others.

This was the period when the then famous Armenian philosopher, scientist, encyclopaedist and traveller Anania Shirakatsi lived and worked (610–685). His heritage was an invaluable contribution to the cultural and scientific life of Armenia. It included researches in astronomy, geometry, cartography, geography, calendary, agriculture, etc. It is worth mentioning that before Shirakatsi's era Armenia already had a rich philosophical heritage. The works of famous philosophers of that period—Yeghishe, Yesnik Koghbatsi, David Anhaght—discussed such problems as that of the origin of the universe. K.S. Ter-Davtian and S.S. Arevshatian state that the separation of the natural sciences and philosophy was due to Shirakatsi, whose works on cosmography, astronomy, and mathematics served as the basis for the further development of Armenian science.

I agree with A. Abrahamian and G. Petrossian, who consider that the period of Shirakatsi (i.e. 5th–7th centuries) was the most flourishing in the history of Armenia. It was the time when Mesrop Mashtots devised the Armenian alphabet, Movses Khorenatsi wrote his *History of Armenia*, etc.

The principal works of Shirakatsi were his *Cosmography*, *The Theory of the Calendar*, *Arithmetics*, and *Geography* [*Ashkharatsuits*]. The *Cosmography* was one of the most valuable products of the period. In those days when biblical criteria were dogmatic, Shirakatsi was one of the rare representatives of the scientific world, who appealed to the ancient heritage as the source of knowledge, concentrating on the achievements of ancient Greek science (see Anania Shirakatsi, 1962, p. 10). He discussed and analysed the ideas of the old Greek authors and expressed his own ideas also.

Shirakatsi's cosmological system was based on the well-known geocentric theory of Ptolemy, and he accepted also the ancient four-element (earth, water, air, fire) theory. These four elements were supposedly necessary as there could be no solid bodies without earth; there would be no formation or displacement without water; there would be no movement without air; and no colour or vision without fire (Shirakatsi, 1962).

The philosophical ideas of Shirakatsi, where dialectical notions are evident, are also of great interest. K.S. Ter-Davtian and S.S. Arevshatian (the translators of the *Cosmography* from ancient Armenian into modern) say that for Shirakatsi the idea of God was initial [a first principle (Ed.)] and that He created the Universe; so his views were not [fundamentally] different from those of other philosophers of his day. But compared with Yeznik Koghbatsi and David Anhaght, Shirakatsi was more interested in the problems of natural philosophy, and thus he is regarded as the founder of Armenian natural science.

Shirakatsi considered nature to be in a constant state of movement and change. Also, the present system is constantly getting older and being destroyed and a new state of affairs is coming into being to replace the former. He accepted the Aristotelian/Ptolemaic system of the world, but kept to the rational part of the theory, such as the idea that the earth is round. In his work *Concerning the Rotation of the Heavens*, he wrote:

That upper sky, which is called "aether" by the Greeks and solid or burning fire by the Chaldeans, is some kind of fire devoid of matter, free from foreign elements. It has not originated from any external body or any thing but appeared spontaneously; and there is nothing beyond it. It has spread itself like a vaulted ceiling around the Earth with a constant and rapid rotation. It is invisible and is known only by reason. (Shirakatsi, 1962, p. 100)

In the same book Shirakatsi also offers the analogy of an egg, in which the Earth is compared with the yolk:

If somebody desires an example of the pagan philosophers' view of the Earth, an excellent comparison would be that of an egg. Like the yolk, the Earth is in the centre and is surrounded by air, and the sky encircles everything (p. 43).

It is true that the ball-shape of the Earth was accepted by the ancient Greeks, but later, in the 4th to 7th centuries, this idea was rejected and the Earth was thought to be flat and surrounded by solid sky, in which celestial bodies moved with the help of angels. Shirakatsi was the only scientist of that time who restored the idea of a spherical earth.

There was another problem that progressive minds had long been interested in: Why doesn't the Earth fall down? Is there something that holds it up? According to Shirakatsi the Earth doesn't fall because it keeps its balance due to the influence of counteracting forces. It presses down due to its weight, but wind from under pushes it up, and these two equal and counteracting forces keep the Earth in balance in that hanging position. This theory of 'whirlwinds' was typical of European scientists of later periods.

Shirakatsi also gave an explanation of the eclipses of the sun and moon, suggesting that the reduction in light occurred when the Sun and the Moon were on the same line [with the earth]: "And thus the Moon is the cause of the Sun's eclipse and the Sun is the cause of the Moon's eclipse" (Shirakatsi, 1962, p. 87). He thought that the Moon was also the cause of many other terrestrial phenomena, including the tides. In addition, he stated that the Sun is larger than the Moon and the Earth, and is more distant than the Moon. He wrote: "The Moon is thick, solid, clean, and the shape of a ball. It does not itself emit light, but gets its light from the Sun, like a mirror, which when we hold it in sunlight reflects the Sun".

Shirakatsi criticised superstitious people and astrologers who explain different terrestrial events or phenomena according to the positions of the constellations and the planets in the sky. Repudiating the legends of the origin of the Milky Way—that it is the spilled milk from a virgin's breast, or according to Armenians that it was the pathway of a person who has stolen straw—Anania stated that it consisted of many distant and not very bright stars, giving a blurred light.

Also in his *Cosmography*, Shirakatsi spoke of the movement of celestial bodies, and explained the origin of night and day, and the year.

Shirakatsi was also the author of the famous *Ashkharatsuits or Geography*. This was a voluminous work in which he compiled the writings of Ptolemy and other geographers and the records and recollections of travellers. But it was not merely a translation of the well-known authors. It gave detailed information about Armenia, the Caucasus, Persia, and Mesopotamia; and it had a supplement of maps.

Anania also gave details of thirty-three types of precious stones, with their characteristics and their usages

S. Yeremian has stated that within the world-wide literature of geography *Ashkharatsuits* was the first work to carry forward the traditions of ancient science.

Great indeed was the importance of Anania Shirakatsi in the domain of natural science. His works were much used by Armenian scientists of subsequent generations—e.g., Hovhannes Imastaser and Hovhannes Sarkavag (11th–12th centuries), Hovhannes Yernkatsi (13 century), Martiros Khrimetsi (14th century), and others. He was important not merely for Armenian science but for scientific knowledge worldwide. He was the first to state—thirteen hundred years ago—that the Earth is an elliptical-shaped ball.

Eduard G. Malkhassian, Yerevan

Why Research into the History of Geosciences?

1. Introduction

Study of the history of various sciences is rather heterogeneous. Some disciplines, such as medicine, mathematics, and astronomy, have numerous noteworthy compendia and even specialised journals where papers on the history of these sciences can be published.

The situation in geophysics, meteorology, and other subdivisions of the geosciences is far less favourable. This neglect is an outcome of a dogma of autonomy that is essentially oriented toward progress in understanding, without much reference to historical developments. But even the geoscientists cannot ignore that the phenomenon 'science' must be viewed in the context of social processes. In the initial stages, sociologists and some philosophers, in the context of general theories of perception, began research into the development of scientific thought, but the geoscientists and other natural scientists contributed very little. It has since become clear that research on these topics requires historical assessment and more insight. The development of the 'science of science' is directed toward understanding and explanation of the complex human involvement in science, not only in the sense of theorising about the scientific processes but also the social, political, and historical context of science (and technology).

Such studies require profound knowledge of many disciplines. The history of science can contribute to a better understanding of these individual disciplines and their interaction toward a better understanding of the overall phenomenon, 'science'.

2. Opportunities for Historical Research in Geosciences

A number of investigations in recent years have made it clear that for better insight, meteorology and geophysics cannot neglect historical reviews. The problem, however, is that geoscientists, as a rule, are not acquainted with the methods of

history and philosophy. This raises the question of how historical studies in these fields can be promoted. I believe the American Geophysical Union (AGU) and the International Union of Geodesy and Geophysics can be of notable assistance.

It is evident that historical questions have not found a significant place in meetings of the AGU and the German Geophysical Society (DGG). The AGU and DGG journals, *Eos* excepted, have no space for contributions of historical material in the particular sciences. Why is this so? There seems to be no lack of interest because there have been several attempts to activate historical research in the AGU and DGG framework.

Two measures would be helpful to promote such work:

- (a) Have invited lectures on these topics at AGU and DGG meetings.
- (b) Offer publication opportunities in AGU and DGG journals.

The dilemma is clear: a geophysicist or meteorologist who wishes to present historical research does not know where and how to present his work. The AGU and DGG meetings are reserved for presentations of current research results. There is hardly time for history of science, something that ought to be remedied to offer opportunities for pertinent papers. But far more difficult is the problem of publication. Where should such papers be published? The traditional journals for the history of science, such as *Isis*, *Centaurus*, *Journal for the History of Astronomy*, *Sudhoff's Archiv*, *NTM-Zeitschrift für Geschichte der Naturwissenschaften*, are not read by geoscientists and certainly not subscribed to by the geophysical-meteorological institutions. This raises the question of what is a suitable journal, i.e., is it responsive to the needs of the geosciences? While astronomy has such a specialised journal, there is only a few counterpart in the geosciences.

There are a number of potential topics for geoscience history. Let me cite several. It is clear that historical weather observations are of importance to modern climatological research. This involves not only extensive literature study but also archival work, including manuscripts and letters. It seems to me equally important to learn about the instruments used in the acquisition of the original data and also information about the observers who collected the data. This should include biographical studies, utilising original literature and correspondence. The climatological studies need broadening into the field of hydrology. In that field, considerable ancillary work has been done by the publication of a source collection by Curt Weikinn (1958-64) (*Quellentexte*). Thanks to the support of the well-known geophysicist and meteorologist Hans Ertel (1904-1971), Weikinn was able to study a large number of original sources, covering many centuries, which reveal much about climate and hydrology. These were published in four substantial volumes, *Quellentexte zur Witterungsgeschichte Europas, 1958-1964* (Akademie Verlag, Berlin).

Auroras offer another example of how modern research and historical science studies converge. Many current studies of auroras frequently refer to Hermann Fritz (1830-1893), who published the well-known *Verzeichnis beobachteter Polarlichter* (*Catalogue of Observed Polar Lights*), Gerolds, Vienna, 1873. For Scandinavia, Sophus Tromholt (1851-1896) also presented a large catalogue of auroras (*Catalog der in Norwegen bis Juli 1878 beobachteten Nordlichter*, Jacob Dybwald Publishing Company, Christiania, Norway, 1902). It seems clear that the discussions about the so-called 'Maunder Minimum' require further reconstruction of old auroral data. In scrutinising old weather diaries, Landsberg found additional auroral observations not catalogued by Hermann Fritz (1873). Moreover, these studies show the change of science concepts through time. In the beginning of the modern period (16-17th century), auroras were regarded as myths, miracles, or inexplicable metaphysical events that were beyond physical explanations by earthbound humans.* It is rather intriguing to reflect on the interpretations of these reactions by the psychologist, Carl Gustav Jung (1875-1961), who conjectured that the existential threats and anxieties of individuals on earth were projected onto or into the sky. This is also reflected in the early pictorial presentations where, around the core of a natural phenomenon, these anxieties were artistically represented. Hence the ancient pictures of sky manifestations always show scenes of death, warfare, storm, and distress. Such aspects have relevance to the development of the geosciences in a historical framework.

The march of thought in the gradual development of geosciences is also worthy of historical investigation. The appearance of hypotheses, the acceptance of theories and their testing, as well as the gradual changes in concepts can often be understood only in connection with knowledge of the originating research personalities. The progress in theoretical meteorology recalls the sequence of creative leaders such as Vilhelm Bjerknes (1862-1951), Lewis Fry Richardson (1881-1953), Carl Gustaf Rossby (1898-1957), and Hans Ertel (1904-1971).

Also noteworthy has been the development of hypotheses about the constitution of the interior of the earth. This pitted physicists against geologists in the 19th century, and geophysicists against cosmologists in the 20th. The vast literature has been reviewed in several essays by Stephen G. Brush.

3. *What measures are necessary?*

The understanding of the growth processes of natural sciences requires historical reflections. In addition to the disciplinary research it is essential to promote studies that elucidate the context of discovery in the sciences. This will involve topics which, by use of critical historical methods, explore the higher-order circumstances leading to growth in geophysics and meteorology. In this context, let me pose a simple problem: what led to the establishment of geophysics (and meteorology) as a separate discipline? Hans Ertel pointed out that the subdivisions of geophysics that existed in the 18th century did not develop in a straightforward way. Hans Ertel, *Entwicklungsphasen der Geophysik*, Berlin, Akademie-Verlag, 1953. As Ertel noted shortly after the death of G.W. von Leibniz (1646-1716), the problem of a precise determination of the figure of the earth prompted rapid advances in geodesy, astronomy, and cosmogony. According to Ertel, a new phase in the development of geophysics started with Alexander von Humboldt, when meteorology, climatology, hydrology, geomagnetism, and seismology separated from the framework of geography and became separate

* Cf. W. Schröder, 'On the Existence of the 11-year Cycle in Solar and Auroral Activity Before and During the So-called Maunder Minimum', *Journal Geomagnetic Geoelectric*, 1992, 44, 119-128.

subdisciplines. In modern times the economic aspects led to rapid developments in applied geophysics, and the interaction of practical requirements with pure research are of considerable interest for understanding the growth of the geosciences.

Many generations of researchers, from all nations, have participated in the various phases of development of meteorology and geophysics. Yet it was not only individual scientists who advanced the science, as in other disciplines, but also the great international programs, including the international polar years, the International Geophysical Year, the Global Atmospheric Research Program, etc. Also important were sponsoring institutions, including academies of sciences, which, for example, have had a decisive influence on the development of climatology. These institutions also supported the observations relating to the Krakatoa eruption (these observations being inaugurated by the Royal Society London in 1883–84), the Norwegian Aurora Program, and others.

It must surely astonish geophysicists that the origin of the field as an independent discipline and even the source of the word 'geophysics' is, even now, not fully clarified. Many of the highly controversial problems of environmental research are geophysical in nature and require assessment of observations taken in the past, much of which need historical studies to ascertain validity.

4. *Bases and Sources for History of Geophysics and Meteorology*

Besides information available in printed works, it is also indispensable to obtain archived documentation as well as information on instruments used in geophysical work. There is a need for the production of bibliographies of the older literature, as is presently done through the *Meteorological and Geostrophysical Abstracts*.

Particularly important is the accession and preservation of correspondence. In recent years I have carried on some pertinent studies and have found that for many important scientists no documents are available. This is an immense loss for research. Equally important is the collection of the transactions of committees and the administrative files pertaining to establishment of projects and institutions. Also essential are undisclosed materials for personal histories, autobiographies, and pictures that may throw light not only on the scientific but also the social aspects of science history. Finally a comment about historical instruments. They need to be rehabilitated and recalibrated to ascertain their accuracy. Such work may help in the reconstruction of long observational time series, which remain of contemporary interest.

This essay has been written not only to acquaint geophysicists with the necessity of historical investigations in geophysics but also to stimulate interested colleagues to contribute to the study of the history of geosciences through their own writings. The historical group established in the International Association for Aeronomy and Geomagnetism (IAGA) and the Historical Research Group of the German Geophysical Society (DGG) deserve the active support of researchers in the field, and establishment of similar commissions or subcommissions in the other associations of International Union for Geophysics and Geodesy (IUGG) is to be much desired. It is hoped that many geoscientists will use their influence to foster the historical aspects of their respective fields.

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Wilfried Schröder, Bremen-Roenebeck, Germany

NEWS FROM THE HISTORY OF THE EARTH SCIENCES SOCIETY (HESS)

Founded in 1982, the History of the Earth Sciences Society (HESS) had an eventful year in 1999. The Society's journal (*Earth Sciences History*) evolved; international membership continued to be strong; co-sponsorship of meetings produced gratifying results; and a potentially valuable linkage with the Geological Society of America (GSA) was forged. The following overview presents a few specifics.

Gregory Good, Editor of *Earth Sciences History*, made a concerted effort to produce a content-rich journal in a timely fashion. He worked to reduce the slight slippages in delivery dates, resulting from a variety of factors, so that both numbers of the 1999 journal (Volume 18) appeared early in 2000, and Volume 19, No. 1 (2000) should go out to members in the summer.

In October, HESS co-sponsored an excellent session on 'Crossing Discipline Boundaries in the Geosciences: Historical Perspectives'. The meeting, held at the 1999 Geological Society of America meeting in Denver, Colorado, was organised by Michele Aldrich and Kenneth Taylor.

Anyone interested in the history of plate tectonics should be aware of the program being developed by Gerald Friedman on 'Lamont (1949–1999) and Plate Tectonics'. Papers will be presented at the GSA Annual Meeting for 2000 (Reno, NV), in sessions co-sponsored by HESS.

Because of the potential synergy resulting from cooperation between societies, and because the Geological Society of America is pursuing a more international focus, Ken Taylor (as GSA History of Geology Division president) and Ken Bork (as HESS president) submitted a joint request to GSA that HESS be granted Associate Society status. This initiative was accepted by the GSA council at its 1999 national meeting. Although HESS is an autonomous organisation, dedicated to serving an international community of members, Associated Society involvement with GSA should be mutually beneficial.

INHIGEO members having questions or suggestions are invited to communicate them to any of the HESS officers.

Kennard Bork, Denison

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THE COMMISSION FOR THE HISTORY OF GEOPHYSICS

The Commission for the History of Geophysics (CHG, Bremen) has continued its work in 1999. Under the leadership of its Chairman, Professor Dr h.c. mult. Hans-Jürgen Treder, the main activities were the publication of various papers related to the history of geophysical matters (e.g., Euler and the theory of gravitation; Kepler's theory of gravitation; the problem of geophysical experiments; Neumayer and the development of geomagnetism; the development of noctilucent cloud research; the history of auroral physics, etc.).

Several books were published by the Commission in 1999. There was *Physics and Geophysics* (a collection of special historical studies—a bibliography by G. Gregori (Italy); a paper on Helmholtz and the problem of two cultures in science by H. Hörz (Germany); one on solar eclipses by H. Filling (Germany); an article on reflexivity in research in the history of science, and biographical studies of Einstein, Laue, and Planck by W. Schröder (Germany); and one on the Mach Principle and its application in the geosciences by H.-J. Treder (Germany). Another book, by Wilfried Schröder, dealt with the problem of religion and the natural sciences (case studies from Heisenberg and Planck). A third, also by Dr Schröder, was devoted to the life and work of Emil Wiechert, the world's first professor of geophysics and one of the founders of modern seismology. Work was started on a book entitled *Methods and Problems in the History and Philosophy of the Geosciences*, with Gregori, Hörz, Schröder, Treder, and K.H. Wiederkehr as authors.

People interested in the work of the Commission are welcome as Members. For their subscription of \$US20.00, they will receive two *Newsletters* per year and one of the books. For further information, please contact Wilfried Schröder, Hechelstrasse 8, D-28777 Bremen-Roennbeck, Germany. (It is requested that cash be sent by mail, please.)

Wilfried Schröder

INTERVIEWS**Interview with Professor Eugeni Milanovsky, Freiberg, 22 September, 1999****David Oldroyd**

So, Eugeni, thank you very much for agreeing to talk to me for the INHIGEO Newsletter. It's a great privilege to speak to you. Could you please tell me first what year you were born?

Eugeni Milanovsky

I was born in Moscow in 1923. I studied there and graduated from secondary school one day before the beginning of the war between Germany and the Soviet Union.

I see. Those were difficult times. Did you then go into the army?

No. I was not mobilised, because of my eyes. I was only involved in the excavation of defences for Moscow; and I entered Moscow University in the Geological Faculty.

What year did you do that?

September, 1941. But we studied for only one-and-a-half months, as the German troops were very close to Moscow. The evacuation of Moscow University began in the middle of October. But I couldn't evacuate because I had my mother, grandmother, and great-grandmother to look after—my father, a professor of geology, had died one year before. *So you followed in his footsteps?*

Yes. He was Professor at Moscow University, and later in the 'Geological Prospecting Institute'. In the 1930s, geology at Moscow University, and all universities throughout the Soviet Union, was liquidated because it was announced that our country needed mining engineers, not people with 'specialist academic profiles'. It was only three years before the War that geological education at universities was restored. And because I was then in Moscow I was involved in the battle near Moscow and defended the buildings of Moscow University against the German aeroplanes' bombs. I did this from October 1941 to March 1942. Then our front was stabilised about 100–150 kilometres from Moscow. In the critical days, the German troops were between the international airport and Moscow—only five kilometres from the modern boundary of Moscow. Then there was our counter-attack and life in Moscow was 'rather normalised'.

We are speaking now at Freiberg, and you told me earlier that you actually came to Freiberg during the War.

Yes, yes. So I studied at Moscow University again for about a year; but in the autumn of 1942, I was mobilised into the Red Army and I spent several months in training in the Vladimir region to the east of Moscow and then our Panzer corps was moved to Orel. In July–August 1943 there was the greatest tank battle of the Soviet–German front: the Orel–

Kursk battle. I took part in this battle from the middle of July. It was Orel, then Brjansk, then Kiev, then Kamenets-Podolsk, then Western Ukraine (formerly eastern Poland) and its main city, Lvov. So I participated in the liberation of Ukraine, especially western Ukraine. I also took part in the battle of the Vistula River, and we forced it and captured a bridge-head on the western side of the Vistula. And then during the last winter of the War, during January 1945, we made our invasion of Germany. So we'd crossed Poland and forced the border at the Oder River near Wroclaw and then after the battle in Silesia I also participated in the Battle of Berlin, but I did not visit Berlin during the War as my unit was only involved in the city surrounds. Then our Panzer army turned southeast. We crossed into Saxony and passed through Freiberg, which was liberated on the 7th of May without any battle, casualties, or damage. The town hung out white flags, and the children called out "Stalin good. Hitler caput!". Two days later we were in Prague. It was the happiest day of my life—9th of May. We entered Prague on a Monday morning. It was specially pleasant for me because co-incidentally we stopped at the house of a famous Czech novelist, Jaroslav Havlicek. He died during the War, but his wife was there, and also his children Zbinek and Eva—students at Prague University. And of course they'd taken part in the battle between the citizens of Prague and the German army, four days before the liberation of Prague. They invited the American, English, and Russian troops to help them, and because of that we moved to help our Czech friends. And I spent several unforgettable days with this family.

So how did you get back into geology?

Well, my father was not only a scientist but also an extremely good artist.

I can readily believe that!

Better than me, especially with water colours. With him it had been a problem as to which way to go, but he decided to be a scientist. It was a tradition in our family. His father had been a chemist and graduated from Moscow University. And now my two sons, and my wife. Also my grand-daughter is at Moscow University as a physical geographer, and my grandson is a mathematician.

So for me it was the same problem as for my father: which way to go? Before the War, I participated in two geological expeditions. The first was in the northern part of European Russia with my uncle, Professor Mazarowitsch, who was Head of the Department of Historical Geology at Moscow University. And we lived in one house together. The second one was with my father on the northern slope of the Great Caucasian Ridge. During my childhood I did many water-colours, line-drawings, lino-cuts, and so on. But when I was in my last year at school my father died from appendicitis through a mistake on the part of the doctors. So after his death I decided to become a geologist. I did think at one time I might try to become a specialist in the history of art, as I knew I didn't have the high talent needed to be an artist. I can draw pictures, but it was clear to me that I didn't really have the ability to be an artist. But during my life as a geologist I have done much drawing.

So what PhD did you do?

Well, after the War, I studied at Moscow University for four years, and graduated in 1949. After my second year, in 1946, I had a very good period of field geology in the Crimea. We had a special base for practical geology (first organised by my father in the 1920s), where I gained experience in field geology. At the ends of the third and fourth years I did fieldwork in the southern part of the Urals. My teacher, Dr Kheraskov, was an extremely talented geologist who'd begun his fieldwork with my father and my uncle in the 1920s. I also had interesting field experience in Karelia and Kola Peninsula on the Baltic Shield. Then I worked for three years as a postgraduate student in the Armenian highlands, where I studied the neo-tectonics of the Sevan Lake Depression in the central part of the Minor [Lesser] Caucasus. My doctoral thesis was concerned with the structure and origin of this intramontane depression and problems of the neo-tectonics and neo-volcanism of the Minor Caucasus.

Then a great multi-disciplinary expedition was organised by Moscow University to the Great[er] Caucasus from the mid-fifties to the early sixties; and I worked in different parts of this mountain region, mainly in the central part of the northern slope. One of the sheets mapped by my group included the highest summit of the Caucasus—Elbrus Volcano (5642 m). I also worked in Daghestan, in Georgia, in Azerbaijan, and many other parts of the Caucasus. This work lasted about ten years. Then I prepared a major work, fifteen hundred pages, on neo-tectonics, neo-volcanism and Pliocene and Quaternary glaciation in the Caucasian region as a whole, including the Great Caucasus, the Transcaucasian Depressions, and the Minor Caucasus.

So you were looking at Pliocene glaciation?

Yes: Pliocene. Previous workers had only described the several Pleistocene glaciations. The contemporary Caucasian glaciers in valleys are no longer than 10–12 kilometres long, whereas in the Pleistocene some of them were 50–100 kilometres long; and I was very pleased to establish the occurrence of Pliocene glaciation in the Caucasus. It's impossible to establish this in the Alps, for example, because of the great denudation there, and the absence of volcanic activity in the Alps. But in the highest part of the Caucasus region there were volcanic eruptions, which began in the Minor Caucasus in the late Miocene, in the Great Caucasus in the late Pliocene, and continued in both ranges in the Pleistocene and Holocene. And the moraines of the ancient glaciations became covered by lavas and ignimbrites. I first described such 'sandwiches' of lavas, ignimbrites, and moraine deposits at altitudes of more than 3,500 metres on the northern slopes of the Caucasus. And now absolute age determinations show that these lavas and ignimbrites are about 2.8 million years old. So we have glaciation in the Middle and Upper Pliocene. In the Alps we only have fluvio-glacial deposits for this age. Of course, there were tremendous Pliocene and Pleistocene glaciations in the Alps—more than in the Great Caucasus—because of wetter climatic conditions in the Alps, with more rain and snow.

Then I suppose you went back to Moscow. What position did you hold, and when did you become a professor?

After doing my first doctorate I was an assistant professor for two years; then associate professor for ten years. After the defence of my DSc thesis in 1965 I became professor, and after the death of our famous Head of Department,

Professor Bogdanov, in 1972, I became Head of the Department of Historical and Regional Geology, but I never had to do any administrative work other than in my department. Administration was not for me.

When did you retire?

I'm not retired! You see, the pension of a professor in Russia is so low that it's impossible to live on it. So I'm still teaching. Also I'm a Member of the Russian Academy of Science—I became a Corresponding Member in 1976 and a Full Member in 1992. And for such people our Rector recommends that they continue their work.

Do you plan to retire eventually?

No, because I get too small a pension—only 600 roubles, or about \$25

You can hardly live on that!

But I'm lucky in that I get some support from the George Soros Foundation, which for two years has given me \$500 [per month]—for the support of outstanding professors. Then, because of my age, I'm now an Honorary Soros Professor, so I also get an additional \$200 per month from the Foundation. It's extremely important under our present conditions because the Foundation's support is greater than my salary and my pension together.

So when did you start getting interested in the history of geology?

That's very interesting. As I said I've been interested in the history of art since my school years—and I'm also interested in the history of culture and the history of science. It too was a tradition in my family. It was only a general interest, though I did have some knowledge in this field. I began to work in this field more particularly on the recommendation of my friend, the late Professor Tikhomirov. You remember him?

Certainly!

He participated in the great patriotic War with Germany. He was an aviator, but he was shot down and lost his sight.

Yes, I know.

Well, he invited me to participate in the INHIGEO Symposium in Madrid in the mid-'70s. I began to be involved properly with INHIGEO in 1978. There was an excellent symposium in Münster and Bonn and a two-week excursion in West Germany. We crossed the country from the North Sea to Switzerland, ending in Basle, and at that time I met many specialists in the history of geology—Martin Schwartzbach back for example. He is now about 100. I'd met him earlier in Moscow and had very good contacts with him over many years.

What proportion of your time do you spend these days in history of geology and what proportion in geology?

90% geology, 10% history of geology. But the history is very dear to me. During the eighties and nineties I have participated in many historical symposiums—for example, in Paris, Budapest, Moscow, Washington, Italy, China, Austria, and Switzerland. In China, I did a collaborative paper with my colleague Professor He Goqi, who during the fifties was one of the Chinese postgraduate students in our Department in Moscow University. Later, he obtained a chair in China in the period of restoration of good relations between China and Russia, and during my visits to China in the eighties and nineties I was very pleased to be able to renew our friendly relationship. So now I've decided to write a fundamental book on the history of geology, which I have been working on for over twenty years, devoted to the scientific ideas of Wegener. Twenty years ago, at the time of the Wegener jubilee (the 100th year of his birth and the 50th of his death) I organised a symposium in Moscow and many outstanding Russian geologists participated. At that time, I published a rather large paper on Wegener in the Russian journal *Nature*, and since that time I have been collecting materials on his life, his scientific activities, and his ideas.

So how is your book getting on? Is it nearly ready?

It will be about three hundred pages and has to be finished by the end of this year. It will be published [in Russian] next year by the Academic Press. Many colleagues from abroad, especially German ones, have helped me, sending different materials about Wegener.

Have you met Mott Green in America, who is writing a biography of Wegener, and Cornelia Lüdecke, who is at this meeting in Freiberg? She knows a lot about Wegener's Greenland expeditions. Perhaps you should get in touch with them.

Yes, please give me their addresses. A lot of my book is finished, but it's very important for me to visit Marburg while I'm in Germany now, not only to get some information but also to feel the atmosphere of this town, famous in the history of culture and science—not only German, but west European and Russian also.

Indeed! And you're going there next week?

Yes. And yesterday I tried to find some information about Wegener in the library of the Freiberg Mining Academy. It was utterly impossible to find any post-War Western materials published before the re-unification of Germany; but now they have such materials. So I should like to visit Marburg University Library to find for instance the books compiled by Wegener's wife. They are unavailable in Russia, but I hope to find them in Marburg. The last of her books was published in 1960. She died at the age of one hundred—sixty-two years after Wegener's tragic death on the Greenland ice-sheet.

Well, I do hope you'll find the books successfully. And now, can you tell me, please, what other work you've done during your long career?

Well, the first problem that interested me in geology was neo-tectonics of the Caucasus and the Carpathian Mountains. Then I studied the neo-tectonics of Macedonia after the catastrophic Skopje earthquake in 1963, and then I studied Andean geology in Bolivia for a year. Then during the second half of the sixties I wanted to study the rift-zones of continents, and I was lucky because Professor Belousov organised a Soviet expedition to the East African rift zones. I worked for three seasons in Uganda, Kenya, Tanzania, Rwanda, Burundi. This was extremely interesting, and I established there two types of continental rift—the arch-volcanic type and the crevice type. The first was identified with dome uplift

and intense volcanism (Kenyan type); and the other type with small volcanoes or without them (Tanganyikan type) is similar to the Baikal type of Russia. I have also produced a classification of continental rift-zones. Then my scientific interest changed to the history of rifting processes during the earth's past: in the Cainozoic, Mesozoic, Palaeozoic, and Upper Proterozoic, when many deep linear grabens—so-called aulacogens—were formed there on the ancient platforms. The term 'aulacogen' was given by Shatsky, but he was against the idea of horizontal movements; and from his point of view the process of forming grabens was only connected with subsidence, without any horizontal extension of continental crust.

There's a book by Robert Muir Wood called The Dark Side of the Earth. He has attempted to relate the ideas about tectonics to the social circumstances of the countries where the different ideas were generated. What do you think of this?

I know this work, but I just don't agree with the suggestion that the long domination of fixist theory and the tardy acceptance of mobilist concepts in Russia, particularly plate tectonics, as compared with Western countries, was conditioned by the political regime and the social conditions in Russia. In fact, the fixist ideas (most orthodoxly developed by Professor Belousov) were popular in our country because Soviet geologists studied mainly the enormous territories of the Eurasian continent the geological development of which may be described and explained without the assumption of great horizontal movements of the Earth's crust. So we began to study the deep oceanic basins with their mid-oceanic ridges, and discuss the problems of the spreading and absorption of oceanic crust, etc., considerably later than our colleagues in the USA and some other countries.

In the USSR, and later in Russia, there was freedom for the development and competition of radically different geotectonic and geodynamic concepts, both fixist and mobilist. And among the latter the concept of moderate Earth expansion is rather popular—no less than in Australia!—especially in the version according to which the expansion is complicated by Earth 'pulsations' of various orders and durations.

In fact, after the sixties—after the oceanic rift-zones were found, and before his death—Belousov told me that he thought that the development of tectonics would, in the next century, go in the direction of earth expansion. For myself, I support the idea of some expansion, but in the way of pulsation, rather than just simple expansion. For expansion alone can't explain compression. I established the alternation of the global phases of folding, first described by Stille, and phases of rifting and spreading intensification, which alternate in time. Consequently we have alternation of epochs of prevailing contraction and prevailing expansion in the Earth's history—both long ones and small ones, superimposed. The smallest pulses are, I think, related to the activity of the sun (11-year cycles). These are not only pulses in the energy emission of the Sun but also in its diameter. During one 11-year cycle, the Sun's diameter changes by 500 kilometres; and during a 22-year period there is a re-orientation of the sun's magnetic field. Maybe these cycles control what's going on on the Earth.

I've just seen reports in the paper this morning of many earthquakes this week. I don't know what the Sun is doing, but it certainly seems to be a very active period for earthquakes.

Yes. There seems to be a *concerto grosso*! So, to go on: after three years in Africa I participated for three years in an on-going expedition to Iceland, organised by Professor Belousov. It was very interesting, as my three main interests—neo-tectonics, volcanism, and glacial geology—were all represented in Iceland. In Africa, I published several works on Quaternary geology and even on glaciation, and I've been very lucky to go to so many countries to see glacial phenomena. So these are my scientific interests. And about twenty years ago I organised a large conference in Moscow on problems to do with the expansion and pulsations of the Earth. Your Australian colleague Professor Carey had sent his greetings to this meeting and his letter was published in the conference proceedings. Then five years ago, there was a small but interesting conference in Wrocław devoted to Earth expansion, and I was pleased to meet Professor Carey, who also participated in this meeting. I had published a Russian translation of his famous book entitled *Theories of the Earth and Universe* as I support his ideas about expansion, except that we differ about the question of contraction. He only thinks that there are variations in the tempo of expansion and doesn't have any contraction in his theory, whereas I believe that the prevailing expansion of the Earth has alternated over time with the periods and phases of its contraction. Or, in other words, the Earth's expansion has been complicated by its pulsations of different orders and duration. The pulsational concept allows us to understand the global scale of alternation of the phases of folding and the phases of rifting and spreading activation. *That's a tremendously broad view. And you are an extraordinarily prolific writer. How many papers and books have you written?*

With co-authors—more than twenty-five; maybe thirty. Without co-authors—about twenty, including textbooks. The first is the *Geology of the USSR* in three volumes; and the other textbook you have [*Geology of Russia and Surrounding Countries (Northern Eurasia)*, 1996, in Russian]. Seven of my books are devoted to the geology of the Caucasus and Mediterranean mobile belt. There are six books on general and regional problems of rifting and its evolution, four of which have been translated into other languages. For papers, about seven hundred, including about one hundred published abroad.

That's an amazing number! You must be one of the most prolific geological authors of all time!

No, the most active in the writing of geological books is Professor Khain. He is the author or co-author of more than a thousand publications, including more than seventy books!

Even so, you really must be one of the world's most published geologists—I don't know how you find time to talk to me this morning. I'm very grateful. I rather think you should be getting on with your next book! Also, I'd like to take this opportunity to say that all the Members of INHIGEO are really delighted to have your pictures illustrating our little Newsletter.

Thank you very much for such propaganda for my very low artistic work.

We don't think of it like that!

Well, you may be interested to know that several months ago I received a letter from Professor Dennis Dean in Chicago. He wanted to publish a book with my drawings and a short text explaining the stages of my scientific life and my work in different countries, my observations and so on. And about a month ago I met him in Moscow during his world tour. So we discussed the details of this work. I have given him some of my pictures. I don't know whether the book will be published but it will certainly be very pleasant for me if it is.

It surely will! I do hope it comes to pass. I'd certainly like to have a volume of your drawings.

Well, if what we've done this morning will be useful to you, please make what use you want of it. I shall be most pleased to do that. Thank you very much indeed. Everyone in INHIGEO will be extremely grateful and interested to read what you've been saying.

[Professor Milanovsky's book on Wegener is currently in press (Ed.)]

Interview with Professor Wang Hongzhen, 21 October, 1999, Beijing

[Professor Wang Hongzhen was born in Cangshan, Shandong Province, China, in 1916. He took his BSc from Peking University in 1939 and his PhD at Cambridge in 1947. He has been Professor at Peking University, Professor and Vice-President of Peking College of Geology, Professor and President of Wuhan College of Geology, and Professor of China University of Geosciences. He is a Member of the Chinese Academy of Sciences, and has been Vice-President of the Geological Society of China and President of the Palaeontological Society of China. The recipient of numerous awards and honours, Professor Wang is the author, editor, or co-editor of twenty-four books and the author or co-author of 184 papers (to 1998). Professor Wang has been a Vice-President of INHIGEO since 1990, representing the interests of Asian Members, and as mentioned below has been very active in promoting studies of the history of geology in China. The following interview was recorded when I had the pleasure to be a guest speaker at the history of geology group at the China University of Geosciences. Ed.]

David Oldroyd

I'm very glad to be in Beijing, and to have the opportunity to talk to you again. Thank you for agreeing to be interviewed this afternoon. I hope to publish a transcription of our conversation in a future issue of the INHIGEO Newsletter. Could I ask you first how you got into geology?

Wang Hongzhen

Well, when I was young in middle school I was interested in travelling and also I loved making sketches, and painting too. Actually at one time I intended to learn painting. However, I aspired to serve my country through science and technology, as many young persons did at that time. Later, some of my friends were in the Geology Department of Peking University, so when I selected my specialisation it was geology.

And you were three years as an undergraduate at Peking University?

We usually had four years.

And then you went on to do a doctorate?

No, you see at that time we only had the bachelor of science degree in China. I entered the University in the middle of 1935, and in 1937 the Japanese invaders came here. So in 1937 we went first to Hunan, and then to Kunming in Yunnan, where there were three leading universities at the time in China: Peking, Tsinghua, and Nankai, all linked up to form the Southwest Associated University. It had a fine tradition; and we all benefited. The actual conditions were very difficult, but two Chinese Nobel prize winners came from this university.

Was it going to that very mountainous part of China that interested you in tectonics?

Well yes. I participated in a travelling group organised by the University teachers including Professor Yuan Fu Li [Ph.L. Yuan] who was educated at Columbia University and a very good teacher. So we just followed him during our travelling and he showed me many geological phenomena around the highway from Hunan to Kunming. I think we were travelling for more than two months.

Just to get to university!

Well just to remove . . . The University was first housed in Changsha but it was not safe there, so in 1938 we moved again. Some of us took the highway to Kunming, and others went overseas. I think I got much knowledge through field observations in the course of that journey with Professor Yuan. Also, during the journey Professor Yuan talked about the history of the development of geology in China.

Oh really! So you got interested in the history of geology even at that early stage?

Yes, at that time I did not have a serious interest, but I loved to hear the accounts of the interesting personalities. For example, there was the famous forerunner in Chinese geology, Dr Ding Wenjiang [V.K. Ting], who was not only a good geologist and teacher, but was also influential in the whole scientific sphere of China. For example, he led a great debate about science and metaphysics, which was an important issue in China in the 1920s.

So you were down in Kunming. You were there in the War. Did you stay there the whole time?

Yes, from 1938 to 1945—a full eight years—we stayed in Kunming. From 1938 to 1939 I joined the field group organised by the Geological Survey of China and got much field training. So after I graduated in 1939 I became a young teacher and my professor was Professor Sun Yun Zhu who was a specialist in trilobite palaeontology; I followed him and chose palaeontology as my preferred thing to do. At that time I was also interested in tectonics. But for the first five or six years we went to the field I got material, mostly rugose corals from the Silurian, Devonian, and Carboniferous; and I made slides for myself, though the conditions were very difficult. Also I published five or six papers in the *Bulletin of the*

Geological Society of China, which was in English and of quite a high level. So that was the period immediately after my graduation. And at that time I gave some lectures on historical geology when I was a 'demonstrator'.

So what led you to England to do a doctorate?

Well, at that time there was the Sino-British co-operation arrangement through the British Council. They provided financial support and entrusted the Chinese Government to organise the examinations. But before that Professors Yuan and Sun had introduced my name to Professor Charles Schuchert and Professor Carl Dunbar at Yale University. Actually, I got the first Schuchert Memorial Fellowship at that time. But after trying unsuccessfully to get to America, I took the British Council examination; and then I went to England. I was very grateful to Professor Dunbar. After he heard about what had happened he wrote to me: "Cambridge is the best place to go; I'm very glad for you".

Which college were you at?

Magdalene.

So you did your PhD there.

Yes, under the direction of Dr Oliver Bulman at the Sedgwick Museum.

Ah! I went to his lectures when I was a student. I remember he was a wonderful artist. So what was your thesis topic?

Well, I'd gathered material on rugose corals in China, mainly Silurian, Devonian, and Carboniferous. I brought my material to the Sedgwick Museum. So I began my thesis quite early, just after my arrival. I got in contact with Stanley Smith and Deighton Thomas. I did my coral studies with a special method to get clear the micro-skeletal structures, mainly through the suggestion of Deighton Thomas, who was at the British Museum at that time. So I often travelled to London, and sometimes to Bristol to see Stanley Smith. Well, I only took fifteen months for my thesis work.

Very quick—but you had the material ready collected.

Yes, and at that time I had already published some papers. Dr Bulman said: "This could be omitted. That could be omitted". I received my degree in May 1947.

Did you speak English when you got there?

Well, we'd studied English in China from middle school. So I knew written, but not speaking, English. Of course when I was in Britain I had a little difficulty in learning, but I had practice.

But then you've kept your good English until now.

Yes, I suppose so. Dr Bulman said he was very glad that my written English was quite good, and that it gave him no trouble.

So you came back to China?

Yes. But in 1947 I went to the United States for several months. Peking University gave me some financial support, enabling me to visit the geology departments of various universities. So I began my journey in September and was back in China at the end of the year. I was very fortunate and met most of the famous people in palaeontology and tectonics. I first went to Harvard, when Raymond was still alive. At MIT, Professors Twenhofel and Shrock were still there. Then I met Professor Dunbar at Yale, and Professor Howell at Princeton, who was a trilobite man. I stayed twice in the National Museum in Washington with Dr Bassler and also Dr Cooper, a famous brachiopod man. They were very kind to me. After that, I went across the continent—Michigan, Chicago. I saw Professor Moore in Kansas, and finally I got to the west coast, where I was able to meet Bailey Willis, the year before he died.

So then you got on a boat and came back to China?

Yes, back to China. But as you'll know the conditions were very bad in those days. First I went to Shanghai and then to Beijing, or Peking, to become an associate professor in palaeontology, still under the leadership of my old professor, Sun, then Director of the department.

So maybe could we jump a bit perhaps now? You've become a very senior geologist in China, an academician and so on.

Could you please tell our readers what you have been doing in more recent years towards encouraging the history of geology in China?

Well, not too fast please! To talk about that I still need to go back to the fifties. You see, after the Sino-Japanese War we came back to Beijing and I was elected first Assistant Secretary of the Geological Society of China and then Secretary. I owe very much to Professor Grabau, though I only heard him lecture on historical geology for one year, before the War. Grabau donated all his books to the Geological Society by his will, and I was entrusted with the arrangements for the receipt of his private library, so I got involved in such matters quite early, and this circumstance added to my interest in the history of geology. Then in the mid-fifties I was made Vice-President of what was then called the Peking College of Geology, and after that we had very hard years, as you know, including the ten years of tumult. But after the years of hardship I participated in the compilation of the 1:5 million Geological Map of Asia. So I had the chance to get more connections with various parts of the continent, and I became much interested in the rise and fall and the development of geology here, especially in our brilliant forerunners in the geology of China. We usually talk of four of these in particular: Zhang Hongzhao [H.C. Chang], Ding Wenjiang [V.K. Ting], Wong Wen-Hao [W.H. Wong], and Li Siguang [J.S. Lee], who became Minister of Geology, Vice-President of the Chinese Academy of Sciences, and Vice-Chairman of the Chinese Peoples' Political Consultative Committee.

He was 'red and expert' they say!

That's right. And so I'm interested in such stories, and especially the question of academic co-operation between China and foreign countries.

How did that work out in practice?

Well I haven't done so very much as my health was not very good in the middle eighties. But I met people like Hedberg, Rodgers, Burke, Wyllie, and Ziegler of Chicago University. I planned to make a round visit to their institutions,

but I couldn't go. I had organised a team project to compile the palaeogeography of China, which appeared in 1985. Then in the early 1990s my health improved and I tried to organise a new project on sequence stratigraphy. But you know, at that time people didn't know much about sequence stratigraphy, then just beginning. And I wasn't quite sure how to organise the matter. But I tried to connect sequence stratigraphy (mainly outcrop sequence stratigraphy) with biostratigraphy and sedimentology. (I don't know much about seismic-stratigraphy.) So, in this way I assembled people who were specialised in sedimentology, palaeontology, and stratigraphy. I invited Western scholars partly concerned with sequence stratigraphy, and also oil-basin geologists. They came once, or more than once, to our university to give special lectures and seminars, but it was difficult for us to organise field trips. So I knew the importance of international co-operation. Perhaps in practice I did not do very much, but I emphasised the collaboration and correspondence about geological ideas and concepts including sequence stratigraphy. I wrote some papers about this, but they mostly appeared in Chinese journals. They were essentially synthetic and sometimes concerned with concepts and it was difficult to get them published outside China. Then after the key project on sequence stratigraphy and sea-level changes I tried another one, which was to continue after 1996 and is still continuing; it is concerned with the broad aspects of earth rhythms and sequence stratigraphy. I have always wished to connect stratigraphy, palaeogeography, tectonics, and the global reconstruction of palaeocontinents.

Yes, I remember when I was here a few years ago you had a student doing reconstructions with a computer.

That's right. Actually I got some serial reconstruction of the palaeocontinents concerned with world biogeography of corals in the late 1980s. The work continued in the early 1990s and an exposition of serial global reconstruction maps was made at the 30th International Geological Congress held in Beijing in 1996. As there was much difference of opinion, I didn't publish the whole thing. I just wrote a short joint paper about the Pangaea cycles in Volume 1 of the 30th IGC *Proceedings*. During this period I discussed with my younger friends from the Nanking Institute of Geology and Palaeontology the study of Palaeozoic stratigraphic boundaries through the Global Stratotype Section and Point method. Actually, I don't think the GSSP studies are very successful. Since the 1970s, this method was first employed by MacLaren of the Canadian Survey, who was the first to establish the boundary between the Silurian and the Devonian. I think that most stratigraphers are too much confined to biostratigraphy and give comparatively little attention to sedimentology and event stratigraphy. So they want to get the boundaries in a perfectly continuous series with the same facies and a complete succession of evolutionary biozones throughout. I don't think this is practicable. After much work worldwide many GSSPs for boundaries have thus been established, but they can seldom be recognised in the field, let alone traced and correlated between different regions. So I think that the contrasts between two schools of thinking, uniformitarianism and neo-catastrophism, are still basic and sharp. You may find that the geo-events usually occur in clusters and in a coeval way. It is these events that form the landmarks in earth's history, which is partitioned into stages. The stages are always progressive, but never repeat. If I have some doctrines of earth evolution, they may be called 'Punctuated Progression' or 'Development by Stages'. That's why I stand for Neo-catastrophism rather than Uniformitarianism.

So that's what you're working on now? And could you just conclude by saying what you and your colleagues are doing in the way of history of geology in China? You are the leader of this group in Beijing. Would you like to say what your group does?

I have some difficulties in this connection. I used to maintain or emphasise the history of modern disciplines, though of course the study of the geological thought of ancient China is also important. Anyway, in recent years we have tried to publish books—from 1986, when I began to be in charge of the HGGSC, we have endeavoured to publish about one book a year, and the majority of them are about the development of the geoscience disciplines.

Well indeed, you gave me one of those books just today. So your work goes on! It would seem to me that you could also properly describe yourself as a facilitator or as a leader of this kind of work. Would you put it this way yourself?

Well, there are difficulties here. At this university [the University of Geosciences, Beijing], we have an Institute for the History of Geology, but not much work of this kind is actually being done. Our young colleagues are very busy people—busy with teaching and research work in their respective special fields, and I can't tell them to do too much work in the history of geology.

But I've met at our seminar today three young people who are keen and interested. So I'd suppose that there are others coming along in China.

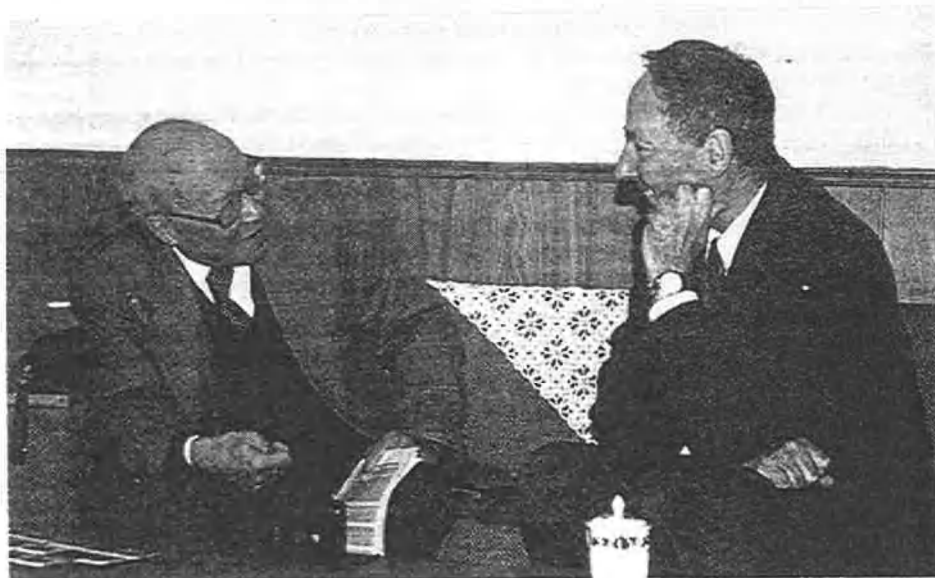
Well yes, there's the young man, Dr Y in Jianzhao, for example, and some others. But they all have other important things to do also.

Anyway, I've seen your books coming out, and very frequently. You're really responsible for a lot of important work here, I do think. If you didn't do it, perhaps no one else would just at the moment, though we could hope that someone else would in fact take the lead.

Well, I fear I've found it more and more difficult to continue in these things, and as I told you the other day I expect to gradually drop things from now on.

We call it passing on the baton. I just hope that there will be someone in China to carry it further when you finally decide to retire from this kind of work. Meanwhile, let me thank you most warmly for giving us so much of your time. I'm certain that INHIGEO Members will find it exceedingly interesting to read what you've been talking about. Thank you very much indeed.

You are most welcome.



BOOK REVIEWS/EXHIBITION REVIEW

The Importance of Science Museums in Naples

Fratta A. (ed.), *I Musei Scientifici dell'Università di Napoli Federico II*, Fridericiana Editrice Universitaria, 1999, 320 pp. Scientific development in Naples has been closely linked to the vicissitudes of its first university, the Federico II University, characterised by a Museum System organised in a Natural Sciences Museums Centre, Sectional Museums and small but significant Collections, with a total of about 140,000 specimens. The Neapolitan university museum activities are not limited to the collection and exhibition of specimens. Original research, and various social and teaching functions are also fundamental aspects. In particular, research activities have always been one of the main reasons for existence of Neapolitan scientific museums.

The book under review is dedicated to the scientific museums of the Federico II University, in particular to the history of the principal museums (anthropological, mineralogical, palaeontological, and zoological), today affiliated to the Natural Sciences Museums Centre. The Natural Sciences Museum Centre extends has an area of about 2500 sq. m., and the exhibition spaces are very interesting places, from both architectural and historical points of view.

In the first chapter, Maurizio Torrini, professor of history of science in Naples, outlines the development of science in the city from the 17th to the 19th century—from the Borbone dynasty to the Unification of Italy. He describes the work of Neapolitan scientists during these centuries, emphasising their difficulties due to inadequate funding and the lack of interest of Neapolitan governments. Next, Leonardo Di Mauro and Cesare de Seta, professors of the history of architecture, deal with the architectural aspects of the museums, stressing their great artistic value and also their changes over the years. Cesare de Seta reconstructs the stages of the artistic restoration of the Santi Marcellino e Festo monastery, now restored to its original splendour, where the geological and the palaeontological museums are located.

Four chapters are devoted to the anthropological, mineralogical, palaeontological, and zoological museums. The authors provide information about the foundation of the museums, the principal directors, the collections, the scientific researches connected with these museums, and information about the historical rooms that are open to the public. The oldest is the mineralogical one (*Real Museo Mineralogico*), founded in 1801, and directed by important mineralogists such as Arcangelo Scacchi (1810–1893), a scientist of world renown and one of the leading experts on Vesuvian mineralogy.

These beautiful and very interesting museums are unknown to many people, even Neapolitans, but their collections have great scientific value and foreign scientists frequently apply to them for assistance in relation to their research. So the book will be useful in making known these important institutions, which have played such a key role in the history of science in Naples and sometimes in the history of the city. For example in 1848, after the granting of the Constitution by King Ferdinando, the Chamber of Deputies gathered in the Monument Room of the mineralogical museum, which in 1861 was one of the twelve polling stations for voting on the question of the annexation of the Kingdom of Naples to Italy.

The volume is beautifully produced and richly illustrated. The quality of pictures and figures is generally good, except for some samples pictures (in particular the mineralogical ones), which needed the work of specialised photographers.

Imma Menditti, Naples

What Happened to Tethys??

Ali Mehmet Celal Sengör, *Die Tethys: vor hundert Jahren und heute*, Mitteilungen der Österreichischen Geologischen Gesellschaft, 1998 (for 1996), 89, 9–177.

This is a greatly expanded and revised version of a formal address at the University of Vienna, in November, 1993. It is devoted to the Vienna 'Giants of Geology', foremost of whom was Eduard Suess (1831–1914).

We must all admire the author's tremendous scope of reading, understanding and interpreting widely scattered literature. His library, on the top floor of his house overlooking the Bosphorus, is in itself a marvellous place for anybody interested in the history of our science. Professor Sengör goes back to antiquity, notably following the fate of the notion of an E–W trending 'Taurus' Chain, shown on the map of Eratosthenes. By way of Ptolemaios, this leads to Élie de Beaumont, the great French geologist of the mid-nineteenth century, whose 'geometrist' views had a long-lasting and ambiguous influence on European geology.

The idea that mountains arose out of the sea also goes back to antiquity. Sengör rightly quotes Pierre-Armand Dufrenoy (in Dufrenoy and Élie de Beaumont, 1848) as the first geologist who recognized that the sediments in mountain belts were thicker and more complete than in the surrounding areas of flat-lying rocks—before James Hall and James Dana.

Eduard Suess is deservedly the author's great hero. The main characteristics of his work are admirably analyzed: his synthetic approach, considering all aspects of geology, and his flexibility, allowing him to advance and discard successive hypotheses. The contraction theory, to which he continued to adhere, was only discredited toward the close of his life.

The term 'Tethys', rather casually introduced by Suess in 1893, has a long prehistory, which is remarkably well outlined. After Roemer's and Marcou's early attempts to reconstruct world-wide Mesozoic palaeogeography, Suess's pupil (and son-in-law) Melchior Neumayr (1845–1890) firmly established the existence of an equatorial 'Centrales Mittelmeer', from the Caribbean to Indonesia, in 1885. In his great little book of 1875, Suess acknowledged the existence of geosynclines—i.e. of elongated basins with a peculiar evolution—without adopting Dana's theoretical explanation. Whether Suess regarded Tethys as a true ocean (he mentioned that its water depth could have exceeded 4,000 metres), whether it had only palaeogeographic or also tectonic implications, and whether it referred only to the Mesozoic or also to earlier situations may be disputed. Suess was too intelligent to worry much about formal definitions.

Sengör's account of Émile Haug (1861–1927) is critical but fair. It should perhaps be stressed more clearly that Haug differed from Hall and Dana by postulating great water depth in geosynclines. The author's bugbears are the 'positivists' Hans Stille (1876–1966) and Leopold Kober (1883–1970). He heaps scathing remarks on geosynclines and orogenic phases, though both may have been necessary steps in our understanding of mountain belts. It is true, however, that Kober and especially Stille founded 'schools', always a dangerous thing to do, and that their followers were often more dogmatic than their masters.

An excellent analysis is devoted to Emile Argand's (1880–1940) mobilist views and to his adoption, some time between 1912 and 1915, of Alfred Wegener's (1880–1930) concept of continental drift. There is a certain amount of personality cult in extolling Argand while deprecating his predecessors and contemporaries among Alpine geologists. Poor old Arnold Escher is rebuked on account of his 'over-precise mapping', which led him to exaggerate the importance of folding (footnote, p. 81). Are we to suppose that precise mapping can be a moral blemish?

Interesting chapters concern the 'pre-plate-tectonicians', Otto Ampferer, Franz Suess, Arthur Holmes, and especially Gustaaf Molengraaf and other Dutch geologists in Indonesia.

Sengör tries to revive Wilhelm Salomon-Calvi's (1868–1941) term of 'Synaphie', for a scar or suture. This reminds me of one of my own juvenile sins: in order to impress my elders, I used to mention 'piptuses' in an offhand manner. A piptuse, as everyone is supposed to know, is the line of most pronounced facies change; it may or may not correspond to the palaeoslope dip-line. The term was proposed in a footnote by Arnold Heim, in 1916, and has not been used in print up to the present review. Now that the synaphie and the piptuse have fulfilled their purpose, of documenting A.M.C.S.'s and R.T.'s erudition, they may be laid to rest again in the Museum of Forgotten Names.

The second part of the text (pp. 124–160) concerns the present status of the Tethys system in Asia, it is relevant for the 'Tethys paradox', which puzzled the first scientists who tried to reconstruct Palaeozoic and Mesozoic palaeogeography according to the plate tectonics model. It is a very useful summary, even if it contains some matter that has been published elsewhere, but it is—for the moment, at least—of lesser interest for the historian of science.

However, in my judgement, the author under-rates the importance of stratigraphy for the development of tectonic theory (p. 35). Folds could be seen in the field and were indeed well described and drawn in the eighteenth century; thrusts could only be deduced much later, once the stratigraphic succession had been established. Cuvier and Brongniart are rated higher than William Smith (p. 21), because Cuvier had a theory—although he was a sombre positivist, preferring the evidence of a frozen elephant over even the most elegant speculations. The worthies of the late eighteenth and early nineteenth centuries are treated in a concise and pertinent manner.

The philosophical considerations (pp. 101–104 and 121–123) are thought-provoking and revealing. The author unashamedly confesses his bias (p. 8). He is a confirmed Popperian and classifies geologists as either 'positivists' or 'critical rationalists'. His sympathies are manifestly with the latter, although he has to admit that both may be necessary for the development of the science. The 'positivists', like Élie de Beaumont or Stille, are represented as founders of schools. This is not the case for the 'rationalists', though in this sense it is somewhat misleading to write of a 'Wegener-

* Readers should be reminded that Professor Sengör started puzzling about this question when he was at elementary school! See *Newsletter* No. 31, p. 25 (Ed.).

Argand school' — such an institution never existed. On the whole, the 'rationalists' supposedly have more flexible minds and greater respect for actualistic analogies. But the division is far from clear-cut; a geologist like Otto Ampferer was a 'good' prophet in some respects (crustal subduction, Atlantic spreading), but a 'bad' reactionary in others (partial autochthonist, gravity gliding).

The monograph is very well produced by the Austrian Geological Society. It contains ample and carefully chosen quotations from the original publications. The language is correct. An abridged version in English would certainly be appreciated.

Even if one does not necessarily share the author's somewhat Manichaean outlook, this work provides an excellent overview of the evolution of geotectonics, and also of the reflections of one of the most knowledgeable living geologists.

Rudolf Trümpy, Küsnacht, Switzerland

In the Skin of Professor Challenger

Taquet, Philippe (translated by Kevin Padian), *Dinosaur Impressions: Postcards from a Paleontologist.*, Cambridge University Press, Cambridge, (UK), 1998, xi + 244 pp. Hard cover £14.95; paper £9.95.

This unpretentious and entertaining volume tackles several important and interwoven topics. First, it is a travel book with a purpose; a field autobiography of its author, who has been fortunate enough to study vertebrate fossils in many parts of the world. Secondly it summarises much recent research on dinosaurs, as well as crocodiles and mosasaurs, featuring (but not exclusively) the author's work. Thirdly, it attempts to provide some historical context for the topics under discussion, with special reference to the distinguished background of French vertebrate palaeontology.

The author is notably qualified to write such a book, since he is (or was, depending on whether the reader believes the text or the dust jacket), Director of the National Museum of Natural History in Paris. Initially produced in French in 1994 as *L'Empreinte des dinosaures*, the book has now been translated by Kevin Padian, a notable American dinosaur scholar at the University of California, Berkeley.

Each of the book's implied objectives is abundantly achieved. As a partial autobiography it gives vivid insights into the joys and hardships of scientific travel in remote parts of the world; much of the research is unfamiliar to readers of other popular work; and the author is always consciously working in a tradition of European geology and biology.

In the first chapter, we are plunged with the author (a week out of University) into his 1964 field trip to Niger. Here, sand-laden desert winds expose dinosaur skeletons. "Leaping from the car, my heart pounding, I headed towards the best preserved of them. I had the exhilarating feeling of being in the skin of Professor Challenger..." says the author. His enthusiasm never lets up.

In boxes for core samples — labelled "drilling carrots" to the confusion of customs — his newly discovered *Ouranosaurus* is transported back to Paris in Chapter 2. We watch its painstaking restoration, while the author embarks on the research that will set the discovery in context. This involves intellectual detours to Cuvier, Steno and Mantell, and physical trips to Bernissart and North America. Taquet explains the process of description and naming, and introduces the reader to cladistics.

Similar combinations of travel, science, and history enliven later chapters, which discuss dinosaur tracks in Niger, Gondwana crocodiles in Niger and Brazil, sauropods in Morocco, and the little-known 1991 Franco-Italian-Mongolian expedition to the Gobi (where the party met the American Museum expedition at Bayn Dzak). An excursion to Laos is followed by a survey of dinosaur discovery in Europe, while a summary of dinosaur evolution completes the main text. A chapter-by-chapter reference list and index complete the work.

Although some of the broader background is readily accessible to what Padian refers to as the "anglophonic hegemony", the book contains much that is not widely available in English. Some of the early French discoveries (including eggs in 1869), the pioneer work of Hoffet in Laos, and the perspective of a scientific descendant of Cuvier on the new catastrophism are notable stories that are little known outside the *francophonie*. However, Taquet's gentle complaint about the invasion of the media by "a gang of American dinosaurs" is not exclusive to the French-speaking world — I have recently explored a similar theme in a book on Canadian dinosaurs.

The author notices, and shares, many intriguing details. We meet the Berber who sits and knits socks while watching scientists excavate a sauropod near his house; learn of dinosaur tracks in Portugal reputed to be made by the Virgin Mary's donkey; meet anthropologist Levi-Strauss as a geologist; join in a Walloon song on *Iguanodon*; and participate in the sacrifice of a pig in Laos before the crew can get to work on a nearby dinosaur locality.

Although this is very much Taquet's book, Padian is more than a translator. He adds illuminating footnotes, and shares with the author an afterword updating the story over the few years between French and English editions.

From an author who speaks elegantly of "the waltz of the continents", and intriguingly of "paleontological ecotourism", it is surprising to note a few infelicities. For instance, Taquet surely does not intend to say that palaeontologists did not try to find evolutionary relationships among dinosaurs before 1984 (p. 48). Nor need Padian have left a Danish word alone in the text when an English equivalent ("kitchen midden") is widely understood (p. 7).

The illustrations, alas, are not of the same calibre as the text. Averaging one every six pages, they include photographs, maps, plans of sites, drawings of skeletons, restorations, reproductions of plates and title pages from historic publications, and even a menu. The line-work generally reproduces adequately, but few of the photographs are more than adequately reproduced, and some are very poor indeed. This is the more disappointing when the originals are surely in vivid colour. While publishers are under severe financial constraints, a book of this calibre surely justifies some colour.

David Spalding, Pender Island, British Columbia, Canada

Challenging Cold Authority: Geomorphology in Trouble at Yosemite?

Schaffer, Jeffery P., *The Geomorphological Evolution of the Yosemite Valley and Sierra Nevada Landscapes: Solving the Riddles of the Rocks*, Wilderness Press, Berkeley (CA), 1997. xii + 388 pp.

For geomorphologists, the landscape is the document, our only document—but the catch is that we each seek to read it in our own language. But still, we must read it. We take it as an assumption that there is a single spatio-temporal logical sequence of events that the landscape has undergone. We realise too that the surface aspects of geology—geomorphology are essentially components of a self-censoring system because erosion removes the evidence of past action, and at best leaves behind an ambiguous morphology of dubious historical pedigree. The process of erosion produces a dispersed, chaotically mixed and incomplete sedimentary trace of its actions. Unscrambling this badly-linked record of erosion and sedimentation has never been easy.

We must try to read this document. Schaffer's book is a monument to the many flaws and inconsistencies that can occur in that reading, and to the failure of many to read it at all, relinquishing the difficulties of the document in favour of the unquestioned authority of an institutional 'tome'—such as François Matthes' long-gestated classic on Yosemite, the key human text discussed in Schaffer's book. Or, in favour of some supposedly adequate substitute such as an aerial photograph inadequately ground-truthed.

Let me say at the outset that this is a controversial text, and given its provenance in several decades of dedicated field work, and in a failed PhD, its aggrieved tone, and at times very pointed remarks—while understandable—are not such that it will win many friends. But, for all that it is controversial, it undoubtedly raises many important issues, many far beyond any specifics that may have been at issue in the PhD. The local publisher used for the volume will greatly limit the circulation, and the length and detail of the text will likely put off many casual readers. It may be a pious hope that an abbreviated, better-produced and more focused document will eventually meet a wider audience. Many photographic illustrations have been reproduced. The line drawings and topographic maps are clear in black and white, though the maps are often so detailed as to be hard to follow in the context of a text argument. The keen reader might wish to visit the seamless colour USGS maps available at www.topozone.com.

Much of the text—by virtue of the regional scale of the problem—and the scattered history of investigation, must be read as a regional history of earth science, and the volume is no less incisive and controversial in this role. Schaffer reviews the history of exploration and geological thinking in the Sierras, and he has examined the field notebooks of Matthes for example—to know where he visited and how much time he spent on particular areas and problems. Given the inordinate delay Matthes created in producing the Yosemite memoir—virtually all of his career—this is not a trivial issue. As with his fieldwork, Schaffer treads new ground here in examining the diaries and letters of the early Sierran geologists.

I cannot hope to adequately summarise the massive detail presented by Schaffer for many different Sierran valleys, but I will try to outline the main arguments. There are a number of crucial elements at stake in interpreting the landscapes of the western Sierra Nevada. Probably prime amongst them is the sheer physical scale and inaccessibility of the terrain which has limited the coverage of any individual's fieldwork. Schaffer has worked monumentally to overcome this problem for himself, for most of the region, over nearly three decades. Even so, he admits to only exploratory expeditions of a few days length into some regions to try and verify what has been 'mapped' by others, but not always mapped from fieldwork. This 'coverage' issue has been noticed before by historians of geology, but I draw it to their attention again. In the light of the need for consistency between the stories told for adjacent drainage basins—in terms of river down-cutting, mountain uplift, and glacial history—this matter is crucial, and Schaffer is merciless in exposing the inconsistencies of adjacency in numerous accounts. These inconsistencies—some of which are truly glaring and no doubt very embarrassing to the resident establishment—truly are the iconoclasts of paradigms, and are perhaps to be the icons of new ones. Landscape study has been so neglected in the latter half of this century that the inconsistencies are too easily brushed aside as the results of 'improved' techniques and 'better' interpretations. In this type of argument the 'later', and 'better' technique almost always undermines insidiously a carefully crafted landscape interpretation from earlier decades.

The primary substantive issues of interpretation are the efficacy—or not—of glacial erosion (and the spatial extent of various glacial phases), and, of almost equal importance, the history of diastrophism—was it primarily late Mesozoic, or late Cainozoic? Schaffer's controversial assertion (p. 353) is that one could use a modern topographic map to navigate the mid-Tertiary landscape. This clearly denies substantial glacial erosion through many epochs of glaciation, and also asserts that subtropical deep weathering in granitic terrain working through deep time was the prime morphologic agent in shaping the Sierras. The deep rock basins are asserted to be basins of deep weathering in more fractured or jointed terrains, not basins of glacial excavation. Glacial action is restricted to scouring loose material, removing rock-fall from unglaciated terrain above the glacier surface, and striating and polishing the rocks. Thus Schaffer claims to restore the importance of rock-fall to the understanding of glacial landscapes—pace Anders Rapp. Indeed, he claims, extravagantly I think, to turn alpine geomorphology 'upside down' by recognising rock-fall as an agent. He claims too, though, that much recent talus has remained in the valleys, preserved from earlier interglacial periods, and not removed by glaciation. It is clear that all these assertions have strong implications for other glaciated mountain terrains where perhaps we have failed too often as geomorphologists to ask—why is so much mountain left, if the process is so vigorous? In the last generation especially, we have seen an escalation by an order of magnitude in the number of glacial cycles. Schaffer brings back glacial protection almost a century after it was fighting a rearguard action against the four-cycle glacial theory developed by James Geikie, Albrecht Penck, and Edouard Bruckner.

Given the broad applicability of Schaffer's assertions, the last chapter is a grave disappointment and the hoped-for review and re-interpretation of other terrains is largely missing. Although headed 'Science, The Sierra Nevada, and the World', the world is missing, and a great opportunity is lost. Instead there is acid sniping at the practice of science in

academia, and further reflections on the Sierras. It is a great pity, for many areas have the evidence that would support Schaffer in a broad sense. The 'origin of tors' controversy in Britain in the fifties would make interesting reading for Schaffer—with the competing theories seeing tors as a result of either periglacial activity removing frost-fractured blocks, or simply removing deeply weathered material inherited from Tertiary time in never-glaciated terrain. Deeply-weathered pocket deposits are known from many locations in Europe, including the United Kingdom, and the eastern seaboard of Canada and the United States, often within the glacial limit, and all are attributed to pre-glacial weathering under warmer conditions. They have been discussed through many decades and more incisive geochemical and palaeontological analysis is now revealing much of interest. Perhaps the opportunity to consider the degree of glacial erosion compared to the preglacial surface has not been exploited as thoroughly as it might have been in the past, but the points have been made. An interesting comparative terrain would be Southern Norway. I had an opportunity last summer to see the view down the Naerøydalen from Stalheim Hotel, in the highlands east of Voss. The view, with the domed Jordalsruten (although complete), bears an eerie resemblance to Yosemite, with the same dramatic steep-sided granite valleys (up to 1,400 m deep), and the rolling plateau surfaces above. And the Norwegian story is greatly complicated by the deeply excavated fjords.

Let me conclude with this return to a specific landscape and urge you to order and read this book. There are some indications that the mood is changing amongst professional geologists over the age of the Sierran uplift, and if it does there are deep implications. And you will be able to say you read it first in this book.

Keith Tinkler, St Catharines, Canada

The Cause of Noah's Flood, Scientifically Explained, With some Thoughts on Creation Science
William Ryan and Walter Pitman, *Noah's Flood: The New Scientific Discoveries about the Event that Changed History*,
Simon & Schuster and Touchstone Books, New York, 1999. Pp. 319. US\$13 paper-back.

I should like to mention two items that have come my way in the last two months: one by unsolicited mail, the other by purchase. The former item (an offprint of unstated provenance) provided a summary by one Martin G. Selbrede of the arguments of Dr Walt[er] Brown, Director of the Center for Scientific Creation, in his many times reprinted work: *In the Beginning: Compelling Evidence for the Creation and the Flood* (6th edn revised, 1996). Brown, a PhD in mechanical engineering from MIT (and formerly a "Chief of Science and Technology Studies at the Air War College", besides being the holder of many other important offices), takes plate-tectonic theory with great seriousness. According to Selbrede's account, he believes that water has welled up from the Earth's interior at the lines of mid-oceanic ridges, heaving up portions of the oceanic crust, which then slid so as to collide with continents, creating such an impact that melting occurred, causing the volcanic activity that we see round the Pacific 'ring of fire' or the production of the lava flows of India's Deccan Plateau—and all this, I suppose, within the few thousand years of the 'Biblical' time-frame (but Selbrede's summary doesn't discuss dates). This upheaval caused catastrophic changes in the levels of land and sea, and (of course) the events of the Noachian flood. This doctrine is dignified with the name of "hydroplate theory". It squares, up to a point, with the Biblical legend of the opening of the "fountains of the deep" at the time of the "Deluge".

This is a sample of the kind of thing that fringe-geology has to tell us. According to Selbrede, this particular species holds that "the ultimate court of appeal for any theory remains the Holy Bible". Does orthodox geology have anything better to offer on the question of Noah's Flood?

Well, until relatively recently perhaps not as much as one might like; and readers of a volume by yours truly (1996) may, with relish, draw attention to the fact that in that book I merely gestured to an old theory of Eduard Suess that the Flood might have been caused by some kind of tsunami, acting in the region of the Persian Gulf. (Yet no reviewer raised any complaint against me on this issue, at least.) But now, in this recent book by two respected geologists, Ryan and Pitman, we get an account of their personal odyssey to solve the problem, with fine detail about how their proposed solution has been arrived at, particularly through hydrographic survey of the Black Sea and the channel of the Bosphorus.

The essence of the idea was apparently first proposed by Oxford's John Dewey when he, Pitman and Ryan were tossing ideas around about the tectonic evolution of Asia Minor not long after the plate-tectonics revolution. As now detailed, the idea is that the basin of the Black Sea was formerly a desiccated sea. Then, after the last main ice age melting waters from the polar regions flowed into the Black Sea basin through rivers such as the Dnieper and the Don and formed a fresh-water lake—the 'New Euxine Lake'. (The ancient Greek name for the Black Sea was *Euxinos Pontos*.) For a time, the water exited through the so-called Sakarya Outlet (a rather indirect outlet that took advantage in part of the North Anatolian Fault) into the Sea of Marmara area, and thence into the Mediterranean (then at a lower level) via the Dardanelles. But then came a colder, drier period (the Younger Dryas), when the level of the 'New Euxine Lake' dropped. So water stopped flowing in the Sakarya Outlet, which got clogged up with mud and debris, brought in by intermittent flooding. Thus we had the fresh-water proto-Black Sea separated from the Sea of Marmara and the Mediterranean by quite a narrow isthmus, and at a significantly lower level than the Mediterranean.

But then the melting of the ice-caps began again, making sea-levels rise world-wide. This necessarily caused the level of water in the Mediterranean and the Sea of Marmara to increase until at last a passage was burst through between the latter and the 'New Euxine Lake'—forming what is now the narrow waterway of the Bosphorus, which cuts through the quite narrow former isthmus. This time the water took a direct course, and the flow was in a direction *opposite* to that which had previously occurred in the Sakarya Outlet. With salt water now flooding catastrophically into the Black Sea, the old waterway, the Sakarya Outlet, was by-passed and now it is merely a modest-sized river flowing *into* the Black Sea.

So Ryan and Pitman envisage first a trickle of water, and then a vast flood breaking into the Black Sea area when the land-barrier was breached. The basin would have taken only a year or two to fill, giving rise (literally) to the modern Black Sea; and obviously many humans living there—practising agriculture according to some palaeobotanical evidence—

would have perished, though others could have escaped. The flood would have been responsible for the extraordinary 'gouged' channel discovered on the floor of the Black Sea, where the Sea joins the Bosphorus, and also on the bottom of that waterway.

There might even have been foreknowledge of the impending catastrophe, as some people might have realised that the land barrier between the Sea of Marmara and the 'New Euxine Lake' was about to be pierced. So it is not inconceivable that some astute farmer might have seen what was coming as the Sea of Marmara inexorably rose and built himself a large boat by means of which he and his family, along with some animals, might have saved themselves. And he lived to tell the tale that has become the stuff of legend (and the source of much debate with and among 'Creation Scientists').

This new interpretation of legend is linked to an ingenious and attractive geological model, which would seem to account for the 'Deluge' most satisfactorily. Initially a speculative suggestion of Dewey, it was not at first testable by hydrographic examination by American scientists during the years of the Cold War. But with the termination of that so-unnecessary and regrettable ideological contest, American/Russian oceanographic collaboration could be initiated in the Black Sea; and when this was done it was found that Dewey's speculation was indeed supported by the evidence most satisfactorily. In particular, the sudden arrival of datable marine shells on the floor of the Black Sea could be demonstrated at a time that correlated with that required by Biblical and Babylonian legends/myths concerning a great 'Deluge'.

Further, drilling of coral reefs in Barbados in 1988 by Rick Fairbanks demonstrated the datable rise of sea-level world-wide, since the last ice age. This could be done by looking for the presence of particular coral types that live near the surface of the sea. So by examining a core from a coral reef one could easily demonstrate the rise of sea-level over time, and it was shown that the rise was seemingly what was needed to produce a catastrophic breakthrough of salt water into the Black Sea Basin about five and a half thousand years B.C.

So, Ryan and Pitman contend, there was a great diaspora from the Black Sea region, where farming had been established at an early date, at a time when the area provided a relatively favourable climate near the fresh-water lake (during the Younger Dryas cold period), while other neighbouring regions were arid or colder. Then, after the 'Deluge', people moved away from the area, taking their farming practices with them. The establishment of farming in the Fertile Crescent of Iraq probably was stimulated or even initiated by this development, after people had moved over the Anatolian plateau to escape from the devastation of the 'Deluge'.

This is the new theory of Noah's Flood, based on an interweaving of studies of Quaternary geology, geomorphology, and recent developments in archaeological knowledge. Ryan and Pitman suggest that ancient sites excavated in Anatolia may resemble ones now flooded beneath the waters of the Black Sea or the shores of the 'New Euxine Lake', but they do not report anything about human remains or artefacts being dredged from the bottom of the Black Sea, which would perhaps be the clincher. Their story covers a good number of areas outside the domain of straight geological theorising. It discusses such matters as Cavalli-Sforza's work on the relationships between languages and genetic characteristics and ideas about the spread of the Indo-European languages. It takes the reader back to the early studies of Babylonian clay tablets; discusses recent archaeological work in the Middle East, especially in Turkey; considers the way ideas may be transmitted orally as myths/legends; and most importantly provides autobiographical accounts of Ryan and Pitman's own investigations of the form and content of the sea floor in the Bosphorus and the Black Sea. Some of the archaeological work they describe is very recent (within the last five years). It all seems to hang together, though this reader is a bit puzzled why the water carved a new channel directly through the Bosphorus rather than taking the old route via the Sakarya Outlet. He would have to visit the ground to get a better idea of the issues on this point. Perhaps if the water level rose in the Marmara side of the outlet there would be no flow in the channel to clear the debris that had accumulated in it since the Younger Dryas? I also wonder why, if the general sea level was rising at the end of the last Ice Age, it did not rise also in the precursor of the Black Sea, by the arrival of fresh meltwater via the Dnieper, Don, etc. Was it because the Arctic ice-cap had receded to the north of the northern coast of Russia? The authors themselves suggest that there was isostatic rebound after the north Russian ice melted, and water then found its way into the North Sea via Poland and Germany.

Anyway, it would appear that one of the world's great mysteries may well be answered at last, by empirical science, hand in hand with the testing of some bold conjectures. It is scarcely surprising that the two authors are so excited about what they have found and the ideas that they have developed that they should have chosen to write a semi-popular book about their findings. (I gather that there is a television programme on the topic too, but I have not had the pleasure of seeing it.) I suggest that the book will be of signal importance if the story that it tells is true. At last we may be able to tell what is fact and what is fiction about 'Diluvialism'.

I do hope Selbrede, and Brown will read this book. It could do them the world of good, and just possibly might destabilise their protopostulates. But probably not. You can rarely argue someone out of a position that they were not argued into in the first place.

David Oldroyd, Sydney*

* This review will appear later in somewhat extended form in *Metascience*. It is published here by permission of the Editor of that journal. It may be mentioned, incidentally, that INHIGEO Member Celâl Sengör gave considerable assistance to the American authors' work while they were in Turkey, and that the issues canvassed in their book would have formed an important part of our discussions had we been able to hold a meeting in Turkey in 2001. Reading this book has persuaded me all the more that INHIGEO should one day hold a meeting in that country.

A Synthesis of the History of Geology in Germany

Wagenbreth, Otfried, *Geschichte der Geologie in Deutschland*, Enke im Otto Thieme-Verlag, Stuttgart, 1999. 123 pp. DEM 128, ATS 934, CHF 114, EUR 67.88.

The writing of the history of a scientific discipline—even if territorially limited—can only be carried out by someone on the basis of sound knowledge and decades of research. Undoubtedly, the publishing company found in Otfried Wagenbreth an author capable of summarising German geoscientific knowledge historically. The task has been admirably managed, with a whole host of illustrations and explanatory tables, within what is—for such a large topic as the history of geology in Germany—a relatively limited scope.

In territorial respect, Wagenbreth does not restrict himself to present-day Germany, but deals with the historical development of geosciences at those universities and institutions which once belonged to Germany.

The book consists of ten sections, Parts One to Six being of scientific/historic importance.

In the first section, the author deals with the theoretical aspects of the development of geology, which he properly regards as part of scientific history. He traces the development of geology as a science independent from the mineralogy of the 16th century. It is surprising that Wagenbreth attaches rather little importance to mining as a starting point. Peripherally, he refers to the importance of the Saxon mining to the development of geology. The surprise increases when one recalls where Wagenbreth lived and suffered for decades. In the GDR era, the 'development of geology' from the 'productive forces', coloured with a little ideological bias, was given the greatest importance. The parallel development of various sources (practical mining experience, 'miracle chambers' of royal houses and monasteries, philosophical directions, knowledge about stones, minerals, ores from 'herb books') and the gradual interconnection between them is hardly dealt with by Wagenbreth.

In the second section, Wagenbreth describes the early history of German geology, which at least during Antiquity and the early Middle Ages was concentrated south of the Alps. Only in the 15th and 16th centuries did German authors appear who also dealt with geological objects and phenomena in greater detail (Agricola, Gesner, etc.). Wagenbreth does not make any comments on the description of the benefits of rocks, minerals, etc., as for example one finds in the herb book by Hildegard von Bingen (1098–1198). Considerable improvements towards geoscientific realisations were achieved during the 17th and 18th centuries, especially in during the Enlightenment. This development was possible due to the fading influence of the Church (or declining 'theological dictate', as Martin Gruntau has put it). Theories about the formation of mountains, stratigraphy, and the nature of fossils could be discussed and published more freely, though numerous errors and ideas now regarded as erroneous persistently slipped in due to lack of knowledge concerning geological objects.

In the third section, Wagenbreth attends to the establishment of geology as a modern scientific discipline. He devotes himself in great detail to the life's work and activities of Abraham Gottlob Werner (1749–1817), who held the first chair of geology in Freiberg/Saxony, and first made geology a 'teachable' subject. The ferocious dispute about neptunism versus plutonism—carried on in Germany and elsewhere—helped geology gain independence as a scientific discipline. Werner's methods and theories were influential for a generation. But his disciples (for example Leopold von Buch) soon proved his teaching to be wrong, on the basis of the application of his methods outside Saxony, and his ideas were abandoned in the 19th century.

The fourth section deals with geology as a classical science in Germany. Institutes, university professors, scientific societies, and scientific journals are discussed in this extended chapter. Also the work of the great Austrian geologist Eduard Suess (1831–1914), who realised the importance of mountain chains and the continents, is discussed. His coining of terms like Tethys proved both revolutionary and pioneering for the development of geology.

The fifth section is dedicated to geology in 20th-century Germany. Wagenbreth sees a change in geological thinking about 1900 and draws comparisons with the development of physics at that time. The 'forcing of a way into smallest and greatest dimensions, as well as tendencies to integration' can also be recognised in geology. The possibility of using new methods within the geosciences (electron microscopy, geophysics, geochemistry, drilling technology, remote sensing etc.) has led to new and profound knowledge, resulting in a change in the global geologic conception of the world. Austrian geologists or rather geoscientists (Leopold Kober, Otto Ampferer, Othenio Abel, Bruno Sander, Robert Schwinner, Josef Stini, among others), or geologists who worked in Austria (for example Alfred Wegener), are appropriately mentioned here too, because their discoveries were decisive not just for German-speaking countries. Different theories and views of *Gebirgsbildung*, ranging from contraction theory (Eduard Suess) to plate-tectonics, are shown in time-lapse charts and depictions. But Wagenbreth leaves explanations of the findings on the alpine theory of cover-tectonics to Austrian geologists, who after Alexander Tollmann (1893) had begun their triumphal march, following the International Geological Congress of Vienna in 1903. Further in this main section, Wagenbreth includes institutes, people, and special disciplines, some of which have only recently been added to the geosciences. There were new impulses regarding the research of the Quaternary research and applied geology. Drilling technology, applied geophysical methods, and remote sensing resulted in deeper insights into the earth crust.

Wagenbreth does not mention German geoscientists' activities with great international projects (IGCP), geological missionaries of (Western) Germany all around the world (for example in Tanzania, Jordan, Argentina, Thailand, etc.) or the co-operation of (GDR) Germany with former countries of the COMECON. Soil science from the geological and scientific historical points of view is omitted completely, though the German regional authorities deal with the soil mapping intensively.

Final observations: a bibliography, organised according to the five main sections, references to pictures (the *Geologische Bundesanstalt* = Geological Survey of Austria also made a contribution), a register of persons with vital statistics (it includes some Austrian geoscientists), and an index conclude the volume.

Although the content of the book is necessarily limited—the publishing company evidently insisted that the content be brief as well as clear—it nevertheless makes possible a rapid and lucid lead-in to the historical development of geology as well as related sciences in Germany and areas such as Austria and the Alps. Anyone intending to study one of the natural sciences, or who is simply interested in them, should consult Wagenbreth's book regarding geology or related disciplines. Without knowledge of the historical development of one of the disciplines of the natural sciences one really cannot be in a position to understand the state of research development and its problems. If one wanted to delve deeper into this area of the history of science one would, of course, be obliged to consult one of the many detailed books available in the literature, some of which could also be from the pen of Otfried Wagenbreth.

One thing which really must be criticised is the very high price (presumably due to the limited print-run) of the relatively slim volume, which will surely limit the legitimate wide distribution of the book. Students will hardly be able to afford such a book.

Tillfried Cernajsek, Vienna

Why Did American Geologists Reject Drift Theory for so Long?

Naomi Oreskes, *The Rejection of Continental Drift: Theory and Method in American Earth Science*, Oxford University Press, New York, 1999, 432 pp. HB \$US 55.00; PB \$US 29.95.

From the early 1970s, geologists, historians, and philosophers have given numerous and sometimes conflicting accounts of the modern revolution in the Earth sciences associated with plate tectonics. Why had American geoscientists, compared with their counterparts elsewhere, been so contemptuous of the earlier theories of continental drift and mantle convection and the large body of evidence assembled in support of these ideas? Why did they reject those theories, yet rapidly accept the new global tectonics in the late 1960s and early 1970s? Is this change to be explained in terms of new empirical data, new theoretical frameworks, different methodological preferences or, perhaps, sociological factors? Many of the general interpretations that have been offered have a certain plausibility. However, they usually are based on published material and participants' recollections. To these may be joined some narrower, detailed studies of particular events or issues.

Naomi Oreskes, trained as both a geologist and historian, provides a signal contribution, based on extensive research and archival resources, to our historical understanding of the initial American rejection of mobilism. Her fine-grained analysis of the scientific culture, values and ideas of the American geological leadership shows how they shaped their response to the mobilist case put by Wegener, du Toit, Daly, Holmes, and others. Some of her conclusions provide new insights; many, though suggested by others, are persuasively nuanced, elaborated in greater detail, and well-supported.

Several writers, including myself, have argued that part of the negative reaction to Wegener was due to his methodology. He followed an avowedly hypothetico-deductive approach, then frequently employed in Europe, which clashed with the American orthodoxy of careful collection of data, based upon fieldwork followed by inductive generalisations. Oreskes delineates these matters with great care. She notes that the practical aspects of scientific work generally were valued in rhetoric and practice in America but that theorising *per se* was not disdained. However, Americans were deeply suspicious of the 'ruling theory'—that is, the belief that a particular theory was true and that counter-evidence should be ignored or explained away. Similarly, there was a suspicion of authority. Oreskes explicates G.K. Gilbert and T.C. Chamberlin's method of multiple working hypothesis as an 'anti-authoritarian logic of discovery'. The method, then widely praised and sometimes followed in America, is pluralistic and egalitarian with respect to contending hypotheses and helps the geologist avoid the dangers of theory-directed science. Wegener had initially presented Drift as a hypothesis, but, by the time of the famous 1926 AAPG symposium, he claimed it to be true. In this context it is more understandable than previously why most of the American participants in the symposium were so scathing in their denunciations of Wegener and, therefore, Drift.

Although Oreskes focuses primarily upon the American community, she illuminates other aspects of the debates over Drift. She nicely traces the negotiations with the Carnegie Institution concerning Alexander du Toit's expedition to compare South African with African geology and palaeontology and the necessary fiction that this was to gather data rather than to test Drift. More tellingly, she suggests that the masses of data collected then and later by du Toit and others, which they argued pointed in favour of Drift, was discounted by many Americans for several reasons. First, a double standard was applied: anyone who advanced an argument for global mobilism in terms of such evidence was clearly partisan and therefore in violation of American methodological canons, even though Americans who put forward evidence of stabilism were not so censured. Second, such evidence was qualitative, circumstantial, and therefore ambiguous. How could such evidence be depersonalised; how could the reports of the observer be distinguished from the observation?

One of Oreskes' most compelling insights is the way in which the concept of isostasy figured in the American response. Isostasy, according to which the Earth's crust floats in the substratum, was a key element of Wegener's case for Drift. It implied, in accord with the view of most American geologists of the time, that the continents were permanent features of the Earth's surface, contra the idea favoured in Europe that continents were transient features that could emerge or disappear. However, in contrast with the American permanentists, Wegener argued that if the continents were floating in isostatic equilibrium then it was possible for them to move laterally through some mechanism. A mechanism suggested by several, adopted by Wegener, and further developed by others was that convection currents in the mantle could drag the continents with them. As Oreskes documents, Americans were among the most enthusiastic supporters of isostasy, yet this only fuelled their resistance to Drift. There were two rival versions of isostasy. One, developed by George Biddell Airy,

postulated that the crust was of relatively uniform density and that therefore, if mountain ranges were in isostatic equilibrium, they must resemble icebergs with deep roots extending into the mantle; and the higher the mountains, the deeper the roots. The alternative, put forward by J.H. Pratt, was that the crust varied in density. Mountains were simply less dense than the pieces of crust surrounding them and did not sink as deep. 'Compensation' was reached at a common depth. In 1904 J.F. Hayford of the U.S. Geological Survey undertook the 'big science' project of reducing measurements of deviation from the vertical made at 507 stations over North America. His first attempts were frustrating. But he reached the conclusion that the deflections caused by nearby topographical features were best accounted for in terms of Pratt's view. With this simplifying assumption, the calculations proved to be far simpler and to yield more consistent results. As Oreskes shows, what soon was termed 'Pratt-Hayford Isostasy' was hailed as one of the outstanding scientific achievements of the time and, moreover, an American achievement. Hayford's successor, William Bowie, accepted the model and developed an implication: the crust was weak and could not transmit lateral stress over any distance. How does this relate to Drift? Some of those who proposed convection currents in the mantle as a motor for Drift presented it in terms of the drag on the deep roots of continental elevations, thus supposing Airy-type isostasy and thereby challenging an iconic achievement of American science. Moreover, if the crust were weak as Bowie had deduced from the Pratt-Hayford model, currents strong enough to move the continents would be strong enough to break them into fragments!

The above three examples illustrate the richness of the interpretations and documentation which Oreskes presents. There are shortcomings, of course. Though some developments in seismology are included, rather more on the work of Gutenberg and others would be welcome. The last portion of the book, which carries us rapidly from the 1930s through to plate tectonics is suggestive but sketchy. However, that is not the author's focus and perhaps will be the subject of a further book. What the reader will have in hand is a well-produced, well-illustrated, highly readable and insightful account of the importance of theory and method in the American rejection of continental drift.

Homer Le Grand, Melbourne

Virtual Reality in Edinburgh: The 'Dynamic Earth' Exhibition

Time is the key to this exhibition—times past, the duration of present processes, and projections for the future.

Time, especially geological time, is a most difficult concept to explain, even more so to illustrate and to understand. The tour of the exhibition starts with an attempt to do this. Taken down one floor, we are presented with many illustrations showing a succession of events, in an effort to illustrate time passing. Unfortunately there is little time (excuse the pun) to absorb this before we are conducted on our journey to explore the dynamic earth. Our understanding is triggered from the start of this journey with the ride in the lift (elevator) further down in the building, to the main galleries, as we go back through historic time into geological time and beyond that to the beginning of the Universe.

Having gone back as far as we can go, the tour starts by the visitor being taken through three dramatic galleries. It is very hard to put these galleries into an order of excellence. Each in its own way is superb. The room explaining the Big Bang uses light effectively to simulate the popular, current theory of the beginning of the Universe. Here real beauty is the overwhelming impression, with galaxies, stars, planets, black holes and red dwarfs hurtling in front of us in almost hypnotic paths. I could have watched this over and over again. But suddenly, as we pass through the asteroid belt, we are jolted from such contemplation with the sensation of multiple impacts, as we move through our own solar system. There was so much to absorb here that all the people present seemed reluctant to obey the summons to move on.

The next gallery is probably the most dramatic one, as we journey to the centre of the earth; Jules Verne has nothing on the graphic artist and geologist of today! All this gallery lacks is the smell of sulphur. All else is reminiscent of Etna, Solfatara, and Vulcano, with some spectacular additions. The earth shakes, the lava glows, the earth roars; and again most onlookers wished for more.

We move on, to what could be, in prospect, somewhat anticlimactic. We are looking at the processes that sculpture the earth's surface. In fact, however, for me this eagle's-eye view—down glaciers, down rivers to sea, travelling in swooping speed across the earth's surface—was probably the most successful and enjoyable gallery of all. We all were flying. We soared. Almost we were at one with the earth, rather than just observing it, or fearing it. We were part of our own experiences. This I could have watched over and over again. But these expositions were all too short. Too much happened, too quickly, and too noisily. We couldn't take it all in. There was too much visual bombardment. I ask myself: was I trying to absorb too much? But I fear that it was a case of information overload. For the lay-person so much would be lost, the senses numbed; and unfortunately little or no explanation was given. We were hustled through far too quickly. We could go round again I suppose, but there would still be the same hustle and overwhelming visual impact. It was a wonderful opportunity lost.

To move into the more free and open galleries was quite a relief. Here we were not conducted through but could travel at our own pace. The evolution of life followed. The display of the 'primordial soup' was a very good and dramatic beginning. The models were numerous, varied and good. It reminded me of a geological sculpture park (shades of the Crystal Palace dinosaurs of Victorian London), with various 'quiz boards' to test the understanding of the onlookers. The vertebrates seemed to dominate here. The long period of invertebrate occupation of the earth was not nearly as noticeable. Even when the vertebrates were featured, the comparison with the BBC's current series 'Walking with Dinosaurs', was unfortunate. These were two different ways of showing past life, two very different media were used, but I wouldn't be the only person, judging by the TV ratings, who had watched the Dinosaur series, read the book, and bought the video, who would see this part of the exhibition and feel somewhat disappointed.

The chronological order and evolutionary links in the section of 'Casualties and Survivors', was not altogether clear and I felt that those with limited knowledge of the earth sciences would find this section somewhat obscure. However,

judging by the time that most people seemed to spend in this section, the 'appeal of the extinct' is as strong as ever, and people were making the effort to understand, judging by comments overheard. But where were the fossils? Where were the rocks? Models, photographs, computer generated graphics and quizzes were there in sometimes stunning abundance, but they are no substitute for the real thing. Virtual reality should be a means, not an end. The real thing cannot be surpassed. If all this stimulated people to go along to the Royal Museum of Scotland to look at the Earth Science exhibits there, then fine. The 'Dynamic Earth' exhibition will have achieved one of its aims. But the only rocks, fossils, and minerals available to examine or touch were . . . in the shop!

In my opinion, the least successful part of the exhibition then followed, dealing with the Oceans and Polar regions. This large topic was dealt with from a wider point of view and seemed to lack immediate focus because of this. There were so many stills, so many enlarged photographs of wonderful subjects, which lacked sharp definition. The calving of the glaciers was probably the best item here, but for drama and verisimilitude the oceanic section as a whole was the better of the two. The use of long, waving drapes was a clever if stylised visual feature, which suggested waves and underwater movement well and was in good contrast to what had gone before. So one took notice. But for both these galleries and for the Tropical Rain Forest (which did rain), I felt that David Attenborough's or some other broadcaster's voice-over was needed to enable us to have a calm explanation presented to us. Indeed the many excellent nature programmes on TV have set quality standards which a semi-static exhibit must find hard to reach, and an impact that is hard to match.

Finally, the room illustrating disasters and problems was reached. This was a circular room with all-round ceiling projection showing the worst that can happen to the earth. It was spectacular and put over the message for the future very well indeed. But by this time a feeling of satiation and deafness was uppermost. My abiding sensations were of numb eardrums and, surprisingly, very comfortable feet.

So that this account is not too negative I feel I must mention those features that helped me on my journey through the exhibition. The flooring, cushioned and quiet is a model of what an exhibition floor should be. All the domestic features, car park, lifts, the 'Food Chain' (i.e. restaurant) are good. Access for all is excellent, even for mothers with toddlers and older children, and for those in wheel chairs. The view through the plate-glass windows on the south side of the classic exposures of Salisbury Crag is the perfect backdrop to an exhibition about the earth in Edinburgh. It was a pity that there was *no* explanation and account of the significance of the rocks around us. Surprisingly, Hutton, who in Edinburgh, triggered all this earth science, and who was so aware of the dynamic nature of the earth, was mentioned only once. In the entrance to the exhibition the quotation, so often—but doubtfully—attributed to him that the 'present is the key to the past', was printed along with others, on the wall.

It is easy to travel to the 'Dynamic Earth' exhibition site on the south side of Edinburgh at the moment. I came in from the west and found it well signposted. How this will be when the new Scottish Parliament building is completed, I shudder to think. Was it worth the two-hundred mile round trip to see it? For me, as an earth scientist I feel the jury is still out on this question. I am glad that I have seen it, though I don't think I shall need to see it again. I would rather repeat visits to the Royal Museum of Scotland, up the way. For the non-earth scientist of any age it is spectacular, good entertainment, stimulating, maybe even thought-provoking. Children do enjoy it. The number of visitors is considerable, in fact exceeding expectations. But how many, I ask, will be tempted to go further and move from the virtual reality of the exhibition to looking at the real rocks and fossils outside—to look at our *real* dynamic earth?

Beryl Ambrose Hamilton, New Galloway, Scotland

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NOTES AND QUERIES

A New Journal for the History of Geo- and Cosmical Physics

From the beginning of 2000, the 'Mitteilungen of the Working Group for the History of Geophysics' will be published annually in 1 or 2 issues under the title *Journal for the History of Geo- and Cosmical Physics*. The journal will contain papers from all the geophysical disciplines, including the histories of meteorology, physics, and space physics, and topics in the history and philosophy of geophysics. Volume 1 will deal with 'Methods and Problems in the History and Philosophy of the Geosciences', with G. Gregori, H. Hörz, W. Schröder, H.-J. Treder, and K.-H. Wiedekehr as authors. Price: \$US 50.00 p.a.. For subscriptions and further information, please contact the scientific editor: Dr Wilfried Schröder, Hechelstrasse 8, D-28777 Bremen-Roennebeck, Germany.

New Publication

Long and Short Term Variability in Sun's History and Global Change, 363 pp., 2000. \$US20.00

Authors: M.E. McIntyre, G.P. Gregori, H. Moritz, R. Sneyers, E. Hanna, V. Bucha, M. Kurgensky, T. Nanni, A. Erelund, L. Paterno, G. Noci, K. O'Brien, and others.

Contents: Lectures from the IAGA Session GA 6.01, dealing with the history of solar neutrinos—Recent results concerning extended solar corona; Early auroral data from Scandinavia; Ertele potential vorticity as a climate variable; Several papers on the relations between solar and geomagnetic activity and weather/climate; Solar activity in the 16th, 17th and 18th centuries; The Earth's middle atmosphere and the Sun's interior, *etc.* To order, please contact: Dr Wilfried Schröder, Hechelstrasse 8, D-28777 Bremen-Roennebeck, Germany.

Comments from Gordon Craig, Edinburgh

Professor Gordon Craig has written in relation to the remarks I made in my review of his co-edited volume, *James Hutton—Present and Future*, in *Newsletter* No. 31. In the review, I commented on the fact that writers on the Scottish Enlightenment often seem to forget about the deplorable working conditions for miners, *etc.* I also questioned whether the architecture for the new 'Dynamic Earth Centre' (see p. 45) was compatible with that of eastern Edinburgh, below Salisbury Crag. I quote from Gordon's letter:

[Regarding] underground conditions in the 18th C. The Scottish Mining Museum is nearby. The city bypass construction uncovered some of the dreadful adits in mines at Gilmerton, less than a mile away, where children and women had to work 10–14 hours per day, bringing coal to the surface. John Clerk of Eldin who owned some of these mines is buried in the Lasswade churchyard and his house still stands on the other side of the valley. Writers on the Enlightenment too often neglect the dreadful conditions of the mass of the working people on whom their mansions, mines and farms depended. T.C. Smout says it all beautifully in his books on the *Economic History of the Scottish People*.

The Dynamic Earth is actually inside a baronial-style, castellated-wall, brewery store, built in the 1860s from land bought from Dr Fletcher of Saltoun—a descendant of the great Scottish Patriot, Andrew Fletcher of Saltoun. The [new 'sail-style'] roof keeps the water out! The building with its pavilion was a great vantage point for Queen Victoria's Volunteer Force reviews. Spectators on Salisbury Crags had a panoramic backcloth of Holyrood Palace and William Younger's breweries as they looked over the assembled troops. [Those] with tickets could look out from the comfort of the brewery ramparts!

David Oldroyd

A Spanish Museum for the History of Mining and Industry

Spanish Member, Dr Luis Adaro, has sent us pamphlets concerning his excellent museum of mining and industry at Le Entrego near Oviedo: 'Mina San Vicente'. Members travelling in that part of the world would surely find it an interesting place to visit. We suggest that such persons contact Dr Adaro (see Membership list for details).

Origin of the Term 'Lag-Fault'

I am currently working on a history of geological research in the Lake District, UK. The Cambridge/Cumbrian geologist John Marr (1900) supposed (erroneously, this whiggish historian believes) that there were two 'lag-faults' and a compensating thrust-fault in the Lakes, thus accounting for some of the main structural features of the region. Does anyone know whether Marr was the first to introduce the concept of 'lag-fault', and the name? I rather think he was. Any relevant information on this point would be most gratefully received.

David Oldroyd

Geological Publications from North Korea

We were a little surprised, but pleased, to receive notice of recent publications in English concerning the geology of North Korea. They are mostly picture books, but one entitled *Korean Geology*, issued by the Geological Institute of the Academy of Sciences of the The Democratic People's Republic of Korea may be of interest to readers (632 pp., US\$100). Geological

and tectonic maps of Korea are also available (1:1,000,000) at \$80 and \$220 respectively. For further information, contact 'Kyong', The Korean Publications Exchange Association, P.O. Box 222 60, Pyongyang, DPR of Korea. Possibly items may be obtained by barter?

New Web Sites from France

Member Lydie Touret has written:

Concerning our museum, we have just finished a CD rom on the history of mineralogy through mineralogical museums in Europe, which will be available for the public at the end of the year; for the time being you can have a look at it on

<<http://cri.ensmp.fr/euromin/>>.

Gaston Godard (nominated INHIGEO Member in this year's ballot) has informed us that COFRHIGEO has established a new web site, entitled COFRHIGÉORAMA, with him as *webmestre*. It has French and English versions, and visitations are recommended:

<<http://www.cri.ensmp.fr/cofrigeo/fr.htm>>

<<http://www.cri.ensmp.fr/cofrigeo/en.htm>>

A Portuguese/Brazilian Data-Base

LUSODAT is a database on history of science, medicine and technology in Portugal and Brazil from the Renaissance to 1900 that includes references to mineralogy, geology, metallurgy, mining, etc. Home-page: <<http://www.ifi.unicamp.br/~ghc/lusodat.htm>>. E-mail: <rmartins@ifi.unicamp.br>

A New Journal on the History of the Petroleum Industry

The Drake Well Foundation is publishing a new journal, *Oil Industry History*, with Professor G.M. Friedman as editor. For further information, please contact him at: Northeastern Science Foundation, Inc., P.O. Box 746, 15 Third Street, Troy, NY 12181, USA (<gmfriedman@juno.com>).

Who Drew the First Coloured Geological Map?

In my book, *Thinking About the Earth* (1996), I erroneously referred to the work of the Freiberg 'geologists'/mining engineers, F.G. Gläser (1774/5) and J.F.W. von T. Charpentier (1778) as being the first to have produce coloured geological maps. But Anke, the widow of our sadly deceased colleague, Dr Peter Schmidt, who was so sorely missed at the Werner Symposium in Freiberg in 1999, has written to me (3 Nov., 1999) drawing my attention to a publication by her late husband ('Mitteilung über die Entdeckung der ersten flächenkolorierten Karte sächsischer und angrenzender Gebiete (1768)', *Zeitschrift für geologische Wissenschaften*, 1985, 13, 249-254), which discusses a manuscript map from A.G. Werner's library of what is now southeast Saxony/southwest Poland, drawn by Christian Hieronymus Lommer (1741-1787), mining inspector and teacher of mining at Freiberg, as a result of a journey he made from Freiberg in May-June 1768. The map is reproduced below (in miniature and without colour) from a copy kindly sent to me by Frau Schmidt. It refers to the region near where Werner was born, and which participants in the Werner Symposium were able to visit in September 1999 (see p. 12). Does any reader know of any earlier coloured 'geological' (lithological) map(s)? If so, we should be pleased to hear from them.

David Oldroyd

ÉLOGES

François Ellenberger (1915-2000)

François Ellenberger nous a quittés ce 11 janvier 2000. Né le 5 Mai 1915, en Rhodésie du nord (actuelle Zambie), où son père est missionnaire, il y passe les douze premières années de sa vie. Rentré en France, il entame de brillantes études qui le conduisent à l'École Normale supérieure. Après cinq années de captivité pendant la guerre, il commence sa thèse en Vanoise. Successivement professeur en Sorbonne puis à Orsay, il prend sa retraite en 1984.

Ses confrères géologues diront combien son œuvre fut riche. Sa thèse, notamment, lui permit de montrer qu'une ride géantoclinale pouvait se métamorphiser, ce qui contredisait le dogme, encore commun dans les années 50, du métamorphisme géosynclinal. Mais l'auteur de ces lignes ne se sent pas compétent pour traiter de ses recherches scientifiques. Il laissera sur ce point la parole à l'un des amis de François Ellenberger, lui aussi géologue réputé, Michel Durand-Delga, professeur honoraire à l'Université de Toulouse, qui, dans un hommage rendu en 1995, à l'occasion des 80 ans du fondateur du COFRHIGEO, présentait ainsi son travail de thèse:

La solide formation pétrographique reçue à l'École Normale Supérieure puis développée en captivité amène Ellenberger à s'attaquer, dans les Alpes françaises, à un sujet difficile, encore presque vierge: la Vanoise. Il souhaite étudier le front externe, occidental, du métamorphisme alpin. . . . Rapidement il s'aperçoit que la stratigraphie, presque inconnue, de ces formations plus ou moins transformées et très tectonisées est une clé indispensable. . . . Soucieux d'obtenir de bonnes préparations, il est conduit à tailler de ses mains les roches qu'il veut dater ou étudier. . . . Il arrive ainsi à découvrir toute une série de niveaux insoupçonnés, du Dogger—découvert en 1948, c'est l'illumination!—au Paléocène. . . . Son mémoire. . . . signe le renouveau de la pensée française sur les Alpes après la Seconde Guerre mondiale: une époque d'or où voisinent cordialement Jean Fabre, Marcel Lemoine, d'autres encore. . . . Le mémoire de thèse d'Ellenberger sera imprimé dans les mémoires du Service de la Carte géologique. C'est un véritable monument, dont la plupart des données de base et bien des interprétations demeurent. Le 13 juin 1960, le prix Viquesnel de la Société géologique lui est attribué.*

Ses travaux postérieurs porteront notamment sur la Montagne Noire où il se découvre un intérêt pour les vieux socles, qui le conduit à encadrer pendant huit ans un groupe Socle et Calédonides en Scandinavie. Cette "période norvégienne", conclut Durand-Delga, "couronne la carrière de géologue de terrain de François Ellenberger".

Nous n'en dirons pas plus de l'œuvre géologique de notre ami car, pour l'INHIGEO, le professeur Ellenberger est avant tout l'auteur d'importants travaux d'histoire de la géologie, et tout particulièrement des deux volumes de son *Histoire de la géologie* (1988, 1994).

En fait, la facette scientifique et la facette historique de son œuvre interfèrent largement. L'introduction historique de sa thèse est particulièrement développée, et l'on sent qu'il l'a écrite avec plaisir. Il en va de même pour sa leçon inaugurale, dans la chaire de géologie structurale, en 1962. Ou dans l'article sur la Vanoise, un géantoclinale métamorphique, en 1963 (in Durand-Delga, dir., *Livre à la mémoire du professeur Paul Fallot*). Mais c'est à partir des années 1970 qu'il commence à publier régulièrement sur l'histoire de la géologie. Etudiant la thèse de médecine de James Hutton sur la circulation du sang, il y trouve l'origine de ses idées sur le cycle. En remontant de Hutton à Louis Bourguet, source possible des thèmes huttoniens, il exhume l'œuvre géologique d'Henri Gautier (1660-1737), ingénieur languedocien qui expose des vues pénétrantes sur le cycle tectonique et les raccourcissements de la croûte. Travail mémorable qu'aucun historien de la géologie ne peut plus ignorer.

Déjà membre de l'INHIGEO, il décide en 1976 de créer un Comité français d'histoire de la géologie, qui sera la section française de la commission internationale. Le 15 juin, le Comité est constitué, et François Ellenberger en devient tout naturellement le président. Il le restera vingt ans. Son énergie, et l'aide que lui apporte Jean Gaudant, élu secrétaire, font que le comité prospère rapidement. Quand il décide de se retirer, il est élu président d'honneur. Et jusqu'à sa mort il continuera aussi souvent que sa santé le permettra de suivre nos réunions trimestrielles.

En 1984, quand est décerné pour la première fois le prix Wegmann, destiné, selon une clause testamentaire de l'illustre géologue de Neuchâtel, à récompenser une œuvre d'histoire de la géologie, c'est évidemment vers lui que se tourne la commission des prix de la Société géologique de France.

Enfin, tout au long de ces années il met de l'ordre dans les fiches qu'il accumule depuis toujours, au fil de ses lectures d'ouvrages anciens. Et il commence à rédiger son *Histoire de la géologie*. Le premier volume paraît en 1988. Il couvre l'Antiquité, le Moyen Âge, la Renaissance, et les temps modernes jusqu'à Sténon. Le second volume était prévu pour l'année suivante. C'était ne pas évaluer l'information qu'il avait sous la main, et qu'il ne parvenait pas à réduire aux dimensions exigées par l'éditeur. Le tome deux ne paraîtra qu'en 1994. Il s'arrête à la "révolution créatrice" des années 1788-1825 qui dote la géologie d'une doctrine et d'un programme de recherche. Probablement, eût-il fallu poursuivre le travail sur le XIXe siècle. Il n'en eut pas le courage, et on le comprend. Au seuil de ses quatre-vingts ans il aspirait à se consacrer à des travaux plus personnels, notamment sur le temps de sa captivité en Autriche (actuelle).

Ce qui est sûr, c'est qu'il nous laisse un travail considérable. Certes, il n'est pas le premier à écrire une histoire de la géologie, quoique la concurrence des philosophes et des historiens de formation, forte dans le domaine des sciences biologiques, soit chez nous à peu près nulle. Ce n'est pourtant pas que notre discipline manque de particularités. Sa dimension historique, la difficulté d'appréhender l'immensité du temps géologique auraient pu tenter certains philosophes

* Durand-Delga, M., 'Du marteau à la plume: l'itinéraire scientifique de François Ellenberger', in: Gohau, G. (ed.), *Hommage à François Ellenberger fondateur du COFRHIGEO*, Geological Society of France, Paris, 1997.

des sciences. Cela n'a pas été le cas. En revanche, nous disposons de travaux réputés de géologues, essentiellement de langue anglaise, ayant abordé l'histoire de leur science.

Mais personne ne semble avoir eu l'idée de tirer tout le bénéfice de sa formation de géologue de terrain pour essayer de retrouver les sites visités par nos prédécesseurs. A cet égard, il avait montré, en organisant une excursion historique lors du Congrès géologique international de 1980 comment on pouvait se faire contemporain de nos aînés. En neuf jours, 'Aux sources de la géologie française' il avait promené les congressistes le long d'un axe Paris-Auvergne-Marseille sur les traces de Pasumot, Guettard, Gautier, bien sûr, de Sauvages, et l'abbé Soulavie.

A ce souci de revoir ce qu'ont vu les anciens, il ajoute, dans son ouvrage, un scrupule que lui dicte l'honnêteté scientifique: retourner aux textes eux-mêmes. Ne jamais croire les commentateurs, même les plus sincères et les plus sérieux. Cela nous vaut des mises au point inédites, notamment à propos de Straton, qu'on ne connaît habituellement qu'à travers le commentaire qu'en fait Strabon, mais l'exemple peut être répété. Qui a lu Sténon, après avoir fait l'effort de traduire le *Prodromus* en français, comme il l'a fait? Qui a pénétré la pensée de ce grand novateur en reconstituant la logique de son ouvrage? Qui a reconstruit son cristal de quartz à partir de la figure développée qu'il en donne?

Un travail de cette qualité ne peut que susciter l'admiration. Le lecteur moyen des deux volumes de l'*Histoire de la géologie* n'a pas forcément conscience de la précision de l'information qui lui est donnée. Mais celle-ci est d'abord destinée aux spécialistes qui, eux, ne s'y trompent pas. Ils savent puiser dans cette extraordinaire documentation des renseignements de première main. C'est pourquoi on peut être assuré que l'ouvrage est destiné à demeurer longtemps dans les bibliothèques des historiens de la géologie, ou plutôt sur leur bureau, à portée immédiate de main. Maintenant traduit en langue anglaise, cet ouvrage perpétuera le nom de François Ellenberger chez les historiens de la géologie du monde entier.

Gabriel Gohau: Président du COFRHIGEO

Dr Gabriel Dengo (1922-1999)

Dr Gabriel Dengo passed away in August, 1999. He had been one of the most outstanding geoscientists of Central America, in every sense of the these words.

Dengo was born in San José, Costa Rica, in 1922. He graduated as an agronomy engineer from the School of Agriculture (Agronomy) in San José but always displayed a clear inclination towards geological sciences. He subsequently moved to the United States, where he studied geology, obtaining a BSc, two MScs, and a PhD. His doctorate was undertaken at Princeton under Harry Hess.

Shortly after completing his PhD, Dengo was involved in regional studies in Central America, and particularly in Costa Rica. His career was dedicated to oil exploration, mineral surveying, and geological assessment for hydroelectrical projects. His *Geology of the Province of Guanacaste, Costa Rica* (1962) is regarded as a seminal work. It covered the Nicoya Peninsula, which contains the Nicoya ophiolite complex, cropping out extensively. Dengo's map and stratigraphic chart have both been invaluable for later studies of the ophiolite, which is still the subject of controversy.

During the sixties, Dr Dengo also published a geological synthesis of Central America, pointing out the differences in history and origin of its northern and southern blocks. In the following decade he co-authored the metallogenic map of Central America (1972). From the seventies, Dengo established his headquarters in Guatemala, at the 'Central American Institute of Industrial Technology Research' (ICAIT), in the publication series of which he was consistent contributor.

Dengo also dedicated long hours to the study of the history of geology, collecting rare or almost entirely lost materials relating to the development of this science in Central America. In recognition of this work, he was elected a Member of the Guatemalan Academy of Geography and History. His best known publication in this field appeared in the volumes of the Centennial of the GSA. He became an INHIGEO Member in the nineties.

Dr Gabriel Dengo received many awards from many sources. He obtained and fully deserved a profound respect from all his colleagues. That is why we so deeply regret his physical passing; but his valuable contributions to geology will never disappear.

Gerardo Soto, Costa Rica/Japan

John Christopher Thackray (1948-1999)

None of us knew quite what to expect. It was the evening of 2 September, 1975. We were attending the symposium held in commemoration of the centenary of the death of Charles Lyell and were seated in the theatre of the Royal Institution in London's Albemarle Street. Our programme contained the enigmatic entry 'A lecture by "Professor Charles Lyell"'. We fell silent. It was a moment of some drama. From the rostrum the chairman spoke with measured words: 'Ladies and gentlemen—Sir Charles Lyell'. From the Lecturer's Room there stepped a slim, black-gowned figure. The figure bowed and the discourse commenced. For the next half-hour we listened to a brilliantly delivered reprise of parts of two lectures which had been discovered among the papers of the real Lyell. One of them was a lecture which he had delivered in that very lecture theatre on 2 May, 1833.

The role of "Sir Charles" was filled for us by John Thackray. He was the Honorary Secretary of the Symposium, and it was the first occasion that a body of scholars from around the world had the opportunity of meeting this young man who was to become a pivotal British figure within the ambit of the history of science.

In the afternoon of 11 May, 1999 some 400 of John's family and friends gathered in the church of St Michael, Chiswick, his local church. The day was warm, and the congregation was bathed in kaleidoscopic sunlight filtered through stained glass. But this was a sad occasion. We were assembled to say our farewell to John. He had left us, a victim of

cancer, on 6 May, 1999. The end came to him painlessly and peacefully. He died at home in the supportive company of Sue, his wife, Jen, their daughter, and Chris, their son.

The news of John's death had already been carried around the world. Some 400 of us may have congregated in St Michael's, but John was being remembered by friends spread across several continents. Not a few of them must have cherished memories of John's memorable presentation that evening during Lyell '75.

John was a Londoner. He was born in the Middlesex Hospital on 17 April, 1948. His parents were Alan Christopher Thackray, later Professor of Morbid Anatomy at the Middlesex Hospital Medical School, and Gladwys (Gill) Thackray (née Acheson). He attended Highgate School where, under the headmaster Alfred Doulton there was maintained a strong musical tradition and as a schoolboy John himself was profoundly influenced by encounters with the musical muses, both in the choir at Highgate School, and while seated at the organ in his parish church, St Michael's. Music was to remain one of the passions of his life.

Another interest manifested itself early. Both at home and in school, John revealed himself to be a born curator. At home, while they were still schoolboys, he and his brother Robert established their own little museum. It was a typical childhood *omnium gatherum*. We all know the kind of thing. A collection in which grandparents are invited to affect the deepest interest, and to which aunts and uncles are solicited for contributions. In the case of John and Robert, the museum was evidently grounded upon the chance 1957 discovery of an exotic knife (from a missionary member of the family) found upon a shelf in the garage. Eventually the exhibit held fossils, coins, militaria, shards of pottery, and the bowls of clay-pipes dug from the Thackray garden. So very characteristically, John left a neat catalogue of the museum, contained within the pages of a Highgate School exercise-book. The exhibits were arranged under five heads: numismatics; archaeology; weapons; stones and shells; and general interest.

The existence of the catalogue is clear confirmation that the brothers took their museum far more seriously than is the case with most such juvenile collectors. They certainly had an acquisitions policy. From time to time the brothers were to be found out shopping down that Aladdin's cave which is Cecil Court, off Charing Cross Road. There they reviewed their modest financial resources in relation to the potential specimens in the shop windows. A decision reached, a purchase effected, upon their return home the new treasure was added to the Museum with pride and affection. It was the same pride and affection as John was to evince in later years as he laid before some visiting scholar a Darwin letter or a Murchison field-map just abstracted from that rich archive which by then had been placed in John's care.

At school, John discovered that Highgate possessed a natural history museum. He became fascinated by its fossils, its pinned beetles, its faded butterflies, and its taxidermised birds. There is no evidence that he ever sought to augment the collection, but he did see it as crying out for cataloguing and conservation. Again John's curatorial instincts became strikingly evident. During several of his vacations he returned to Highgate to work upon the museum, cleaning, repairing, and re-arranging. Above all he catalogued. John would never have agreed with Keats. John knew nothing of Keats's 'dull catalogue of common things'.

At Highgate in 1965, John presented himself for the General Certificate of Education at Advanced Level in chemistry, physics, and zoology. But his results were somewhat lacklustre. He resolved to return to school for a further year, to better his examination performance and in the hope of winning a choral scholarship to Cambridge. Now Highgate clearly was an attentive institution and pupils in John's position were encouraged to undertake some academic project during the summer vacation before their return for a final year. In connection with this project John took a decision which at first sight might appear somewhat odd. He possessed no formal association with the earth sciences, but as his project he nonetheless opted to investigate the geology of the Isle of Wight. A word of explanation would here seem appropriate.

For several years John had already enjoyed some modest familiarity with the earth sciences. Geology, in the form of fossils, had for long featured in the displays of the Thackray Museum, and the School museum School also possessed its geological content. It was amidst such museum specimens that John's interest in the earth sciences evidently had its roots. But even as a schoolboy he had gone on to establish some relationship with geology in the field. For an annual holiday his parents regularly went to Ware Barton in Devonshire. There his brother remembers a fifteen-year-old John spending his days geologising. Hammer in hand, he worked the country up and down the stratigraphical column from the coastal New Red Sandstone, up to the Bovey Tracey Beds, and then down to the Carboniferous grits and the Dartmoor Granite.

But geology did not feature in the Highgate curriculum, and the school treated that other geo-subject—geography—as unavailable to pupils who were studying a cluster of science subjects. It thus becomes easy to see why John leaped at the opportunity of undertaking an earth-science project during the summer of 1965. The Isle of Wight presented a delightful field environment, well provided with youth hostels, and conveniently located at no great distance from London. It was a compact and manageable study unit. At Alum Bay and Culver Cliff—at Compton Bay and Luccombe Chine—all its geological lines terminate in saltwater with a decisive and satisfying finality. Such clearly defined geology would surely have appealed to John's instinct for ordered tidiness.

John must have enjoyed his summer of 1965. Perhaps it is significant that his booklet entitled *British Fossils* (1984) featured as a frontispiece a magnificent plate of the Upper Greensand meeting the Chalk at Compton Bay. Certainly when he returned to Highgate in the autumn of 1965 it was to seek a place in a university honours course in geology. Shortly, there arrived an offer from University College, London, where Desmond Donovan had recently assumed the Chair of Geology. That offer John accepted, and between 1966 and 1969 he read geology down Gower Street. His enthusiasm for his new science took him into the ranks of the Geologists' Association as early as 1966, although it was late in 1971 before he aspired to Fellowship of the Geological Society. He was elected on 5 January, 1972.

While an undergraduate, John launched into a fresh field of activity, purchasing the foundation tome for his new collecting area: Richard Owen's *Palaeontology*. Two days later John was again off hunting. This time he returned with an

edition of Lyell's *Antiquity of Man*. For thirty years John remained deeply involved with the classics among the literature generated by the earth sciences. He never aspired to be a geological book-collector playing in the premier league. He never sought to rival the magnificent library assembled by his eventual friends, Victor and Joan Eyles, but John did, nevertheless, assemble a useful collection—I suppose that it might be termed a working collection. Needless to say, it was provided with a comprehensive and informative catalogue. John made his final addition to it less than three months before his demise: William Borlase's *Natural History of Cornwall*.

John received his BSc in the summer of 1969. What next? At that juncture he would seem to have had no very clearly defined career objective. There was some talk of his going to a post-graduate studentship at Keele to study the stratigraphy of the Jurassic Amphill Clay under the supervision of Hugh Torrens. Another possibility lay across the Irish Sea. An enjoyable undergraduate mapping-class around Lough Nafuoey, in the Emerald Isle, had prompted him to apply for a post as a field-officer with the Geological Survey of Ireland. And then there was an application to the Natural Environment Research Council for a museum post at the Institute of Geological Sciences in London's Exhibition Road. There John was called for interview, and his wife Sue recalls that he approached the occasion in a somewhat casual manner. She still remembers the shirt that he wore. It was a garment such as an antiquarian book-dealer might have described as 'fore-edge rubbed but without loss of text'. But NERC was seeking curatorial potential, not sartorial perfection, and in John they recognised they had their man. He was appointed to the Geological Museum as a Scientific Officer.

John had landed upon his feet. He was now in his element as part of the team holding responsibility for a major British museum. He assisted in the planning of new displays. He mounted exhibits. He wrote exhibition leaflets and handbooks. He liaised with the public. In a peripheral way I saw him at work. He was ever the enthusiast. For some unaccountable reason a Museum visitor stole from an open display a piece of Leinster granite. John called me. Would I send a replacement? In the Museum he took me to see a large new diorama illustrative of landforms associated with the front of a former glacier. Did I think the drumlins were moulded quite as they should be? Again in the Museum. It was the eve of the opening of 'The Story of the Earth', by the Queen, on 30 October 1972. Frenzied activity was all around. We stood before a dramatic model of a volcano in eruption. Its 'lava' spilled out of the exhibit, down the front of the case, and away onto the Museum's floor. John was in deep discussion. Should the floor-covering be coloured as if singed by the heat of the 'lava'?

When John first joined the Institute of Geological Sciences, there existed a rule that geological staff within the Museum should annually hone their scientific skills through a few weeks spent mapping in the field. Thus it was that in 1970 John found himself in Somerset mapping ground around Watchet. There he worked under the direction of Alfred Whittaker who remembers John remarking at the close of his stint that the few weeks in the field had been most enjoyable, but that he might have reservations were he required to pass an entire lifetime as a hammer-swinging, pencil-pushing Survey mapper. John was well content to live amidst his Museum showcases. He was happy to be encountering real and lively people as they came into the Museum to be entertained, to learn, and to have their latest geological finds expertly identified.

The late 1960s witnessed a remarkable growth of interest in the history of the earth sciences. Scholars suddenly recognised that here was a significant yet sadly neglected field. Perhaps the realisation came as a result of the celebration in 1959 of the centenary of Darwin's *Origin of Species*. Be that as it may, John was certainly very much a part of the new movement. In 1968 he began his collection of classical geological literature. In 1969 he started to interest himself in the riches contained within the archives of the Institute of Geological Sciences. In 1972 he published the earliest of his numerous papers devoted to the history of the earth sciences. In 1973 he completed an MSc in the history of science under Rupert Hall of Imperial College. In the same year John was elected Secretary of what was then the Society for the Bibliography of Natural History, a post which he was to hold for a total of seventeen years.

The clearest and most impressive sign of the burgeoning interest in the history of the earth sciences was the mounting of the elaborate Charles Lyell Centenary Symposium of 1975. It was held under the auspices of the IUGS and INHIGEO. The Chairman of the organising committee was Douglas Bassett of the National Museum of Wales, and under him John shouldered the considerable burden of service as the Honorary Secretary to the symposium from 1973 until its affairs were wound up in 1976. On the afternoon of 5 September, 1975, a small group of delegates from the symposium attended at Westminster Abbey to pay their tribute at Lyell's grave and at his nearby bust by William Theed. Most appropriately, John was one of those present. He came bearing a small floral offering.

From 1981 until his death, John was also Honorary Archivist to the Geological Society. Other posts he held ranged from a consultancy in the National Museum of Kenya, and the chairmanship of the Geological Society's History of Geology Group, to his membership of the Editorial Board of *Geology Today*. Less than a month before his death he was elected President of what had become the Society for the History of Natural History.

On 1 January, 1984 the Institute of Geological Sciences was renamed the British Geological Survey, but for John and his Museum colleagues there were in the offing changes of a much more dramatic character. In April, 1985 the Geological Museum was separated from the Survey and tucked under the wing of the Museum's larger neighbour, the British Museum (Natural History), an institution which was itself shortly to be restyled as the Natural History Museum. For the former staff of the Geological Survey Museum this was a traumatic moment as career opportunities had to be reassessed and fresh institutional loyalties had to be developed. The Survey's archives, in which John had taken such an interest, were removed to the new British Geological Survey headquarters near Nottingham, and John himself was transferred to the British Museum (Natural History) as a Senior Scientific Officer, with a continuing responsibility for exhibitions.

The years immediately following 1985 were perhaps not the happiest of John's professional career, but in 1989 he received a new appointment which brought him both intellectual satisfaction and personal pleasure. The appointment

was that of Archivist to the Natural History Museum. It was surely the post above all others for which John would have wished. He wrote to me in August, 1993:

I get great satisfaction out of the appraising, arranging, and listing part of the job, and find the contacts with researchers very stimulating. There are lots of challenges, areas for development

His paper qualifications for such archival duties might have been adjudged to be somewhat slender. That he secured the post is a striking testimony to the high regard in which he and his skills were now held within the Museum. And yet he was still eager to learn. It was at this time (1991–1993) that he returned to University College, London, as a part-timer to join students little more than half his age in the classes for the Diploma in Archives Administration.

Of John's activities as the Museum's Archivist I am able to offer no inside story. His obituary in *The Times* on 1 June, 1999 informs us that he was able 'to transform the organisation of the museum archives', and that 'he elevated the archives to their proper status within the building'. All that I do not doubt. But my own first-hand experience of the archives was as a reader. As such it was John's profound knowledge of the treasures in his care which so impressed me. Further, it was always such a pleasure to find an archivist who took patent satisfaction in seeing materials from his collections being employed in the advancement of knowledge. It was with delight that in 1998 he received permission to himself undertake an even more complete exploration of the Museum's archives. He had been placed at liberty to begin the writing of a comprehensive history of the Natural History Museum as a part of his official duties. It is so tragic that John should have been struck down within only months of the inauguration of this exciting new project.

John has left to us considerable literary monuments standing within the fields of both popular science and professional history of science. By the somewhat modest standards of science publishing, several of the titles within the bibliography must be assessed as having been outstandingly successful best-sellers. The ice-cream vendors along Exhibition Road must have seen tens of thousands of visitors leave the Geological Museum clutching copies of John's *Age of the Earth* or his *British Fossils*. At the other extreme will even fifty people have read *A Short History of the Museum of the Geological Society of London* of which John was one of three co-authors? Yet to me it is among the most valuable of the works that he has bequeathed to us.

Generations yet to come will encounter John through these and other of his scholarly writings, but those of us who had the good fortune to know John have a duty to explain to posterity that among his contemporaries he possessed a significance which far transcends the importance of his published contributions to knowledge. I reiterate my earlier point: John was a pivotal figure within his chosen field of learning.

We are told that upon their arrival in London, naturalists of an earlier age would wait upon Sir Joseph Banks. During the closing decades of the second millennium, John, for historians of the earth sciences, filled much the same role as that once performed by Sir Joseph. John's office, wheresoever it might be located, was a clearing house for all those scholars who shared his interests. John knew who was in town. He seemed to be familiar with the outline of everybody's ongoing research. He was *au fait* with forthcoming events such as symposia or excursions. He had to hand catalogues from antiquarian booksellers and auction houses. And, above all else, he was so responsive to our academic inquisition. His was an intimate knowledge of the archives within his care, and he was ever ready to offer guidance to those desirous of exploring them in satisfaction of their own research interests. He was so generous of his time. He was so modest of his expertise. He was so esteemed and respected a friend to all.

Gordon Herries Davies, BallinacloUGH House, County Tipperary

(I am deeply grateful to Sue Thackray for her patient answering of my many questions while I was writing in remembrance of John. Robert, John's brother, was equally of the greatest assistance, and John's one-time Geological Survey colleague, Alf Whittaker, also generously offered me some memories. G.L.H.D.)

[This is a shortened version of the text that appeared recently in *Archives of Natural History* (Ed.).]

Antonio Nuñez Jimenez

It is a great loss, not only for Cuban science but also for the whole scientific world, that Professor Dr Dr hc Antonio Nuñez Jimenez passed away in 1998. The scientific community has lost in him a well-known scientist who spent many years in active research and participated in many expeditions all over the world. His output includes several books and many papers; and he founded various scientific societies and organisations in Cuba.

Born in 1923, Jimenez studied in La Habana, Cuba, and in 1954 he published the first edition of his *Geography of Cuba*, while he received his Doctor of Philosophy and Letters at the University in La Habana in 1951. In the following years and in connection with development in Cuba, Jimenez continued his scientific activity, depending on the actual situation in his country. Later he became the Foundation President of the Academy of Sciences of Cuba (*Academia Ciencias de la Cuba*, 1959–1962). In this period, he also became a member of the editorial board of *Gerlands Beiträge zur Geophysik* during the editorship of the well-known geophysicist Professor Hans Ertel. In the framework of the connection between the German Academy of Sciences in Berlin and the developing seismological activity in Cuba, members of the staff of the German Academy visited Cuba from time to time, and installed instruments for a seismological network. Jimenez was deeply interested in this type of geophysical research and stimulated its development, including also the history of geophysics and related disciplines. He was particularly interested in the work of Alexander von Humboldt. Following a ceremony at the German Academy in Berlin in 1959, Jimenez published a most interesting paper in the *Festschrift* for Alexander Humboldt on Humboldt's visit to Cuba.

Jimenez's had wide interests and was a creative scientist in many field. Thus, for example, he was Founding President of the Foundation Man and Nature, President of the Cuban Geographical Society, Founding President of the Latin

American and Caribbean Speleological Society, and a member of many scientific societies all over the world. He carried out speleological and karstological studies in several countries, and also historical studies in Cuba and elsewhere in Latin America. He liked to travel for science, making expeditions to the appropriate locations for his research. He participated in the expeditions to the North Pole and to Antarctica, and explored the Andes from Peru to Venezuela. One of his pioneering acts was to lead the trip "In a Canoe from the Amazons to the Caribbean" during which he visited different countries in the Amazon, Orinoco and Caribbean Basins. In this respect he was a worthy successor to Alexander von Humboldt. Among Jimenez's publications, the best known are his *Geography of Cuba* (3 volumes) and *Geology*, which includes much historical material.

Professor Antonio Nuñez Jimenez did much for science in Cuba, for the Cuban Academy of Science and for international scientific co-operation. He was an excellent scientist, a noble man, a wonderful friend. The scientific community will miss him all over the world, but he will survive in our hearts, in his books and through his scientific accomplishments. We constantly remember our *amigo* Antonio Nuñez Jimenez. We shall never forget you! You are in our hearts, and in our science.

Wilfried Schröder, Bremen

COUNTRY REPORTS

Armenia

Professor Malkhassian has written to say that the economic situation in his country has not been good for science for several years in his country, and even less so for the history of science. However, he has prepared a bibliography on the history of Armenian geology, which INHIGEO hopes it may be able to publish on his behalf. And he has written a short article on early science in Armenia for the present *Newsletter* (see p. 26).

Australia

The 'Earth Sciences History Group' of the Geological Society of Australia continues in its very useful role of providing links between Australian researchers. Two newsletters are distributed each year, with articles, reports from conferences, lists of events, publications and reviews. The group is chaired by Carol Bacon and the Treasurer is Barry Cooper.

David Branagan published a short, popular paper on the life of Sir T. W. Edgeworth David in the *National Library of Australia News*, August 1999, following the presentation of several papers on this geologist, and based on research carried out largely at the Library as a Harold White Fellow. A full-length biography of Edgeworth David, one of Australia's most distinguished geologists, is in progress, and fieldwork has been carried out in South Australia and Northern Territory in connection with the study. David Branagan also presented a short paper on the 'Early Geological observations in the New England region of New South Wales' at the 33rd Symposium on 'Advances in the Study of the Sydney Basin', which was published in the *Proceedings* by the University of Newcastle. His paper on research on glaciation in Australasia, 'Antipodean ice Ages', presented at the INHIGEO meeting in Neuchâtel, was accepted for publication in *Eclogae Geologicae Helveticae*.

Tom Darragh continues to work on the Victorian section of Ferdinand Hochstetter's notebooks. He has finished transcribing and translating the relevant section and is now working on the explanatory notes. Any suggestions for a possible publisher would be greatly appreciated. His paper on the Sedgwick/Smyth correspondence is in press.

This year David Oldroyd was awarded the History of Geology award by the Geological Society of America. Members of the ESHG are very pleased to see his work honoured in this way. He is still researching the history of geology of the Lake District in England.

Max Banks continues his studies relating to Charles Darwin. Darwin's field notes on the geology of Hobart Town, Tasmania, made during his visit in 1836, were transcribed and a commentary prepared in the light of historical and modern knowledge. The field-notes, including a sketch, allowed corrections to be made to earlier suggestions as to the routes Darwin took, and provided much more information on high-level shell beds and the problems—still unresolved—associated with them. An old photograph of a limestone quarry from which Darwin collected Tertiary fossil plants was discovered in a private collection and allowed, for the first time, confident interpretation of the geology of the quarry. The appraisal of the field-notes led to a comparison of the various Darwin texts, unpublished and published, which dealt with the geology of Hobart and to a brief examination of Darwin's relationship with George Frankland, Surveyor-General of Van Diemen's Land. Frankland provided Darwin with information on the regional geology as well as specimens of fossils from areas not visited by Darwin. Dr Banks co-authored a paper arising from this study and has presented talks and led excursions on the topic of Darwin's visit.

A highlight of the year was leading a week-long course, 'In the Steps of Charles Darwin'. The course, held in January 2000 under the auspices of the Australian and New Zealand College for Seniors, consisted of talks on the background to Darwin's visit to Tasmania, and excursions following, as far as is now possible, the routes he took, and observations of the rocks that he saw. The Darwin visit has been made more familiar to the local community not only by talks and excursions but also by reference to Darwin excursions in a recently published book by David Leaman (*Walk into History in southern Tasmania*. Leaman Geophysics, Hobart, 1999).

Carol Bacon continues her interest in the history of geology in Tasmania. A bulletin incorporating her writing on the history of oil exploration in Tasmania has now been published. She has started work on a *Dictionary of Tasmanian Mining* and has continued her work on a timeline of events significant in the history of geology and mining in Tasmania.

Barry Cooper reports that he maintains a strong interest in the History of Geology in South Australia. His major current interest is the history of building stone use.

David Corbett continues research into aspects of the life of Sir Douglas Mawson, and has been involved in the preparation of a major exhibition on the life and work of Sir Douglas Mawson, which opened at the museum of South Australia in March 2000. A biography of Mawson has been written by Philip Ayres.

Additional papers of Robert Logan Jack (1845–1921) have recently been found in family archives and are being added to the Jack papers in the Queensland State Archives

Publications by ESHG members

- Bacon, C.A., Calver, C.R., Boreham, C.J., Leaman, D.E., Morrison, K.C., Revill, A.T., and Volkman, J.K., *The Petroleum Potential of Onshore Tasmania: A Review*, Geological Survey Bulletin 71, Mineral Resources Tasmania, 2000.
- Banks, M.R. and Leaman, D.E., 'Charles Darwin's field notes on the geology of Hobart Town: A Modern Appraisal', *Papers and Proceedings of the Royal Society of Tasmania*, 1999, 133, 29–50.
- Branagan, D.F., 'Beyond the Northern Boundary: The Early Years of New England Geology', *Proceedings of the 33rd Symposium on Advances in the Study of the Sydney Basin*. Department of Geology, The University of Newcastle.
- Branagan, D.F., 'Seeking Edgeworth David, Knight in the old Brown Hat', *National Library of Australia News*, August 1999, 7–11.
- McNally, G.H., 'Geology and Mining Practice in Relation to Shallow Subsidence in the Northern Coalfield, New South Wales' *Australian Journal of Earth Sciences*, 2000, 47, 21–34.
- Oldroyd, D.R., 'Ami Boué and the First Geological Map of New Zealand', *Geological Society of New Zealand, Historical Studies Group Newsletter*, 1999, No. 18, 19–25.
- Oldroyd, D.R., 'Early Ideas about Glaciation in the English Lake District: The Problem of Making Sense of Glaciation in a Glaciated Region', *Annals of Science*, 1999, 56, 175–203.
- Oldroyd, D.R., 'Non-written Sources in the Study of the History of Geology: Pros and Cons in the Light of the Views of Collingwood and Foucault', *Annals of Science*, 1999, 56, 395–415.
- Oldroyd, D.R., 'Evidence that Disappears: John Marr *et al.* and Lakeland Geological Sites', *Geological Curator*, 1999, 7, 17–25.
- Oldroyd, D.R., 'Homage to François Ellenberger'. Essay review of: G. Gohau (ed.), *Hommage à François Ellenberger: Fondateur du Comité Français d'Histoire de la Géologie*, Société Géologique de France, Paris, 1997; and G. Gohau (ed.), *De la Géologie à son Histoire: Ouvrage en Hommage à François Ellenberger*, Comité de Travaux Historiques et Scientifiques, Paris, 1997. In: *Metascience*, 1999, 8, 420–431.
- Oldroyd, D.R. Review of: E.L. Yochelson, *Charles Doolittle Walcott, Paleontologist*, The Kent State University Press, Kent and London, 1998. In: *Annals of Science*, 1999, 56, 318–320.
- Oldroyd, D.R. Review of: L.J. Jordanova and R. Porter (eds), *Images of the Earth: Essays in the History of the Environmental Sciences*, The British Society for the History of Science, [Chalfont St Giles]/Manchester, 1997. In: *Annals of Science*, 1999, 56, 326–328.
- Oldroyd, D.R. Review of: M.J.S. Rudwick, *Georges Cuvier, Fossil Bones, and Geological Catastrophes: New Translations & Interpretations of the Primary Texts*, The University of Chicago Press, Chicago and London, 1997. In: *Metascience*, 1999, 8, 157–163.
- Oldroyd, D.R. Review of: N. Oreskes, *The Rejection of Continental Drift: Theory and Method in American Earth Science*, Oxford University Press, New York, 1999. In: *Science*, 1999, 284, 440–441.
- Oldroyd, D.R. Review of: V.I. Vernadsky, *The Biosphere*, translated by David B. Langmuir, Springer-Verlag, New York, 1997. In: *Metascience*, 1999, 8, 346–347.

Carol Bacon, Hobart

Bolivia

In the May issue of *Pour la Science* (pp. 42–47), which is the French edition of *Scientific American*, Dr Alain Gioda and I published the article 'L'Argent de l'Ancien Pérou'. It is about mining at the Cerro Rico, for which the water needs were provided by the construction of a system of lacunae (lakes) and its transportation by means of open channels that fed the hydraulic wheels in the processing plants. Water was used not only for the fragmentation of argentiferous ores but also for the processes of separation by amalgamation. This work relied on cheap labour, which is why emphasis was given to the so called *mita* (forced labour, imposed on the natives).

Another published work by the same authors has been 'Notes Relating to the Hydraulic Catastrophe of 1626 in Potosi', in the *Magazine of the House of Liberty, Sucre*, 1999, 6, 77–123. It deals with the implications of the disaster (the rupture of the rampart of the lake San Ildefonso), the measures adopted by the Crown, the financing of the works and other concessions, the carrying out of repair works, and the economic and ecological implications of the greatest disaster in the history of mining in Potosi.

Following the same subject, we published in the 1999 issue of the *Annual National Archive and Library of Bolivia* (pp. 139–167) a paper entitled 'Argent and White Coal (Silver and Water in Potosi, Charcas and Bolivia, XVI–XX centuries)', with reference to climate, mining booms, compulsory labour, natural catastrophes, and the decline of Potosi.

A seminar was held in the city of Sucre from 26–29 October on 'Meteorological Archives in South America' as part of the ARCHISS Project (Archival Climate History Survey). It was sponsored by the International Hydrological Programme of UNESCO (Montivideo/Uruguay headquarters). The main objective of the project was a study of the water supply for the year 2025. Twelve lectures were delivered, with speakers from France, Spain, Argentina, the United States, Peru, Uruguay,

and Bolivia. The theme dealt with the 'historical climatic' series of primary and secondary sources held in national archives in Bolivia (the Historical Archive of the Mint and the National Archive of Bolivia) and in foreign countries (e.g., Archive of the Indies in Sevilla, the National Archive of Argentina, the Cuzco Archive). I participated in the presentation of the theme 'Towards a Serial History of the Weather in Potosi', using newspaper reports from 1849 to 1942 (from the—unfortunately incomplete—newspaper archive in the Historical Archive of the Mint at Potosi, the 'Mecca' of the Spanish Colonial period. The search of climatological material is being complemented with information concerning health, diseases, physicians' records, drugs, and salubrity.

Carlos Serrano, Potosi

Canada

Brief mention was made in *Newsletter* No. 31 of the death of Loris Russell (1904–1998), but his earth sciences history work deserves further mention here. Born in the US but raised in Alberta, Canada, Russell was a notable figure in Canadian paleontological and museological circles. He was trained at the University of Alberta, followed by higher degrees at Princeton, where he studied with William Berryman Scott. Early field experience with Charles M. Sternberg (1885–1981) led him to work at the Geological Survey of Canada, followed by a museum and academic career in which he directed Canada's two largest scientific museums, served as President of both the Canadian Museums Association and the Society for Vertebrate Paleontology, and taught at the University of Toronto.

Russel's paleontological work focused on the Mesozoic and Cenozoic of western Canada, with studies of freshwater molluscs, mammals, and dinosaurs (where he seems to have been the first in this century to suggest—in 1965—that dinosaurs might be 'warm-blooded'). His earth sciences historical work includes a pioneering study of Dinosaur Hunting in Western Canada (*Royal Ontario Museum Life Sciences Contribution* 70, 1966), important papers on First Nations (aboriginal) fossil collecting, and the pioneer dinosaur collectors and researchers Charles M. Sternberg and Thomas C. Weston.

Notable Canadian publications during 1999 have included James Delgado's study of the exploration of Arctic Canada, *Across the Top of the World: The Quest for the Northwest Passage*. (Douglas & McIntyre). A new children's biography *George Mercer Dawson: Scientist, Geologist, Explorer* by John Chalmers will be published in June 2000 (Quest Library).

Two of my own books published during 1999 contain some earth science history. *Whales of the West Coast* (Harbour Publishing) briefly discusses work on the fossil whales of western North America, and also the cetacean researches of Roy Chapman Andrews (1884–1960), better known as leader of the American Museum Gobi expeditions in the twenties. *Into the Dinosaurs Graveyard* appeared in August 1999 with Doubleday Canada. As mentioned in *Newsletter* No. 31, it includes a significant amount of Canadian dinosaur and museum history. A trade paperback edition will be available in June of 2000.

One reviewer, former colleague Clive Coy, pointed out an error in my account of the loss of the S.S. *Mount Temple* during World War I. This ship was bearing dinosaurs from the Alberta badlands to the British Museum, and the specimens were lost, causing considerable anguish to the collector, Charles H. Sternberg (1850–1943). Following earlier sources going back at least as far as L. Sprague and Catherine Crook de Camp's *Day of the Dinosaur* (1968), I attributed the loss to a German U-boat, but it now appears that this is incorrect. By courtesy of Gerhard Maier, I have obtained a copy of a book (Edwin P. Hoyt, *The Elusive Seagull*, Tandem Publishing Ltd, 1970) on the operations of the German surface raider *Moewe* (*Seagull*). This gives a fictionalised but detailed account of its role in the sinking of the *Mount Temple*. Conveniently, I was preparing at the time a detailed account of the episode using quotations from Sternberg's letters, and have been able to correct the inaccuracy. This paper will be published during 2000.

The long promised *Encyclopedia of Paleontology* (also mentioned in No. 31) was apparently published in January 2000, but I have not yet seen a copy.

Following extensive research in British and German sources, Gerhard Maier (Calgary) is preparing for publication a historical account of the important Tendeguru dinosaur site in Tanzania.

David Spalding, Pender Island, British Columbia

Keith Tinkler has written to mention his *History of Geology Field Trip to Niagara Falls* (Field Trip Guide # 9), Geological Society of America, Boulder, Colorado, 1998, 20 pp. The volume contains new material, mainly on topics other than Niagara Falls—the origin of the Great lakes basins, and coastal geomorphology at Toronto Island in mid-nineteenth century—mainly Sir Sandford Fleming.

Bill Sarjeant has alerted us to the following publications:

Sarjeant, W.A.S., 'The Decline of the Latin Name', *Geoscientist*, 1999, 9, 4–7.

Sarjeant, W.A.S., 'History of Dinosaur Discoveries', in: P.J. Currie and K. Padian (eds), *Encyclopedia of Dinosaurs*, Academic Press, San Diego, London, Boston, New York, Sydney, Tokyo, and Toronto, 1999, 340–347.

He has also recently reviewed the following books:

J. Langton, *Dead as a Dodo*, viking, New York, 1996 (in *Earth Sciences History*, 1998, 17, 222–223)

G. Gohau (ed.), *De la Géologie à son Histoire*, Comité des Travaux Historiques et Scientifiques, Paris, 1997 (in *Earth Sciences History*, 1998, 17, 212–213)

L. Howsam, *Sciences since 1660: A Bibliography of Bibliographies*, Ashgate, Aldershot, 1997 (in *Isis*, 1998, 89, 374–375)

Wang Hongzhen, D.F. Branagan, Ouyang Ziyuan, and Wang Xulian (eds), *Comparative Planetology, Geological Education, History of Geology* . . . , VSP, Utrecht, 1997 (in *Episodes*, 1988, 21, 52–54. (This book was substantially an INHIGEO publication.)

E.L. Yochelson, *Charles Doolittle Walcott: Paleontologist*, Kent State University Press, Ohio and London, 1998 (in *Episodes*, 1998, 21, 285).

(For those who would wish to know more of this most remarkable INHIGEO Member, who does basic research in micropalaeontology and on fossil footprints, writes novels [under the pseudonym of Anthony Swithin], has published *THE* standard 10-volume bibliography for the history of geology, and once had a massive book collection of 85,000 volumes, but has now [under pressure from his spouse?—no, she is a writer too] passed some 15,000 of them to The University of Alberta, one should perhaps get hold of: Ned Powers, 'Dreams Become Reality: Sarjeant's Careers in Geology, Writing Beautifully Intertwined [sic] at U[niversity] of S[askatchewan]', *The StarPhoenix*, August 24, 1999. This reveals that Professor Sarjeant 'can be reading parts of as many as six books at a time'. We can only assume that he does so simultaneously [Ed.]

China

Symposium on Fifty Years of Geological Science in China

The 13th Annual Meeting of the Committee on History of Geology of the Geological Society of China (HGGSC) was held at the Academic Interchange Center, China University of Geosciences, Beijing, from 9 to 11 September, 1999, the theme being 'Fifty Years of Geological Science in New China'. It was organised by the HGGSC, China University of Geosciences, Beijing, and the Geology Department of Peking University. The meeting attracted a rather large attendance of over 150 scholars, including 19 Members of the Chinese Academy of Sciences and the Chinese Engineering Academy; and more than 200 research students attended the various sessions. Professor Zhao Pengda, President of the University gave an address of welcome. Other speakers included Professor Wang Mili, Secretary-General of the GSC, Professor Zhu Xun, President of the Chinese Association of Mining, Professor Cheng Yuqi, a former President of the GSC, and Professor Wang Hongzhen, President of the HGGSC, who gave the main talk entitled 'A Brief View of the Fifty Years of Geological Science in China'. After summarizing the main achievements of the geological research, Professor Wang pointed out that geological science presently holds an important strategic position in the sustainable development of the economy and society, and is therefore destined to prosper in China. He also emphasized that with the acceptance of the new concept of 'Earth System Science' by the majority of geologists all branches of geoscience will merge into a synthetic and co-ordinate research such that geological science in China will be facing an entirely new stage of development in the 21st century.

Papers read at the Symposium were concerned with various geological disciplines. Outstanding topics were:

- Dong Sahenbao, 'Granite Studies in China as Viewed from the Development Tendency in Geoscience Research'
- Ren Jinshun, 'Welcome to the New Stage of Geotectonic Research'
- Liu Bao Jun, 'Retrospect and Prospect in Sedimentology'
- Chen Mengxiong, 'Fifty Years of Hydrogeology in China'
- Xie Xuejin, 'Twenty Years of Regional Geochemical Scanning in China'
- Tian Zaiyi, 'Development of Petroleum Geology in China'
- Zhai Yusheng, 'Retrospect and Prospect of Mineral Deposit Research in China'
- Yang Qi, 'Coal and its Derived Energy Resources'
- Zhang Xiangong, 'Contributions of Engineering Geology to National Economic Constructions in China'
- Jiang Zhi, 'Discoveries of Mineral Deposits in China'
- You Zhendong, 'Ultrahigh Pressure Metamorphism—Chance and Challenge in Metamorphic Geology'
- Shi Baoheng, 'Fifty Years of Petroleum Geology in China'
- Pu Qingyu, 'Fifty Years' Activities of the Geological Society of China and the Development of Geological Science in China'
- Yang Guangrong, 'Meditations on Some Problems in Geological Education in China'
- Yin Jianzhao, 'Inspiration from the Discovery of the Argyle Diamond Deposits in West Australia'

Wang Hongzhen, Zhai Yusheng, and Yang Guangrong, Beijing

Anniversary and Honour

A meeting commemorating the 110th anniversary of the birth of Professor Li Siguang (J.S. Lee) was held in Beijing on 26 December 1999, jointly organised by the Ministry of Land and Resources, the Chinese Academy of Sciences, and the Geological Society of China. In tribute, a new and enlarged edition of his book *The Geology of China*, originally published in English in Britain in 1939, was issued by the Geological Publishing House, Beijing in 1999. The work contains thirteen chapters and has 821 pages. The enlarged edition was organised and edited by an editorial board headed by Professor Sun Dianqing, Honorary Director of the Institute of Geomechanics, CAGS.

Professor Zhai Yusheng, Vice President of HGGSC, and INHIGEO Member, formerly President of the China University of Geosciences, Beijing, was elected a Member of the Earth Sciences Section of the Chinese Academy of Sciences. He has been Chairman of the Ore Field Structure Group, International Association of the Geology of Ore Deposits (IAGOD) since 1994.

*Publications in the History of Geosciences**Books*

Wang Hongzhen *et al.* (eds), *Fifty Years of Geological Science in China*, China University of Geosciences Press, Wuhan, 1999.

(This book is a celebration volume of the 50th Anniversary of the People's Republic of China under the sponsorship of the Geological Society of China and interested authorities in the Ministry of Land and Resources. It was organised by the HGGSC and the Institute of the History of Geology, China University of Geosciences, Beijing. It contains 48 papers divided into two parts: 22 referring approximately to basic geology and 16 to applied geology. The authors include some twenty members of CAS and CEA. The volume is perhaps the first to set out the main achievements in, and the history of, the geosciences since the establishment of the New China in 1949.)

Song Zhenghai and Sun Guanlong (eds), *Traditional Cultures and Modern Science and Technology*, Zhejiang Educational Press, Hangzhou, Zhejiang, 1999.

Gillispie, C.C., *Genesis and Geology*, translated into Chinese by Yang Jing-Yi, Jiangxi Educational Press, Nanchang, 1999.

Papers

Weili Qiu, 'The History of Research on Physiography: Stages in China', *China Historical Materials of Science and Technology*, 1999, 20, 95-106.

Jiang Pan, 'Biographical Sketch of Teachers and Students of the Institute of Geology, Ministry of Agriculture and Commerce' *China Historical Materials of Science and Technology*, 1999, 20, 285-293.

Wang Hongzhen, Yusheng Zhai, and Zhendong You, 'Fifty Years of Geological Science in China', *China Historical Materials of Science and Technology*, 1999, 20, 310-320.

Visit of Professor David Oldroyd, INHIGEO Secretary-General to China

By invitation of the Institute for the History of Natural Sciences of the Chinese Academy of Sciences, Professor Oldroyd visited China from October 8 to November 2, 1999. During his stay in Beijing [which he much enjoyed (Ed.)] he gave his principal talk at the Institute for the History of Natural Science, and also visited the Chinese Committee of the History of Geology at the China University of Geosciences, Beijing, and the Centre for the Study of Science and Society at Peking University. The topics for his presentations were: 'Non-Written Sources in the Study of the History of Geology: Pros and Cons in the Light of the Views of Collingwood and Foucault', and 'The Geology of the Lake District (UK) and the Problem of the Disposal of Nuclear Waste in Britain: Making Impossible Decisions in a Democracy'. His topics and research methods aroused great interest among the audiences in the three institutes. He also arranged an interview with Professor Wang Hongzhen and discussed a wide variety of topics, from INHIGEO matters to Professor Wang's personal scientific career [see p. 33 (Ed.)].

After leaving Beijing, Professor Oldroyd visited the magnificent Mt Huashan near Xi'an in Shaanxi Province, where the famous American geologist Bailey Willis made observations during his renowned researches on the geology of China in 1903-4. [Professor Oldroyd also took the opportunity to visit friends in the desert province of Ningxia in northern China (Ed.)]

Yang Jing-Yi and Wang Hongzhen, Beijing

Costa Rica

Gerardo Soto, who is currently working in Japan, reports that his historical work is currently curtailed for that reason; and that a planned chapter on the history of geology in Costa Rica had to be abandoned because of funding shortages. However, he has two historical papers in press, which will be reported in 2001. He further reports the publication of:

Walter Fernández, 'Los Antecedentes de la Creación del Centro de Investigaciones Geofísicas (CIGEFI) de la Universidad de Costa Rica', *Revista Geológica de América Central*, 1998, 21, 99-104,

commemorating the 20th anniversary of the Centre.

Also, the 2nd edition of *Volcanes de Costa Rica* was published early in 2000. Its second chapter is an historical account of volcanological research in Costa Rica, and contains 18 photographs of real historical interest, including one of a manuscript relating to the eruption of Irazú in 1723.

Dr Soto has kindly written us a note on his Guatemalan/Costa Rican colleague Gabriel Dengo, who died in 1999, and it may be mentioned that one of the pictures in *Volcanes de Costa Rica* shows a picture of Dr Dengo on a field-trip in the 1960s.

Czech Republic (Brno)

This report summarises activities concerned with the history of geological sciences in the eastern territories of the former Czech Republic: Moravia and Silesia. It was prepared by specialists at the Department of Geology and Palaeontology, Masaryk University, Brno.

We have been concentrated on three spheres: publications, conferences and public exhibitions relevant to the history of geology and mining.

We continued publication of the volume *Folia Historica* (see the previous information in *Newsletter* No. 30 for 1997, when that volume was devoted to personalities of the Faculty of Science at Masaryk University including outstanding geologists and earth scientists). In 1999, the volume has been a monograph focused on the history of Pleistocene research in the territory of former Czechoslovakia (R. Musil, J. Karásek, K. Valoch: *Pleistocene: Folia Historica*, 175 pp. [in Czech]). In the publication is a section about the historical development of all Quaternary disciplines during the 20th

century in the individual countries of Czechoslovakia (Bohemia, Moravia and Silesia, Slovakia, and Sub-Carpathian Ukraine). This territory is a classical area for Quaternary research in Europe being situated between the southern mountain glaciation in the Alps and the continental glaciation in northern/central Europe (Poland, Germany). In addition, Moravia and Silesia in particular, being the main natural corridor connecting northern Europe with the Danube region, are extremely rich in archaeological, palaeontological and sedimentological finds. The text is divided into chapters according to the territories of former Czechoslovakia and the historical evolutionary stages marking developments in the level of knowledge (1900–1918, 1919–1929, 1930–1938, 1939–1945, 1975–1960, 1960–1990).

Another paper, 'Moravian geology II', published by Rudolf Musil in *Universitas* (1999, pp. 14–21, Masaryk University, Brno), follows a previous publication from the last year. It introduces next sixteen outstanding geologists who had anniversaries of their births or deaths in 1999 and who worked in Moravia or Silesia.

A workshop on 'Silver-mining and Coinage of Jihlava' was held in September 10, 1999, on the occasion of the 750th anniversary of the Town and Mining Law of Jihlava. The foundation of Jihlava was connected with the mining of silver ores, which were discovered nearby at the end of the first half of 13th century. Jihlava silver production also supported the supernational policy of Přemysl Ottakar II and his economic reforms. The culmination of silver production in the Jihlava mining-district is dated from 1240 to 1380, with production of 1,000 to 1,500 kg per year in the first few decades. Jihlava's Town and Mining Law spread its fame and established the place's leading position throughout central Europe regarding Mediaeval jurisdiction. The laws were given to the town by the Bohemian King Wenceslas I in 1249. Because of this important anniversary, a new permanent exhibition in the Jihlava museum was arranged, dedicated to the mining and minting of Jihlava. The seminar *Proceedings* contain ten contributions (68 pp., in Czech) and a special volume, *Silver-Mining and Coinage of Jihlava (Iglau)*, was also published (nine contributions, 110 pp., in English). Further information on the workshop, the volumes issued, and the workshop being prepared for 2001, can be obtained from Dr Karel Malý, Muzeum Vysociny, 58601 Jihlava, Czech Republic (muzeum.vysociny@post.cz).

A new Czech stamp, showing King Wenceslas I giving the Town and Mining Law of Jihlava to the miners, was issued in 1999.

In 1999, there was another important event: the 200th anniversary of the birth of the great palaeontologist Joachim Barrande (11 August 1799), who held an extraordinary position among European palaeontologists during the nineteenth century. His most important study was devoted to the Bohemian Lower Palaeozoic in what is now called the Barrandian. The Moravian museum prepared an exhibition (11 May 1999 to 8 January 2000) on his life and researches, with special emphasis on his work in Moravia. The Czech Post issued two special stamps to mark the anniversary, the first reproducing a portrait of Barrande and the second showing fossils from the Barrandian.

Rudolf Musil and Antonín Prichystal, Brno

Czech Republic (Prague)

The Prague National Technical Museum, together with the Society for the History of Science and Technology, issued an anthology in the series *Prague Studies in the History of Science and Technology* (n.s. Vol. 3), entitled *1929–Calculi—1999*. The volume contained studies dedicated to the 'youthful' septuagenarian Lubos Novy (born in Prague on November 13, 1929), who has been the leading scholar in the history of exact sciences in Prague. From 1956 to 1985 he was head of the Department of the History of Natural Sciences and Technology at the Czechoslovak Academy of Science. From 1965 to 1988 he was Chairman of the Czechoslovak Society for the History of Sciences and Technology and from 1968 to 1990 he was editor-in-chief of the journal *Dejiny ved a Techniky (DVT—History of Sciences and Technology)*. Research into the history of science and technology, including geosciences, was concentrated in the latter institutions. The anthology contains twenty-three significant studies from the field of geophysics by Czech as well as foreign researchers. Here are a few examples: 'Creativity and Discovery' by Vítězslav Orel (Brno), 'De l'Histoire de la Mathématisation des Sciences au Siècle des Lumières' by Irena Stasiewicz-Jasiuk (Warsaw), 'Kommunikative und geographische Strukturen in der Wissenschaft' by Hubert Laitko (Berlin), 'Magister Cristiannus de Prachatitz and his Astronomical Work' by Alena Hadravová and Petr Hadrava (Prague and Ondřejov). The anthology appraised Novy's contributions to the progress/development of the field. Its papers also make a significant contribution to the study of the history of geophysics.

Changes in the social sciences were revealed particularly in the history of science and technology section of the programme of the VIIIth Congress of the Czech Historians (10–12 September 1999 in Hradec Králové). General problems were treated by Pavel Drábek (Prague) and Jaroslav Foltá (Prague) in their study 'The Present State and Problems of the History of Sciences and Technology in the Czech Republic'. Studies from the history of the Earth sciences included Ivan Jakubec's (Prague) symposia on the history of science and technology, including the history of political economy, Jan Munzar's 'The Oldest Meteorological Measurement in Bohemia and Moravia', Karel Kársa's 'The History of Czech and Slovak Meteorology', Drahoň Dušátko's 'The Place and Role of the Military Geographical Institute in the History of Czech Geodesy and Cartography', and Josef Haubelt's 'Problems with the History of Science and Technology' (including commemoration of the work of Kaspar Maria, Count of Sternberg, and Joachim Barrande). The geosciences, together with the science of mining, were also covered by two traditional seminars organised by the National Technical Museum of Prague.

The XXXIXth Seminar 'On the History of Metallurgical Production' (3 November 1999) included: Vratislav Grulich's 'Toponymy of Mining of Iron ores in Moravia and Silesia', Jindra Biolková's 'On the Professors of the State College of Mining and Metallurgy in Ostrava', A. Dobner, 'Miroslav Kamenick's Mining Education in the Central Slovak Mining Region until the Foundation of the Mining Academy in 1762', and Josef Haubelt's 'Abraham Gottlob Werner

(1749–1817) and his Time'. The traditional pre-Christmas seminar on the history of mining (9 December 1999) included Roman Makarius's '750 Years from the Publication of *Jura montium et montanorum* for Jihlava', Rudolf Tomček's 'Mining of Uranium in Horní Slavkov', Jaroslav Kudrnáč's 'Mining Archaeology in Co-operation with Geologists and Mineralogists', Václav Štěpán's 'The significance of the Mining Scientist Jan Jakub Lutz', and Josef Haubelt's 'Otakar Matoušek (1899–1994)—Geology and Mining'.

The history of geosciences has an important centre in the Mining Foundation of Silesia, Moravia, and Bohemia (founded on 18 December 1998), whose key figure is Milos Zárýbnick. The foundation presently links fifty-one institutions and forty-five individuals involved in the archaeology of mining, the protection of geological and mining monuments/sights, and in the history of the Earth sciences. It is a co-organiser of many events including, for example, 'Agricola's Pupils III' (Kowary 9–10 November 1999), the conference on '750 years of Jihlava's Mining Legislation/Law' (Jihlava 29–30 September 1999), and traditional symposium 'Průbram in Science and Technology' (11–13 October 1999). The Foundation publishes a bulletin, takes part in a number of events of regional significance, and is beginning to publish studies on the history of geosciences. The first volume is to be devoted to the work of the notable petrologist from the Charles University, Jindřich Ladislav Barvř (1863–1952).

The bicentenary of Joachim Barrande (1799–1883), together with a conference on palaeontology conference on Ordovician Period, generated two special studies. Jirí Krfz (Czech Institute of Geology, Prague) published a biography of Barrande. The National Museum in Prague, in collaboration with the Agricola-Forschungszentrum (Agricola Research Centre) based in Schlossbergmuseum, Chemnitz (BRD), organised the exhibition 'Joachim Barrande (1799–1883): His Life, Work and Heritage to World Palaeontology', which ran from 2 August to 19 September 1999. Its representative catalogue was compiled by the leading Barrande scholars Radvan Horní and Vojtech Turek. Scholars specialised in historical matters to do with mining geology in Agricola's time have been meeting twice a year since 1994, on the anniversaries of Agricola's birthday and the date of his death. For the year 2000, 'Agricola-Gespräche' is to be held in Jáchymov, with Andra Kramarczyk, Secretary of the Centre, as the principal organiser.

Josef Haubelt, Prague

Germany

1999 was a year not without problems for the German Working Group for the history of earth sciences. After the sudden and unexpected death of its former chairman, Peter Schmidt, the group faced some difficulties and started its re-organisation at its annual meeting during the 'Werner-Symposium' at Freiberg in September. Currently, B. Fritscher and Oskar Burghardt (Krefeld) are serving as chairmen of the group, with councillors M. Guntau, G. Hofbauer, and M. Koefl-Ebert. A first outcome is a new group web-site, created (and currently operated) by G. Hofbauer (Erlangen) (<<http://www.gdgh.de/arbkreis/haupt.html>>). Please note that the web-site is still only in a preliminary state!

Meetings

The main event for the German group was, of course, the Symposium on 'Abraham Gottlob Werner and his Time' in Freiberg (September 19–24). People came from all over the world 'to celebrate Germany's most popular mineralogist' and about a hundred papers were given on nearly all aspects of Werner's mineralogy and his influence on the development of earth sciences. A personal 'antipodean' view of the symposium is to be found in this *Newsletter*. Another more technical account is my own review, forthcoming in *Berichte zur Wissenschaftsgeschichte*. The papers of the symposium, at least, in part, will be published by Helmut Albrecht at Freiberg in the series *Freiberger Forschungshefte* (it is to be hoped in 2000). During the Werner Symposium, the History of Meteorology Specialist Group held a session on 'Meteorology in the Time of Werner' (chaired by Cornelia Luedecke, Munich). Dr Luedecke also participated in the organisation of an advanced training by the German Meteorological Society at Leipzig (10.11.1999) on 'Meteorology at the Turn of 18th to 19th century'.

On 20 November, 1999, a Symposium was held to mark the 100th anniversary of Professor Kurt von Buelow at the Mueritz-Museum at Waren (Mecklenburg), organised by Mrs A. Guenther (Waren). Ten papers were presented on various aspects of 'Research on Quaternary Geology in North Germany in Twentieth Century'.

The 'Berlin-group' (see below) held a meeting on the occasion of the 225th anniversary of the German geologist Leopold von Buch (1774–1853) at Stolpe (near Angermünde, north of Berlin), Buch's place of birth. Papers were presented by M. Guntau, O. Wagenbreth, and others. Some of L. von Buch's descendants were among the participants.

Exhibitions

The Museum of the Bavarian State's Geological Collection (Munich), presented an exhibition on Abraham Gottlob Werner (1749–1817) from June 15, 1999, to January 31, 2000. It was prepared and organised by Dr Martina Koefl-Ebert (with some minor assistance from myself). During the initial planning stage the topic met with considerable opposition, since Werner—as the leading Neptunist—was considered a 'negative figure' in geology. In response, the exhibition took this anachronistic image of Werner into account and sought to place him in his historical frame. The exhibition was entitled '*Viel Laerm um Steine, oder: Irren ist menschlich — Abraham Gottlob Werner zum 250. Geburtstag*' ('Much Ado about Rocks, or: To Err is Human—Abraham Gottlob Werner for his 250th Anniversary'); a title which, however, Werner devotees considered disrespectful. This shows the ambiguity of Werner's present image. While he is regarded in Saxony and especially in Freiberg as the 'Founder of Modern Geology and Mineralogy', he still suffers elsewhere as a result of his support of Neptunism.

Although the exhibition dealt with different aspects of Werner's life and work, its main focus was the 'difficult' topic of 'Neptunism, Volcanism, Plutonism'. We sought to present a non-anachronistic, historical perspective on Werner's ideas. For example, the exhibition suggested that Neptunism must have been the more 'intelligible' theory for Werner's contemporaries because of its affinity to a Christian-Biblical perspective of the world. The exhibition also

showed the (geo-)logical base of Neptunism, stressing that the local geology of Saxony, *i.e.* Werner's 'scientific horizon', did not falsify his theory. Further, the exhibition confronted visitors with the contemporary critique of Plutonism and an assessment of local scientific cultures, which influenced the shaping of geological knowledge. Thus, the exhibition made one aware of how a research programme may depend upon the spiritual horizon and social milieu of a scientist (or scientists), and that the horizon of any scientist is always more or less constrained—not only by personal factors such as intelligence or experience, but also by the general social, cultural, and historical frame—factors that are often only apparent with the help of historical perspective. This 'constraint' on our present scientific culture is probably one of the most important reasons for undertaking research into the history of science.

Wolfhart Langer (in connection with a paleontological excursion to Texas by one of his colleagues at Bonn, Dr. Sander) organised a small exhibition on Ferdinand Roemer (1818–1891) at the Goldfuss-Museum at Bonn. Roemer was a professor of geology and palaeontology at the former University of Breslau, and did pioneering work on the geology and palaeontology of Texas. Some of the materials of the exhibition were provided by Mrs Dr. H. Hein (Hildesheim).

Lecture courses

I presented two lecture courses at the Institute for the History of Science at The University of Munich, one on 'Romantic-Idealist Earth Sciences (from Goethe to Hegel)' and (together with C. Luedecke and S. Kirschner) one on 'Aristotle's Meteorology and its Influence in the History of Science'. Dr Luedecke gave a lecture course on 'Milestones in the Emergence of Modern Meteorology', also at The University of Munich.

Lectures and Poster-Presentations

Daber, Rudolf, 'Die Geschichte der Erforschung des Unterkreide-Farnes *Weichsella reticulata*', Museum fuer Naturkunde, Berlin (16.2.1999). (The lecture was repeated at the 'Urweltmuseum', Bayreuth, 12.9.1999.)

Daber, Rudolf, 'Die Geschichte der Erforschung der Entwicklung, die zu *Ginkgo biloba* fuehrte', Museum fuer Naturkunde, Berlin (20.10.1999).

Engelhardt, Wolf von, 'Goethe and Geology', Colloque internationale à l'occasion du 250th anniversaire de la naissance de Johann Wolfgang Goethe, Université Paris-Sorbonne (29.3.1999). (This guest lecture was repeated at the University of Halle on 3.5.1999, and at The University of Tuebingen on 17.5.1999).

Engelhardt, Wolf von, 'Goethe and Alexander von Humboldt', Akademie der Naturforscher Leopoldina, Halle, 29.10.1999.
Fritscher, B., 'Wernerianismus' and the 'German Movement': Mineralogy at Jena, and the 'Contextualization' of Werner's Mineralogy', Werner Symposium, Freiberg (22.9.1999).

Guntau, M., 'Leopold von Buch—sein Werden zum Geologen', Gedenkkolloquium aus Anlass des 225. Geburtstages von Leopold von Buch (1774 bis 1853) des Vereins der Berlin-Brandenburger Geologie-Historiker "Leopold von Buch", Stolpe bei Angermueende (Uckermark) (24.4.1999).

Guntau, M., 'Prinzipien der Klassifikation natuerlicher Objekte und die Vorstellungen von A. G. Werner', Werner Symposium, Freiberg (21.9.1999).

Guntau, M., 'Kurd von Buelow (1899–1971) und seine wissenschaftlichen Arbeitsgebiete', Ehrenkolloquium aus Anlass des 100. Geburtstages von Professor Kurd von Buelow, "Die quatergeologische Erforschung und Erkundung in Norddeutschland im 20. Jahrhundert", Mueritz-Museum, Waren (20.11.1999).

Luedecke, C. (three lectures), 'The German Network in the History of Polar Research'; 'International Cooperation in Polar Research'; 'The First German South Polar Expedition (1901–03) and Naval Politics under Kaiser Wilhelm II', St. Petersburg International Conference: Polar Sea of Discord and Collaboration: Science and Politics in Oceanography and Arctic Exploration, St Petersburg (27., 29. and 30.1.1999).

Luedecke, C., "'Und sollte die deutsche Polargeschichte mehr Beachtung finden": Ein Bericht ueber internationale polargeschichtliche Tagungen seit 1997', Institut fuer Geschichte der Naturwissenschaften, Muenchen (11.2.1999).

Luedecke, C., 'Wechselbeziehungen zwischen Geologie und Meteorologie am Beispiel von Horace-Bénédict de Saussure (1740–1799)', Werner Symposium (22.9.1999).

Luedecke, C., 'Von der Messung zur Abstraktion: Meteorologie um die Wende vom 18. zum 19. Jahrhundert', Advanced training course, German Meteorological Society, Leipzig Branch (10.11.1999).

Luedecke, C., and H. Volkert, 'Geschichte der Meteorologie: Ein Fachausschuss der Deutschen Meteorologischen Gesellschaft (DMG)', Werner Symposium (20.–22.9.99) (poster presentation).

Publications

Burghardt, O., Fritscher, B., Guntau, M., Krueger, P., 'Zum Gedenken an Dr. rer. nat. Peter Schmidt (1939–1999)', in: by O. Burghardt and P. Schmidt (eds), *Nachrichtenblatt zur Geschichte der Geowissenschaften*, No. 7/8, Krefeld and Freiberg, 1999, 15–18.

Daber, Rudolf, 'Warum erst 1848? Die Gruendung der Deutschen Geologischen Gesellschaft 1848 in Berlin, damals schon sehr spaet, laengst ueberfaellig?' *Zeitschrift fuer geologische Wissenschaften*, 1998, 26, 359–368.

Daber, Rudolf, 'Die kambrische Explosion', 'Pflanzen und Tiere erobern das Festland', 'Fortschritte durch Katastrophen—Saurier und das Artensterben', in: *Mensch-Natur-Technik*, Vol. 1 (*Vom Urknall zum Menschen*), Brockhaus-Redaktion, Leipzig and Mannheim, 1999, 342–69, 370–98, 399–455.

Ehmke, G., Guntau, M., 'Dr. rer. nat. Peter Schmidt (1939–1999)', *Fundgrube*, 1999, 3/4, 110–111.

[Engelhardt, Wolf von,] 'Goethe, Die Schriften zur Naturwissenschaft', Leopoldina-Ausgabe, 2. Abt., Vol. 8 B: *Zur Geologie und Mineralogie, 1821–1832, Ergaenzungen und Erlaeterungen*, bearbeitet von Wolf von Engelhardt unter Mitwirkung von Dorothea Kuhn, xxv + 1081 Seiten, 2 Tafeln, Weimar, 1999.

- Fritscher, Bernhard, 'Bemerkungen zu einer historischen Epistemologie der romantisch-idealistischen Erdwissenschaft am Beispiel der "Geosophie" Lorenz Okens', *Zeitschrift fuer geologische Wissenschaften*, 1999, 27, 61–69.
- Fritscher, B. Review of: William H. Brock, *Justus von Liebig: The Chemical Gatekeeper*, Cambridge University Press, Cambridge, 1997. In: *Sudhoffs Archiv*, 1999, 83, 244–45.
- Fritscher, B. Review of: *Voltaire, Elemente der Philosophie Newtons. Verteidigung des Newtonianismus. Die Metaphysik des Neuton*, hrsg., eingeleitet und mit einem Anhang versehen von Renate Wahsner und Horst-Heino von Borzeszkowski (Berlin 1997). In: *Sudhoffs Archiv*, 1999, 83, 248–49.
- Fritscher, B. Review of: D.J. Blundell und A.C. Scott (eds), *Lyell: The Past is the Key to the Present*, The Geological Society, London 1998. In: *Berichte zur Wissenschaftsgeschichte* 22, 1999, 208–9.
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Other matters

In November 1999, Dr Martina Koelbl-Ebert, Curator at the Geologische Staatssammlung Munich, was honoured by the Philipp-Matthaeus-Hahn-Award of the City of Kornwestheim for her paper 'Observing Orogeny—Maria Graham's Account of the Earthquake in Chile in 1822' (see above). The 'reverend-mechanic' Philipp Matthaeus Hahn (1739–1790) developed astronomical clocks and mechanical calculating machines during his time in Kornwestheim, and his theological publications influenced the shaping of Swabian pietism. The City of Kornwestheim established the prize at the time of Hahn's 250th birthday. It is awarded every third year for scientific work in theology and natural sciences/history of science.

The 'Berlin group' (*Verein Berlin-Brandenburgische Geologie-Historiker "Leopold von Buch" e.V.*) founded in 1998, continues its work under the leadership of Drs Peter Kuehn and Peter Krueger, including the publication of its journal *Geologehistorische Blaetter*.

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

Bernhard Fritscher, Munich

Hungary

1998 was the 150th anniversary of the Hungarian Geological Society. Efforts and publications were focused on this jubilee. Nevertheless, eight regular meetings were held, with the following topics being presented and discussed.

19 January

Károly Breznyánszky, 'On the Traces of James Hutton (Edinburgh, Scotland)'.

Irma Dobos, 'The Third Fifty Years of the Hungarian Geological Society. Part IV'.

- Károly Breznyánszky, Presentation of G. Csíky's book *From the History of Earth Sciences in Hungary* (1997).
- 23 February
György Bárdossy, Attila Pataki, and János Tiszai, 'Exploration History of the Halimba Bauxite Deposits (Bakony Mountains, Hungary)'.
László Korössy, 'A Hungarian Oil Geologist in China (1959–1962)'.
- 16 March
Commemorative Meeting on the Occasion of the 150th Anniversary of Béla Zsigmondy's Birth. Held jointly with several other scientific and engineering societies.
- 18 March
Celebratory General Assembly of the 150-Year Old Hungarian Geological Society. Held at the Headquarters of the Geological Institute of Hungary.
Endre Dudich, 'Milestones of 150 Years'.
- 21 April
Gusztáv Morvai, 'Brief History of the Hungarian Central Office of Geology (1953–1993)'
Béla Víz, 'History of the Hungarian Aluminium Industry, with Particular Regard to the Exploration of Bauxite. Part I'.
- 11 May
Vilma Széky-Fux, 'Commemoration of Béla Inkey on the Occasion of the 150th Anniversary of his Birth'.
László Kuti, 'Béla Inkey's Agrogeological Work'.
- 3 September
Special Symposium I of the XVIIth Congress of the Carpathian-Balkan Geological Association. Theme: '19–20th-Century Exploration History of the Carpathian-Balkan Region' (Co-Convenor Endre Dudich on behalf of INHIGEO).
Gusztáv Morvai, 'Brief History of the Carpathian-Balkan Geological Association'.
Irma Dobos, 'Mapping the Springs and Artesian Wells of Hungary in the Nineteenth Century'.
Teréz Póka, 'Propylites and the 19th-Century Hungarian School of Petrography'.
Endre Dudich, 'Changing Concepts: From the Median Mass to the Microplates'.
- 19 October
József Cseh-Németh, 'History of the Exploration of the Metallic and Non-Metallic Minerals in Hungary'.
Béla Csath, 'Water Exploration in Hungary and the National Directorate of Geology'.
György Vitális, 'Concerning the Hydrogeological Activities of Károly Papp, on the Occasion of the 125th Anniversary of his Birth'.
- 30 October
Placement of flowers at the former Kubinyi Mansion at Vidéfalva (Vidina) near Losonc (Lucenec) in Southern Slovakia, where the Hungarian Geological Society was founded on 3 January, 1848. Joint celebration with the Slovak Geological Society. Talks were delivered by Géza Császár (Secretary-General of the Slovak Geological Society), Peter Reichwalder (President of the Slovak Geological Society, and Dionyz Vass (representing the geologists now working in the area). 16 November
Lajos Stegena Memorial Day (a meeting held jointly with the Society of Hungarian Geophysicists and the Hungarian Society of Geodesy, Cartography, and Remote Sensing at the Eötvös Institute of Geophysics)
Károly Posgay, 'The Connection of the Szolnok-Mármaros Flysch Belt with the Mid-Hungarian Lineament'.
Rolf Meissner (Kiel), 'Rheological and Seismological Properties of the Earth's Crust'.
Robert Gutdeutsch (Vienna), 'The Resolution Power of Historical Data with Respect to Seismological Parameters'.
Bruno d'Argenio (Naples), 'Time Sampling and Time Gaps in the Earth's History: Are we Aware of the Missing Links?'.
Sierd Cloething (The Netherlands), 'Perspectives of Basin Research: From the Pannonian Basin to the Norwegian Continental Margin'.
László Rybach (Zurich), 'Lajos Stegena's Contributions to Geothermy'.
István Klinghammer, 'Lajos Stegena as an Authority on Old Maps'.
Imre Kubovics, 'Lajos Stegena and the Study of Meteorites in Hungary'.
Andrea Mindszenty, 'Carbonate Sedimentology, Bauxite Formation, and Geodynamics', Contributions to the Cretaceous Evolution History of the Transdanubian Central Range'.
Ferenc Horváth, 'A Great Opportunity for Hungarian Geology: Integrated Quaternary Research'.
- 30 November
Béla Víz, 'History of the Hungarian Aluminium Industry from 1945, With Particular Regard to the Exploration for Bauxite. Part II'.
- Károly Ferenckz, 'My Geological Explorations in Guinea in the Sixties'.
- 15 December
Tibor Kecskeméti, 'Early Scientific Interrelations of the Hungarian Geological Society and the Hungarian National Museum'.
István Zoltán Nagy, 'Commemoration of Agoston Kubinyi, One of the Founding Fathers of the Hungarian Geological Society'.
Endre Dudich, 'Chairman's Report for 1998'.

Selected Publications

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- Dudich, Endre, '150 Years of the Hungarian Geological Society', *Acta Geologica Academiae Scientiarum Geologicae*, 1998, 41, 151-170.
- Dudich, Endre, 'Interrelations of the Imperial and Royal Geological Survey, Vienna, and the Hungarian Geology from 1867 through 1918', *Abhandlungen der Geologischen Bundesanstalt*, 1999, 56, 61-68 (in German)
- Dudich, Endre, 'Changing Concepts: From the Median Mass to the Microplates', *Abstracts of the XVIth CBGA Congress*, Vienna.
- Dudich, Endre, 'In love with the Earth—Lajos Lóczy Senior was born 150 years ago', *Acta Geologica Academiae Scientiarum Geologicae*, 1999, 42, 471-472
- Dudich, Endre, Székely-Fux, Vilma, and Dobos, Irma, 'The Third Fifty Years of the Hungarian Geological Society', *Jubilee Special Paper of the Hungarian Geological Society*, The Hungarian Geological Society, Budapest, 1999.
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- Kázmer, Miklós, 'Carpathian Minerals in the Eighteenth Century Woodwardian Collection at Cambridge', *Journal of the History of Collections*, 1998, 10, 159-168.
- Kecskeméti, Tibor, 'The Past Twenty-Five Years of Palaeontological Research In Hungary', *Földtani Közlemény*, 1999, 128, 93-98 (in Hungarian).
- Kopek, Gábor and Rákosi, László, 'On the Third Hungarian-Mongolian Geological Mapping Expedition (1971-1973)', *Földtani Közlemény*, 1998, 127, 37-40 (in Hungarian).
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- Morvai, Gusztáv, 'A Brief History of the Carpathian-Balkan Geological Association', *Abstracts of the XVIth CBGA Congress*, Vienna.
- Póka, Teréz, 'Propylites: The History of their Classification and Genesis: The Nineteenth-Century Hungarian School of Petrography', *Abstracts of the XVIth CBGA Congress*, Vienna.
- Vitális, György, 'Hydrological Activities of the 150-Year Old Hungarian Geological Society from its Beginning until the Creation of its Hydrological Section. Part I: From the Beginning until 1996', *Hidrologiai Tájékoztató [Hydrogeological Information]*, June 1998, 13-16 (in Hungarian).
- Vitális, György, 'Commemoration of Hugó Böckh on the 125th Anniversary of his birth', *Bányászati Kohászati Lapok [Mining and Metallurgical Journal]*, 1999, 132, 290-294 (in Hungarian).

Endre Dudich, Budapest

Italy

In September 1999, the Italian Group for the History of Geology (GITHIGEO) was established during an informal meeting in Pavia, as a free association (without subscription charges) of historians and scientists interested in the history of the geosciences. The aim of GITHIGEO is to provide regular information on the state of the history of geological sciences in Italy (publications, research projects, conferences and symposia), as well as to encourage co-operation among individuals and institutions. Besides the electronic circulation of a newsletter, projects for future activities will include calls for contributions from GITHIGEO Members on the survey of primary sources kept in Italian libraries and archives and contributions to a bibliographical database of the Italian studies in the history of geological sciences. For further information, contact Nicoletta Morello and Ezio Vaccari, c/o Dipartimento di Storia Moderna e Contemporanea, Università di Genova, via Balbi 6, 16126 Genova, Italy. Fax: 39 0102099826 (<GITHIGEO@lettere.unige.it>).

The proceedings of the symposium 'The Earth Sciences in Veneto from the fall of the Venetian Republic to the Unification of Italy [1797-1870]', held in Venice in October 1997, were published by the Venetian Society of Natural Sciences with the title *Le Scienze della Terra dalla caduta della Serenissima all'Unità d'Italia* (edited by Corrado Lazzari). The book contains seven papers, in Italian, on topics such as a general introduction to geology and palaeontology between 18th and 19th century (C. Lazzari); the geological studies in the Lyceum 'Santa Caterina' in Venice (D. Magnanini); Giuseppe Marzari Pencati and his contribution to the Venetian geology (E. Vaccari); the *Saggio di Zoologia Fossile* (1827) by Tommaso Antonio Catullo (N. Morello); Tommaso Antonio Catullo and the geological collection of Luigi Castellini (C. Lazzari); the idea of Natural History according to S.A. Renier, T.A. Catullo and R. Molin, professors at the University of Padua (C. Gibin); and the first palaeontological studies in the Ladine valleys of south Tyrol, from von Buch to von

* We understand that GITHIGEO must be in capitals for this e-mail address to work successfully.

Richtshofen (F. Bizzarini). For ordering information, write to Corrado Lazzari, Societ  Venezia di Scienze Naturali, c/o Museo Civico di Storia Naturale, S. Croce 1730, 30125 Venezia (Italy), tel./fax. +39 0415227375.

Also, the proceedings of the symposium on Giovanni Arduino, held in Verona in 1996, have been published by the Academy of Agriculture, Science and Letters of Verona with the title *Scienza, tecnica e 'pubblico bene' nell'opera di Giovanni Arduino (1714-1795)*, edited by Ettore Curi. The book contains thirteen papers in Italian, including topics such as Arduino's role in 18th-century geological sciences (N. Morello); Arduino and the Swedish chemical-mineralogy (F. Abbri); Arduino's lithostratigraphic theory (E. Vaccari); Arduino and Alberto Fortis (L. Ciancio); Arduino and mining in 18th-century Veneto (R. Vergani); Arduino's cartographical works (E. Filippi). For ordering information, contact the Accademia di Agricoltura Scienze e Lettere, via Leoncino 6, 37121 Verona, Italy. Fax +39 0458068911; Email: <aasivr@tin.it>.

During the celebrations for the bicentenary of the death of the notable Italian scientist Lazzaro Spallanzani (1729-1799), Ezio Vaccari presented a paper on Spallanzani's geological correspondence and diaries. Dr Vaccari also gave talks on the Italian reception of Horace-B n dict de Saussure's geological works (at the symposium 'Saussure en Lumi res' in Geneva); on the role of geological education in the mining academies between 18th and 19th century (at the meeting 'Il ruolo sociale della scienza' in Arezzo); on the geological observations in Goethe's Italian Journey (at the 1999 GSA Annual Meeting in Denver) and on Italian Vulcanists and Wernerian Geognosy (at the INHIGEO Werner Symposium in Freiberg).

Nicoletta Morello has completed her edition of the book by Giovanni Alfonso Borelli, *Historia et meteorologia incendii Aetnaei anni 1669 (1670)*, now in press in the series 'Biblioteca della Scienza Italiana' (Firenze, Giunti) of the Institute and Museum of History of Science of Florence.

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- Gibin, Cinzio, 'La Storia naturale nell'interpretazione di tre professori dell'Universit  di Padova: Renier, Catullo, Molin', in: Corrado Lazzari (ed.), *Le Scienze della Terra nel Veneto dalla caduta della Serenissima all'Unit  d'Italia*, Venezia, societ  Venezia di Scienze Naturali, 1999, 99-117.
- Lazzari, Corrado (ed.), *Le Scienze della Terra dalla caduta della Serenissima all'Unit  d'Italia*, Atti del Convegno. Venezia, 25 ottobre 1997, Venezia, Societ  Venezia di Scienze Naturali, 1999, 137 pp.
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- Vaccari, Ezio, 'Il contributo di Giuseppe Marzari Pencati (1779-1836) alla geologia veneta dell'Ottocento', in: Corrado Lazzari (ed.), *Le Scienze della Terra nel Veneto dalla caduta della Serenissima all'Unit  d'Italia*, Venezia, Societ  Venezia di Scienze Naturali, 1999, 25-41.

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- Vaccari, Ezio, 'La "classificazione" delle montagne nel Settecento e la teoria litostratigrafica di Giovanni Arduino', in: Ettore Curi (ed.), *Scienza, tecnica e "pubblico bene" nell'opera di Giovanni Arduino (1714-1795)*, Verona, Accademia di Agricoltura, Scienze e Lettere, 1999, 47-80.
- Vaccari, Ezio, 'Die geologische Untersuchung des Kaiserreiches: Italien', in Christina Bachl-Hofmann, Tillfried Cernajsek, Thomas Hoffmann and Albert Schedl (eds), *Die Geologische Bundesanstalt in Wien. 150 Jahre Geologie im Dienste Österreich (1849-1999)*, Wien, Bohlau, 1999, 99-102.
- Vergani, Raffaello, 'Tra economia e scienza: Giovanni Arduino e le miniere venete del Settecento', in: Ettore Curi (ed.), *Scienza, tecnica e "pubblico bene" nell'opera di Giovanni Arduino (1714-1795)*, Verona, Accademia di Agricoltura, Scienze e Lettere, 1999, 193-206.

Ezio Vaccari and Nicoletta Morello, Genoa

Note on Activities in the History of Geological Research in Venice (Venezia) during 1999

In November/December 1999, Professor Corrado Lazzari gave a series of lectures on the development of the research on the Venice Lagoon to the *Società Veneziana di Scienze Naturali* (Venetian Society for Natural Sciences). His account began as far back as the pre-Renaissance, at the beginning of extant written documentation, for which his information was based mainly on unpublished manuscripts; and it was carried through to the end of the eighteenth century. It involved description of both the geologic/geographic and biological aspects of scientific research. The lectures will be published in the journal of the *Società Veneziana di Scienze Naturali*.

On 16-17 December, a series of lectures was given on 'La ricerca sul sistema lagunare veneziano' ('Research on the Venetian Lagoonal System') at the *Istituto Veneto di Scienze, Lettere ed Arti*—the distinguished academic institution founded in 1810 by Napoleon Buonaparte during the brief period of his 'Kingdom of Italy'. The lectures described the results of a wide range of research, both geological and biological. They were supported by the Italian National Research Council (CNR), the universities of Venice (Venezia) and of Padua (Padova), the *Istituto Veneto* itself, the Italian Ministry of University and Scientific and Technological Research (MURST), UNESCO, and the local governments of the Veneto Region and Venice. The historic development of the research in the last two centuries was also considered. The papers are to be published in the *Proceedings of the Istituto Veneto*.

Giuliano Piccoli, Padua

Japan

See the JAHIGEO Newsletter No. 2, herewith.

New Zealand

The *Newsletter* of the Historical Studies Group of the Geological Society of New Zealand is sent to eighty addresses (nine overseas). Two issues were printed during the year: Nos. 18 and 19. Among the published papers were:

- Mason, Alan, 'Geology at Auckland Museum Part 2: 1867-1946', No. 19, 16-24.
 Mason, Alan, 'Charles Edward Adams: A Predecessor to Cotton', No. 19, 26-31.
 Mason, Alan and Harrington, Larry, 'The Thames Miners' Guide', No. 19, 32-40.
 Nicholson, Heather, 'The Settler Geologists: The Maitai and the Axial Rocks', No. 18, 29-40.
 Oldroyd, David, 'Ami Boué and the First Geological Map of New Zealand', No. 18, 19-25.
 Oliver, Robin, 'Henri Filhol (1843-1902) and Campbell Island', No. 18, 7-12.

A talk on Sir James Hector was given at the annual conference of the Geological Society of New Zealand in November.

Gideon Mantell

In 1859, Walter Mantell (elder son of Gideon Algernon Mantell), who had emigrated to New Zealand twenty years earlier, brought his father's papers and books to New Zealand. They remained in the hands of the family for many years but the papers were presented to the Alexander Turnbull Library, Wellington, in 1927 by Walter's daughter-in-law. They remain there to this day as probably the most important resource in the southern hemisphere for research in the history of geology.

The books, however, are now unfortunately scattered through New Zealand and even appear on the second-hand market from time to time. This dispersal began in the 1860s when Walter made a donation to the New Zealand Society. He made later donations to other scientific bodies, and the dispersal has continued to the present day, with successive institutional owners making their own distributions. This has made their location and identification difficult but the Historical Studies Group has had some success in this direction. The Auckland City Library has proof copies, corrected by Gideon, of several of his books. The library of the Canterbury Museum has Gideon's personal copies of several classic geology works from the early nineteenth century. Some carry Gideon's annotations and one, Richard Owen's *Report on British Fossil Reptiles* (1842), has recently been published by Dennis Dean.

The situation outlined in the previous paragraph is symptomatic of the common lack of 'a sense of history' amongst New Zealand's scientists. As far as the country's scientific heritage is concerned, the attitude has too often been: "If it is old, it must be out of date, so throw it away". The Historical Studies Group of the Geological Society of New Zealand is working to change this attitude, but much has already been lost.

Alan Mason, Auckland

Norway

Professor Hestmark reports that he has published his major biography of the great Norwegian geologist Waldemar Brøgger: *Witenskap og Nasjon: Waldemar Cristopher Brøgger 1851–1905*, Aschehoug & Co. (W. Nygaard), Oslo, 1999, 862 pp. + 28 plates. The book was recognised as one of the three best biographies in Norway in 1999 and received the Freedom of Speech Honour Prize. [Congratulations! Ed.] Professor Hestmark is currently working on a study of V.M. Goldschmidt.

Poland

In 1999 the activity of Polish INHIGEO members was focused mainly on the problems and persons related to the geosciences of the Enlightenment (18th and early 19th centuries).

A.S. Kleczkowski participated in the international INHIGEO conference to celebrate the 250th anniversary of birth of Abraham Gottlob Werner, delivering a lecture devoted to the influence of this outstanding geoscientist on the development of modern geology in Poland at the plenary session in Freiberg. Several Polish geological institutions, represented by their Wrocław branches, organised an interesting excursion commemorating Werner's activities in Lower Silesia and co-sponsored a memorial plaque which was unveiled at the house where he was born in Osiecznica (Wehrau). The original plaque in German was, unfortunately, destroyed in 1945, but its remnants are preserved in the museum of local school. It should be recalled that the attempts to put a new plaque to celebrate the 170th anniversary of Werner's death in 1987 by two sister universities—the mining academies of Freiberg and Cracow (represented by their rectors H. Emmons and A.S. Kleczkowski)—were frustrated by the political authorities of that time.

S. Czarniecki, J. Skoczylas and Z. Wojcik delivered lectures during the scientific session at the Symposium devoted to Stanislaw Staszic, whilst the last-named historian, at a symposium on the activity of K. Kluk, presented new documents on their scientific achievements.

The 100th anniversary of hydrogeology in Poland was celebrated by a scientific conference with lectures by A.S. Kleczkowski, S. Kowalczewski, S. Krajewski, A. Sadurski, Z. Wojcik, and others. Moreover, the State Geological Institute published a special volume of its Bulletin No. 388 (*Origin and Evolution of Polish Hydrogeology*) edited by A.S. Kleczkowski and A. Sadurski.

The 80th anniversary of the foundation of the University of Mining and Metallurgy in Cracow and the State Geological Institute was celebrated in Warsaw. For this occasion the University edited Z. Wojcik's biography of its patron: *Stanislaw Staszic – Promotor of Science and Economy* and A. Bolewski's *Memoirs of the "Old Thatched Cottage": About the Mining Academy*.

A.S. Kleczkowski and W. Narebski are active members of the Commission on the History of Science of The Polish Academy of Arts and Sciences in Cracow. Z. Wojcik is co-operating and he recently presented a lecture at the Academy. A.S. Kleczkowski reported on A.G. Werner's celebrations at a meeting of the Mineralogical Society of Poland.

The Siberian Commission of the Committee on the History of Science and Technology of The Polish Academy of Sciences, led by Z. Wojcik, has been continuing its studies on the contribution of Poles (predominantly political deportees) and Russians to the development of the study of the geology of Siberia. Particularly interesting is the manuscript of a priest, F. Ciecierski, who, being deported to the mines east of Lake Baykal in the years 1797–1801, and thus separated from concepts such as those of James Hutton, presented 'modern' ideas on the origin of ore deposits.

S. Czarniecki was invited by The Institute of Geological Sciences of the Jagellonian University to deliver lectures on the history of geology in Cracow. He spoke in the S. Staszic Museum in Pila and in secondary schools in Mietna and Slupsk.

Publications

Czarniecki S., 'An Unknown Report of Rudolf Zuber on Geological Fieldwork in Argentina', *Wiek Nafty*, 1999, 4, 4–20.

Czarniecki S., 'Staszic Today', *Biuletyn Liceum Imienia Stanislaw Staszica w Lulinie*, No. 34, 6–13.

Kleczkowski, A.S., 'Abraham Gottlob Werner (1749–1817) and his Polish Connections (in the 250 anniversary of his birth)', *Mineralogia Polononia*, 1999, 30, 127–133.

Narebski W., 'Outline of the History of Mineralogical Sciences in the Jagellonian University in the Years 1953–1974', *Geological Sciences at Jagellonian University in the Years 1975–2000*, Cracow, 1999, pp. 15–19.

Narebski W., 'Czeslaw Haranczyk (1927–1998)—Obituary Note', *Annales Societatis Geologorum Poloniae*, 1999, 69, 85–86.

Skoczylas J., 'History of Studies of Bog Iron Ores in Poland. In: Ratajczak T. and Skoczylas J., *Bog Iron Ores in Poland*, Cracow, 1999, pp. 17–46.

Skoczylas J., 'Exploration Works for Oil Deposits in the Polish Lowland—65 Years of "Oil Fever" in Kcynia', *Przeegl. Geolog.*, 1999, 47, 438–439.

Skoczylas J., 'Utilization of Rocky Raw Materials in Early Mediaeval Wolin', *Przeegl. Geologiczny*, 1999, 47, 238–240.

Skoczylas J., 'History of the Development of Geology', in: *Encyclopedia Britannica* (Polish edition), Vol. 13, 1999, 323–325.

Wojciech Narebski, Cracow; and Zibigniew Wojcik, Warsaw

Portugal

Publications

Andrade, A.A.S., 'The Mineralogy of Abraham Gottlob Werner (1749–1817) in Silvestre Pinheiro Ferreira's (1769–1846) Philosophical Lectures', International Symposium "Abraham Gottlob Werner and his Times", Freiberg, Germany, 1999, *Proceedings*, C08.

- Antunes, M. Telles, 'Dinossauros em Portugal: dois casos menos conhecidos', *Ciencias da Terra (UNL)*, 1999, 13, 59–69.
- Antunes, M. Telles, 'Veiga Ferreira e a Paleontologia em Portugal', *Ciencias da Terra (UNL)*, 1999, 13, 157–167.
- Guimaraes, P. 'As Minas Portuguesas do Antigo Regime ao Liberalismo', *Revista de Arqueologia e Industria*, 1999, 2/2, 53–80.
- Matos, A.M.C. and Martins, A.C., 'Propostas e accoes de aproveitamento economico dos recursos naturais do Brasil', Congresso Luso-Brasileiro Portugal-Brasil: Memorias e Imaginarios', *Abstracts*, 1999.
- Pinto, M.S., 'Assessment of Effects of Mercury on Humans of the Use of Mercury in Gold Mining in Brazil in the 18th Century', 3rd International Symposium on Environmental Geochemistry in Tropical Countries, Nova Friburgo, Brazil, 1999, *Abstracts*, 24–25.
- Pinto, M.S., 'Werner, the Bergakademie and Manoel Ferreira da Camara', International Symposium 'Abraham Gottlob Werner and his Times', Freiberg, Germany, 1999, *Proceedings*, D07.
- Puche, O. and Mazadiego, L.F., 'Salinas Historicas de la Comunidad de Madrid-Carcaballana', *Revista de Arqueologia e Industria*, 1999, 2/3, 81–90.
- Santos, L. and Tinoco, A., 'Um Projecto de Museizacao para as Minas do Lousal', *Revista de Arqueologia e Industria*, 1998, 1, 117–125.
- William, R., 'A Brief Account of the Development and Applications of Steam Power in the Mines of Cornwall, UK', *Revista de Arqueologia e Industria*, 1998, 1, 73–82.

News

Several meetings were held in Portugal in 1999 related to the geological sciences, particularly mining, namely 'Museologia e Arqueologia Mineiras', organised by the Instituto Geologica e Mineiro, Lisbon.

Aspects of gold mining in colonial Brazil were displayed in 1999 as part of the 'Natura' exhibition held in the National Museum of Natural History, Lisbon.

The monograph, *A Provincia de Minas Gerais nas Memorias de tres Membros da Academia Real das Ciencias de Lisboa*, written by A.C. Martins and focusing on the importance of the mineral resources in that Brazilian province in colonial times, was awarded a prize in 1999 by the Fundacao Cultural Brasil-Portugal.

Manuel Pinto attended the Werner Symposium at Freiberg and presented a paper. His colleague, Antonio de Andrade's paper was published in the abstracts for the Symposium, but unfortunately he was unable to be present to deliver the paper in person.

LUSODAT is a database on history of science, medicine and technology in Portugal and Brazil from the Renaissance to 1900 that includes references to mineralogy, geology, metallurgy, mining, etc. Home-page: <<http://www.ifi.unicamp.br/~ghic/lusodat.htm>>. E-mail contact: <rmartins@ifi.unicamp.br>.

Manuel Pinto, Aveiro

Russia

Professor Ryabukhin reports that he has been working on the following projects:

1. The history of geology as a part of common history and culture of humanity. The significance of the teaching of history of geology in the general and special education of geologists.
2. Fundamental geological ideas and universities.
3. Ideas of catastrophism in geology.
4. The history of geology in Russia and at the M. Lomonosov Moscow State University.

His publications (all in Russian) for 1999 are:

- Ryabukhin, A.G. and Naymarc, A.A., 'Geocatastrophes in the Context of Ideas on Nonlinear Dynamics', IVth International Conference on New Ideas in Earth Sciences, Moscow, 1999. Abstracts, Section S-XXVII, p. 111.
- Ryabukhin, A.G., 'Dynamics of the Development of Geological Ideas', IVth International Conference on New ideas in Earth Sciences, Moscow, 1999. Abstracts, Section S-I, p. 115.
- Naimarc, A.A. and Ryabukhin, A.G., 'Geophysics-Tectonophysics-Tectonodynamics (A Deductive Approach to the Classification of the Physico-geological and Geologico-physical Branches of Science)', *Proceedings of Higher Educational Institutions Series: Geology and Prospecting*, 1999, No. 1, pp. 130–141.
- Ryabukhin, A.G. Naymarc, A.A., 'Problems of the Classification of Geological Sciences', *Bulletin of Moscow State University*, 1999, No. 2, pp. 65–69.
- Ryabukhin, A.G., 'Geological Ideas of Elie de Beaumont: History and Contemporaneity', *Bulletin of Moscow Society of Naturalists*, 1999, 73, pp. 60–63.
- Ryabukhin, A. and Sokolov, B.A., 'Geology at Moscow University', *Moscow University Annual for 1999*, Moscow State University, 1999, pp. 233–234.
- Lomise, M.G. and Ryabukhin, A.G., 'On the Scientific and Pedagogic Activities of Victor Khain', *Victor E. Khain (Materials for the Biography of Scientists)*, Nauka, Moscow, 1999, pp. 9–23.

* * *

Professor Yushkin writes:

My main activity was associated with work for the Commission on the History of Mineralogy of the Russian Mineralogical Society (as head of the Commission), and I was elected Vice-President of the Society at its 9th Congress in St Petersburg on May 17–21, 1999.

The most important event of the year 1999 was the 2nd International seminar, 'The History and Philosophy of Mineralogy', organised and conducted on October 4–8 in Syktyvkar and followed by a field excursion (information about the seminar has been submitted to *The Newsletter* as a separate article).

A special symposium 'The History of Geological Investigations, Geological Education' was included into the programme of the 13th Geological Congress of the Republic of Komi, that was held in Syktyvkar on February 24–26. The symposium worked under my chairmanship and was opened by my paper 'The Most Important Traits of Study of the Interior in the European North-East and the Topical Problems of Geohistorical Investigations'.

The 2nd student conference 'Geological/Archaeological Investigations in the Timan/Northern Urals Region' was held in Syktyvkar on October 28, 1999.

My paper, 'The Role of the Academy of Sciences in Dealing with Geological Issues and Forming the Mineral Complex of the Timan/Northern Urals Region', was delivered on the annual session of the Department of Geology, Geochemistry, and Mining that took place in June 1999 in Moscow on the occasion of the 275th anniversary of the Russian Academy of Sciences.

A series of articles with analysis of the development of mineralogy, its state on the verge of the new millennium and prognosis of its further progress was published in different periodicals. A series of essays was published devoted to life and work of scientists: D.P. Grigoriyev, V.A. Vityazeva, G.A. Markova, B.A. Ostashenko, Chen Guangyuan, etc.

As for the geohistorical investigations in Russia on the whole, one observes their recent revival. This is to a great extent connected with celebration of two anniversaries: the 275th anniversary of the Russian Academy of Sciences, which was founded by Peter I's decree on February 8, 1724, and the 300th anniversary of the Russian Geological Service that took its origin from the Chamber of Mines, decreed on August 24, 1700. These important events are celebrated as state holidays, with special scientific meetings and other events devoted to them in all academic and university centres of Russia.

Nikolai Yushkin, Syktyvkar

Professor Eugeni Milanovsky attended the Werner Symposium in Freiberg, and kindly allowed himself to be interviewed by David Oldroyd (see p. 30). Perhaps thus encouraged, he was subsequently interviewed in Russia by Svetlana Belyayeva and a report of their conversation, which covered essentially the same ground as the INHIGEO interview, was printed in a Russian newspaper on January 21, 2000. (Professor Milanovsky does not know [until he reads this note] that we have informants in strategic places in Russia! [Ed.]

Professor Milanovsky presented an introductory speech on the work of Academician D.V. Nalivkin, on the occasion of a conference on scientific method in honour of Nalivkin's 110th birthday, which was published by the St Petersburg Mining Institute in 1999 (*Conference Proceedings*, pp. 6–9). His paper at the Freiberg Symposium, 'The Influence of Werner's Scientific Ideas on the Development of Geology in Russia', was summarised in the Conference Abstracts (C 05). The full text will appear in the volume to be published by the Bergakademie Freiberg. Eugeni also published the following paper: 'A.P. Pavlov's Ideas on the Plurality of Cenozoic Glacial Epochs in Europe and on the Occurrence of the Most Ancient of them in the Pliocene', *Bulletin of the Moscow Naturalists' Society*, 1999, 74, 10–15 (in Russian). This was produced for the 70th anniversary of the death of the outstanding Russian geologist and 'father' of the Moscow Geological School, Alexej Petrovich Pavlov.

Professor Milanovsky has been working on a biography of Alfred Wegener (in Russian), which is, we understand, now complete, and should be appearing in print from *Nauka* (Science) Publishers, Moscow, at about the same time as the publication of the present *Newsletter*.

(Again, we thank Professor Milanovsky most sincerely for his beautiful drawings, which so enhance the INHIGEO *Newsletters* [Ed.]

Spain

The Spanish group for the History of Geology held a meeting on the 'History of Spanish Palaeontology' in Madrid (October 28–29, 1999). It was organised by the Spanish Palaeontological Society in collaboration with the Museum of Technological Gemines Institute. Also in 1999, the Instituto Tecnológico Geominero de España celebrated its 150th anniversary. The 15th *Jornadas de Paleontología* was devoted to the 'Historia de la Paleontología española'. The inaugural lecture was delivered by INHIGEO Member, Dr Francisco Pelayo, on 'Los orígenes de la Paleontología en España' ('The Origins of Spanish Palaeontology'). All twenty-two contributions were published in *Temas Geológico-Mineros* (Geological Institute, Ríos Rosas 21, 28003 Madrid, Spain).

Leandro Sequeiros, Granada

Publications on the History of Geology

Aragonés i Valls, Enric, 'El mapa geològic i topogràfic de la província de Barcelona: de l'escala 1:100,000 a la 1:40,000 (1884–1891)', *Treballs del Museu Geològic de Barcelona*, 1998, 7, 129–174.

Aragonés i Valls, Enric, 'Luis Mariano Vidal y la Comisión del Mapa Geológico de España (1873–1900)', *Boletín Geológico y Minero*, 1999, 6, 1954–1073.

Aragonés i Valls, Enric, 'Primera cartografía geológica subvencionada per una Institució Catalana (1869–1870)', *Treballs del Museu Geològic de Barcelona*, 1992, 2, 13–44.

Barrera, J.L. (1999) Centenario del nacimiento de Francisco Hernández-Pacheco (1899–1966). *Tierra y Tecnología*, 1999, 19, 45–49.

Cabezas, E., 'La Teoría del Clima y su función dentro del Sistema Uniformitarista de Charles Lyell', *Llull*, 1999, 22, 37–49.

Calvo Rebollos, M., *Bibliografía fundamental de la antigua mineralogía y minería españolas*, Libris, Madrid, 1999. 255 pp.

Driever, S.L. and Ayala-Carcedo, F.J. (eds), *Lucas Mallada: La futura revolución española y otros escritos regeneracionistas*, Biblioteca Nueva, Madrid, 1998. 320pp.

- García Cruz, C.M. 'Resumen de la Teoría de la Tierra (1785) de James Hutton', *Llull*, 1999, 22, 223–238.
- Hernando de Luna, R., 'Antonio Carbonell y Trillo-Figueroa', *Asociación Cordobesa de Mineralogía y Paleontología*, 1999, 37, 20–21.
- Lopes, Maria Margaret, 'Fósseis e Museus no Brasil e Argentina: uma contribuição à História da Paleontologia na América Latina', *Llull*, 1999, 22, 145–164.
- Madero, J., 'Museo de las Ciencias de Castilla-La Mancha: una puerta al tiempo', *Tierra y Tecnología*, 1999, 19, 17–19.
- Martin Escorza, C., Ordaz, J. and Alcalá, L., 'Historia "terrestre" de los meteoritos caídos en Cangas de Onís (Asturias) el 6 de diciembre de 1866', *Tierra y Tecnología*, 1999, 19, 38–44.
- Montealegre, L., 'Los cristales, los minerales y el arte árabe. Ejemplos de la mezquita de Córdoba y la Alhambra de Granada', *Asociación Cordobesa de Mineralogía y Paleontología*, 1999, 37, 8–12.
- Montero, A., 'El cordobés Fernando López de Cárdenas, colector del Real Gabinete de Historia Natural en el siglo XVIII', *Asociación Cordobesa de Mineralogía y Paleontología*, 1999, 38, 20–21.
- Montero, A., Sequeiros, L., and Cano, S., 'Las colectas de fósiles de Fernando López de Cárdenas en Montoro (Córdoba), en el último tercio del siglo XVIII' *Jornadas de Paleontología*, Temas Geológico- Mineros Instituto Tecnológico Geominero de España, 1999, 26, 89–91.
- Ordóñez, S., 'Los textos de Mineralogía en España a finales del XVIII: segundo centenario de la traducción de la "Orictognosia" de Widenmann por Ch. Herrgen (1797)', *Boletín Geológico y Minero*, 1999, 110–111, 103–120.
- Pardo, M.V. and Gozalo, R., 'Historia de los estudios paleontológicos en el Devónico de la región de Almadén (Zona Centroibérica, España): período 1834–1900', *Revista Española de Paleontología*, 1999, 217–227.
- Rábano, I., 'Colecciones paleontológicas cordobesas en el Museo Geominero ITGM, Madrid', *Asociación Cordobesa de Mineralogía y Paleontología*, 1999, 37, 17–19.
- Sequeiros, L. and Bergillos, P., 'Juan Bautista Bru (1740–1799) y el Megaterio', *Boletín de la Comisión de Historia de la Geología de España*, 1999, 15, 6–7.
- Sequeiros, L. and Montero, A., 'Historia del conocimiento de los yacimientos paleontológicos del Jurásico de Cabra (Subbética cordobesa)', *Actas XX Jornadas de Paleontología*. Madrid, octubre 1999. Temas Geológico- Mineros Instituto Tecnológico Geominero de España, 1999, 26, 113–116.
- Sequeiros, L., '“El sentido de la Evolución” de George Gaylord Simpson (1949): Cincuenta años de debates entre biología, filosofía y teología', *Proyección*, 1999, 193, 137–154.
- Sequeiros, L., 'Del diluvio Universal a los impactos de asteroides: historia de las ideas sobre la extinción de las especies', *Curso en la Universidad Internacional Menéndez Pelayo, Valencia*, 13 Oct., 1999.
- Sequeiros, L., 'El geólogo y paleontólogo Lucas Mallada en Montoro (Córdoba)', *Asociación Cordobesa de Mineralogía y Paleontología*, 1999, 38, 8–10.
- Sequeiros, L., 'El jesuita José de Acosta (1540–1600): geógrafo y evolucionista en la América Hispana', *Boletín de la Comisión de Historia de la Geología de España*, 1999, 15, 7–9.
- Sequeiros, L., 'José de Acosta (1540–1600): fundador de la Biogeografía en el siglo XVII en América Hispana', *INTERNET: Galería de Paleontólogos Hispanoamericanos (1999)*, www.ehu.es/~gpplapam/galeria/Acosta.html
- Sequeiros, L., 'José Torrubia (1698–1761): viajero, naturalista y paleontólogo', *Galería de Paleontólogos (1999)*, www.ehu.es/~gpplapam/galeria/Torrubia.html
- Sequeiros, L., 'La epistemología oculta de los paleontólogos. Los fósiles "bajo el crisol de Bacon"', *Actas XX Jornadas de Paleontología* Madrid, octubre 1999. Conferencia invitada. *Temas Geológico- Mineros Instituto Tecnológico Geominero de España*, 1999, 26, 36–43.
- Sequeiros, L., 'La Mesa de los Escalones, como punto de interés geológico y didáctico', *Educación*, 10 March, 1999, 32.
- Sequeiros, L., 'Lucas Mallada y Pueyo (1841–1921): fundador de la Paleontología española', *INTERNET: Galería de Paleontólogos Hispanoamericanos (1999)*
- Sequeiros, L., 'The two hundredth anniversary of the *First Essay on Population* (1798) by T.R. Malthus: The return of Malthusianism two centuries later?', *Congreso Internacional sobre Población*, 1999.
- Sequeiros, L., 'La paleontología española nació en nuestra tierra: el franciscano José Torrubia (1698–1761) y los fósiles de Aragón', *Naturaleza Aragonesa*, 1998, 3, 14–21.

Turkey

Professor Sengör reports that his life has been greatly disrupted by the recent earthquakes in his country; and since he has forecast that another quake may strike near his home he has had to vacate it temporarily to undertake pre-emptive defence measures! Nevertheless, he has produced a major paper on epeirogeny in *Tectonophysics* (see publications received). It has a large historical component; and he plans to expand the work into a book. He has written two purely geological papers on the recent Turkish earthquakes, and has two more in hand; also a paper on the geological calendar. He gave a lecture in Germany on the occasion of Alfred Kröner's 60th birthday, in which he repeated the lecture on Hutton–Werner/Smith–Marx, delivered at the Hutton Conference in Edinburgh. We understand that this will be published in the *Festschrift* organised by the *American Journal of Science*. In addition, Professor Sengör gave the opening lecture at his university this year ('Reason, Science, Earthquake, Man'), expounding his ideas on the evolution of critical rationalism since the Milesians, on science, and the 'deplorable recent developments in the world supporting belief systems that some think are as good as science'; and also proposing a reconstruction of Anaximander's map of the then-known world. This lecture has appeared as a 39-page pamphlet (*Akil, Bilim, Deprem, Insan, Istanbul Teknik Üniversitesi, İstanbul*, 1999). Further, Professor Sengör has produced an introduction to an exhibition catalogue on old maps; and he has published a collection of his weekly essays

on popular science that appear in a Turkish newspaper. As if this were not enough, he is completing a major book on the geology of Asia for Cambridge University Press, which will have a very substantial historical component. His major publication on the history of the notion of 'Tethys' appeared in German in 1998 and is reviewed on p. 37 by Professor Trümpy. (See also the interview with Professor Sengör, published in last year's *Newsletter*, which mentions that he had been pondering the problem of 'Tethys' since his childhood.) He is *hoping* to get back to Asia to do further geological research in the Far East. We heartily congratulate him on his receipt of the Bigsby Medal by the Geological Society in 1999 (see *Geoscientist*, 1999, 9 (6), 10–11)—awarded for 'substantial work done by a geologist under the age of 45 years'. [Indeed! (Ed.)]

United Kingdom

Following the death of John Thackray, who usually compiled the British report, we have not this year received a unified report from Britain, but the following information has been gleaned.

Trevor Ford has written that his movements are now restricted after three hip replacements, but his recent book *Derbyshire Blue John* (1999) is selling well. He has also co-authored: Ford, T.D., Wilson, E., and Burnett, D.J., 'Previous Ideas and Models of the Stratigraphy, Structure and Mineral Deposits of the Manx Group, Isle of Man', in: Woodcock, N.J., Quirk, D.G., Fitches, W.R., and Barnes, R.P. (eds), *In Sight of the Suture: The Palaeozoic Geology of the Isle of Man in its Iapetus Suture Context*, The Geological Society, London, 11–21.

Richard Howarth reports that his paper 'Measurement, Portrayal and Analysis of Orientation Data in Structural Geology (1670–1967)' *Proceedings of the Geologists' Association*, 1999, 110, 273–309 received the Richardson Award of the Geologists' Association for the best research-based paper in the 1999 volume of the *Proceedings of the Geologists' Association*. (See p. 25.)

Martin Rudwick has been awarded the Bernal Prize of the Society for Social Studies of Science (see p. 26), and has reported the following publication: 'A la Recherche des Monstres Perdus', *Les Cahiers de Science et Vie*, 1999, No. 49 ('La Passion des Mondes Disparus'), 34–41.

Hugh Torrens has reported the following publications:

- Torrens, H.S., 'Coal Hunting at Bexhill 1805–1811: How the New Science of Stratigraphy was Ignored', *Sussex Archaeological Collections*, 1999, 136, 177–191.
- Torrens, H.S., 'No Impact': René Gallant (1906–1985) and his book *Bombarded Earth* (An Essay on the Geological and Biological Effects of Huge Meteorite Impacts)', *Earth Sciences History*, 1999, 17, 174–189.
- Torrens, H.S. and W.R. Brice, 'James Buckman (1814–1884) English Consulting Geologist and his Visit to the Guyandotte Coal-fields in 1854', *Southeastern Geology*, 1999, 38, 191–201.
- Torrens, H.S., 'Some Reflections on the Sale of Academic Libraries', in: *A Catalogue of Books from the Library of the Royal Geological Society of Cornwall*, Catalogue 1270, Maggs Brothers, London, 1999, 3–6.
- Torrens, H.S., 'Robert Townson (1762–1827): Utazo, Polihistor & Nyelvesz', *Neprijzi Hirek*, 1999 (for 1997), 84–85.
- Torrens, H.S., Bawden, L.A. and Padian, K., 'The Undercliff of John Fowles's *The French Lieutenant's Woman*: A Note on Geology and Geography', in: Aubrey, J.R. (ed.), *John Fowles and Nature: Fourteen Perspectives on Landscape*, Fairleigh Dickinson University Press, Madison, 1999, 137–153.
- Torrens, H.S., 'Richard Cowling Taylor (18 Jan. 1789–26 Oct. 1851)', *American Dictionary of Biography*, Oxford University Press, Cary (North Carolina), 21, 1999, 402–404.
- Torrens, H.S., 'William Edmond Logan's Geological Apprenticeship in Britain 1831–1842', *Geoscience Canada*, 1999, 26, 97–110.
- Torrens, H.S., 'Spelling it Out', *Times Higher Education Supplement*, 3 December, 1999, p. 15.
- Torrens, H.S., 'The History of Oil in the West Midlands', *Journal of the Staffordshire Industrial Archaeology Society*, 1999, 17, 80–89.

United States

General

At the Geological Society of America's October meeting in Denver, the Division presented its History of Geology Award to David R. Oldroyd. For the citation by Ursula Marvin and Oldroyd's reply, read by Kenneth Taylor in Oldroyd's absence in China/Mongolia, see pages 24–25.

An all-day Topical Session entitled 'Crossing Disciplinary Boundaries in the Geosciences: Historical Perspectives', sponsored by the Division and co-sponsored by the History of the Earth Sciences Society, was organised by Kenneth Taylor and Michele Aldrich. It consisted of 23 presentations by 28 authors. Four of the speakers came from outside North America: England, France, Italy, and Turkey.

Two distinguished geologists were honoured in special events. A gathering to pay tribute to the sedimentary geologist, Francis J. Pettijohn, who died in April 1999, was organised by two of his former students, Robert Ginsburg and Lawrence Hardie. It drew a large number of participants, many of whom shared vivid memories of Pettijohn as teacher, colleague, co-author, and field companion. Leo Laporte led a walking tour through the neighbourhood where palaeontologist, George Gaylord Simpson, spent his boyhood (see Laporte, below).

Election results announced at the business meeting listed the new officers of the History of Geology Division as: Gerald M. Friedman, Chair; Sally Newcomb, First Vice-Chair; A.M. Cefäl Sengör, Second Vice-Chair, Bill Brice, Secretary-Treasurer. Kenneth Taylor serves as the Past-Chair.

Several American historians of geology were presented with awards during the year. Albert Carozzi received the *Prix Wegmann* (see p. 22). In May, William Brice won the Distinguished Service Award of the Eastern Section of the National Association of Geoscience Teachers (NAGT). At the Annual meeting in October, the GSA awarded its first GSA Public Service Award to Stephen Jay Gould.

Members

Albert Carozzi received the *Prix Wegmann* in Paris in June, 1999, from the *Société Géologique de France* for his lifelong contribution to the history of geology.

Carozzi corrected the final proofs of his bilingual volume (English–French) entitled *Manuscripts and Publications of Horace-Bénédict de Saussure on the Origin of Basalt (1772–1797)*. The volume is scheduled for publication in the summer of 2000 by Editions ZOE in Geneva under the auspices of the University of Geneva and the Museum of Ethnography of Geneva. He currently is working on another set of de Saussure's unpublished manuscripts relating to the lectures he gave on introductory geology (then called *Géographie Physique*) at the Academy of Geneva in 1775. The unique feature of these manuscripts is that they include de Saussure's own lecture-notes in French as well as the notes taken by one of his students, Jean-Louis Peschier, who recopied them in final formal form in Latin in 1786. The planned volume will provide a glimpse of teaching techniques in the 18th century and of the reciprocal relationships between professor and student. The book will include the transcription of de Saussure's notes, the Latin notes of Peschier, and Carozzi's annotated translation of them in English.

Publication

Carozzi, A. V., 'Les Théories de l'Origine des Montagnes Primitives de Louis Jurine, 1797 et 1804', in: René Sigrist *et al.* (eds), *Louis Jurine, Chirurgien et Naturaliste (1751–1819)*, Bibliothèque d'Histoire des Sciences, Genève, 1999, 2, 351–376.

Robert Dott spent much of 1999 concentrating on the early history of the Wisconsin geology program for the sesquicentennial celebrations of the University. He focused mainly on the Wisconsin School of Precambrian Geology, which gained international recognition during the first decades of the 20th Century. The names of Roland D. Irving, Wisconsin's first professionally trained geologist, his protégé Charles R. van Hise, in turn van Hise's protégé, Charles K. Leith, and in turn his protégé, Warren J. Mead, were the key players. Crucial to the distinguished stature of the program was the creation at the University of a US Geological Survey Division for the study of the Precambrian iron-bearing rocks of the Lake Superior region, during the early days of American industrialisation. Irving was the first Division chief in 1882, but upon his premature death, van Hise took over in 1888; Leith joined in 1903. Van Hise and Leith directed a small army of field geologists, mapping all of the iron districts during a three-decade period spanning the turn of the century. This research program, which was big science before the era of Big Science, produced a dozen large publications, which quickly attracted attention. Van Hise and Leith concentrated upon a broad synthesis of the work, and developed fundamental concepts of structural and metamorphic geology. Leith helped to publicise those concepts more widely through four textbooks.

By 1915, the Department had developed such a reputation that it was attracting graduate students from other countries as well as the US. Canadians were most numerous, but a number of Chinese, at least one Japanese, and an Englishman, Gilbert Wilson, also came during the 1920s. Wilson carried the Wisconsin structural geology to Imperial College, and there spawned a revolution in structural analysis during the 1950s and 1960s. Wilson acknowledged that it was the use of small-scale structures to infer large-scale structure that so impressed him at Wisconsin in 1925–26. The remarkable genealogical legacy from Irving to Mead languished during the 1930s–1950s because of 'inbreeding' and Leith's continuing occupancy of his faculty position for twenty more years after he had shifted his professional attentions from academia to consulting and government advising on mineral resources.

In May, 1999, Dott took part in the presentation by the University of Wisconsin Department of Geology and Geophysics of a Distinguished Alumna Award, posthumously, to Katharine Fowler-Billings in recognition of the remarkable career of an irrepressible, early woman geologist. Kay earned her Bachelor's degree in Geology at Bryn Mawr, where she studied partly with Florence Bascom, who had earned her BA and MA degrees in the 1880s at Wisconsin (while her father was President of the University). Katharine then went to Wisconsin for the year 1925–26 to work for a Masters degree. There she studied under such luminaries as C.K. Leith and W.J. Mead. From Wisconsin, she went to Columbia University where she earned her PhD in 1929 for her thesis on the anorthosites of the Laramie Range in Wyoming. That accomplished, she attended the International Geological Congress in South Africa and then made her own way from the Cape to Cairo and on to London via a series of rail and boat trips, with many stops to look at the geology. Soon afterward she returned to Africa where she spent three years prospecting for haematite, molybdenite, and gold in Sierra Leone. As the first woman geologist to pursue her own mapping and sampling program in the West African bush, Kay created a sensation but eventually won the full respect of the colonial officials and of the Africans she worked with. Afterwards, she returned to her native New England, and in 1938 married Marland P. Billings, professor of structural geology at Harvard University. While Kay held teaching positions at Wellesley and Tufts Colleges, she and Marland collaborated extensively on revising the geological map of New Hampshire, where Billings had determined a Devonian age for major rock formations previously mapped as Precambrian. During the summer of 1946, Ursula Bailey (Marvin) was fortunate enough to serve as Kay Billing's field assistant in the Mt Monadnock Quadrangle of New Hampshire. Kay's book *The Gold Missus: a Woman Prospector in Sierra Leone* was published in 1938 by the W.W. Norton, and her fascinating autobiography, *Stepping-Stones: The Reminiscences of a Woman Geologist in the Twentieth Century*, was published in 1999 by the Connecticut Academy of Sciences.

Publications

- Dott, R.H., Jr, 'What is Unique about Geological Reasoning?', *GSA Today*, October, 1998, 15–18.
- Dott, R.H. Jr, and W.M. Jordan, 'Doctor Koch's Horrendous Hydrarchos', *Geotimes*, March, 1999, 20–24.
- Dott, R.H. Jr, 'The Wisconsin School of Geology: Early Intellectual Exports', *Wisconsin Academy Review*, Summer, 1999, 29–36.
- Dott, R.H. Jr, 'A Sesquicentennial Timeline for the Department of Geology and Geophysics, University of Wisconsin–Madison (1848–1998)', published by the Department, Madison.
- Dott, R.H. Jr, 'A Case of Mistaken Identity (a remembrance of vertebrate paleontologist Ermine Cowles Case)', *Geoscience News*, University of Michigan Department of Geological Sciences, July 1999, 3–5.
- Dott, R.H. Jr, 'Fifty Years Adrift (A Turn-of-the-Century Retrospective Essay)', *Geoscience News*, University of Michigan Department of Geological Sciences, December, 1999, 16–17.

Ursula Marvin presented four invited lectures that included historical themes. In April, she delivered the keynote address outlining the history of the Antarctic meteorite recovery programme at a symposium honouring Professor William A. Cassidy, of the University of Pittsburgh, who initiated the US-led expeditions to the ice sheet. In 1969, Japanese geologists discovered four different types of meteorites lying in close proximity on a patch of bare ice. Subsequently, Cassidy and Japanese colleagues surmised that meteorites, frozen into the shoreward-creeping ice sheet, are exposed in placer-like concentrations wherever expanses of stagnant ice have been deeply eroded by wind scour and ablation. During the past thirty years, US, Japanese, and German teams have recovered nearly 20,000 meteorite fragments, including rare samples of impact ejecta from the Moon, Mars, and previously unknown types of asteroids. Isotopic dating shows that at least two Antarctic meteorites fell to the ice two million years ago—older by far than any found elsewhere on the Earth. Marvin spent two field seasons as a member of Cassidy's meteorite-collecting expeditions to Antarctica.

In July, at a workshop in South Africa she traced the changing attitudes toward discoveries of erratic lumps of iron in southern Africa from 1793, when the Cape of Good Hope meteorite was believed to be the remnant of a ship's anchor, to 1920 when a 70-ton mass of meteoritic iron—the largest in the world—was found in Namibia. Being immovable, that meteorite was made the centrepiece of a National Monument.

In August, at a conference held at Harvard University celebrating Victor M. Goldschmidt, the 'father of geochemistry', Marvin reviewed the distinguished career of Dr Brian Mason, who travelled from his native New Zealand to Norway in 1941 to be one of Goldschmidt's students. Through his books *Geochemistry* (1952) and *Meteoritics* (1962), Mason was largely responsible for introducing both geochemistry and meteoritics to the curricula of American universities.

At the GSA meeting in October Marvin presented a talk to the Planetary Sciences Division entitled 'Uniformitarianism: Bombed Out'. In it, she argued that uniformitarianism has been rendered obsolete by our recent recognition that hypervelocity impacts of bodies from space wreak large-scale changes on the Earth instantaneously. Today, some geologists categorise impact geology as 'Neo-uniformitarianism' while others call it 'Neo-catastrophism'. They cannot both be right; and the fact that both camps are referring to exactly the same process demonstrates the bankruptcy of these old 19th-century terms. Marvin seconded the call for an end to 'isms', sounded back in 1989 by Claude C. Albritton Jr, and urged that as we enter the new century we discard doctrinaire labels and describe geologic processes in plain language.

Publications

- Marvin, Ursula B., 'Impacts from Space: The Implications for Uniformitarian Geology', in: Craig, G.Y. and Hull, J.H. (eds), *James Hutton—Present and Future*, Geological Society of London, Special Publications, 1999, 150, 89–117.
- Marvin, Ursula B. Review of: Roberta J.M. Olson and Jay M. Pasachoff, *Fire in the Sky! Comets and Meteors, the Decisive Centuries in British Art and Science*, Cambridge University Press, Cambridge, UK, 1998, xiv + 369 pp. In *ISIS*, 1999, 90, 365–366.
- Marvin, Ursula B. Review of: John Remo (ed.), *Near-Earth Objects: The United Nations International Conference, Annals of the New York Academy of Sciences*, 1997, 822, 632 pp. 147–148. In: *Meteoritics and Planetary Science* 1999, 34, 147–149.

Marvin, Ursula B., 'Iron Meteorites and Controversies over the Origin of Erratic Boulders', 23rd INHIGEO Symposium, Neuchâtel, Switzerland, September, 1998 (proofed in 1999 for *Eclogae Geologicae Helveticae*).

Leo Laporte led attendees at the 1999 GSA meeting in Denver on a Sunday afternoon walking tour of the neighbourhood where George Gaylord Simpson spent most of his boyhood from the age of four years (in 1906) to 1918; and where his future wife, Anne Roe, spent her childhood. The group encountered one home owner who was delighted to hear, for the first time, of the historical significance of his house. Leo authored a brief guide for the tour in GSA Field Guidebook, No. 1, pp. 93–95, published for the Denver meeting. Laporte's book entitled *George Gaylord Simpson: Paleontologist and Evolutionist* (Columbia University Press) is due for publication in the autumn of 2000.

Kennard Bork served the first year of his two-year term (1999–2000) as president of the History of Earth Sciences Society. He also was one of four members of the editorial board of the 'Rock Stars' section of *GSA Today*. The board is responsible for soliciting, reviewing, and editing articles about major 'stars' in the history of geology in an effort to interest students in choosing careers in geology. Texts of the Rock Star profiles appear in *GSA Today* and can be accessed electronically at: <http://geoclio.st.usm.edu/gsa/history.html>.

Publications

- Bork, K.B., 'Notes on the James Hutton Bicentennial: Eighteenth-Century Scotland', *Newsletter of the Eighteenth-Century Scottish Studies Society*, 1999, No. 13, 13–14
- Bork, K.B., 'Parker Cleaveland', *American National Biography*, Oxford University Press, 1999, 5, 42–44.

Naomi Oreskes' book, *The Rejection of Continental Drift: Theory and Method in American Earth Science*, was published in 1999. In it she presents in-depth analyses of several factors that may have influenced American geologists to reject the concept of horizontal displacement of continents until the 1960s. (See review, p. 44.) Naomi is currently serving as guest editor of a special issue of *Studies in the History and Philosophy of Modern Physics*.

Clifford Nelson was assigned by USGS Director Charles Groat to complete the research, writing, and other work required to publish Volume 4 (1939-1979) of Mary Rabbit's *Minerals, Lands, and Geology for the Common Defence and General Welfare*. Nelson edited *Records and History of the United States Geological Survey*, USGS Circular 1179 (CD-ROM, with Adobe Acrobat Reader 4.0). The disk, available gratis in April 2000, contains two presentations in PDF format: Renée Jaussaud's 700-page *Inventory of the Records of the United States Geological Survey: Record Group 57 in the National Archives* and Mary Rabbit's *United States Geological Survey 1879-1989*, USGS Circular 1050 (1989; also available in HTML format). Nelson also completed two additional articles (on Vincent McKelvey and Thomas Nolan) for the supplement to the *American National Biography* that will be published on-line in 2000.

Publications

Edwards, Carol A. and Nelson, Clifford M., 'Hague, Arnold', in: John A. Garraty and Mark C. Carnes (eds), *American National Biography*, New York and Oxford, Oxford University Press, 1999, 9, 792-794.

Jaussaud, Renée M. and Nelson, Clifford M., 'Newberry, John Strong', *Ibid.*, 16, 321-323.

Nelson, Clifford M., 'Mendenhall, Walter Curran', *Ibid.*, 15, 298-300.

Nelson, Clifford M., 'Owen, David Dale', *Ibid.*, 16, 859-860.

Nelson, Clifford M., 'Smith, George Otis', *Ibid.*, 20, 182-184.

Nelson, Clifford M., 'Wrather, William Embry', *Ibid.*, 23, 895-897.

Nelson, Clifford M., 'Toward a Reliable Geologic Map of the United States, 1803-1893', in Edward C. Carter II (ed.), *Surveying the Record: North American Scientific Exploration to 1930*, American Philosophical Society Memoirs, No. 231, 1999, 51-74.

Cecil Schneer recently has obtained copies of 'group' photographs of the INHIGEO members who attended the founding meeting at Yerevan in 1967 and the meeting in Montreal in 1972. After each of these meetings, the participants sent pictures of themselves to President Vladimir V. Tikhomirov, who arranged them on a single sheet and had them re-photographed. Cecil plans to publish these pictures and perhaps make them available on a Web Page. Cecil authored the article 'Renaissance Geology' (although he says he was not keen on calling it 'geology') in Paul F. Grendler (editor-in-chief), *Encyclopedia of the Renaissance*, Scribner's, New York, 1999, 6 volumes.

Alexander M. Ospovat presented the University of Oklahoma with his personal collection of original and photocopied materials assembled in a lifetime of research on Abraham Gottlob Werner and the development of geology during his times. Ospovat's gift was established in a dedication ceremony as the 'Abraham Gottlob Werner Research Collection'. Made by special agreement with the Rektor of the Technische Universität Bergakademie Freiberg, Ernst Schlegel, the deposit of these materials adds significantly to the strengths of the Oklahoma University History of Science Collections. In September, Ospovat attended the joint meeting of INHIGEO and the T.U. Bergakademie Freiberg. He addressed the plenary session following the playing of violin sonatas by his grandson. An INHIGEO booklet edited by Ospovat, *Abraham Gottlob Werner, Allgemeine Betrachtungen über den Festen Erdkörper/General Observations about the Earth*, was made available to participants at the Freiberg meeting, having previously been distributed to all INHIGEO Members.

Kenneth Taylor chaired the History of Geology Division of the GSA and co-convoked its symposium (noted above). He also attended the meeting in Freiberg where he gave a paper titled: 'The New Lavoisian Chemistry and Volcanology Two Centuries Ago: The Volcanological Synthesis of E.M.L. Patrin (1742-1815)'.

Publication

Taylor, Kenneth L., 'Earth and Heaven, 1750-1800: Enlightenment Ideas about the Relevance to Geology of Extraterrestrial Operations and Events', *Earth Sciences History*, 1999 (for 1998), 17, 84-91.

Ursula Marvin, Cambridge (Mass)

Yugoslavia (1997-1999)

Due to the huge disaster that affected my country (international sanctions, embargo, and bombing by NATO forces), I was not in a position to submit reports on our work on the history of geological sciences for part of 1997 and 1998. I had neither the time nor the necessary concentration to work during the two and a half months of bombing. However, I now send the missing reports and I apologise to all Members of our Commission for the delays. Also, I send warm regards to all Members and many thanks to those who sent me their support, encouragement, and scientific solidarity during those tragic days.

1997

During May and June, an exhibition was mounted by the Museum of Natural History, Belgrade, and the National Museum, Krusevac, in Belgrade, Krusevac and Kraljevo, on 'Life Stopped in Time', the authors being A. Maran and M. Trifunovic. The well produced and valuable publication *Life World Stopped in Time* (13 pp.) was issued by A. Maran on the occasion of the exhibition (in Serbian).

In December, a Symposium entitled 'Jubilee and Celebration of One Hundred Years of Hydrogeology' was organised by the Faculty of Mining and Geology at The University of Belgrade and had many participants. The *Proceedings* were published in a book of 368 pages, with a high standard of technical production. Along with eleven contributions on hydrogeology in Yugoslavia there was a reprint of Svetolik Radanovanovic's famous work on *Ground Waters*, first published in Serbian in 1897. Important articles in the publication were:

- A. Grubic, 'Svetolik Radanovanovic and his pioneer works in Serbian hydrogeology and geothermy' (pp. 7-12)
 M. Milojevic, 'Ground Waters: the first book and the first text-book of hydrogeology and geothermy by Svetolik Radanovanovic', pp. 13-20
 B. Filipovic, 'History of Yugoslav hydrogeology and the level of hydrogeological investigations', pp. 31-46
 V. Radulovic and M. Radulovic, 'Historic background of hydrogeological explorations of Montenegro', pp. 57-74
 Z. Stevanovic, 'The first studies of eastern Serbian karst by Jovan Cvijic—The basis of modern karst hydrogeology', pp. 99-114.

1998

The following meetings were organised in 1998:

1. Celebration of the first fifty years of the Geoinstitute—with the publication of *The Geoinstitute—Its First Fifty Years*, edited by R. Popovic, Belgrade, 379 pp. (in Serbian).
2. Celebration of the first fifty years of the Milan Milankovic High School of Geology and Hydrometeorology. For the occasion, a hundred-page book was published under the editorship of V. Milicevic, containing a compilation of data concerning the fifty year history of the school, with a list of all the students who had studied there.

Three interesting books were published during the year, with contributions on geosciences history:

1. T. Podgorac (ed.), *Science and Technology in Serbia in the Second Half of the Nineteenth Century (1854-1904)*, Kragujevac, 847 pp. This book contained 90 papers, with contributions on geosciences as follows:
 - A. Grubic, 'Geology in Serbia in the latter half of the nineteenth century' (pp. 77-86)
 - A. Grubic and S. Blagojevic, 'Baron Herder's Collection in Kragujevac—the foundation of natural history museum development in Serbia' (pp. 87-92)
 - V. Jovic, 'Geological investigations in Serbia, 1854-1904' (pp. 237-238)
2. *Life and Work of Serbian Scientists, Volume 3*.
 - A. Grubic, 'Aleksandar Sandor Popovic' (pp. 93-129) (in Serbian with English summary)
 - P. Nikolic, 'Vladimir K. Petkovic' (pp. 375-416) (in Serbian with English summary)
3. *Life and Work of Serbian Scientists, Volume 4*.
 - V. Jovic and S. Karamata, 'Sava Urosevic' (pp. 67-92) (in Serbian with English summary).

1999

A symposium entitled 'Milankovic—Yesterday—Today—and Tomorrow' was held at the Faculty of Mining and Geology, The University of Belgrade. It commemorated the 120th year of his birth, the 90 years since the start of his careers at The University of Belgrade, and the 60 years since the start of his work *Kanon der Erdbestrahlung*. Articles from the meeting were published in an appropriate book under the editorship of Vlado Milicevic, with twenty-six contributions.

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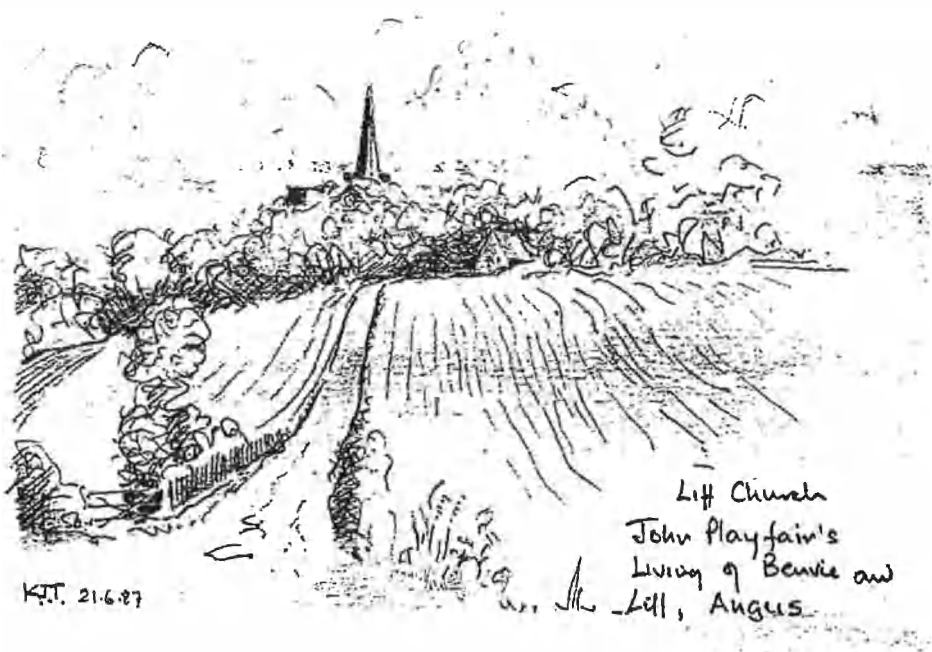
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