Kenneth L. Taylor

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REPORTS

President's message

Dear Members of INHIGEO,

After the very successful meeting of INHIGEO in Prague (Czech Republic) in July 2005, a meeting perfectly organized by our colleague Jan Kozak, our program for the next few years proposes very exciting highlights.

In July 2006, we will meet in Vilnius (Lithuania) where our colleague Algimantis Grigelis is waiting for us, and has prepared a fine rendezvous with a nice excursion through the Baltic countries. The theme is devoted to "History of Quaternary Geology and Geomorphology," along with regional geological aspects.

In 2007, Martina Kölbl-Ebert, with her German colleagues, will receive us in Eichstätt (Bavaria, Germany)—the world city of *Archaeopteryx*—from the 28th of July to the 5th of August, for an excellent project, entitled "The historical relationships of geology and religion."

In 2008, for the 33rd International Geological Congress, to be held in Oslo (Norway), the Board of the International Union of Geological Sciences has agreed to our proposal to have the INHIGEO conference on the "The History of Exploration of the Polar Regions." And the year 2008, after confirmation this past autumn by UNESCO, will be the celebrated as the "International Year of the Planet Earth."

At a time when the inhabitants of the Earth wonder more and more about the future of their planet, at a time when they are concerned with global warming, when they are anxiously looking at the succession of extreme

events (tsunamis, cyclones, earthquakes), when they are questioning the quantity of fossil resources of energy for the future, it is a time for serious reflection.

Historians of geology are essential for giving a necessary and useful perception and appreciation of what is happening with the natural phenomena in this century. It is important to the people living today, and also to give a just measurement of what could happen in the future.

The studies of the Earth's past and the history of these studies are very useful to developing a better understanding of the present, and to give the best rational approach for an evaluation of the future of our planet.

Philippe Taquet, Paris

Secretary-General's Report

This report will be considerably shorter that my initial communication as Secretary-General. That commentary, in last year's *Newsletter*, included a wide range of introductory remarks. It also contained a listing of *Objectives and Strategies* for the Commission, following a request from the International Union of Geological Sciences (IUGS) for all of the Commissions to generate a "Terms of Reference" statement. For those interested, please see the blue-covered INHIGEO *Newsletter* No. 37 (pp. 4–6).

As this *Newsletter* goes to press, an excellent meeting in the Czech Republic is behind us (July 2005) and an interesting and well-planned conference in Lithuania is ahead of us (July 2006). A number of the papers given in Prague will become part of a Special Edition of *Earth Sciences History* devoted to "The History of Geophysics." Discussions are currently under way with the Geological Society (London) to publish papers from the upcoming conference in Vilnius, on "The History of Quaternary Geology and Geomorphology." Thus, the Commission is doing well in advancing the discipline of geoscience history. Our hosting of symposia and field excursions, as well as fostering publication of papers stemming from our meetings, are at the heart of our stated goals.

March through May 2006 involves another INHIGEO biennial (two-year cycle) election, so we will soon have a coterie of new members to share the wealth of our activities. The election process is ongoing at this moment, and final results will be announced at the Business Meeting in Vilnius. I would like to thank all of those members who have already voted. As noted in my letter of mid-March 2006, a friendly caution needs to be given about the need to participate in the election process. The By-Laws are quite explicit in stating that those who do not vote in two consecutive elections will have their membership in the Commission terminated. If you did not participate during March-April 2006, your vote may still be counted if I receive it by 1 June 2006. Otherwise those for whom this is a second missed election must, regrettably, be removed from the rolls.

As was the case last year, we are receiving valuable funding from the IUGS and the International Union for the History and Philosophy of Science, History of Science Division (IUHPS/DHS). Again in 2006, however, as has occurred in recent years, our funding organizations have not been able to meet the full amount of our requested budgets. Thus, our primary expenditures must be devoted to the *Newsletter* and to helping our hosts for the annual meetings with costs associated with conducting their programs. That has the sad result of terminating our already small program of extending travel grants to the annual meetings.

Thanks to your generous gifts of time, effort, and creativity, we again have many strong elements incorporated in this year's *Newsletter*. Genuine notes of appreciation are extended to all contributors. We are continuing the practice of my compiling and editing the booklet, but sending the contents to Australia for printing and distribution. The postal-cost savings are critical to the welfare of the Commission.

Speaking of saving—if authors would follow the **formatting suggestions** on the inside back cover of the *Newsletter*, it would save your editor much time and eye fatigue! When virtually every review, note, publication, and country report follows a totally different format, it makes for arduous editing. Of course, editors have to do some real editing, or the task would become boring! Apologies are extended for any problems you do find within this issue. Editors know how many gremlins they have caught, but readers easily spot remaining infelicities. Please feel free to let me know if there are major improvements that you can suggest concerning the editorial process or practice.

A number of you have reported changes in postal and/or e-mail addresses. Many thanks! It is essential that we keep our records up to date. Your input is greatly appreciated.

President Taquet has given you a good introduction to our upcoming meetings. Please be thinking beyond 2008. Those of you willing to host INHIGEO meetings after the 2008 International Geological Congress in Oslo are invited to submit brief and informal proposals. These proposals will then be considered at our Business Meeting in Vilnius, Lithuania (July 2006).

Our thanks to the Board, our Conference and field-trip hosts, *Newsletter* authors, and all who have contributed to making this another good year for the Commission.

Kennard B. Bork, Granville, Ohio

Minutes of the INHIGEO Business Meeting 2005
Hotel Hubertus, Valtice (Moravia) Czech Republic
Sunday, 10 July 2005; 9:00 a.m. to 10:35 a.m.
President Philippe Taquet (France) in the Chair

Present: Filomena Amador (Portugal); Carol Bacon (New Zealand); Zoya Bessudnova (Russia); Ken Bork (USA); Ana Carneiro (Portugal); Greg Good (USA); Rodney Grapes (NZ/Germany); Mike Johnston (New Zealand); Martina Kölbl-Ebert (Germany); Jan Kozák (Czech Republic); Kerry Magruder (USA); Simon Nathan (New Zealand); Sally Newcomb (USA); David Oldroyd (Australia); Octavio Puche (Spain); Yasumoto Suzuki (Japan); Ken Taylor (USA); Philippe Taquet (France)
Attending: Kay Bork (USA); Alena Ceichanova (Czech Republic); Josef Haubelt (Czech Republic); Luis Mazadiego (Spain); Teresa Mota (Portugal); John Norris (USA/Czech Republic); Johannes Schweitzer (Germany/Norway); Claudia Schweizer (Austria);
The meeting was conducted jointly by President Philippe R. Taquet and Secretary-General Kennard B. Bork.
President Taquet opened with a request for a moment of reflection concerning the past week's terrorist attacks in London, as well as previous tragedies in Madrid, New York City, and throughout the world.
1) APOLOGIES received, from those not able to attend, were presented by the Secretary-General:
David Branagan (Australia); Barry Cooper (Australia); Algimantas Grigelis (Lithuania); Martin Guntau (Germany); Richard Howarth (UK); Léo Laporte (USA); Ursula Marvin (USA); Alan Mason (New Zealand); Kottapalli Murty (India); Manuel Pinto (Portugal); Hakuyu Okada (Japan); Gerardo Soto (Costa Rica); Hugh Torrens (UK); Susan Turner (Australia)
2) ARRANGEMENT OF AGENDA (requests for modification of the agenda)
No major requests for revision of the agenda were received, but Ken Taylor made a brief announcement about the relevance to INHIGEO members of the History of the Earth Sciences Society (HESS), and its journal *Earth Sciences History*. He also noted the existence of the Petroleum History Institute and its journal *Oil Industry History*.
3) MINUTES OF PREVIOUS MEETING (The Bologna meeting, 2004; as noted in *NEWSLETTER* #37, pp. 6–8)
There were no corrections or emendations.
4) MATTERS ARISING / Discussion
No questions or new issues were raised.
5) PRESIDENT's REPORT (Philippe Taquet)
A) The IUGS has designated 2007–2008 as "The Year of the Earth." It also added "Life" to the agenda. The IUGS wishes to coordinate the specifics of the Oslo 2008 meeting with the various Commissions.
B) There is a serious lack of funding for UNESCO, and that has major financial implications for work being done in the earth sciences. In fact, the Division of Earth Sciences was disbanded in 2005. The exact long-term ramifications are unknown at this time.
C) The IUGS website now includes a sub-site for INHIGEO. Ken Bork has been working with John Aaron to keep our site up-to-date.
D) About the Oslo meeting in 2008:
(1) We will need to generate an INHIGEO theme. Perhaps "The History of Arctic Explorations" would be viable.
– Johannes Schweitzer (Germany/Norway) noted that 2007–2008 is to be the "International Polar Year"—a point of possible tie-in with any theme we select.
(2) Jan Kozak reported that he has a collection of materials and pictures concerning the Arctic, dating from the 16th through 19th centuries.
(3) With very few Scandinavian members, we perhaps need to think about nominating Scandinavian colleagues for the 2006 election.
(4) David Oldroyd suggested that Cornelia Lüdecke, a German member of INHIGEO, is involved with the history of Arctic science and might be a valuable contact regarding 2008.
6) MATTERS ARISING / Discussion
David Oldroyd made the point that 2007 is the Bicentennial of the Geological Society (London).
7) SECRETARY-GENERAL's REPORT (Kennard Bork)
A) The Secretary-General called attention to his full report, as provided in *Newsletter No. 37*, p. 4–6.
(1) He reiterated the high value of the 2004 excursion, from Pisa to Venice, run by our Italian colleagues.
(2) An invitation was extended for members to contact officers with suggestions about improving INHIGEO operations.

(3) No additions or discussions regarding the *Newsletter* commentary were pursued by those attending.

B) Discussion ensued concerning a number of issues.

(1) This is a membership-election year. Feel free to consider nominations for the 2006 meeting (Vilnius, Lithuania).

(2) A run-through of election procedures was conducted. The full set of procedures will be spelled out in a communication from the S-G to all members (probably in October 2005).

* A limit of 11 members per country exists.
* Honorary Senior Members and those over 70 don't count against the total of 11 per country.
* Two nominators + a Board member = required.
* CV, prepared by nominators, goes to Secretary-General.
* A 'booklet' of CVs is sent to members by Secretary-General.
* Voting occurs early in 2006; members can vote in Vilnius.
* The vote is ratified at the annual Business Meeting.

(3) IUGS has requested a new "Terms of Reference" statement from all of its Commissions. (Such documents contain sections on 'Objectives' and 'Strategies.') Please see *Newsletter* No. 37, p. 4, and/or the INHIGEO website for the current statement.

(4) Budget cutbacks from UNESCO affected IUGS and had an impact on our INHIGEO budgets. We are attempting cost cutting in the newsletter and will probably have to stop making travel grants for members to attend meetings.

We do not know how our annual budget requests have been treated by IUGS until June. That can make planning and paying for services a bit difficult. IUGS is considering how to improve the timing of notification.

(5) Apologies were extended concerning the low quality of some photographs in *Newsletter* No. 37. The printer apparently could not translate the excellent color photos on a CD disk into high-resolution black and white results.

(6) A call went out for UPDATING ADDRESSES—both postal and e-mail addresses. Optimal communication is not possible without valid addresses.

(7) A reminder was extended that members who did not vote in two consecutive elections would be dropped from INHIGEO.

(8) Feel free to consult the INHIGEO website and/or offer suggestions for materials to be included.

(9) Please consider themes and field trips (and new members) for the Oslo 2008 meeting.

8) MATTERS ARISING / Discussion

None were articulated at this time.

9) IUGS TOPICS

President Taquet discussed the difficult funding issue resulting from cutbacks originating at the top level of UNESCO, and impinging upon IUGS and INHIGEO. The potential to pursue other funding sources was considered. Ken Taylor and others noted that there might be internal problems (within IUGS, vis à vis INHIGEO) if we succeeded in acquiring corporate or other external funding.

10) IUGS FUTURE MEETINGS and IUHPS/DHS MEETINGS

A) IUHPS has contributed US$ 600 to INHIGEO for 2005. David Oldroyd will be our representative at the Beijing meeting of IUHPS/DHS (July 2005).

David recounted the situation involving a potential session on "The History of Asian Geology," but the organizers would not allow a one-day registration (that would have aided Chinese participants), so the idea withered on the vine.

Sally Newcomb expressed concern that little information came from IUHPS concerning timing and content of meetings and specific technical sessions.

Ken Bork made that point that IUHPS and IUGS funding has been sufficient in the past but was cut in 2005. If the trend continues, INHIGEO will have little leeway to fund major projects, such as supporting publication of symposia volumes or financing the "In the Steps" guidebooks to be discussed in few moments.

B) Discussion ensued on the merits of INHIGEO involvement with *Episodes*, the journal of IUGS.

(1) David Oldroyd reported that IUGS is anxious to have more articles of a high-quality nature. They also have a desire to increase the journal's "citation index."

(2) The "Classic Paper" series has been well received by IUGS, but David is having trouble acquiring sufficient response from the INHGEO membership.

*** Please aid him in this endeavor, if possible.

(3) Similarly, the reports on specific International Geological Congresses (IGCs) have been applauded, but the set is not complete. Authors are welcomed to contact David Oldroyd about articles to be submitted concerning IGC meetings not yet covered.

(4) With a new editorship at *Episodes*, there is some resistance to articles that are strictly limited to the history of geology.

C) Oslo, Norwary, will be the site of the next IGC (2008).

(1) Taquet and Bork have received letters from the Oslo LOC (Local Organizing Committee) inviting INHIGEO involvement and cooperation with the mission of the IGC. Both officers have responded in a positive vein to the invitation.

(2) Cornelia Lüdecke and Johannes Schweitzer are both contacts of potential great value in planning for the Oslo meeting.

(3) David Oldroyd raised the topic of the length of oral presentations at IGC meetings. They typically are limited to 15 minutes, but it may be that the conducting 'Workshops' will allow INHIGEO to have paper lengths of 30 minutes or more.

D) We all need to be thinking about the 2009 meeting—both as to WHERE and what the THEME might be.

A proposal from the USA was presented last year, at the 2004 meeting in Bologna, but the target date was 2006 or 2007 and it is not certain that such a proposal would be repeated by the hosts nor favored by the membership at the present time.

It may be time to consider venues outside of Europe. We have had a sequence since 1997 that includes Belgium, Switzerland, Germany, Portugal, France, Ireland, Italy, and the Czech Republic, with Lithuania, Germany, and Norway in the future. The 2000 meeting in Brazil was the only break in the chain.

E) Discussion ensued about the 2006 INHIGEO meetings to be held in the Baltic States (Lithuania, Latvia, Estonia) and the 2007 meeting to be hosted by Martina Kölbl-Ebert, in Bavaria. Martina suggested late July to early April 2007 and highlighted some of the planned field excursions.

11) BUSINESS WITHOUT NOTICE / NEW BUSINESS

A) A primary topic of discussion was the potential publication of papers associated with the 2005 INHIGEO symposia, held in Prague, Czech Republic, 4–5 July 2005.

(1) One option is to have Jan Kozak use his facilities at the Geophysical Institute to produce about 100 copies, to be distributed to all participants.

This "grey literature" mode has the merit of publishing ALL the contributions, but the debit of being "lost" to a wide readership and having little professional impact.

(2) Higher visibility would result from having a special volume be produced by a first-tier publisher, such as the Geological Society (London).

The merits would be a high-quality product, a strong international audience, and long-term impact. The debits would include the time, money, and rigorous editorial procedures required, along with the likely need to select just a few papers from the full range of papers given at the Prague sessions.

(3) Along that line, it might be feasible to have a journal such as *Earth Sciences History* (associated with HESS, the History of the Earth Sciences Society) produce a special issue devoted to the history of geophysics.

Again, there would be a selection process and not all papers from the Prague meeting would be published. Circulation would be good, and the audience would be an extensive one, with subscribers already interested in the history of geology. (This was one of the problems cited by the editor of the Czech journal of geophysics. He doubted that his own readers would be that attuned to the historical aspects of the papers.)

Such a move would also be of potential value to both INHIGEO and *ESH*, in that an editor already exists (Patrick Wyse-Jackson, Dublin) and having a special issue devoted to the history of geophysics might be a significant advancement for both the journal and for the discipline.

(4) Authors might pursue publication on their own. This would undercut any coherent impact of the Prague proceedings but would allow individuals to publish where they saw fit. It would have no financial or operational costs to INHIGEO or to the Geophysical Institute, but the benefits would also be rather nonexistent to the institutions and people who sponsored the symposia.

B) The floor was opened to discussion.

(1) Jan Kozak reflected upon the options and summarized the situation from his point of view as convener of the 2005 INHIGEO Symposium.

Producing an "in-house" proceedings volume and distributing it to participants only would not generate a homogeneous product and would likely be relegated to dusty shelves, never to be seen again.

There might be real value in attempting to create a coherent volume on the history of geophysics, perhaps calling upon persons outside of Prague participants to fill in any gaps in the disciplinary content.

Not all Prague papers would be included in such a project.

(2) David Oldroyd called attention to the problems of producing a major book, for example through the auspices of the Geological Society. An Anglophone editor with expertise in geophysics would be needed, and the time, effort, and expense required might be extensive.

(3) Philippe Taquet noted that résumés of the Prague papers could be produced in *Newsletter No. 38* (2006, for 2005).

(4) The potential to publish all the papers on the web and a few selected papers in a book or major journal was introduced.

Some concern was expressed about the ethics or legality of "dual publishing," and how a particular journal would view such a practice.

(5) Various venues were considered, including *Annals of Science.*

(6) John Norris wondered what had happened to publishing in the journal of the Czech Academy of Science, or possibly under the auspices of the Czech Geological Survey.

Jan Kozak highlighted the history, noted above, of the Academy's unwillingness to publish "overly historical" materials. No one present could speak for the Czech Survey, but there was some doubt that it would be enthused about publishing items totally "external" to its own work and agenda.

(7) David Oldroyd introduced a formal motion that the officers of INHIGEO contact Patrick Wyse-Jackson about the potential to publish a selected number of Prague articles in a special issue of *Earth Sciences History* devoted to the history of geophysics. Johannes Schweitzer offered a 'friendly amendment' stating that we not specify how many papers need be selected (that amendment was accepted).

(8) Jan Kozak asked for input from the authors who papers might well NOT be included in such an undertaking.

A number of individuals commented that they would not be offended by being excluded. Some papers had been published elsewhere, some were simply descriptive, and some were summary overviews. A formal accounting of reactions was not made, but everyone seemed to accept the reality that a selection process might have to operate.

(9) It was agreed, again on the grounds of ethics, that we could NOT produce a CD with all the papers and also have a major journal publish a selected set of papers. Perhaps only the Abstracts could be produced on a CD, or in the *Newsletter.*

(10) David Oldroyd re-introduced his motion suggesting that we contact Patrick Wyse-Jackson concerning the potential to publish some portion of the Prague symposium in *Earth Sciences History.*

The motion was accepted without dissent.

Ken Bork, the Secretary-General will contact Prof. Wyse Jackson to initiate a dialogue about the possibility of publishing a selected number of papers in *Earth Sciences History.*

(11) We also need to think about publishing the proceedings arising from the symposia in Vilnius next year. The theme will be "The History of Geomorphology and Quaternary Geology."

Rodney Grapes offered to help with the process.

C) President Taquet's concept of publishing guidebooks "In the Steps" of a number of major geologists became the next topic of discussion. Philippe suggested that we could greatly improve the visibility of earth sciences among an educated public if we found a way to produce popular guidebooks having a geological and historical focus.

(1) All members received a two-page written outline, produced by Philippe Taquet and Ken Bork, which highlighted basic elements of the proposal.

(2) President Taquet gave an overview of his "vision" of the concept. He showed the *National Geographic* booklet on the Lewis and Clark expedition and alluded to the valuable guidebook, produced by François Ellenberger in 1979, that followed key figures in the debate about volcanism in France. He suggested that 2007 or 2008 would be a viable target date for production of the first volume. His aspirations include a positive impact for INHIGEO and the potential to have a rather wide audience for the booklets -- to be available in bookstores.

(3) Discussion followed.

Sally Newcomb wondered if a region, a city, or a major topic might be a viable focus of the guidebooks. She hoped to avoid being caught up in the "hero-worship" syndrome.

For better or worse, focus on an individual was often much easier for an author. All agreed that any booklet would need a strong focus, whether thematic, regional, or on a person.

A few specific cases were considered: Pierre Simon Pallas; William Smith; Georges Cuvier; Paris; Edinburgh.

Ken Bork suggested that Cuvier was not only a viable topic, but that Philippe Taquet was well acquainted with Cuvier's life, travels, and important contributions to geoscience. Furthermore, a French publisher was already

aware of the project. It was agreed that Philippe would pursue the matter, at his convenience, and give us a status report at the Vilnius meeting in 2006.

12) Greg Good, seconded by Johannes Schweitzer, two of the invited speakers at the Prague INHIGEO sessions, offered deep thanks to Jan Kozak, the Local Organizing Committee, and our Czech field-trip guides, for providing a superb meeting. His positive sentiments were greeted with unanimous agreement and Jan Kozak received the applause of all in attendance.

A motion to adjourn was moved and seconded. The vote to adjourn was unanimous. The meeting adjourned at 10:35 a.m.

Kennard B. Bork, Granville, Ohio

INHIGEO BUSINESS MEETING, Vilnius, Lithuania, JULY 2006 PROVISIONAL AGENDA

1. Regrets/Apologies from those not able to attend
2. Arrangement of the Agenda (requests for modification)
3. Minutes of the Previous Meeting: Prague, Czech Republic (2005) (See above, this *Newsletter*)
4. Discussion / Matters arising
5. President's Report
6. Discussion / Matters arising
7. Secretary-General's Report
8. Discussion / Matters arising
9. IUGS Topics
10. Future Meetings of the Commission; or of IUGS or IUHPS/DHS
11. Finalization of 2006 ballot and declaration of result
12. Honorary Senior Members (nominations by Board)
13. New Business / Business without notice
14. Vote of thanks for our hosts in Vilnius, 2006

CONFERENCE REPORTS

The International Commission on the History of Geological Sciences (INHIGEO) Symposium on "History of Geophysics" held in Prague and throughout the Czech Republic 2–12 July 2005

The 30th INHIGEO Symposium, with its theme on the "History of Geophysics," was held in the Czech Republic from 2–12 July 2005, and attracted 42 participants from 18 countries. Appropriately, it was hosted by the Geophysical Institute of the Czech Academy of Sciences (GFU) in Prague and was very ably organised by Dr. Jan Kozák of the Institute. The symposium commenced with a two-day field trip to West Bohemia led by Jiří Babůrek and Ondřej Jäger of the Czech Geological Survey and PLA Czech Karst respectively. On leaving Prague and its well-bedded Paleozoic sedimentary rocks, the route was northwest across gently rolling Bohemian landscape to the city of Most. On the outskirts of the city a change from Cretaceous sedimentary rocks, to those of Tertiary age, was heralded by the appearance of numerous volcanic cones that mark the northeastern end of the Ohře River Rift Zone or Eger Graben. The graben is filled with a thick succession of Mio-Pliocene sediments, including three basins with extensive deposits of brown coal. Although volcanism has waned, mineralized hot springs still rise within the graben.

The economic importance of the coal was dramatically brought home to participants at the first stop—the 16th-century Church of the Assumption of the Virgin Mary at Most. In the 1970s it was decided to opencast the coal beneath Most. In a complex engineering operation the 12,000-ton church was, over a period of five years, shifted to a secure location 800 m away, but the town was not so fortunate and was demolished. Just how large the mining is was soon appreciated by almost circumnavigating the huge Czech Army Mine in the Most Basin. From an impressive fault-line scarp, separating the basin from the Precambrian to Paleozoic basement rocks of the Krušně Hory Mountains, the scale and complexity of mining a 40-m thick seam was quickly comprehended. The stripping and stockpiling of the overburden, for later back-filling, and the stabilization of the sides of the pits and the prevention of pollution from the nearby coal-fired power stations, were all explained.

In contrast to the industrial activity, participants were able to relax over lunch in the delightful former royal town of Karlovy Vary, the largest of Bohemia's spas, on the banks of the aptly named Teplá (tepid) River.

Following lunch, the spa itself was visited and the thermal waters, whose temperatures range up to 72°C, were sampled. After an explanation of the geothermal system and its mineralization, by Tomas Vylita, participants were guided through steamy subterranean passages below the spa, where sinter and a kaleidoscope of color caused by algae and minerals abounded. Refreshingly cool was the crypt of the nearby Mari Magdaleny Church, which sits on a mound of sinter, the products of a now-extinct spring. Within the town itself, participants admired the buildings and monuments in the narrow valley floor, or perched precariously on the forested slopes above. Amongst the numerous monuments to the illustrious beneficiaries of the healing waters was one to the German poet and scientist Johann Wolfgang Goethe who, amongst other things, is remembered by the iron oxide mineral goethite.

Late in the afternoon, the route continued south to the Norbertine Abbey in Teplá Monastery, which was founded in the 12th century. The abbey consists of a large complex of buildings of varying ages and architectural styles. Despite years of neglect and vandalism by Nazi and Communist administrators, who also used it for more sinister activities, much of what the abbey was like in its heyday can been gained. The magnificence of its church, chapels, and library was overwhelming. The library, with over 100,000 volumes, is the second largest in the Czech Republic and contains much of interest to historians of geology. A comfortable night was spent in what was formerly the Abbey's barn, now tastefully transformed to accommodate visitors.

The second day of the field-trip concentrated on the thermal springs, beginning at the Soos National Nature Reserve in the Cheb Basin. Although the basin is the smallest of the three basins in the Eger Graben, and contains no economic coal deposits, it is geologically the most complex. It is also the most seismically active area of the Czech Republic. Within it, at the intersection of two structural trends at right angles to each other, carbon dioxide-rich gas, and in one spring hydrogen sulphide, bubble to the surface through peat and diatomaceous deposits. The gas is also notable in that it contains helium, thought to be derived from the mantle. Outflow of water is largely dependent on the depth to the water table and is thus controlled by rainfall. Because of the swampy nature of the ground, forest trees are largely lacking and instead a specialised flora of halophytic plants has evolved.

Lunch was at the Pozdrav ze Švejk restaurant in the nearby Františkovy Lázně Spa in the heart of the Cheb Basin. Unlike Karlovy Vary, this spa town is not confined to a narrow river valley and is consequently more spacious, with more formal public gardens and a quieter temperament. This is also partly a reflection of the perceived greater medicinal value of its springs, which contain Glauber salts, rich in sodium, iron and magnesium chlorides and sulphates. The final stop involved a climb to the top of the geologically young (400,000 years) Komoruí Hůrka volcano. This nepheline-rich volcano comprises a small cone of tuff, scoria, and basalt and is thus typical of those in west Bohemia. In addition to being one of the two youngest volcanoes in the area, it is of considerable importance to historians of geology because it was the place where the debate between the "neptunists" and "plutonists" culminated. On visiting the volcano, Goethe suggested the debate could be resolved by digging a tunnel into the volcano. However, it was not until after Goethe's death that Count Sternberg, between 1834 and 1837, financed underground exploration that conclusively demonstrated the volcanic origin of the basalt. As if to emphasise this, the gateway to the tunnel is faced with granite. The return to Prague was through Pilsen.

The symposium formally commenced on 4 July, at the GFU, with an introduction by Jan Kozák, an opening speech by the President of INHIGEO Professor Phillipe Taquet, and a welcome from Dr. Ales Spicak, Director of GFU. Despite having all windows and doors open, participants sweltered as temperatures in Prague rose to almost record heights. However, any discomfort was soon discounted as participants were treated to a series of informative papers dealing with aspects of the history of geophysics. The first three papers were from invited speakers: Johannes Schweitzer, Greg Good, and Richard Howarth. The next session was devoted to the Lisbon and Visp earthquakes of 1755 and 1855 respectively. Participants had also received a copy of an illustrated account of the Lisbon Earthquake by Jan Kozák and David Oldroyd (see review in this *Newsletter*). Then followed through the remainder of the day and into the next, which was accompanied by rain and cooler temperatures, a variety of papers as summarised below:

Invited Papers

Johannes Schweitzer – The Birth of Modern Seismology at the Turn of the 19–20th century.

Gregory Good – Earth's Magnetism in the 20th century: From the Core to the Magnetosphere.

Richard J. Howarth – The Swing of the Pendulum: a brief Survey of Gravity Surveying to 1930.

Submitted Papers

Maria J. F. Tavares and Filomena Amador – To explain Earthquakes: a Portuguese Historical View (Centuries XIII–XVIII).

Ana Carneiro and Teresa S. Mota – The Role of Historical Records in the Construction of Scientific Interpretations: Pereira de Sousa's (1870–1931) Studies on the Lisbon Earthquake of 1755.

David R. Oldroyd and Jan T. Kozák – The Lisbon Earthquake of 1755: A Milestone in Earth Sciences?

Jiří Vaněk, Jan T. Kozák and Monika Gisler – The 1855 Visp (Switzerland) Earthquake – 150-year Anniversary.

Zoya Bessudnova – Boris Golitsyn (1862–1916) – Russian Geophysicist, Founder of Seismology in Russia and Creator of the Electrodynamic Seismograph.
Yasumoto Suzuki – Historical Review on the Study of Intermediate and Deep Earthquakes.
Rodney Grapes – Historical Displacement on Faults: A New Zealand Discovery Forgotten for 60 Years.
Kenneth L. Taylor – Marivetz, Goussier and Planet Earth: A Late Enlightenment Geo-Physical Project.
Phillipe Taquet – From the Arrangement of the Mountains by the Geologist Élie de Beaumont to the Reconstruction of the Alps by the Architect Eugene Viollet de Duc: Two 'Tentatives' to Rationalize Nature.
Algimantis Grigelis – Earliest Geophysical Investigations in Lithuania.
Manuel S. Pinto – Prevailing Ideas in Portugal about the Nature of the Earth's Interior (16th and 18th Centuries).
Bernhard Fritscher – Prussian Legacy: The 'German Prehistory' of the Geophysical Laboratory of the Carnegie Institution.
Teresa S. A. da Mota – The Eyes of Geology *versus* the Knowledge of the Geologist: Using Geophysical Methods in Geological Prospecting in Portugal for the First Time.
Kerry Magruder – The Global Visions of Thomas Burnet: Whole-Earth Thinking and Early Theories of the Earth.
Martina Kölbl-Ebert: Discovering the Inner Earth's Core – A Visualization of Inge Lehmann's Simplified Three-Shell Earth Model.
John A. Norris – The Compositional Relations between Vitriol and Pyrites in the Pre-modern Mineral Chemistry.
González M Fabre, Octavio Puche Riart and Martinez L. F. Mazadiego – The Contribution of the Mining Engineer Casiano de Prato to Joachim Barrande's "Primordial Fauna" Theory.
Claudia Schweizer – Kaspar Sternberg's Paleobotanical Research in Bohemia and his Scientific Exchange with Ernst Friedrich Schlotheim.
Marianne Klemun – Natural Science as Medium of Integration: the "*Versammlung deutscher Naturforscher und Artzte*" in Prague in 1837 and the Meetings of German Natural Scientists and Physicians during the "*Vormärz*" (1822–1848).

Posters

Octavio Puche Riart, Martinez L. F. Mazadiego, Bordehore L. Jorda, and Menendez J. E. Ortiz – Historic Mining in the Community of Madrid, Spain.
Mazadiego L. F. Mazadiego, Octavio Puche, J. F. Lamas and Menendez J. E. Ortiz – Bitumen in the Life of Alexander the Great.
Alena Čejchanová – Geological Maps of Europe (1780–1918) with Special Emphasis on the Territory of the Czech Republic and the Slovak Republic.

All of the papers generated questions and a number provoked vigorous discussion that spilled over into tea and lunch-breaks as well as continuing in a restaurant on the evening of the first day of papers. The restaurant was located in the old part of Prague, ensuring that participants quickly mastered the Underground rail network, which while extremely efficient is prone to the depredations of pickpockets.

The first of the post-papers field trips, on 6 July, was led by Stanislaw Čech and Vladimír Rapprich of the Czech Geological Survey and focused on the Cretaceous, Tertiary and Quaternary rocks of the Českě Středohoří Mountains, northwest of Prague. As the bus crossed the gentle lowlands underlain by Cretaceous strata, a distant view of Rip Hill, an erosion remnant of a large volcano in central Bohemia provided the first intimation of what was to come. More serious examination of the fog-shrouded Humensky Vrch hill on the margin of the mountains revealed volcanic breccia containing small xenoliths of Cretaceous siltstone and an abundance of titanium-rich phlogopite mica. As the trip progressed into the mountains, the fog cleared to reveal a landscape of small basalt domes, many crowned by ruined castles, explosion vents and other evidence of volcanism. The nature of the volcanism changed over geological time from an initial olivine-rich to an olivine-free basalt. A deviation to the Českého Granáta Museum, in a former Lutheran church in Třebenice village, provided the opportunity to learn about the history of the Českě Středohoří Mountains and in particular the famed Bohemian garnets. These blood-red pyrope garnets originated in peridotite granulite facies schist that has been carried up as xenoliths in the basaltic magma. Most of the garnets are recovered from fluvial deposits of the Ohře River.

After the museum, the village of Klapy at the foot of a sharp ridge of basalt, capped by the remains of two towers was visited. The village has been subjected to ruinous landslides when volcanic debris becomes water saturated. Further stops examined the volcanic geology, including one outcrop at Hnojnice known as the *kamenná slunce* or "sun stones", which provoked much discussion. The sun stones get their name from an unusual radial jointing pattern developed in a tuff ring. The precise mode of origin is still not known, according to our Czech guides. After a prolonged lunch break in a deep cellar in the delightful medieval town of Litoměřice, beside the Labe River, the final stop was at Dubi Hora quarry to view Oligocene basalt, which displayed spectacular columnar

jointing. The basalt is unusual in that the columns reach over a metre in diameter. Returning to Prague, participants were treated to vistas of farmland, forest, and villages.

The following day a few specks of rain gave way to a fine sunny morning as participants were treated to a half-day excursion to the geologically and historically important Barrande's Rock in the Barrandian Basin of Prague. As explained by Jiří Kříž, the importance of the section was revealed when the French constructed a military road along the west bank of the Vltava River that exposed undeformed and unmetamorphosed rocks, rich in Ordovician, Silurian, and Devonian fossils. The fossils were subsequently described by Frenchman Joachim Barrande (1799–1883) in a massive treatise of 22 volumes. In the lower part of the section are pyroxene-rich basalts that erupted in Late Wenlock time and are overlain by deepwater mudstone, in which are found an abundance of graptolites. Above the mudstone are limestones of Silurian and Devonian age containing a diverse fauna dominated by brachiopods and trilobites. In the vertical face of Barrande's Rock the limestone is spectacularly folded. In the afternoon participants, beginning at Prague Castle, independently explored the medieval architecture of Prague.

The latter part of the symposium involved field trips to the eastern Czech Republic. The first of these was to the old royal silver mining town of Kutná Hora, now on UNESCO's World Heritage List. The town owes its origin to the discovery in the 14th century of veins of argentiferous galena in gneissic inliers, exposed where the cover of younger sedimentary rocks has been eroded. Mining ceased in 1726, due largely to the depletion of reserves and, more particularly, as a result of increasing production in the New World. Unfortunately the promise of fine weather after morning mist cleared was dispelled as Kutná Hora was reached and light, but persistent, rain set in for the day. Our guides were Josef Haubelt and Jan Urban, both members of INHIGEO. Jan's commentary was quietly translated into English by his granddaughter, and then embellished by David Oldroyd for the benefit of those at the back of the group or hard of hearing.

The first stop was the former Sedlec Cistercian Monastery, now run as a manufacturing plant by the tobacco giant Phillip Morris. Irrespective of this, much of the monastery remains largely unaltered, including its huge hall containing equally huge murals, and the church of St. Mary's is a fine example of "baroque gothic." In the grounds of the former monastery is the bizarre Sedlec Ossuary, containing over 40,000 artistically arranged human remains, including an enormous chandelier of bones. The next point of interest was the unusually roofed great Gothic Cathedral of St. Barbara, the patron saint of miners, the construction of which commenced in the 14th century. Amongst its numerous treasures are 15th century frescoes including one depicting various mining activities. A stop at the Czech Mining Museum was disappointingly brief, being confined to viewing a horse whim (winch) constructed of massive spruce beams, which raised ore from deep underground. From the museum, participants entered the 13th-century St. Jacob's Church where structural cracks indicated foundation subsidence. That subsidence, resulting from centuries of mining, is indeed a problem was confirmed by Petr Šeba, Director of the nearby office of the Geofond Institute, which we were invited to visit. As well as explaining the work of the institute, which includes stability assessment and mitigation, examples from its collection of nearly 10,000 maps were specially displayed, including a huge wall-mounted "*Mappa Geographia Regni Bohemiae*" dated 1720. After inspecting the nearby Alchemy Museum, where one can descend to an original subterranean 'alchemists' den' (very few of which still survive), the last stop before returning to Prague was the Italian Court, the site of the Royal Mint where the craftsman from Florence had transformed the silver into *groschen* coins.

The second trip was a three-day one to South Moravia. Under grey skies and light rain the bus travelled to Brno, the second largest Czech city, where the former Abbey of St. Thomas is home to the informative Mendel Museum and highlights the work of Gregor Mendel (1822–1884). The afternoon was spent in the world renowned Moravian karst, developed largely in Devonian limestone. Misty rain added to the magic of the deep limestone chasms before entering boats that negotiated the floodlit caverns. The night was spent in a magnificent chateau (now a hotel) at Valtice in the beautiful wine-growing area adjacent to the Austrian border. The next morning was devoted to the INHIGEO business meeting, which is reported elsewhere in this *Newsletter*. At the conclusion of the meeting Simon Nathan presented a video on Harold Wellman, one of the pioneers in recognizing horizontal displacements on faults. A leisurely afternoon was spent at the archaeological museum in the village of Vostonic where tools, figurines and other remains dating back 30,000 years are on display. This was followed by a hot climb to the top of a hill which gave memorable views of the perched town of Mikulov and the surrounding Moravian wine country. In the evening, a cellar in the chateau provided the venue for a most enjoyable conference dinner, where traditional food was served to the vigorous accompaniment of the South Moravian Starobreclavska Folk Group. Their instruments included muzika, clarinet, guitar, violin and double bass, with spirited renditions of folk songs (some said to be raunchy, but most of the participants were blissfully ignorant of this).

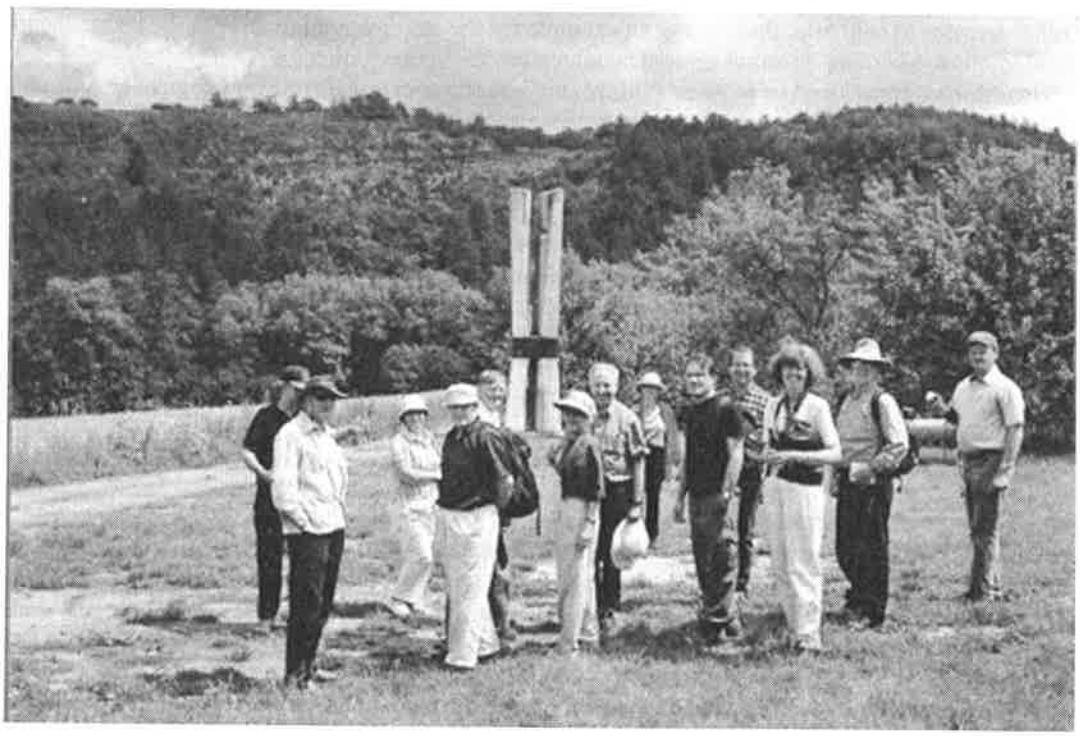
The final day of this trip, and the symposium, was a return to Prague with stops at Třebíč and Telč, both UNESCO sites. At the former, the geological collection at the Museum Vysocing Třebíč was viewed. This collection includes an impressive variety of samples from the Proterozoic and Paleozoic rocks of the area, as well as

a large display of locally-found green glass or moldavite, which resulted from a meteorite impacting in the Reis district of Bavaria in the Miocene (14.8 Ma). After a quick look at the Jewish Quarter of the town on a hillside of Paleozoic granite, participants were conducted around St. Procopius Basilica, which was completed in the 13th century. After a late lunch in the town square of the medieval town of Telč, the INHIGEO Meeting was formally concluded with toasts, and sincere thanks were extended to Jan Kozák and his colleagues for planning and running such a memorable symposium.

For those who were reluctant to leave the Czech Republic, a further field trip was held on 12 July to the Silurian–Devonian rocks of the Bohemian Karst between Prague and the Beroun Valley. The excursion leaders were again Jiří Kříž and Ondřej Jäger, assisted by paleontologist Štěpán Manda. Fine sunny weather, beautiful countryside, and excellent commentaries made for a great day. The first rocks examined were at the Nová Ves Volcano, where four generations of Silurian pyroclastics and outpourings of basalt are well exposed on a ridge southwest of Butovice. From Butovice, the route crossed an undulating Cretaceous peneplain before descending into beautiful valleys carved into Silurian and Devonian limestones. Lunch, near Suchomasty, was in the shadow of a monument commemorating the acceptance, by the 24th IGC in 1972, of the adjacent Klonk cliff section as the stratotype for the Silurian–Devonian boundary. The monument incorporates a sight-line for locating the 'golden spike' in the cliff. Jiří Babůrek succinctly summarised the long, and agonizing, debate that surrounded the "Silurian Problem." After lunch a happy time was spent in the Plešivec limestone quarry collecting a variety of Devonian fossils, dominated by brachiopods and bryozoa but with many other forms, such as trilobites. The return to Prague was along the southwest margin of the karst, with brief stops to photograph well-bedded and folded sedimentary sequences and historic places like Karlštyn Castle, founded in 1348.

In all it was an outstanding INHIGEO meeting, with informative papers and wide-ranging field trips, both in areas covered and the rocks seen, numerous historic buildings, beautiful countryside, unspoilt villages, and an insight into Czech culture and cuisine. The participants will be forever grateful for the enormous effort put in by Jan Kozák in organizing the meeting and for ensuring that participants were well looked after. The field trips were greatly enhanced by experienced leaders, comprehensive notes, and other provided material, all of which made INHIGEO 2005 such an outstanding success.

Mike Johnston, Nelson, New Zealand



INHIGEO members looking at the camera instead of at the famous stratotype marker (the "clothespin") and the "golden spike" at the Silurian-Devonian boundary, in the distant Klonk cliff.
Photograph by Mike Johnston

Editor's Note: Rather than fill the *Newsletter* with potentially difficult-to-see black and white photographs, I suggest that interested viewers go to the fine website produced by INHIGEO member Kerry Magruder (University of Oklahoma). The site includes folios of color photographs illustrating the following subjects: Finding the Geophysical Institute (Prague); Excursion to Western Bohemia; Northern Bohemia; Barrande's Rock; Kutna Hora; Brno and Moravian Karst; Bohemian Karst; and INHIGEO People. The site = **http://homepage.mac.com/kvmagruder/INHIGEO2005/Menu141.html**

The Role of Women in the History of Geology

Report on a Meeting, organized by the History of Geology Group, The Geological Society of London, Burlington House. Piccadilly, London, 28 November 2005

In the past, the history of the geosciences has largely been interpreted as a history of male scientists, but in recent years, several historians of geoscience have endeavored to show how women in various roles have participated in and shaped the geosciences.

The beginning of geological research in a modern sense occurred around 1800, and in a largely non-professional culture of natural sciences in Britain, women were not excluded from participation. They were not yet regarded as opponents in the competition for jobs, but were welcomed as fellow-enthusiasts. More so, wives, daughters and sisters, or even non-related female acquaintances at that time were an integral part of the infrastructure of scientific work. As a result, there have been many female contributors especially to paleontology in the early 19th century in the United Kingdom, forming a framework of assistants, secretaries, collectors, painters and field geologists to the leading figures in the geological sciences, thereby adding to and shaping their work. Anthony Brooks in his contribution coined the term 'auxiliary geologists' to describe these British women pioneers of geology.

My own paper tried to pin down several factors, which allowed the emergence of early British female geologists. There was a gap between an early onset of industrialization together with its social implications, which freed the more wealthy women from their traditional household duties, and a late professionalization of geology, which thus required an informal workforce to help the typical gentleman geologist. A fairly liberal gender model for women, in combination with a rather uncomplicated fashion in clothes, allowed women to address these demands. They were often encouraged by leading scientists, such as William Buckland, a geologist of the very first hour, who himself had a supportive, intelligent wife, and therefore knew of the benefits and did not hesitate to "employ" all sorts of other females to help him, thus setting an example for the next generation, his pupils. Consequently, it was only natural to allow a certain, informal geological education for these women.

Nina Morgan introduced us to Anne Phillips, the housekeeper and devoted geological amanuensis of her brother John. More than an amanuensis was Lady Prestwick, in John Mather's opinion. Her interest in geology was genuine and her obituary stated that she was prevented from enrolling as a fellow of the Geological Society of London by her sex alone.

What was quite common for British women at that time was highly unusual in France. Nevertheless, Mary Orr provided the assembly with the story of Sophie Duvaucel, Cuvier's stepdaughter, whom he used to introduce to British visitors as his 'aide naturaliste,' and who worked for her father in the Paris natural history museum, organizing fossil collections, making drawings and reading to her stepfather.

Most of the HOGG-meeting, however, was dedicated to female geologists of the late 19th and early 20th century. Profesionalization of geology had set in, and women also—at least in Britain—were able to get professional training, and sometimes, if they were very lucky, a paid job too!

But this was obviously connected with some difficulties, as Patrick Wyse Jackson and Mary Spencer Jones showed. Quite a number of women worked in museums and collections but often in subordinate, affiliate or temporary positions, and those who had a properly paid job risked losing it upon marriage. Others managed to develop their own profile as noteworthy scientists. Jacqueline Malpas, together with Cynthia Burek, told the stories of Ethel Skeat and Margaret Crosfield, who worked on graptolites in Wales. Karolyn Shindler brought to life Dorothea Bate (Shindler has recently written a book-size biography on Bate). Howard Falcon-Lang informed the meeting about the highly accomplished paleobotanical work of Marie Stopes. Jane Hard compiled an impressive list of women geologists, who were active in Quaternary Science, and Eric Robinson gave a very personal account of Muriel Arber.

But female geologists were no speciality of the United Kingdom, as became clear form Susan Turner's talk about Australian women's contribution to paleontology ('invincible but mostly invisible') and from the contribution by Bettie Higgs and Patrick Wyse Jackson on the role of women in the history of geology in Ireland. Renee Clary and James Wandersee explored the career of Florence Bascom, who apart from her achievements as a scientist

became very important and a teacher, educating the next generation of female geologists at Bryn Mawr. Women like her were most crucial role models for those who came after her.

In Britain, Catherine Raisin and Emily Dix both taught at Bedford College and considerably helped their younger female protégées, not only financially but also socially, as was related by Cynthia Burek, who together with John Mather and Bettie Higgs organized this very nice little meeting.

And this is maybe the only thing I was sorry about: that the meeting was so "little." One day was hardly enough to explore the wealth of history that can be drawn even from the scarce archive sources on women geologists. I would have liked many more papers trying to analyze the historical circumstances and social history of female geologists to give a more general idea of their contributions. And I think that both the women, whose lives were the targets of the meeting, and also the enthusiastic organizers and contributors would have merited a more densely populated auditorium.

Martina Kölbl-Ebert, Eichstätt

1st SCAR Workshop on the History of Antarctic Research

The Action Group on the "History of the institutionalisation of Antarctic Research within the Scientific Committee of Antarctic Research (SCAR)" was established in October 2004 under the chairmanship of Cornelia Lüdecke. It is the first international and interdisciplinary group devoted to the history of polar research. In the course of annual workshops the group wants to investigate the engagement, realization, and co-operation in Antarctic research, as well as the leading figures in the context of different national settings and perspectives.

To answer some of these questions the 1st SCAR Workshop on the History of Antarctic Research took place at the Bavarian Academy of Science and Humanities in Munich on 2–3 June 2005, under aegis of the SCAR Action Group and the Commission for Glaciology of the Academy. Eighteen participants came from Australia, Chile, England, Germany, The Netherlands, Sweden, and USA to give nine papers and to present three posters. The posters were on display throughout the workshop. Abstracts describing the Australian and Russian activities were received also.

Adrian Howkins (USA) and Aant Elsinga (S) explained the early involvement in Antarctic research of Argentina and of Sweden respectively, while Johan van Bennekom (NL) talked about the Dutch interest in Antarctica. International cooperation long before the Antarctic Treaty was highlighted by Jorge Berguño (RCH) and by Cornelia Lüdecke (D). John Behrendt (USA) took us along on dangerous early traverses to measure ice thickness during the IGY (1957/58) while Reinhardt Krause (D) gave a biography of Georg von Neumayer (1826–1909), after whom the German Antarctic station was named. Peter Abbink (NL) discussed the changes in the Antarctic Treaty in the 1980s, when the number of consulting parties nearly doubled. Lüdecke explained why the privately organized German expedition of the physician and mountaineer Karl Maria Herrligkoffer (1916–1991) failed, due to opposition from scientific bodies in the 1950s. The workshop ended with Balthasar Indermuehl's (AUS) lecture on the history of Astrophysics in Antarctica, from the first meteorite find in 1960 till the use of the ice as gigantic particle detector.

During the poster presentation, Jason Davis (USA) explained the changes to Antarctic identity rhetoric as demonstrated by papers published in the *National Geographic* Magazine. David Michael Dodd (AUS) addressed the Australian context of the history of Antarctic research. Helmut Honik's (D) and Lüdecke's poster focussed on the Bavarian officer Wilhelm Filchner (1877–1957), leader of the second German Antarctic expedition (1911–12) to the south-eastern part of the Weddell Sea. They also discussed his estate, which is placed in the Filchner-Archive of the Bavarian Academy of Science and Humanities in Munich.

Summing up the workshop, it can be said that the mixture of PhD and graduate students, historians, Antarctic veterans, and historians of science, as well as profound experts of the Antarctic Treaty System, led to very lively and interesting discussions. Between single sessions nice coffee breaks right next to the conference room facilitated the continuation of the discussions. During lunch breaks typical Bavarian dishes were served at the same place. A nice summer evening made the visit to a beer garden in Munich very pleasant.

It is planned to publish the proceedings of the first SCAR workshop in the Reports of Polar and Marine Research of the Alfred Wegener Institute in Bremerhaven (Germany) in 2006.

Cornelia Lüdecke, Munich

ARTICLES

Foundation of the Geological Institute (1877) and the Geological Survey of Japan (1882)

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ABSTRACT

In 1854, Japan, after its long isolation, 'opened the door' to Western countries. From 1868, the rapid changes of the Meiji Restoration began, even with respect to geological research. Foreign geologists were invited to Japan. Among them, three figures, the Frenchman François Coignet (1835–1902), the American Benjamin Smith Lyman (1835–1920), and the German Edmund Naumann (1854–1927) were the most important.

In 1867, François Coignet was invited to Japan by the local lord of Kagoshima, southern Japan, and the Meiji Government then hired him to advise on the reconstruction of silver and copper mines. Staying in Japan for ten years, doing mostly mining geology, he trained one Japanese geologist.

Benjamin Lyman was invited to Japan by the Meiji Government in 1872 and was chiefly engaged in oil and coal exploration in northern Japan. He stayed in the country for nine years and trained more than fifteen Japanese geologists.

Edmund Naumann was employed by the Meiji Government in 1875 and was appointed as the first Professor of Geology at Tokyo University in 1877, where he taught more than eight students. In 1878, the Geological Department in the Ministry of Home Affairs was founded and Naumann assisted in the establishment and organization of the Geological Survey of Japan. He worked on a 1:400,000 geological map (5 sheets) and a 1:200,000 map (98 sheets), but returned to Germany in 1885. The following year, the Survey published the geological map of the Northeastern Division. In 1899, a 1:1,000,000 map of the Japanese Empire was completed and displayed at the International Exhibition in Paris in 1900.

Historical Background

As is well known, Japan closed its doors to foreigners during the Edo Era, except for the Dutch and Chinese, who were allowed to occupy a trading station at the small island of Dejima, Nagasaki Prefecture, in southwest Japan. Only a small amount of Western knowledge entered through that narrow entrance. Some books on geology written in Chinese were, however, introduced to Japan. Lyell's *Elements of Geology* (1838) was translated into Chinese in 1872 and this reached Japan soon after publication. A Japanese edition was published in 1882. But this was well after the Meiji Restoration and the opening of Japan's door to Western influences.

Towards the end of the Edo Era, the power of the Tokugawa Government declined, and several *Han*s, or local lords, grew powerful, their wealth being based on agriculture and trade with Ryukyu, China, Korea, and Southeast Asian countries. Numerous foreigners, particularly Americans, English, and Russians, traveled to Japan, wishing to 'open the door' for trading purposes. However, some well-informed Japanese knew about the French Revolution (1789) and the American Declaration of Independence (1776) from Chinese books, and were aware of the situation in China and the incipient colonization that was occurring there. As a result, there were many debates between those who saw benefits in 'opening the door' as rapidly as possible and those who wished to maintain Japan's isolation. Eventually, the dispute escalated to a minor civil war (the Boshin War, at the beginning of 1868).

In 1854, Japan did open the door to Westerners after its long isolation. Both the Japanese people and the Government recognized the large technological gap between Western countries and Japan. The Tokugawa Government and some of the *Han*s suffered from the low productivity and the backward status of the mining areas of gold, silver, copper, and so on. Westerners were invited to Japan and students were sent to Europe and America to learn about modern science and technology.

From 1868, the rapid changes of the Meiji Restoration started, even with respect to geological research. The Meiji Government hired a considerable number of Western people as *Oyatoi*, or Western employees, in order to learn modern scientific and technological procedures. The Western employees were at their maximum (about 850) in 1874–1875, but decreased thereafter to about a hundred by 1894. The Government hoped to replace the Westerners by Japanese as soon as possible because the cost of employing Westerners was considerable, and an independent Japanese economy was wanted.

Several foreign geologists visited, or were invited to, Japan. Among them, three figures, the Frenchman François Coignet (1835–1902), the American Benjamin Smith Lyman (1835–1920), and the German Edmund

Naumann (1854–1927), were particularly important. They stayed in Japan for about ten years and learned to speak and write Japanese well.

François Coignet

From 1851, the Lord of Satsuma *Han* (Kagoshima District), Nariakira SHIMAZU, endeavored to manufacture medicines, glass, guns, etc., and establish a strong local economy. The Satsuma *Han* was rich because of its occupation of the Ryukyu Islands and its covert trade with China and Southeast Asia. However, the Satsuma *Han* had a naval battle with English ships in 1863 and was defeated. SHIMAZU thereupon made greater efforts to develop his territory independently of the Tokugawa Government. In 1867, there was the International Exhibition in Paris, and SHIMAZU exhibited his local materials, and negotiated with Belgian merchants to send competent mining people to Japan. As a result, François Coignet traveled to Japan to advise on the development of mining for the iron industry and on the production of munitions.

Coignet (see Figure 1) was probably the first geologist to come to Japan for an extended period (Imai, 1966; 1975). He arrived in the country with his wife in 1867 and stayed about ten years. He was born at Saint-Etienne, eastern France, and graduated from the Saint-Etienne Mining School. Before his arrival in Japan, he had worked in Spain, Algeria, Madagascar, and America. He first investigated the gold, silver, and tin mines of the Kagoshima district.

Figure 1 François Coignet (1835–1902), from Imai (1966)

While Coignet was in Kagoshima, the Edo Era came to a close (1868), and he was then hired by the Meiji Government. The Meiji officials engaged eighty foreign mining engineers and metallurgists for the fourteen principal mines, and Coignet was instructed to develop the Ikuno Mine, from which copper was then being extracted. On the basis of his geological research, Coignet concluded that the mine was not likely to be profitable for copper, but it did contain useful gold and silver ores. He taught the local people modern Western techniques for separating gold from silver, and the Ikuno Mine became a success.

Coignet's work attracted considerable attention. He journeyed around Japan, investigating many more mines, and compiled a rough outline of the geology of the country. His report (1874/1944) thus gave the first overview of Japanese geology. He recognized "massive granite distributed along the Setouchi (Inland Sea)"; and a "belt of Paleozoic rocks and pyrite mines" south of the granite. He also observed a "belt of Mesozoic strata of Cretaceous and Jurassic, and a metamorphic zone with another type of ore." He further remarked that Tertiary rocks

were distributed in patches along the sea coast, where there were indications of good coal. He trained fifteen Japanese geologists, of whom Tokuzo TAKASHIMA became one of the best known. Coignet returned to Europe in 1877.

Benjamin Smith Lyman

The next foreign geologist to spend a significant time in Japan was the American Benjamin Smith Lyman (see Figure 2). He graduated as a lawyer from Harvard in 1855, but had the chance to meet the famous American geologist, James Hall, in 1858, as a result of which he became interested in geology and went to France to study at the *École des Mines* in Paris. He also attended the Freiberg Mining Academy in Saxony. After some geological work in America and India, Lyman came to Japan in 1872, with an assistant. They were invited by the Yesso (Hokkaido) Government to develop the mining of the northern island, which is rich in coal and metallic ores. At that time, Hokkaido was mostly inhabited by Ainu people, but the Meiji Government hastened to develop the island's resources.

Figure 2: Benjamin Smith Lyman (1835–1920) and his students, from Kuwata (1937)

Lyman taught more than fifteen young Japanese at a mining school that the Hokkaido Government established in Tokyo. This institution later moved to Sapporo (the capital of Hokkaido) and subsequently it developed into the Sapporo Agriculture School—the forerunner of the present Hokkaido University. Lyman studied the geology of Hokkaido to obtain data for the mining of coal and ore bodies, as an aid to the construction of the railroad in the island. There were many difficulties because of the undeveloped state of the area.

Lyman had a good rapport with his Japanese students, many of whom later became important figures in the development of the Hokkaido area. He prepared a geological sketch map of the island in 1876 (scale: 1:500,000; see Figure 3) for what Lyman called the "Geological Survey of Hokkaido," though it was only a brief and incomplete reconnaissance investigation. This may be regarded as the first geological map of Japan. It mentioned the names of students who helped him, and made use of the earlier sketch maps of the Americans William P. Blake (1826–1910), Raphael Pumpelly (1837–1923), and Thomas Antisell (1817–1893), who had previously spent brief periods in Hokkaido.

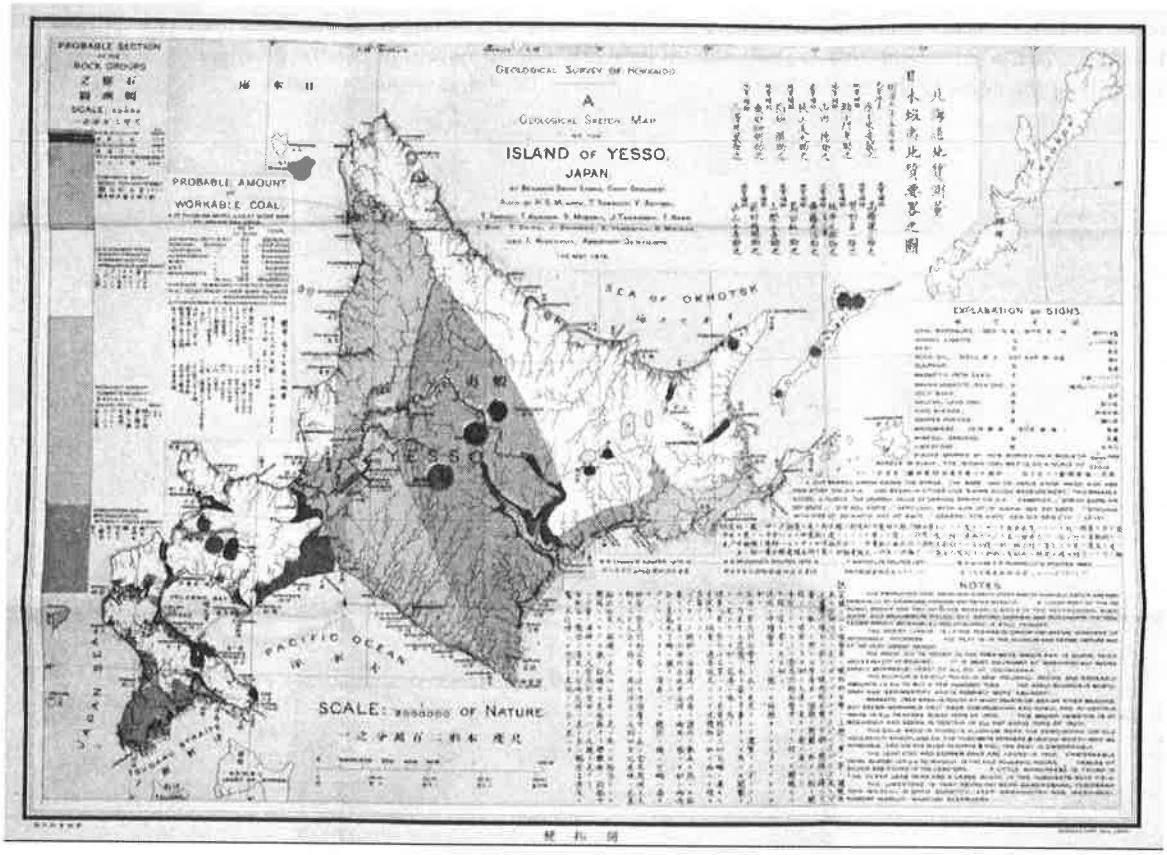

Figure 3: *Lyman's Geological Sketch of the Island of Yesso, Japan (colored in the original) (Lyman, 1876)*

Blake and Pumpelly had been in Japan in 1862 but only stayed for four months. At that time, it was dangerous for Westerners to be in Japan because some *Samurai*s disliked Westerners and in many cases wanted to kill them. Even in four months, however, Blake and Pumpelly conducted geological researches in southern Hokkaido and later published a geological map. (See Pumpelly [1866], especially Plate 8, for his geological sketch map of the southern part of Hokkaido, the original of which was deposited with the "Imperial Archives of the vice-royalty of Yesso"; also see Oldroyd and Yang, 1996). Pumpelly's "Geological Route-Sketch" has been named as the first geological map in Japan. It was only a small one covering a limited area, though it did provide a profile of the southwest coast of the island. Pumpelly subsequently went on to China, where he was undertook the first extensive geological reconnaissance work in that country.

Antisell came to Japan in 1871, with Horace Capron, Commissioner of Agriculture for the United States of America, to assist with the development of the agriculture of Hokkaido. He only had very short period of field research, because the relationship of foreigners with Japanese people was particularly bad at that time. The topographic maps on which Blake, Pumpelly, Antisell, and Lyman based their works were all compiled by Takeshiro MATSUURA (1818–1888) and issued in 1859. Lyman used a version of the MATSUURA map, as emended by J. R. Watson.

In 1877, Lyman wrote "A General Report of the Geology of Yesso [Hokkaido]" and it was translated and published in Japanese by the Hokkaido Government in 1878. Lyman divided the strata of the island into seven lithological groups: 1) the Kamoikotan Group (metamorphic, and without fossils); 2) the Horumui Group (brown coal measures; Lower Tertiary?), 3) Older Volcanic Rocks (chiefly trachyte, porphyry tufa [*sic*], and so-called "pebble rock"); 4) the Toshibetsu Group (Middle Tertiary); 5) Newer Volcanic Rocks; 6) Older Alluvium, and 7) Newer Alluvium (in ascending order). He also indicated the probable areas of workable coal on the map. The Horumui Group was shown to be folded along a NE–SW axis. The Older Volcanic Rock (now called "Green Tuff") contained ores of lead, zinc, manganese, and copper. The Toshibetsu Group consisted of sedimentary rocks, had a molasse-like structure, and contained oil. Lyman thought it was Miocene.

Another important contribution made by Lyman to Japanese geology was his investigation of oil deposits. From the beginning of the Meiji Era, both the Government and ordinary people recognized the importance of the oil

industry, and there were small-scale and unsuccessful efforts to dig wells for oil. In 1872, the Hokkaido Government sent Keisuke OHTORI to America to study the oil industry. On his return, he started prospecting in the Niigata district (along the coast of the Sea of Japan, central Japan) in 1874 and wrote a report

Figure 5: *Bunjiro KOTO (1856–1935), the first Japanese professor of geology. Photograph by the author, with permission of the University of Tokyo*

The syllabus initially used for geology students at Tokyo University was as follows:
First Grade: English, Logic, Psychology, Mathematics, General Mineralogy, General Geology, Graphics
Second Grade: Mineralogy, Geological Field Excursion, English, Zoology, Botany
Third Grade: Paleontology, History of Geology, The analytic method, French, Experimental paleontology, Geological field excursion
Fourth Grade: Geology of Japan, Microscope petrology, Graduate thesis.
The students' first geological excursion began on 14 November 1877, and lasted twenty-six days. Naumann was only 22. The students were also very young. There were many quarrels, and WADA had to mediate. Naumann rode in a rickshaw, while the students had to walk or run. But as soon as the students arrived at a stop-locality, Naumann started off again; and thus the excursion continued! As may be imagined, this did not make for good relations between Naumann and his students. Later, however, they came to recognize Naumann's ability in geology, and studied hard.

Naumann taught geology, paleontology, and mineralogy in English. A surviving set of student notes reveals that the paleontology lectures were based solely on Karl Zittel's *Handbuch der Palaeontologie* (Vol. 1, 1876). But by April, 1877, the Geological Institute had exhibition rooms that held 32,981 mineral and fossil specimens. In addition to Japanese items, the University purchased fossil and mineral specimens from the Krantz Company in Germany.

Establishment of the Geological Survey

In 1878, the Geological Department of the Ministry of Home Affairs (later the Geological Survey) was founded by Naumann, WADA, Tokuzo TAKASHIMA (a student of Coignet), and four others. The Japanese Government chose not to 'hear' Lyman's suggestion of the establishment of a geological survey but was receptive to Naumann's voice,

p. 20a

wrote a report (top of p. 20 in Newsletter No. 38) proposing development of an oil industry there. From 1876, Lyman joined with OHTORI in developing the oil industry in Hokkaido. (Lyman's research coincided with the writing of his report on the geology of Hokkaido.) Lyman first went to Niigata in 1876 and again in 1877; also to Sagara, Shizuoka Prefecture, in 1877. In 1878, he went to western Japan, to Shikoku, and to Kyushu.

Lyman then proposed the establishment of a Geological Survey of Japan, but the idea was not taken up, and in 1880 he returned to America, where he worked at the Pennsylvania State Geological Survey from 1882. That year, he published his "Geological and Topographical Map of the Oil Regions of Japan" (1:60,000) (Lyman, 1882, in Japanese).

Edmund Naumann and the First Geological Institute

Edmund Naumann (see Figure 4) was born in Meissen, south Germany, on 11 September 1854, the eldest son of a city official. He learned paleontology from Karl Alfred von Zittel (1839–1904) and geology from Carl Wilhelm von Gümbel at Munich University. He received his doctoral degree for his study of Holocene sediments on a small island in Lake Starnberg.

After working in the Bavarian Geological Survey for a short time, Naumann arrived in Japan in 1875, with the recommendation of von Gümbel, and in 1877 he became the first Professor of Geology in the Science Department of the University of Tokyo, which had just been founded.

Figure 4: *Edmund Naumann (1854–1927) and his student Takao FUJITANI. Reproduced by courtesy of the Fossa Magna Museum, Japan*

The Science Department of University of Tokyo had Institutes of Geology, Chemistry, Biology, Physics and Engineering. (The Engineering Institute was changed to the Engineering Department after two years.) In the Institute of Geology, the associate professor was Tsunasiro WADA (1856–1920), who learned mineralogy at Tokyo from the German Karl Schenck. Naumann taught eight Japanese students, one of whom, Bunjiro KOTO (1856–1935), became the first Japanese professor of geology (see Figure 5).

(This is missing from p 20 of Newsletter)

as it had selected the German model for the military, medicine, and some branches of science. (Germany was arguably the leading country for science and science education in the second half of the nineteenth century.)

In 1879, Naumann's student KOTO and many of Lyman's students worked in the Geological Department of the Ministry of Home Affairs. Naumann himself worked on the 1:400,000 Reconnaissance Geological Map (5 sheets), and the 1:200,000 Geological Sheet-Map (98 sheets). For the topographic map, that of Tadataka INO (1745–1818) was used. This had been issued back in 1821, but was still found useful a hundred years later. Japanese, English, and American naval maps were also employed. In 1880, the Geological Survey was officially founded, with WADA as Head.

During his stay in Japan, Naumann conducted geological researches at Ohshima, the Shirane volcanoes, Boso Peninsula, Shikoku Island, and some other places, publishing a number of papers. When he traveled to Nagano Prefecture in 1875, he was much impressed by the great graben-like structure, with a north–south trend, developed in central Japan, which he named *Fossa Magna.* It was described in his papers 'Ueber den Bau und die Entstehung der Japanischen Inseln' (1885) and 'The physical geography of Japan, with remarks on the people' (1887), which were his main works on Japanese geology. In the former, he wrote of the crystalline schists, and the Paleozoic, Mesozoic, and Cenozoic strata that make up the Japanese archipelago, and he discussed the geological structure of the islands and beyond. In the latter, he interpreted the *Fossa Magna* (or *Grosser Graben*) as a fissure that originated in a collision of Izu Islands with the main Japan Arc. The origin of the *Fossa Magna* (the western margin of which is now called the Itoigawa–Shizuoka Tectonic Line) has been debated through to the present, but it is now usually thought to mark the boundary between the Eurasian Plate and a sliver of the North American Plate.

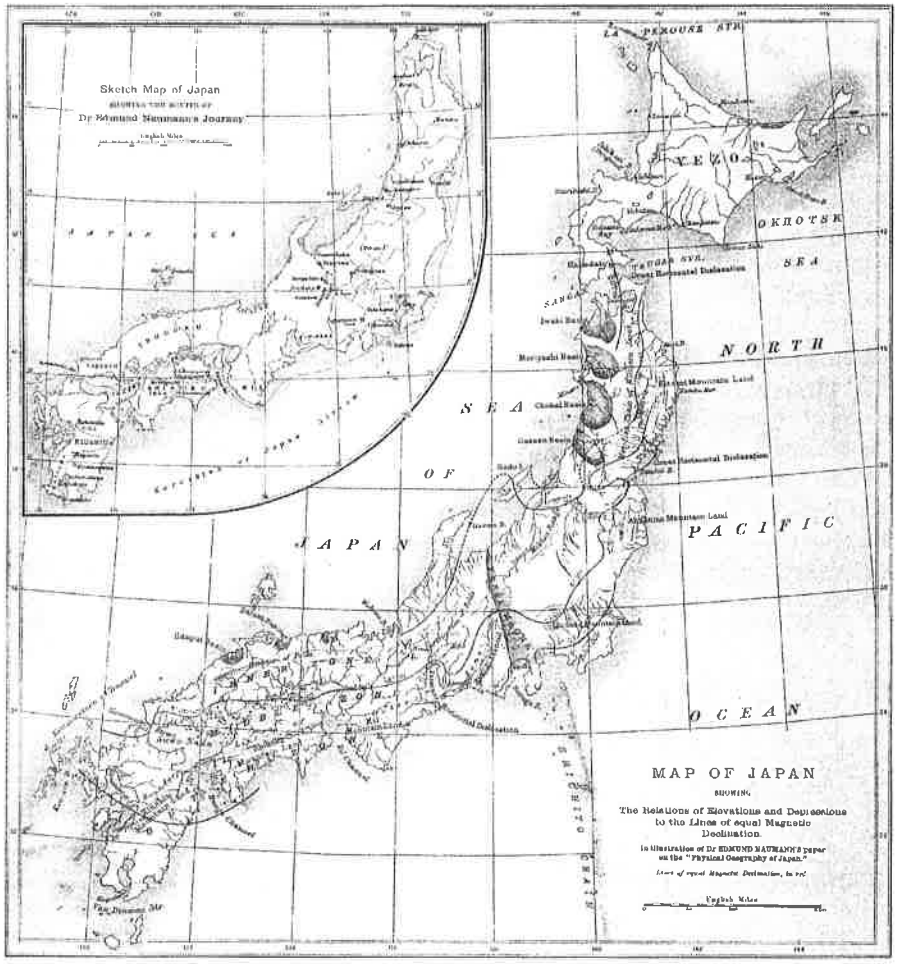

Figure 6: *The tectonic division of the Japanese islands by the Fossa Magna, as depicted by Naumann (1887)*

Naumann (1881) also described the tooth of a fossil mammoth. Whereas few Japanese people today know what Naumann did, though his contributions to Japanese geology were considerable, the extinct Naumann elephant is very famous, with the Naumann Elephant Museum in central Japan being an active centre for research on the fossil and associated materials, and attracting many visitors (Yagi, 2000).

In 1883, Toyokichi HARADA (1860–1894) (see Figure 8) returned from Germany, where he had studied for ten years. He graduated from the Freiberg Mining School and Munich University and worked in the Austrian Geological Survey. As previously mentioned, the Japanese Government initially adopted knowledge from the *Oyatoi*, before becoming independent of them. Harada's return was thus most welcome. Naumann was 'dismissed,' and Harada was initially employed as an associate professor at the University of Tokyo and then as Assistant Director of the Geological Survey.

Naumann returned to Germany in 1885, but the following year (1886) the Geological Survey of Japan published the 'Geological Map of the Northeastern Division, Reconnaissance.' All five sheets were completed by 1894. In 1899, the 1:1,000,000 Geological Map of the Japanese Empire was successfully completed, and displayed to the world at the International Exhibition in Paris (Imai, 1966). This, then, was the chief fruit of Naumann's work in Japan.

Acknowledgements

I am indebted to David Oldroyd for giving me a copy of Pumpelly's paper and providing comments and suggestions on a first draft of the present paper. I am grateful to Dr Isao Imai, who first researched the work and life of Coignet, Lyman, and Naumann.

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Michiko Yajima, Tokyo

Trying to Understand the Earth—and the Universe Born too Late or too Early? Elemér Szádeczky-Kardoss, Hungary (1903–1984)

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Our will for knowledge wants more than one line
We try to sum up everything as a whole.
(Imre Madách, *The Tragedy of Man*, Scene 12)

1. From Heaven to Earth

Samuel Szádeczky was a nineteenth-century Calvinist pastor at Pusztafalu village (Abauj County, Northern

Hungary). Of his five sons, two became university professors: Lajos, an historian, in Debrecen; and Gyula, a geologist, in Kolozsvár/Klausenburg/Cluj-Napoca. (In Transylvania, most settlements have three names: in Hungarian, German, and Romanian.)

Gyula Szádeczky (born at Pusztafalu, 27 December, 1860) was Professor of Geology at the Hungarian-language Ferencz József University in Kolozsvár/Klausenburg/Cluj-Napoca. He was the first to recognize the occurrence of bauxite in the territory of historical Hungary, and started its exploration, in Jád Valley, Bihar/Bihor Mountains, in 1904. After the Trianon Peace Treaty (4 June 1920), when the whole of Transylvania became part of the Romanian kingdom, the University of Kolozsvár moved to Szeged upon the Tisza River in southeast Hungary. Professor Szádeczky stayed, though he no longer participated in teaching, as the language of instruction changed to Romanian (and the University was renamed after Ferdinand I, King of Romania). His Romanian successor in the chair, Ion Popescu-Voiteşti, appreciated his attitude, and granted him an office and laboratory facilities, enabling him to continue his scientific research. He was subsequently appointed chief geologist of the Geological Institute of Romania (Bucharest), residing in Cluj-Napoca. In those years, he published under the name of Julius von Szádeczky. He was even allowed to go on attending the International Geological Congresses (1926 Madrid, 1929 Pretoria, 1932 Washington D.C.) He died in 1936, and rests in the Házsongárd cemetery—a kind of local Pantheon—of his beloved home town.

2. Fleeing and a Flying Start

Elemér Szádeczky-Kardoss (who was born in Kolozsvár/Klausenburg/Cluj-Napoca on 10 September 1903) (see Figure 1) decided to follow the same profession as his father. His first scientific papers dealt with the Eocene formations of the Transylvanian Basin, with particular emphasis on tectonics (1, 2). However, he soon bade farewell to his father and emigrated to Hungary, where he studied at Budapest University, becoming a fellow of the prestigious Eötvös College. He graduated in Natural History and Chemistry in 1926.

The young Szádeczky-Kardoss obtained a job with the College (before 1904 called the Academy) of Mining, Metallurgy and Forestry in the town of Sopron/Ödenburg, near the western border of Hungary. (This renowned institution, which dated back to 1735, had moved to Sopron from Selemecbánya/Schemnitz/Banská Štiavnica, in the northern volcanic belt of historical Hungary, which, as a result of the Trianon Peace Treaty, became part of Czechoslovakia.) He was appointed as assistant to Professor Miklós Vendel.

Figure 1
Professor Elemér Szádeczky-Kardoss (1903–1984)

3. Gravels and Coals

Szádeczky-Kardoss' academic career was smooth: in 1931 he became a Reader at Budapest University and in 1936 obtained a Chair in Sopron, whereupon he began to study the Neogene and Quaternary basin-filling sediments of the Little Hungarian Plain. (3, 5, 6) He devised a morphometric method for analyzing gravels, measuring the proportion of the CPV (concave–plane–convex) surfaces of pebbles and evaluating them statistically—a technique that is still used today.

The grade of roundedness can be expressed numerically: C = percentage of the concave surfaces, V = percentage of the convex surfaces. The percentage of plane surfaces is then obviously P = 100 – (C + V). These two numerical values allow one to distinguish various types of roundedness and genetically different rocks. The measured values can be visualized by means of a triangular diagram (4).

Szádeczky-Kardoss' monograph on the *Geology of the Little Hungarian Plain* (5) was published in 1938. Meanwhile, he had obtained a postgraduate fellowship at the Collegium Hungaricum in (pre-Nazi) Berlin (1929–1930), where he became interested in coal petrology. Back home, he initiated the microscopic and laboratory study of coals in Hungary.

A close correlation has been found to exist between the physical properties and the chemical compositions of most of the organic constituents of coals. On this basis, these constituents can be arranged in a quantitative physical-chemical system. Accordingly the overwhelming part of the organic constituents can be divided into three main groups: bituminites, huminites and oxinites. These represent groups the character of which changes successively from the reductive–anaerobic type to the oxidative–aerobic one. This novel system was first presented by the Author of this study in 1948, relying mainly on investigations performed on brown coals (7, p. 86).

Bituminite is not identical with bitumen. Bituminite is a petrographic term for the optically distinguishable, yellow-coloured, hydrogen-rich constituents of coal. Bitumen is a chemical term, comprising all the constituents of coal that are soluble in organic solvents. [Accordingly] some part of the bituminite is bitumen, but it also includes the bitumen derivates that have become insoluble, while bitumen consists not only of soluble bituminites, but some "bitumen" is leached from huminites, too, especially if the coal has been ground to a very fine grain size (ibid., p. 90).

[W]ithin the bituminites, two main groups can be distinguished according to the predominantly open-chain or ringed hydrocarbon chains of the minerals (ibid.).

After the turbulent (and for Hungary disastrous) years of World War II and the Communist seizure of power, Szádeczky-Kardoss was among the first scientists to be awarded the Kossuth Prize (1949), the country's highest distinction for a man of science or humanities. His textbook, *Coal Petrology*, was published in 1952 (7). Another paper dealt with coals from the viewpoint of metamorphism (8).

4. Is Trilocation Possible?

Szádeczky-Kardoss' career took a decisive turn in 1948–1950. He accepted a chair (of Geology and Ore Deposits) at the University of Heavy Industries at Miskolc, which was at that time the second-largest town in Hungary, and in due course he became the first Rector of this new institution. Since the Faculty of Metallurgy, and later the Faculty of Mining, were moved there from Sopron, Miskolc University can claim to be one of the successors of the Selmec / Schemnitz / Banská Štiavnica Academy.

In Budapest, Professor Béla Mauritz was forced to retire from Budapest University for political reasons, and the Chair of Mineralogy and Petrography thus became vacant. The Department was divided into a Department of Mineralogy and Ore Deposits and a Department of Petrology and Geochemistry. K. I. Sztrókay was appointed to the first of the two chairs, and Professor Miklós Vendel (from Sopron) was called to the second one. However, he declined—refusing to take advantage of the personal tragedy of Béla Mauritz, his former teacher and tutor—and stayed in Sopron until his death in 1977. In consequence, the chair was offered to Szádeczky-Kardoss, and he accepted it. With his triple appointment, Professor Szádeczky-Kardoss was for a couple of years teaching at three universities simultaneously; and Sopron and Miskolc were some 400 km apart.

5. From Ionic Potentials to Plate Tectonics

Szádeczky-Kardoss's main activities were as follows:

1. He introduced Geochemistry as an independent subject at Budapest University, and published its first Hungarian-language treatise in 1955 (14).

In this book an attempt is made to reveal systematically the relationships existing between the atomic (above all, electronic) structures of the elements and their distribution in the Earth, and thereby to develop a specifically geochemical approach that would establish links between the geological sciences and nuclear physics and physical chemistry based on their electronic structures (14, p. 3).

2. He paid special attention to the grouping of chemical elements (improving and further developing Goldschmidt's classification), as well as their cycles across the geospheres (9, 10, 11, 12).

Szádeczky-Kardoss also distinguished altogether 22 'geophases': 10 magmatic endogenous ones; 9 sedimentary exogenous ones; and (provisionally) 3 metamorphic ones (14, pp. 81–83). He defined geochemical provinces, developing the pertinent ideas of the Russian geochemists V. I. Vernadsky and A. E. Fersman. The elements Carbon, Oxygen, Hydrogen, Nitrogen, and Phosphorus he considered together as the 'biophilic' elements. As far as the role of the biota was concerned, he relied on Vernadsky's assumptions, summarized by the statement:

Hungary). Of his five sons, two became university professors: Lajos, an historian, in Debrecen; and Gyula, a geologist, in Kolozsvár/Klausenburg/Cluj-Napoca. (In Transylvania, most settlements have three names: in Hungarian, German, and Romanian.)

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After the turbulent (and for Hungary disastrous) years of World War II and the Communist seizure of power, Szádeczky-Kardoss was among the first scientists to be awarded the Kossuth Prize (1949), the country's highest distinction for a man of science or humanities. His textbook, *Coal Petrology*, was published in 1952 (7). Another paper dealt with coals from the viewpoint of metamorphism (8).

4. Is Trilocation Possible?

Szádeczky-Kardoss' career took a decisive turn in 1948–1950. He accepted a chair (of Geology and Ore Deposits) at the University of Heavy Industries at Miskolc, which was at that time the second-largest town in Hungary, and in due course he became the first Rector of this new institution. Since the Faculty of Metallurgy, and later the Faculty of Mining, were moved there from Sopron, Miskolc University can claim to be one of the successors of the Selmec / Schemnitz / Banská Štiavnica Academy.

In Budapest, Professor Béla Mauritz was forced to retire from Budapest University for political reasons, and the Chair of Mineralogy and Petrography thus became vacant. The Department was divided into a Department of Mineralogy and Ore Deposits and a Department of Petrology and Geochemistry. K. I. Sztrókay was appointed to the first of the two chairs, and Professor Miklós Vendel (from Sopron) was called to the second one. However, he declined—refusing to take advantage of the personal tragedy of Béla Mauritz, his former teacher and tutor—and stayed in Sopron until his death in 1977. In consequence, the chair was offered to Szádeczky-Kardoss, and he accepted it. With his triple appointment, Professor Szádeczky-Kardoss was for a couple of years teaching at three universities simultaneously; and Sopron and Miskolc were some 400 km apart.

5. From Ionic Potentials to Plate Tectonics

Szádeczky-Kardoss's main activities were as follows:

1. He introduced Geochemistry as an independent subject at Budapest University, and published its first Hungarian-language treatise in 1955 (14).

In this book an attempt is made to reveal systematically the relationships existing between the atomic (above all, electronic) structures of the elements and their distribution in the Earth, and thereby to develop a specifically geochemical approach that would establish links between the geological sciences and nuclear physics and physical chemistry based on their electronic structures (14, p. 3).

2. He paid special attention to the grouping of chemical elements (improving and further developing Goldschmidt's classification), as well as their cycles across the geospheres (9, 10, 11, 12).

Szádeczky-Kardoss also distinguished altogether 22 'geophases': 10 magmatic endogenous ones; 9 sedimentary exogenous ones; and (provisionally) 3 metamorphic ones (14, pp. 81–83). He defined geochemical provinces, developing the pertinent ideas of the Russian geochemists V. I. Vernadsky and A. E. Fersman. The elements Carbon, Oxygen, Hydrogen, Nitrogen, and Phosphorus he considered together as the 'biophilic' elements. As far as the role of the biota was concerned, he relied on Vernadsky's assumptions, summarized by the statement:

The effects of the biosphere are manifested above all by the biogenic control of the redox potential of the zones (ibid., p. 598).

3. He developed a classification of sediments and sedimentary rocks based on the sequence of cation and anion potentials (see Figure 2).

Until very recent times the ionic potentials were calculated for cations only. We felt justified in extending the manipulations with ionic potentials to the anions, and even to the complex anions as well. In geochemical processes, the anionic potential values are just as important as the cationic potential values are. E.g., the system of sediment[ary rock]s can be established on this basis too, in a similar manner as Goldschmidt established a system based on the cationic potentials This system is improved in several respects by the introduction of anionic potentials.

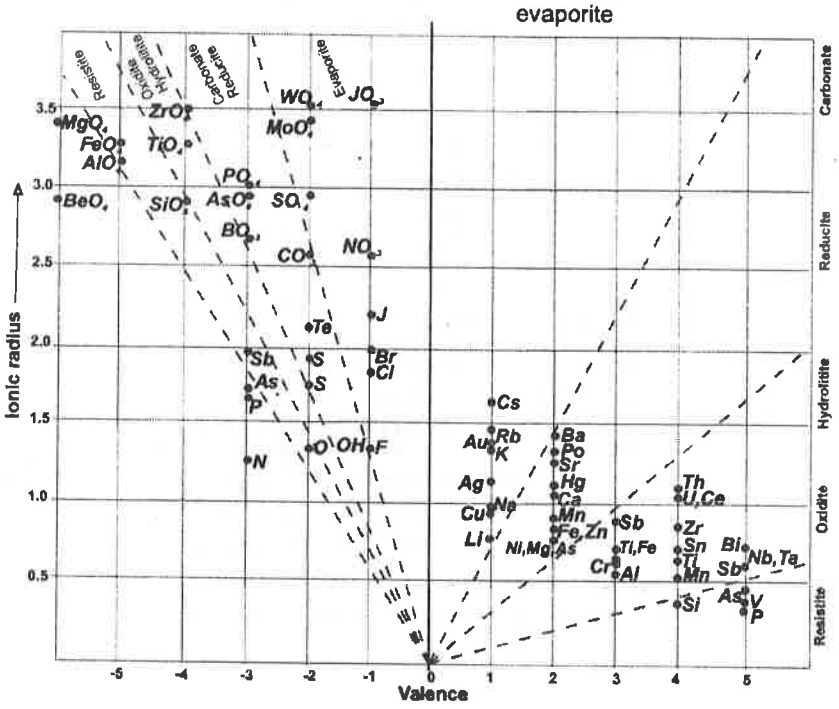

Figure 2
Classification of sediments, based on ionic potentials (13, p. 107)

4. He proposed the theory of *transvaporization* in igneous petrology, on the basis of which he elaborated a novel system of igneous rock classification (17), thus founding a specifically Hungarian school of igneous petrology.

The contact of magma with water or with water-containing country rocks, respectively, produces high-pressure vapour. After filling the cavities and fissures of the country rocks, the water penetrates into the still liquid, consequently permeable and originally mostly lower-pressure magma, which partly resorbs it. . . . The melting temperature and viscosity of the magma are decreased thereby, so that the physical conditions of vapour resorption become more favourable and the duration of the whole process is increased. . . . This sort of hydratation of the magma may be called transhydratation; or, taking into consideration other volatile substances, transvaporization. . . . Thus the migration of water chiefly does not take place in the direction of the temperature slope but on the contrary from the cooler towards the higher-temperature medium. Increase of temperature only activates this process (15).

Water of transvaporizational origin can often play an important role in the crystallization of intruded magma from the very beginning of the process. Consequently, many rocks exist which cannot be graded [ranged into] the . . . four categories of magmatic rocks [liquid magmatic, pegmatitic, pneumatolytic, and hydrothermal]. The crystallization of these rocks is not completed at liquid–magmatic temperature but it goes on in the pegmatitic, pneumatolytic and often even in the hydrothermal phase. We propose to denominate 'hemi-orthomagmatites' those

rocks, the crystallization of which takes place from liquid–magmatic to pneumatolytic temperature, and 'hypomagmatites' for which the crystallization goes on from liquid–magmatic to hydrothermal temperature (*ibid.*, pp. 199–200).

The transvaporization approach resulted in the development of a new system of magmatic rocks . . . (16, p. 50) (see Figure 3).

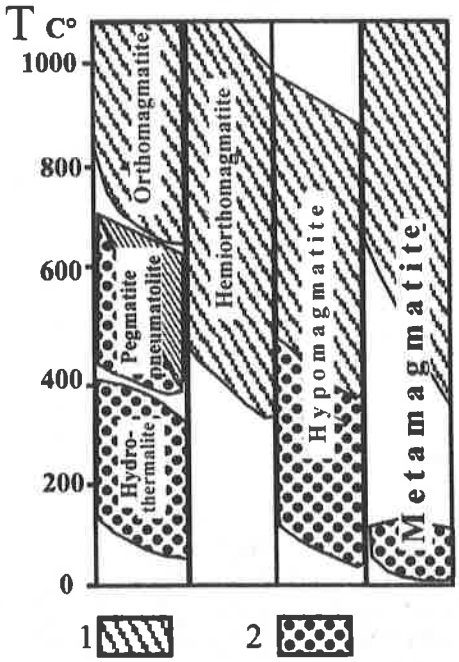

Figure 3
Crystallization from silicate melt
Crystallization from aqueous solution

5. Aiming at a better understanding of metamorphic processes, Szádeczky-Kardoss conceived and executed a series of low- and medium-pressure and high-temperature laboratory experiments (1965–1968). In this context, he started to think about a possible experimental approach to the problem of the origin of living matter.

This modeling mean[t] the simulation of the complex geonomical-(pre)biological process [see below], *comprising also the investigation of the gradual, joint evolution of the compounds and processes of the prevital compounds and later of living matter* (37, p. 745).

The decisive factor of geochemical changes—as in other thermodynamic systems—is not Time, but the three 'intensive' factors: P, T, C. Accordingly, by changing these parameters the temporal process can be modelled (*ibid.*, p. 747).

There is no need to calculate with particularly slow reactions for the time interval 3.5-4.0 Ga (10^9 years), which was the first to be modeled experimentally. According to our theoretical model, in those times the average temperature of the Earth's surface was 80 to 100 degrees centigrade, with a pressure in the order of magnitude of 100 atmospheres (ibid., p. 747).

One of the determining factors of the potential state (along with the presence of liquid water) is the ancient clay mineral-like product that on one hand adsorbed the complex of pre-vital compounds and protected them from extreme effects, and on the other hand it catalyzed their reactions. It might have played an important role also in the development of the predominance of L[aevo]-isomers, and possibly also influenced the sequence of the organic megamolecules, the structure of the common protein code. The ancient clay mineral structure is one of the determining factors of the megamolecules evolving to give rise to a living system, just as much as the P–T–C conditions and the system of rotation and orbiting cycles of the Earth (ibid., p. 753).

Thus, Szádeczky-Kardoss made significant contributions in sedimentary, igneous and metamorphic petrology. Moreover, he was among the first in Hungary to recognize the epochal, paradigm-changing importance of global plate tectonics and to apply it to the geology of Hungary. In 1968 he concluded:

1. *In the upper mantle matter is moving even at present. 2. The movement of matter in the mantle correlates with the orogenic cycles. 3. It is essentially a spatial circulation, i.e., a slow cyclic deep current/flow* (23, p. 64).

Szádeczky-Kardoss summed up the structural evolution of the Carpathian–Pannonian–Dinaric region in 14 theses (30) and in a more elaborate study in English (27). Some of his statements merit being quoted here.

Subduction is more or less a cyclic phenomenon. The so-called tectonophases correspond to the maxima of the movement's velocity (27, p. 83).

The major part of the vapor originating . . . from the continuously descending sediments accumulates in the uppermost—therefore relatively low-pressure—level of the Gutenberg channel. Thus a vapor-'pillow' is generated in this level, which separates the lithosphere from the deeper part of the mantle. The lithosphere above the vapor-pillow becomes horizontally mobile by reason of the floating effect of its lubricant and the counter pressure (ibid., p. 85). (N.B.: this suggestion was later rejected.)

In the Carpatho–Pannon–Dinaric area, at least three main Alpine subduction zones can be distinguished: the Pieniny Klippen Zone; the Igal–Bükk–Northern Transylvania-- Maros–Vardar zone; and the Inner Dinarid zone (ibid., p. 86).

In the Mediterranean zone, the subduction goes down to about the asthenosphere of the Gutenberg-channel. The Circumpacific type of subduction reaching even to a depth of 750 km represents another, simpler kind of subduction (ibid., p. 87).

On the basis of the new global tectonics the investigation of the geonomical connections between the evolution of the solid Earth and that of the hydrosphere, atmosphere and biosphere becomes possible (*ibid.*, p. 89).

6. Innovations in the Hungarian Academy of Sciences

In 1949, Szádeczky-Kardoss was elected a Corresponding Member of the Hungarian Academy of Sciences, and became a Full (ordinary) Member in 1951. In 1952, he won the Kossuth Prize for a second time. He also became the first Secretary and later President of the Department of Earth Sciences and Mining of the Hungarian Academy of Sciences, which in 1965 became an independent unit (separate from the Department of Technical Sciences), thanks to his initiative and his successful lobbying. He also served as chief editor of the Department's Hungarian-language journal and of its newly established foreign-language one: *Acta geologica Academiae Scientiarum hungaricae*. In 1955, he founded the Laboratory for Geochemical Research of the Hungarian Academy of Sciences, which he directed until his retirement in 1974 (see 19).

7. Cross-border Management of Geosciences

Professor Szádeczky-Kardoss was also active and efficient in international (mainly regional) scientific cooperation, for which his gentlemanly appearance and manner, his good working knowledge of English, French and German, his tact and diplomacy, and his 'Renaissance' erudition were great assets. (For example, in his leisure time he enjoyed playing the violoncello and was a member of an amateur string quartet.)

Szádeczky-Kardoss also prepared and chaired the only congress of the Carpatho–Balkan Geological Association held in Hungary (in Budapest in 1969). Under the aegis of the CBGA, he initiated and coordinated the compilation of the Map of Metamorphic Rocks of the CBGA Region (scale 1:5 million).

As far as Hungary is concerned, Szádeczky-Kardoss distinguished three types of metamorphic rocks: 1. Baikalian, mainly epi-, partly meso-zonal, progressive; 2. Hercynian anchi-, epi- and meso-zonal progressive; and 3. Alpine retrograde, mainly slightly epizonal ones. The Baikalian formations are always overprinted by the other two (25).

8. Awards and Honors

Szádeczky-Kardoss was awarded the Szabó József Medal, the highest distinction of the Hungarian Geological Society, in 1958. A series of state distinctions followed. He was elected to honorary membership of the Geological Societies of Hungary, Czechoslovakia, and Finland; to corresponding membership of the Austrian Academy of Sciences; and to membership of the World Academy of Sciences and Arts. On his 80th birthday, the international geoscientific community acknowledged his achievements by awarding him the Leopold von Buch Medal (1983).

9. Towards a New Synthesis

After more than thirty years of intensive scientific research, mainly of an analytical nature, from 1968 on Szádeczky-Kardoss moved towards seeking to synthesize all relevant geoscientific information. At the Hungarian Academy of Sciences, he organized a series of workshops on the Matter and Energy Flows of the Earth (1968–1975). The topic was dealt with by an amazingly multidisciplinary team, consisting of experts in virtually all scientific disciplines, and including also the social and human sciences and arts (29).

Thus, on the basis of his remarkable knowledge, Szádeczky-Kardoss sought to establish an all-embracing

synthesis of earth sciences (or of natural science as a unified whole), publishing his *Geonomy* in 1974 (31), regrettably only in Hungarian and as a preliminary edition for collective reviewing. It contained such statements as:

Geonomy is the science of the operation of the planet that has produced Man and has been playing a significant role in his self-formation (p. 2).

The main task of Geonomy is to systematize the interrelations of geoscientific phenomena detected by various disciplines using different methods (p. 3).

Geonomy is not only a geoscience seeking for causes, it also embraces as inseparable the basically biological themes of the origins and inorganic background of life (p. 386).

According to the achievements of Geonomy, the Earth is an active system; its constituting 'spheres' interact with each other (p. 388).

It is remarkable that Szádeczky-Kardoss refused to consider seriously James Lovelock's Gaia Hypothesis. In a private conversation he qualified it as "unscientific geopoetry."

Szádeczky-Kardoss also established and chaired, until the end of his life, the Hungarian Academy of Sciences' Commission on Geonomy. This largely multidisciplinary commission remains active to the present, in an even broader field comprising also, for example, comparative planetology and space research.

Szádeczky-Kardoss further elaborated a concept that he named the Universal Cycle Relation. This was intended to be nothing less than a unified worldview, comprising all phenomena in the universe, based on the two fundamental parameters of space and time. He discovered that, on a base-10 logarithmic scale, a log Space–Time diagram revealed that all motions in space and time could be arranged in four distinct bands: A electromagnetic, B mechanical, C chemical and biological, D subatomic motions.

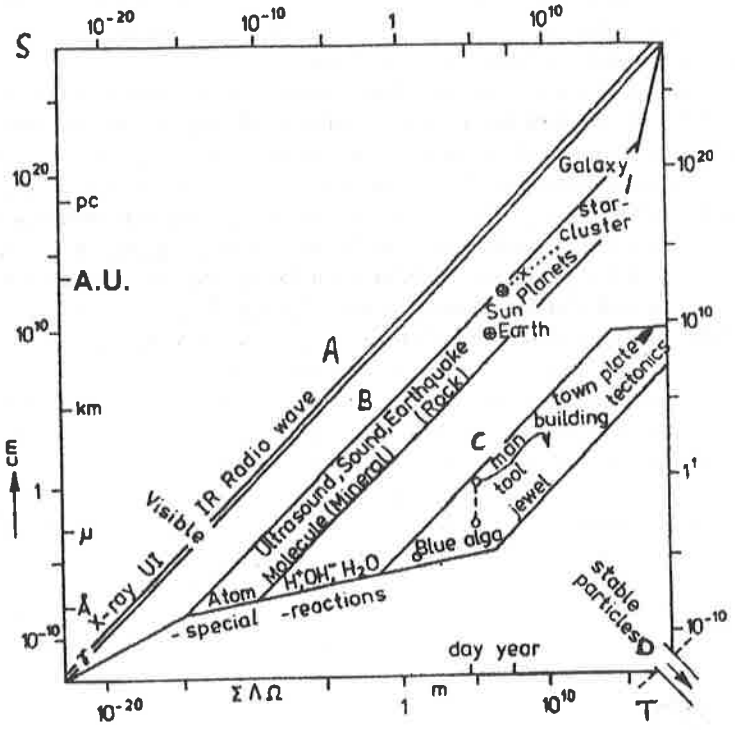

Figure 4
The Double Logarithmic Space *versus* Time Plot (47, p. 23)

The cycle relations provide us with a new basis to deal uniformly with all natural phenomena in a quantitative manner. They promote the unification of physics, chemistry, earth sciences, and biology into a higher entity and make their interrelations mutually calculable. As a general ordering principle they represent a quantitative basis for the systematization of sciences and for the study of their evolutionary trends (34, p. 12).

The *Proceedings* of the workshops were published in his Department's journal in 1976. In 1978, a collection of selected papers dealing with the application of the Universal Cycle Relation (UCR) was published also in English as

Cyclicities: Theory and Practice (38).

[The UCR] *was critically applied to different realms of the Universe by an interdisciplinary team of physicists, astronomers, geoscientists, biologists and philosophers . . . . [It is] planned to discuss the law of cyclicities on a much broader and international level* (op. cit., p. 4).

Unfortunately this has not been done. In 1980, another paper was published in English (40) but no international echo followed.

But Szádeczky-Kardoss's generalization was published after his death in several versions (44, 45, 46, 47). This time—too late!—his ideas provoked lively, and in some cases even passionate, debates. The main objections concerned the extension of the Space–Time view to the non-material world, e.g., giving a simple formula for the Buddhist world-view. Szádeczky-Kardoss was accused of reductionism (what he always firmly rejected) and oversimplification (which in some cases he admitted).

10. A Rich Heritage

Szádeczky-Kardoss died in Budapest on 13 August 1984. His widow established the E. Szádeczky-Kardoss Foundation in his memory, to provide young scientists with some financial support.

According to a compilation performed by Teréz Póka (one of Szádeczky-Kardoss' most faithful disciples), his publications comprised a total of 242 items (128 in Hungarian, 114 in other languages, namely English, French, German, and Russian). They include four books, three monographs, one journal volume, and one thematic map. Their distribution by discipline was: petrology 53%; geochemistry 18%; geonomy 15%; science policy 8%; mineralogy and ore deposits 3%; and history of science 1%.

11. Twenty Years Later

On the 100th anniversary of Szádeczky-Kardoss' birth, a ten-member team of the Hungarian Academy of Sciences' Subcommission on Geonomy published a volume entitled *Geonomy after the Turn of Millennium* (Budapest, July 2003), in Hungarian, and scientifically edited by the author of the present paper (48). The book gives a critical overview of Szádeczky-Kardoss' ideas in the light of our present knowledge. An abridged English-language version was printed in August 2005 (49).

On 31 September 2003, a bust of Szádeczky-Kardoss was unveiled in the Great Hall of Building C in the new campus of the Budapest University Faculty of Sciences, and his grave was solemnly crowned. Scientific sessions were held in his honor by the Hungarian Academy of Sciences (31 September 2003) and by L. Eötvös University and the Commission on Geonomy (21 October, 2003).

In 2004, a special issue of *Acta geologica Academiae Scientiarum hungaricae* was devoted to Professor Elemér Szádeczky-Kardoss, making known the latest scientific achievements of some of his disciples.

12. Out of his Time

It is a nice question whether the Renaissance man, Szádeczky-Kardoss, came too late, or whether he was too early—as a pioneer of a unified or integrated science of the twenty-first century. Be that as it may, he was one of Hungary's most prominent geoscientists.

Acknowledgment

Hearty thanks are due to Dr. Teréz Póka for her support and (in)valuable assistance, to Professor David Oldroyd for his kind encouragement, pertinent comments and careful language editing, and to Professor Kennard Bork for further improvements, technical editing, and publication..

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AWARDS

Sue Tyler Friedman Medal, Geological Society of London (2005): Ursula Bailey Marvin

Citation by Cherry Lewis and Ted Nield

Born in Vermont in 1921, within sight of a spectacular range of mountains, Ursula Bailey Marvin received a BA in history from Tufts College, Massachusetts, which also required her to complete two years of science. An introductory course in geology ultimately determined the direction of her academic career. Unable to major in the subject because the Department Head would not accept women, she fitted in enough geology and math to win a scholarship to Radcliffe to do a Masters in geology. It is this unique combination of trained historian and geologist that sets Marvin apart from historians who 'socially construct' the history of geology, and geologist-historians whose prime commitment is to their science.

Following several years in Brazil and Angola, where she and her husband searched for ore deposits, Marvin was offered a research post at Harvard to study the mineralogy of the meteorites in the Harvard collection. This work developed into a cooperative project with scientists at the Smithsonian Astrophysical Observatory, and in 1961 she was invited to join the SAO staff. There, she became part of a small group of scientists chosen by NASA to study the lunar rocks brought back by the Apollo missions. She obtained a PhD in 1969, based on the many significant papers she had written. In 1978 she was the first woman to join a U.S.A.-led expedition to collect meteorites in Antarctica. She returned there for two more field seasons. Due to the breadth of her interests, she has both an Asteroid and an Antarctic Nunatak named for her.

An early convert to continental drift, despite Harvard's stance on the subject, in 1973 she published her seminal book *Continental Drift: the Evolution of a Concept.* Marvin was observing and recording the history of her science, almost as it happened. But her real mark in the history of geology has been made with her work on the history of meteorites and impact structures—a field she has essentially made her own. She has shown how the study of meteorites and other bodies in space has transformed them from astronomical to geological objects, which in turn has changed geology from an Earth-centred science to one that is planetary-wide.

Marvin has done much to popularise her science, as well as advancing the cause of women in science. She cultivated the global community by serving two terms as Secretary-General of the International Commission on the History of Geological Sciences (INHIGEO). Over the course of her career, she has written or co-authored more than 180 research papers and, although she retired in 1998, she continues to produce major papers on historical subjects every year. She has been a force in the history of geology that few manage to emulate, and is therefore a worthy

recipient of this medal and the admiration and gratitude of this Society.

Ursula Marvin replied (18 May, 2005):

Thank you, very much. Last winter, when I opened the letter informing me I was to receive this medal, I replied that I was astonished and thrilled—in equal proportions. I still am—even more so, now that I am here with all of you. I am particularly pleased with this honor because, as you have heard, I began serious research on the history of geology rather late in my career.

The period from the 1960s through the 1980s saw two spectacular advances in our knowledge of the Earth, and I was fortunate enough to experience both of them and to place them in their historical contexts. In 1966, I was focusing my attention on the mineralogy of meteorites when the Associate Director of the Observatory enlisted me to present a summer seminar reviewing the status of the continental drift hypothesis.

Having been educated at Harvard University, I knew that continental drift was sheer nonsense. But I soon found new materials in the library that said otherwise—particularly the Royal Society's volume from its 1964 *Symposium on Continental Drift.* In my seminar, I reviewed the pros and cons, evenhandedly, I thought; although some in the audience detected a slight anti-drift bias. But before my written version was due six months later, radiometric dates had been assigned to magnetic stripes on the sea floor, and to matching rock formations across the Atlantic from Ghana to Brazil. This new and very persuasive type of evidence converted me into a drifter.

Later on, the Smithsonian Press asked me to write a book on this subject, so I traced the long history of ideas on the distribution of lands and seas even as I watched continental drift being transformed into plate tectonics—changing Earth science forever.

Meanwhile, the Space Age was transforming the Earth from an isolated body subject only to intrinsic forces, to a planet subject to all the vicissitudes of orbiting in space along a path gritty with interplanetary debris—dust and cobbles falling on Earth every day, larger fragments every year, and huge ones wreaking instant damage on the landscape on rare occasions.

Suddenly, meteorites and the Moon, which had been largely ignored by geologists and astronomers, had become topics of research worldwide. Throughout the 1960s scientists debated whether the Moon is a cold, primitive planetesimal or a hot, volcanic body, and whether impacting meteorites had been of any importance in cratering the surfaces of the Moon or the Earth. Each hypothesis of lunar origin—earth-fission, lunar capture, simultaneous accretion, a recent accumulation of Earth-orbiting moonlets—was so unsatisfactory that some observers half-seriously claimed the Moon could not exist, it must be a gigantic fraud or delusion.

In the early 1970s, samples from the Apollo Missions, and the Russian unmanned Luna Missions, showed that the Moon is essentially as old as the Earth; it started out hot, lost all its water and volatiles, cooled early, and has been the passive target of impacting bodies ever since. Not only did the preponderance of shocked minerals in the surface materials confirm an impact origin of lunar craters, but a new theory of origin calls for a giant impact between the accreting Earth and another large body to form the Moon, itself.

Impacting bodies have pockmarked the Earth, and left their evidence in shocked rocks and minerals at more than 150 (and counting) sites around the globe. At the Lyell Centenary Symposium of 1975 (my first history of geology meeting), I argued that impacts are demanded by the principle of uniformitarianism. But I changed my mind when I read more of what the founding fathers actually wrote. Missiles from space that instantaneously excavate craters, melt and shock the country rocks, blanket the surroundings with piles of rubble, and disrupt the atmosphere and/or biosphere, never were part of our uniformitarian heritage; which was based on gradual changes by internally generated processes that are observed in operation.

One more advance occurred in the 1980s, when primitive meteorites were found to contain minute mineral grains that had formed in stars older than the solar system. This spectacular discovery showed that our primeval solar nebula was not homogeneous after all, and it forged a new link between planetary science and astrophysics.

In 1973, when the news broke that a Japanese field team had found four different species of meteorites close together on an Antarctic ice field, the first American proposal to search for such concentrations was judged to be "Ludicrous." Three proposal cycles later, the first U.S.-team located a concentration, and USA-led expeditions have gone there annually ever since. Parties from Japan, the UK, and other countries also have gone, adding well over 25,000 samples to the world's meteorite collections. Most of these are fragments of asteroids, but the Antarctic ice fields provided us with the first meteorites from the Moon, and the first from Mars, to be recognized on the Earth. One of the Martian stones reportedly contains biologic fossils. I don't believe it, but the existence of microbes on Mars seems perfectly reasonable, so we may yet find them in Martian meteorites.

I had to go to Antarctica, so I arranged to join the team in 1978 and again in 1981. That time I shared a tent with a friend, Ghislaine Crozaz, who was then a professor of geochemistry at Washington University in St. Louis, where her husband, the late Robert M. Walker, was a professor of physics. I am happy to say that we wound up the season better friends than ever. So this morning, Ghislaine rode the Chunnel train from Brussels to join us here. In

addition, I have a second guest, whom I met this morning for the first time: James Normington, at the Inns of Court Law School here in London. He is a close friend of one of my grandnieces, who left Boston a year ago to study veterinary medicine in Edinburgh. On a personal note, I want to extend a hearty welcome to Ghislaine and James for helping to make this event so special for me.

Thank you again for this great honor.

Hugh Torrens awarded the Brighton Medal

Hugh Torrens is to be congratulated on his being awarded the Brighton Medal of the Geological Curator's Group of the Geological Society of London. The medal is awarded every three years to an individual or individuals who have devoted a significant part of their working lives to the care of geological specimens, or who have introduced innovations which have led to significant improvements in the care of geological specimens or who, through their example or by teaching and/or writing, have inspired others to the better care of geological specimens, or have fostered an increased awareness of the value of geological collections through collections research. This is the first time it has been awarded to any non-curator!

Hugh's early research was on Mesozoic ammonites and stratigraphy and he continued this work while developing his interest in the history of geology and technology. He has written extensively on William Smith, Mary Anning, and on many facets of the history of British geology. He served the Geological Curators' Group as a member of its original committee in 1974, and as Chairman in 1977–1980. With Brian Page he established their Newsletter (now *The Geological Curator*) and contributed many papers and notes on geological collections and institutions. He has shown Collections Research to be an essential component of museum work, and continues to champion the cause of geological museums, their collections and history.

OBITUARIES

Professor Neil Wilfred Archbold
(14 August 1950–28 November 2005)

It is with deep sadness that news of the death of Professor Neil Archbold has been received by members of INHIGEO. Professor Archbold was a palaeontologist of international standing. As well as being a leading fossil brachiopod specialist, taxonomist, and biostratigrapher, he also had a strong interest in the history of geology and palaeontology. He became an INHIGEO member *circa* 1990.

Although it was not generally well known, as a child Neil suffered from a chronic life-threatening illness and between the ages of eight and twelve underwent a long series of life-saving operations by the distinguished wartime surgeon, Sir Albert Coates. Over the years Neil periodically underwent further surgery but he always remained cheerful, alert, uncomplaining, and optimistic. Consequently, despite periodic bouts of poor health in recent years, his death still came as a severe shock. Throughout his working life Neil had a remarkable ability to focus on his scientific research and pursue his academic interests no matter what his prevailing medical circumstances.

Neil's interests were many and diverse. He was a great collector. At an early age he began collecting all sorts or natural objects as well as stamps, coins, and books. From about the age of eight he displayed a deep interest in natural history, especially the *Lepidoptera*. As well as butterflies and moths he also turned his attention to spiders, native birds, native animals and native plants generally, rocks, minerals, fossils, astronomy, and later, to conservation issues, in particular, the preservation of native fauna and flora and also geological heritage.

He followed his brother Jim in his devotion to natural history and to butterflies in particular. The family home was in Barkly Terrace, Mitcham (in Melbourne) and the local butterfly species collected included the Emperor Gum Moth (*Opodipthera eucalypti*), the Wanderer or Monarch Butterfly (*Danaus plexippus)*, the Orchard Swallowtail (*Papilio aegeus)*, the Painted Lady (*Vanessa kershawi*) and the little brown Skippers (*Hesperiidae*). They collected the eggs and caterpillars and bred them. Eventually the progeny were released. For several years they carried out banding of the Wanderer Butterfly. They noted population changes in years of abundance or scarcity. Neil and Jim took a strong interest in the accidental introduction of the European wasp, which had a negative impact on their beloved caterpillars and they vigorously sought out wasp nests and destroyed them.

Later Neil and his wife Linda cultivated a flourishing, mainly native, garden at their home in Doncaster East (Melbourne), featuring many drought-tolerant plants and a number of uncommon species such as araucarias and ginkgo. Neil grew specific plants to attract butterflies, such as stinging nettles (*Urtica)* to attract Painted Ladies, the Swan plant (*Asclepias*) to attract Wanderers and *Buddleia* (for many species).

After completing his secondary school education at Camberwell Grammar School in Canterbury in 1969, Neil completed a BA (1973), MSc (1976), and PhD (1983) all at the University of Melbourne. His PhD was on

Permian brachiopods, in which he eventually became a recognised world authority. His supervisor was George Thomas, who had a special interest in Western Australian brachiopod faunas, on which Neil did his original work and remained interested in throughout his career. This work expanded to include Late Palaeozoic biogeography and local and international stratigraphic correlations. For example, Neil published on stratigraphical relationships within Australia, such as between the Eastern and Western Australian provinces as well as between the Australian faunas and those of other Gondwanan faunas such as those in India, Timor, Irian Jaya, and Thailand, and those even further afield such those of Russia and Serbia.

His research received wide recognition and he established productive linkages with scientists both at home and abroad. He had a strong commitment to international collaborative research and the development of science in countries such as Russia, China, India, Argentina, and Timor. He was a member of numerous scientific and academic societies and served on many local and international committees.

Neil's academic career began in 1973 at the University of Melbourne where he was employed first as a part-time tutor (1973–1980) and then as a full-time tutor (1980–1982) in the Geology Department. He also tutored for many years (1973–1989) for the Council of Adult Education where he inspired many students to take up an interest in geology and palaeontology. A number of his mature-age students became active members of the Geology Group of the Field Naturalists Club of Victoria. He taught at a number of institutions until eventually in 1989 he became a full-time lecturer at Rusden campus of Victoria College (which was incorporated into Deakin University in 1992). He then achieved a rapid series of promotions becoming Professor (personal chair) in 1996. From 1985 onwards he received fifteen research grants from the ARC (Australian Research Council) and raised the status of the geology section at Deakin University from relative obscurity to one of national and international significance. He was an encouraging and much appreciated tutor, lecturer and postgraduate supervisor.

Neil published over 160 scientific papers. Of these, he was sole author of 76 papers but he was also a great collaborator, publishing some 85 papers with 40 or so co-researchers from more than twenty institutions around the globe. The topics ranged from the taxonomy of brachiopods to palaeogeography, palaebiogeography, palaeoclimatology, palaeoecology, ocean circulation patterns, global stratigraphy and the history of geology and palaeontology. His taxonomic output was impressive, describing more than 150 new species, nearly 40 new genera or subgenera, five new subfamilies and one new family of brachiopods as well as a new genus and species of trilobite and a new species of bivalve.

Neil also had a deep and abiding passion for the history of geology and palaeontology. To some extent it was a natural outcome of his work in these fields, which can be, in themselves, historical disciplines. One of his early historical papers published in 1981, titled 'Western Australian geology: an historical review to the year 1870,' was a direct outcome of his study of Western Australian brachiopods. In addition, many of his more routine palaeontolgical papers had interesting historical content. One particularly memorable historical paper titled 'History of Geological and Palaeontological Studies on the Permian Glacially Derived Sequences of the Bacchus Marsh District, Victoria, Australia' was delivered at the Strzelecki International Symposium on Permian of Eastern Tethys: Biostratigraphy, Palaeogeography and Resources held in 1997—a conference organized by Neil himself.

The Permian glacially derived sediments of the Bacchus Marsh district held a special interest for Neil and he frequently conducted field trips with his students to this area. He was particularly interested in elucidating the palaeontological and geological details of what appeared to be a brief marine incursion in the area. He was pleased when he and his colleagues discovered that the marine incursion was far more extensive than had been previously believed, despite 150 years of prior intermittent investigation.

Neil's interest in history continued to grow and in 2003 he assumed leadership of the Geological Society of Australia's Earth Sciences History Group (ESHG). In 2003 leadership of the ESHG moved from Tasmania to Victoria and a mainly Victorian Committee was set up with Neil Archbold as chair of the Committee.

He was excited at having the opportunity to 'dig up' (as Neil put it) historical material on some noted Victorian geologists and palaeontologists such as Alfred Selwyn, Richard Daintree, Alfred Howitt, James Stirling, E.J. Dunn, and visiting geologists such as John Walter Gregory, but also to rehabilitate and "set the record straight" on what he regarded as neglected, maligned, and misunderstood figures such as Frederick McCoy.

He particularly revelled in his investigations of the Australian "black coal debate" the history of which he considered was completely biased and skewed by "Sydney-centric" authors. He was thrilled when he uncovered a series of sketches by James Stirling relating to his black coal investigations and fully intended to continue to tease out the details of the black coal debate, but his premature death in Mendoza, Argentina, meant that this was not to be. He commented that when he returned from Argentina he was going to dedicate himself to upgrading the ESHG Newsletter and promote the study of the history of geology and palaeontology. He was moving towards a major stu ly on the origin of the whole concept of Gondwana.

Perhaps the institution closest to Neil's heart was to the Royal Society of Victoria, which he served as honorary librarian for many years. He joined the Society in 1975 and became a member of Council (1992–2005), Vice-President (1999–2000), and President (2001–2004). His work as custodian of the Society's valuable library and in finding it a permanent home was decisive to its preservation. He helped broaden the Society's appeal to the general public and defended and promoted the Society's traditional scientific emphasis. His legacy is a vital, active Society with a growing membership, in comparison with some similar institutions in Australia which at present are struggling for relevance and viability.

Universally regarded as a gentleman, Neil was admired and loved by his colleagues. He was an inspirational scientist, intellectual and teacher. His wisdom, insight, humour, gentleness, and fortitude will be deeply missed. His untimely passing at the peak of his career is a grievous loss to science and academia.

Acknowledgements

The author gratefully acknowledges assistance from Linda Archbold, Jim Archbold, John Talent, and Monica Campi in the preparation of this obituary.

Doug McCann, Melbourne

Geneviève Bouillet
(30 July 1917–22 January 2006)

Geneviève Bouillet was born in Bourges on 30 July 1917. She studied in the Lycée of Bourges where she obtained her *Baccalauréat* in 1934. Then she moved to Versailles for preparing her admission to the *École normale supérieure de Sèvres* but severe health problems forced her to abandon. After obtaining the required degrees, she taught in several colleges around Bourges, and finally in her native city. Additionally, she prepared a research diploma in geology (*Diplôme d'Études supérieures*) at the Sorbonne, under the guidance of Professor Léon Lutaud (1952).

Later, Geneviève Bouillet, who had always had a deep interest in Greek and Latin, decided to prepare a thesis in the history of geology, that she defended in 1976 in Paris: '*La géologie dynamique chez les Anciens, Grecs et Latins, d'après les textes.*'

After her retirement in 1978, Geneviève Bouillet contributed from time to time (from 1982 to 1996) to the *Travaux du Comité français d'Histoire de la Géologie.* Then, she began a programme of translation of Latin texts on the beginnings of paleontology. Some of her translations were used for documenting papers written in collaboration with Jean Gaudant:

'Aux sources de la paléoichthyologie,' In: G. Gohau (ed.), *De la géologie à son histoire* (1997).

'Hommage à Johann Friedrich Blumenbach (1752–1840) à l'occasion du bicentenaire de la publication de son essai d' "Archéologie de la Terre",' *Trav. Comité fr. Hist. Géol.*, (2003).

'Johannes Reiskius (1687): une tentative de réfutation aristotélicienne des idées de Fabio Colonna et Nicolas Sténon sur la nature organique des glossopètres,' *Ibid.* (2004).

'La Paléontologie de la Renaissance,' *Ibid.* (2005).

Geneviève Bouillet, who had been elected an INHIGEO member in 2000, died near the famous Gothic cathedral of Bourges on 22 January, 2006.

Jean Gaudant, Paris

Death of Dr Sergey I. Romanovsky, Russian INHIGEO member, at St Petersburg, Russia
(13 July 1937–24 August 2005)

Sergey Ivanovich Romanovsky was born in St. Petersburg on 13 July 1937 and graduated from the Mining Institute there in 1960. For about 40 years he worked in the All-Russian Geological Research Institute in St Petersburg as a geologist. Hand in hand with his geological research, for at least 30 years of his life he felt a calling for history. The hobby gradually became his second professional line.

Romanovsky is famous as an author of eighteen books (including eight on the history of geology) and about 200 articles on stratigraphy, lithology, geotectonics, and geomorphology, as well as the history of geological sciences. He was much experienced in scientific biographies, writing on such Russian geologists as A.P. Karpinsky, N.A. Golovkinsky, and L.I. Lutugin. In 2003 he published, in *Episodes*, the first English version of A.P. Karpinksy's classical article.

Sergey Romanovsky is also the author of the book *Great Geological Discoveries* (1995; 2nd edition, 2005). During the last five years he has published four interesting books on the social history of Russia in the whole, and on its social science and culture: *Science under the Russian History Oppression* (1999); *Impatience of Thinking,*

or the Historical Portrait of the Radical Russian Intelligentsia (2000); *Talents—from Everybody, Destiny—to Everybody* (2003); and *"Dragged along" Science* (2004).

Romanovsky was an INHIGEO member from 1984 to 1998. High energy, keen intellect and a deep scientific approach to various problems, both in science and society, made him a unique researcher indeed. We lost the perfect friend and colleague.

Dr A.V .Lapo (All-Russian Geological Institute, St Petersburg)
Dr Z.A. Bessudnova, Dr G.P. Khomizuri, Dr I.G. Malakhova, Professor Dr. Yu.Ya. Solovyev
(Department for the History of Geology, Vernadsky State Geological Museum, Moscow)

Death of Dr Daikichiro Shimizu, Japanese INHIGEO Member, at Kyoto, Japan (1931–17 February 2006)

Dr Daikichiro Shimizu (1931–2006)

Dr Daikichiro SHIMIZU was born in Hyogo Prefecture in 1931, and was graduated from the Department of Geology and Mineralogy, Kyoto University, in 1953. He received a Doctor of Science degree in 1959, after completing post-graduate courses. He majored in Paleozoic and Mesozoic historical geology, and studied the paleontology of brachiopods. After graduation, he was engaged in education in the department, and retired from the lecturer's position in 1994.

Many classical books of geology, mineralogy, and paleontology were collected by Takuji OGAWA and Shintaro NAKAMURA, the first professors in the department, in the 1920s. The books were reserved in the library of the department. Shimizu was one of the most familiar with them and introduced them to the Geological Society of Japan and the Association for the Geological Collaboration in Japan.

He published 'Tracing geologic technical terms to their origin' in 1978, and 'History of Geology, referring to the classics' in 1996. He had wide and deep knowledge of geology and was one of the active members of the Japanese Association for History of Geological Sciences, giving several speeches at the meetings, namely, 'Historical review on the earthquakes in relation to faults' in 1995, 'Shingo EHARA and his Pacific movement' in 1997, 'NAUMANN's geologic view of the Japanese islands' in 1999, 'Inferior supposition for the technical term named by NAUMANN' in 2000, and 'LYMAN's, NAUMANN's and Bunjiro KOTO's field works in San'in district' in 2000. Those speeches were printed in the JAHIGEO bulletin, no. 4, 10, 13, 14 and 15.

SHIMIZU suffered from heart decease, so we could not meet with him to hear his speeches for the last several years.

He will be greatly missed not only by his wife, Mrs Tamiko Shimizu, and his family, but also by all who knew him.

Yasumoto SUZUKI and Hakuyu OKADA

AN INTERVIEW WITH OUR LITHUANIAN HOST: ALGIMANTAS GRIGELIS

Kennard B. Bork

Introduction

The subject of this interview is Dr. Hab. Algimantas GRIGELIS, our hard-working host for the INHIGEO meeting to be held in Vilnius, Lithuania, in late July–early August 2006. Algimantas is a geologist and paleontologist (Foraminifera), holding the Doctor of Sciences and Doctor Habilitatis (Physical Sciences) degrees. He is currently a Professor in the Department of Geology and Mineralogy at Vilnius University. Among his positions and memberships are service as: Corresponding Member of the Lithuanian Academy of Sciences; Expert of the Lithuanian Science and Studies Foundation; President of the Lithuanian Ignotas Domeika Society; Chairman of the Coastal Research Commission of the Lithuanian Academy of Sciences; Ex-Chairman of the Lithuanian National Committee of Geologists; Ex-Chairman of the Baltic Stratigraphic Association BSA; Member of INHIGEO; Member of ISSC (IUGS-ICS); Member of the European Palaeontological Association EPA; Honorary Member of the Lithuanian and Estonian Geological Societies; Member of the Swedish Geological Society; and consultant for the Lithuanian Institute of Geology and Geography.

The following "conversation" was conducted, through the magic of e-mail, in April of 2006.

Dr. Hab. Algimantas Grigelis

What have been your primary research interests over the years?

- Since my third year of geological studies at Vilnius University (VU; 1949–1954) I started to specialize in micropaleontology, namely in Foraminifera. I have held this primary interest throughout my subsequent scientific career.

How did those interests evolve?

- In the 1950s Professor Juozas Dalinkevičius, Chair of Geology and Mineralogy at Vilnius University, introduced—for the first time in Lithuania—micropaleontology as a method of biostratigraphy. In the fourth year of my studies I wrote my term paper on Upper Cretaceous foraminifera. In the fifth year I did my diploma work on mapping the Quaternary and Upper Cretaceous in Kaunas city, and in 1954 I graduated from the university, qualified in "geology and geological mapping."

Tell us about your youth and your educational trajectory?

- I was born into a family of physicians in Kaunas, Lithuania. In 1933 my parents moved to Utena, a district city in NE Lithuania. There I went to a primary school and after that to a gymnasium. I finished in 1949 with a gold medal. The same year I entered geology studies in Vilnius University. In 1954 I got a first-class university diploma. In the autumn of 1954 I started my PhD studies on Jurassic micropaleontology and biostratigraphy of Lithuania. My supervisor was the famous micropaleontologist, Professor Alexander Fursenko, at the time a Member of the Academy of Sciences in Minsk, Belarus. From time to time I did my research in Vilnius, or in Minsk. In 1957 I completed my PhD work, published my results, and in 1958 I defended my dissertation in Vilnius University. Upon passing, I was qualified as a "Doctor of Sciences" ("Candidate of Sciences" as the degree was called at that time). After a short time (1958–1960), working in the Geological Survey of Lithuania, I moved to the Institute of Geology

and Geography of the Lithuanian Academy of Sciences, where I am still working after 45 years. My further path in science is briefly given in my Curriculum Vitae, presented to the Cambridge International Biographical Centre, England, in 1997 with some later additions (see the Addenda).

Explain to our non-European readers what Dr. Hab. means?

- Doctor Habilitatis is the next scientific degree given to a scholar in the European countries after the PhD (or Doctor of Sciences, or Candidate of Sciences). Dr. Hab. means the highest scientific qualification; this degree appeared in medieval times within some Western European universities. At the present time, for example in Lithuania, there are no strict rules or specific requirements defined for an aspirant to the degree of Doctor Habilitatis. The main thing is that his (her) thesis (dissertation) should be published and publicly defended before the experts of the Committee of Habilitation. Only a Dr. Hab. can be elected as a member of the Academy of Sciences. It takes a lot of time and effort to make the "habilitation." I defended my PhD in 1958, and got Doctor Habilitatis in 1981.

Comment on your linguistic repertoire and how you gained it?

- Before World War II, the German language was popular in Lithuania, and I learned it in my gymnasium and in the Vilnius University. My parents were fluent in German, Russian and Polish (my grandmother was a Polish woman). Russian used to be learned in Lithuania during the Soviet period. Beyond the political reasons, Russian was very useful for scientific communication and during work and expeditions in different regions of Russia, Siberia, and the Caucasus. After my university studies, I turned to English and learned it after having attended many courses. But the main linguistic (English) experience was obtained during my practical work abroad: in Syria, Canada and Sweden, and also by communicating at scientific conferences, geological congresses, and taking part in the international projects. And Vilnius was always a multilingual city. Its citizens still have everyday practice in Polish, English and Russian.

How did you get interested in the history of geology?

- I am not a professional historian but I always had a link to history in general. The circumstances at the very beginning of my scientific career also drove me to the history of geology. In the 1960s, when still a young Dr. Sci., I was employed at the Research Institute of Geology and Geography, and the Director, Academician Kazys Bieliukas, put me in charge of compiling *The Lithuanian Geological Awareness*—a history project involving two hundred years of education, science, and activity of the geological survey. It was a great All-Soviet-Union project, led by Professor Vladimir Vladimirovich Tikhomirov, a Member of the Academy of Sciences in Moscow, and the promoter and first President of INHIGEO (1967–1976). Each Soviet republic was involved in this project. Our Institute was responsible for Lithuania and the neighboring Kaliningrad Region (former East Prussia/Ostpreussen with its well-known old Koenigsberg University). I had a responsibility to be the Editor-in-Chief of this elaboration. It was very interesting work. My Institute colleagues and I checked thousands of publication *de visa* (in their original versions) in Lithuanian, Polish, German, English, Russian, and, rarely, Latin, Finnish, and Swedish. We started from 1780, the year of the first geological publication on Lithuania. We wrote short papers and reviewed different disciplines embracing large time periods from 1800 to 1980. As a result of this enormous job, seven books were published on the Lithuanian geological awareness (*Geologicheskaya izuchennost SSSR, T. 43, Vilnius,* 1962–1975; 2,340 pages) and two on that of the Kaliningrad Region (*T. 6, Vilnius,* 1966, 141 p.; 1970, 132 p.). Aside from other publications on historical themes, a monograph on *History of Geology of Lithuania* was compiled by me and published in Lithuanian (Vilnius, 1981, 160 p.). Beginning in 1970 I started to participate in the international symposia on the history of geology, and in 1972 I was elected a Corresponding Member of INHIGEO (re-elected in 2002 in Paris). Despite my permanent business in the history of geology, micropaleontology, stratigraphy, geological maps, and marine geology were always at the top of my scientific research interests. On the other hand, the knowledge of history always helped me feel that history of science is a firm background for the professional geologist.

Say a few words about your current research interests in the history of geology.

- First, since the 1990s, I have focused on studying a period, 1803–1842, of the old Vilnius University. The Chair of Mineralogy was established in 1803 and mineralogy was very popular at the time. The university had close relations with European geognosy and mineralogy centers, such as the famous Freiberg Bergakademie, with Abraham Gottlob Werner, and the Paris École des Mines, with Alexander Brongniart. Vilnius University graduates studied at those institutions. For example, Roman Symonowicz was in Freiberg, and Ignacy Domeyko studied at the École des Mines. Secondly, from time to time I have analyzed the results, development, and prospects of Lithuanian geology, in line with activities of the Lithuanian National Committee of Geologists. Thirdly, I have written several biographies of my Lithuanian, Swedish, German, and Russian colleagues.

In general, during the half-decade of 2000–2005, I have published 47 papers on various aspects of historical geological matters; issued my own bio-bibliography *(Three Edges of Life,* Vilnius, 2001); edited and

published a big volume devoted to Ignacy Domeyko's 200-year anniversary *(Ignotas Domeika 1802–1889. His life, works and contribution to science,* Proceedings of the International Scientific-Conference, 10–12 September 2002, Vilnius, 2002); and been an active participant in INHIGEO symposia.

What essentials should visitors to the INHIGEO-'06 meeting in Vilnius know?

- Vilnius was a settlement in the 2nd century BC, but became the Capital of the State when it was established in 1323 by Gediminas [Gedimin], Grand Duke of Lithuania. The city is nicely located in a valley, where the Neris and Vilnia Rivers meet. The Old Town is a multi-architectural monument built during many centuries. It is included on the UNESCO World Heritage List. The city is convenient for everyday life, it has a population of around 600,000 people, and has been developing rapidly in recent years. Cultural and musical life is extensive; there are many theatres, the opera, and philharmonic orchestras. We are strong fans of our basketball team *Lietuvos Rytas*, representing Vilnius in the Eurobasket League. Vilnius is designated to be a European Cultural Centre in 2009. More details can be seen in the website http://www.vilnius.lt.

Vilnius University was established in 1579, while its Central Library, nowadays a depository of the United Nations, was founded in 1570. There are seven faculties and around 20,000 students in the university (see http://www.vu.lt). The Academy of Sciences was established in 1940; now it has 150 members, elected from the scientific elite of the State, and around forty foreign members (see http://www.neris.ktl.mii.lt). Eleven universities and high school academies are located in Vilnius.

Lithuania as a name—"Litua" (from the Latin, pertaining to 'rain')—was first used in 1009, in *Annales Quedlinburgensis*. There were many events, peaceful and war-related, during the millennia of the State's history. It is important to note that despite complex turns of history, Lithuanians have retained their identity, own national traditions, own language, own mentality, and own culture. Among the major historical events are: loss of independence of the State of Two Nations after its third subdivision (1795); rebellions (1831, 1863) against the tsarist regime of Russia; WW-I and the declaration of independent Lithuanian Republic (16 February 1918); WW-II and Soviet occupation (1939–1990); and, last of all, restoration of Independence (11 March 1990). Now Lithuania is a Member of the European Union and its Constitution is the basis of democracy and human rights. Lithuania is now built on free-market principles, and has a fast-developing economy, open for international cooperation. The country plays an important political role in the Commonwealth of Europe. For more information, please consult: http://neris.mii.lt/homepage/lietuva.html.

Latvia and Estonia have many historical features in common with Lithuania, but there are also some differences. I think that further answers about these two other of our Baltic Republics should be pursued through Internet sources, http://www.lv/; and http://www.riik.ee/en/.

What will visitors see on the INHIGEO-2006 meeting field trip?

- The answer is given already in the First Circular of the Vilnius-2006 meeting distributed on 10 November 2005; information can be seen also on the on IUGS Calendar-2006 http://www.iugs.org/iugs/calendar/cal06.htm. The field trip is planned as a scientific-historical-cultural event and it might be optimally interesting for all participants, despite who is coming with us—whether, for example, a geologist, historian, librarian, teacher, or musician.

What are your favorite travel sites and why?

- A reader could be disappointed to hear that my wife and I have never travelled as tourists. Nevertheless, I alone, or we both together, have visited countries with our scientific work and expeditions (eighty-eight times!), and everyone has been especially nice. We have spent many days every year, from 1979 to 1999, in the Baltic Sea doing marine geology surveys with our team on research vessels. I should say I have had the best feeling in places where civilization was somewhat distant: in the mountains; in the high northern latitudes; or in the sea when I hear only full silence, or noises of polar birds, or rhythmical work of the vessel's engine... But what is my favorite site? The answer is that it is a little First Century Christian chapel in Sednaya village, close to Damascus, Syria. I entered it alone, and I sat on the floor watching only one candle lighting the darkness and a very small picture of the Virgin Mary, painted, according to a legend, by the hand of Apostle Luke (Lukas), when Jesus Christ was still alive. I was deeply in nirvana, I forgot the surrounding world, my spirit hovered high in a blue sky on this Aramaic site, where people have been living from generation to generation for more than 2000 years. Years later I understood what this experience was, when I saw a plaque in Vygry Church in Northeast Poland saying: SILENCE, HE IS HERE!

What have been your primary activities within INHIGEO?

- My first publication on the history of geology 'Geological sciences in Lithuania at the beginning of the 19th century,' appeared in Vilnius in 1962. During 1962–1972 I published 20 papers on history of geology and a booklet entitled *Geological investigations in Lithuania.* This activity was noted by Professor Vladimir Tikhomirov, the first Chairman of INHIGEO (1967–1976). I took part in the INHIGEO meeting in Yerevan in 1970, and was elected a Corresponding Member in 1972. Scientific relations involving the geology of the Baltic States were at that time a subject of extensive studies. Reports were given at conferences and symposia held in Riga, Vilnius, Tallinn,

Warsaw, and Moscow during the years 1968–1980, including a report presented at the 26th International Geological Congress (Paris, 1980). The materials studied were compiled (with co-authors) in a monograph entitled *History of geology of the Lithuanian SSR*, published in Vilnius (1981). Unfortunately, after 1976 there was a break in my relations with INHIGEO, as a function of lost addresses, when it was led by M. Guntau, E. Dudich and U. Marvin as Secretaries-General of the Commission. I again became part of the Commission in 2002.

Are there ways in which you would like to see INHIGEO evolve?

- In general, INHIGEO is well-organized and useful commission of IUGS. At the present time, the annual conferences held each year in various countries play an important role in activating national members. A pyramid, where a president and a secretary-general are at the top and its members are at the base, actually is a valid working structure, and vice-presidents for regions can actively assist in reaching common tasks of the Commission. As an organizer of the Vilnius-2006 conference I could note that around a half of our members are inactive, not responding, and their role is thus unclear. It is very important that the Commission has its own pages on the IUGS web site, as we do now, supported by a IUGS Webmaster and by the Secretary-General of INHIGEO.

Many thanks for an enjoyable and informative "conversation."

PROFESSOR DR. HABIL. ALGIMANTAS GRIGELIS

CURRICULUM VITAE

Born in 1931, Kaunas, Lithuania.

Education

1949–54 Senior High School degree at Vilnius University

1954–57 Postgraduate studies at Belarus University, Minsk

11/1958 Doctor (Cand. Sci.) degree at Vilnius University. Thesis: Jurassic Foraminifera of Lithuania and its stratigraphical significance

05/1981 Doctor Habilitatis (Doct. Sci.) degree at Saint-Petersburg Geological Institute. Thesis: The Baltic Jurassic: Foraminifera and Zonal Stratigraphy

Academic Standing

1964-1977 Director of the Lithuanian Institute of Geology

03/1992 Expert Member, Lithuanian Academy of Sciences

04/1994 Corresponding Member, Lithuanian Academy of Sciences

06/1994 Professor at Dept. of Geol. & Min., Vilnius University

Recent Positions

1977–1992 Head of Department of Regional Geology, Institute of Geology

1992–2001 Head of Department of Baltic Marine Geology, Institute of Geology

2001– Consultant, Institute of Geology and Geography

1992–2004 Chairman of Lithuanian National Committee of Geologists (IUGS)

1969–1994 Chairman of the Baltic Stratigraphic Association

1992– Chairman, Section of Geosciences, Lithuanian Academy of Sciences

1993– Editor-in-Chief, International Journal on Geosciences *Baltica*

Main recent activities

Regional geological-geophysical investigations in the Central Baltic Sea; geological mapping and environmental geology studies in the Lithuanian economic zone of the Baltic Sea. Expertise of State programmes and projects in the field of the Natural Sciences.

Author of 260 papers, 22 monographs.

State Award of Science and Technology (1984); Moscow Naturalists Society's Prize (1988); Lithuanian State Award of Science (1996); Academician Juozas Dalinkevicius Prize (2002).

Lithuanian scientific leader of the IGCP Project No. 86 "East European Platform. SW Border" (1975–1982).

Member of the International Subcommission on Stratigraphic Classification (Intern. Commission Stratigraphy);

Member of the International Subcommission on Jurassic Stratigraphy (ICS). Member of

INHIGEO. Honorary Member of the Lithuanian Geological Society (2002). President of the Lithuanian Ignotas Domeika Society (2003).

FORTHCOMING MEETINGS

Cartography and 'Earth and Water'
June 2006

The 5th European Congress on Regional Geoscientific Cartography and Information Systems will be held in Barcelona, Spain, from 13–15 June 2006. The focus of the meeting is 'Earth and Water.' The meeting is likely to be very close to distribution dates for this *Newsletter*, but you may wish to pursue the relevant details by going to the website: www.icc.es/econgeo2006/home.html

History of Soil Science in Developing Countries
July 2006

Professor Dan Yaalon, an Honorary Senior Member of INHIGEO, reports that a symposium on the 'History of Soil Science in Developing Countries' will be held during the World Congress of Soil Science in Philadelphia, July 2006. Anthony Young will be an invited speaker, along with oral presentations and poster sessions. Those interested may contact Eric Brevik ecbrevik@valdosta.edu.

European Society for the History of Science Meetings
September 2006

The European Society for the History of Science (ESHS) is organizing two international events in 2006. One has already occurred—a symposium on 'Franco-British interactions in science since the seventeenth century,' held in Oxford, England, 24–25 March, 2006. That meeting was jointly organized by the ESHS, the BSHS (British Society for the History of Science), the SFHST (*Société Française d'Histoire des Sciences et des Techniques*) and the *Maison Francaise d'Oxford*.

The second conference is scheduled for 6–9 September, 2006, in Cracow, Poland. It will concern 'The global and the local: the history of science and the cultural integration of Europe.' The meeting is to be jointly organized by the ESHS, the Polish Academy of Arts and Sciences and its Institute for the History of Science, and the Jagellonian University.

The deadline for the proposal of individual papers for the Cracow conference was March 15. Further information on the conference is available at: www.eshs.org and www.2iceshs.cyfronet.pl.

Slovac Conference Honoring Ignac Born
September 2006

INHIGEO member Josef Haubelt (Czech Republic) informs us that a conference honoring Ignac Born will be held in the Slovak Republic, 6–8 September 2006. The formal title is 'Ignac Born a 220. Vyrocie Vzniku Prvej Vedeckej Spollocnosti Na Svete' ('Ignac Born and the 220th Anniversary of the First Science Association in the World'), Banska Stiavnica, Slovak Republic. Conference languages will be Slovak, Czech, English, German, Polish, and Hungarian. The conference fee is 500 Sk. Those desiring further information may contact blastmine@stonline.sk or may visit the site www.blastmine.sk

Eduard Suess (1831–1914)
December 2006

A symposium on 'Eduard Suess (1831–1914) and the Development of Earth Sciences over the Periods of the "Biedermeier" and "Sezession"' will be held on 1–2 December 2006. The symposium will be part of a series on 'History of Austrian Earth Sciences.' It is to be hosted at the Geologische Bundesanstalt Wien, Neulinggassse 38, A-1030, Vienna, Austria. A wide range of topics are welcomed, with a focus on Suess, his contemporaries, and the development of geoscience in the general era of 1850 through 1915. The deadline for submission of abstracts is 4 September, 2006. Anyone with an interest in the history of earth sciences is welcomed.

Organizers are: Hans Peters Schönlaub, Head of the Austrian Geological Survey in Vienna; Tillfried Cernajsek, of the Austrian Geological Survey Vienna; Johannes Seidl, at the Archives of Vienna University; and Bernhard Hubmann, of the Institute for Earth Sciences, University of Graz.

Contact persons are members of INHIGEO. Their e-mail addresses are: tillfried.Cernajsek@geologie.ac.at; johannes.seidl@univie.ac.at; and bernhard.hubmann@uni-graz.at.

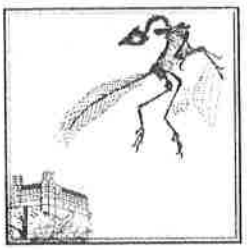
Geology of the Tethys
March 2007

The Tethys Geological Society, Cairo University, is inviting participation in a Second International Conference on the 'Geology of the Tethys,' to be hosted in Cairo on 19–23 March 2007.

Those interested in the details, or in communicating about potential participation, are welcomed to contact Professor El Sayed Abd El Aziz Aly Youssef, Geology Department, Faculty of Science, Cairo University, Giza, Egypt. His e-mail address is <elsayedyoussef2005@yhahoo.com> or <elsayedyoussef@hotmail.com>.

INHIGEO / Geology and Religion
Eichstätt (Bavaria), Germany
July-August 2007

Arbeitskreis Geschichte der Geowissenschaften der GGW
& Jura-Museum Eichstätt



The German delegation of INHIGEO is pleased to invite you to the INHIGEO-meeting 2007 in Eichstätt. The conference topic will be: "The historical relationship of geology and religion."

For thousands of years, religious ideas have shaped thoughts and deeds of human beings, and therefore many early geological concepts were initially developed in this context. The meeting will offer a stage to openly discuss from a historical point of view this long-standing relationship, which in the past has been sometimes indifferent, sometimes fruitful, and sometimes full of conflict. Specific topics, which spring to mind, are, for example:

- religious interpretations of the nature of the Earth and its history
- the age of the earth in different religions, cultures and times
- the (Darwinian) theory of evolution and creation
- geological research with religious motivation (such as "natural theology")
- life and work of geological authors with a religious/clerical background
- geological institutions (museums, collections) run by religious organisations, etc.

We are sure that you will think of many more aspects of this fascinating topic, and we also hope that you keep in mind that we are talking about Religion in general, not just Christianity.

There are two reasons why we think of Eichstätt as a most appropriate site for such a meeting. As is befitting for INHIGEO, one is geological and one historical.

The region around Eichstätt and Solnhofen is one of the classical geological localities. In the quarries around these two localities the early bird *Archaeopteryx* was found – one of the key arguments in the debate about biological evolution. And it is here where the most valuable lithographic limestone is quarried. Lithographs have been used, since about 1800, for many geological and palaeontological illustrations.

The small city of Eichstätt presents itself in baroque attire, having suffered badly during the Thirty-Years War. At that time, Eichstätt was capital of a small independent country with the local bishop as head of state. Until today Eichstätt remains a bishop's town and harbours the main campus of the Catholic University Eichstätt-Ingolstadt. Apart from other collections and responsibilities, the Bishop's Seminary traditionally houses a natural history collection, which originated in 1844. Throughout the 19th century and up until the 1960s, this collection was used by the church for scientific and educational purposes. Since 1976, part of the collection – with one original *Archaeoteryx* specimen, among many other stunningly beautiful fossils – is shown in the Jura-Museum Eichstätt. Here, the relationship between religion and geology is practiced daily.

Scientific Sessions (Monday, July 30th, to Friday, August 3rd, 2007)

- Monday, July 30th, 2007; morning: opening reception in the hall of mirrors of the historical palace of Eichstätt; introduction to the fruitful historical relationship between geology and religion in Eichstätt; guided tour through the palace and the city.

- Afternoon, July 30th, and second day, July 31st: presentation of scientific papers in the old Jesuits' refectory of the Bishop's Seminary in Eichstätt.
- Evening of July 30th: visit to and party in the Jura-Museum, which is situated in the castle of Eichstätt. We plan a special exhibition on the natural history collections of the Bishop's Seminary.
- Wednesday, August 1st, 2007: fieldtrip to see the limestone quarries and a lithographic workshop.
- Thursday and Friday, August 2nd and 3rd, 2007: two more days of scientific papers
- Evening of Thursday, August 2nd, 2007: conference dinner
- The conference language will be English.

Additional Field-Trips

In addition to the scientific sessions and the one-day field-trip already mentioned, two additional field-trips will be organized: (field-trip vs. fieldtrip = up to you, but usage should be consistent throughout...)

- **Pre-conference field-trip** (2 days, July 28th and 29th, 2007) featuring the "Swabian Volcano", karst features on the Swabian Alb, the famous Posidonia Shales of Holzmaden and a most amazing church
- **Post-conference field-trip** (2 days, August 4th and 5th, 2007) featuring the impact craters Steinheim Basin and Ries-Kessel Nördlingen. As you know, until 1960, these structures were commonly regarded as volcanoes. We are going to show you both the volcano and the impact crater in the field.

Fees

The conference fee will be around 150 €, plus any optional features such as the conference dinner (about 30 €) or pre- and post-conference field-trips (around 120 € each).

Publications

We intend to publish the proceedings of this conference.

Accommodation

Good and inexpensive accommodation in Eichstätt will be arranged. Participants will receive the booking form together with the second circular.

Accompanying Persons/Extended Stays

Located in the heart of Bavaria, Eichstätt is situated within the Altmühl Nature Park, one of the largest nature parks in Germany. Fine palaces, strong castles, elegant churches, convents and monasteries are testimonies to the long history and rich cultural heritage of this region, one of the most beautiful holiday areas in Bavaria. The idyllic landscape of the Altmühl valley seems to be made for bicyclists or hikers, and the lazy flowing Altmühl River is an ideal stream for paddling excursions.

Judging from this background, we are bound to organise an interesting and relaxing programme for accompanying family members.

The Eichstätt Tourist Office or the Information Centre of the Altmühl Nature Park will be happy to inform you on any possibilities to extend you stay: http://www.naturpark-altmuehltal.de/

Travel

Eichstätt can be reached by train, e.g., within two hours from Munich's central station. There is an airport shuttle between the Munich airport and Ingolstadt, from whence it is about 30 minutes by train to Eichstätt-Stadt. Direct shuttle connections from Eichstätt to Munich airport and vice versa can be organised upon request (at additional costs).

Insurance

The organizers cannot accept responsibility for accidents that might occur in connection with the symposium and field trips. Delegates are encouraged to purchase travel insurance.

Deadlines

Please return the questionnaire to our first circular by the 1st of September 2006.
The second circular is scheduled for December, 2006.
The registration deadline is February 1st, 2007.
The abstracts must be sent in by April 1st, 2007.
Manuscripts must be submitted by September 1st, 2007.

Organization Committee

Martina Kölbl-Ebert (Jura-Museum Eichstätt)
Martin Guntau (Rostock)
Bernhard Fritscher (Munich)
Gottfried Hofbauer (Erlangen)
Oskar Burghardt (Krefeld)

Contacts and request for a Questionnaire
INHIGEO Meeting 2007
Jura-Museum Eichstätt
Willibaldsburg
D-85072 Eichstätt (Germany)
FAX +49-8421-89609
E-Mail: Koelbl-Ebert@jura-museum.de

Bicentenary of the Geological Society (of London)
November 2007

The History of Geology Group (HOGG) will be holding a major two-day conference on 12–13 November 2007 to celebrate the Geological Society's bicentenary. The Geological Society, founded 13 November 1807, is the oldest national geological society in the world.

Conference

The conference will focus on the achievements of the Society, the founders, and some of its members and their activities over the past 200 years.

- Theme 1: The status of geology in comparison to other sciences in the UK and to geology in other countries around 1807
- Theme 2: The foundation and founders of the Society
- Theme 3: The first 100 years
- Theme 4: Towards the 21st Century

Field trip

The conference will be preceded by a field trip to the Isle of Wight on 10–11 November 2007 to visit some of the classic geological localities of historic interest.

Dinners

On the evening of 12 November 2007 a dinner will be held in the Connaught Rooms, which now incorporates the Free Mason's Tavern where the Geological Society was founded. A plaque commemorating the founding of the Society will be unveiled. On the evening of the 13 November 2007, the Geological Society will be holding a dinner in the Natural History Museum.

Call for papers

Anyone interested in offering a paper should send an abstract of not more than 300 words to cherry.lewis@bristol.ac.uk to arrive not later than 1 June, 2006. Please clearly state which theme your paper addresses.

Register your interest

Anyone wishing to go on the mailing list to receive further information about this event should email cherry.lewis@bristol.ac.uk putting 'HOGG bicentenary event' in the subject line.

Further information

For further information, please see www.geolsoc.org.uk/HOGG

BOOK REVIEWS

David on David: A New Biography of a Notable Australian Geologist

Branagan, David, *T.W. Edgeworth David: A Life: Geologist, Adventurer, Soldier and 'Knight in the Old Brown Hat,'* National Library of Australia, Canberra, 2005, xx + 648 pp.

Tannatt William Edgeworth David, the subject of this biography by INIGEO member David Branagan, was in his time Australia's most famous geologist; so famous in fact that when he died in 1934 he was awarded a state funeral by the New South Wales Government. No Australian geologist before or since has been awarded such an honour and yet David is now almost forgotten. Therefore this comprehensive biography is a welcome addition to the slowly accumulating literature of the history of Australian geology and geologists.

David was born in Wales in 1858, the eldest son of an Anglican clergyman. He attended Oxford University where he graduated BA in 1880. His studies were interrupted by illness and he was advised to take a long sea voyage as a cure. Australia was as far away as he could get, so he chose to go to Melbourne, where his father had friends. He returned to England on the same ship. Though his studies were centred on the classics, he did study geology under Joseph Prestwich and also appears to have been greatly influenced by the geological content of John Ruskin's lectures. Other people who also influenced him were William Ussher and Charles Tanfield Vachell of the Cardiff Naturalists' Society, which published David's first paper, in 1881, on glaciation around Cardiff. To

strengthen his geological knowledge, David attended lectures by J.W. Judd at the Royal School of Mines and also started undertaking field excursions in Wales. However, his work in Wales was cut off by his appointment as an Assistant Surveyor in the New South Wales Geological Survey. He secured the advertised appointment through the support of Professors Prestwich, Judd, and Boyd Dawkins.

David was sent to map in the Hunter River coal fields north of Sydney and was fortunate to map an important seam that led to the development of the huge South Maitland coalfield. His work here laid the foundations of his subsequent reputation. Nine years after his appointment, he was so highly regarded in New South Wales that he was appointed Professor of Geology in the University of Sydney, from a field of outstanding British applicants, including William J. Sollas, who later became Professor of Geology at Oxford.

David was an inspiring teacher and lecturer and his list of students makes up a 'Who's Who' of Australian geology—E.C. Andrews, W.N. Benson, W.R. Brown, Ida Brown, Leo Cotton, Douglas Mawson, Griffith Taylor, and A.B. Walkom, just to name a few. It is ironic that Mawson is still held in high regard whereas David is largely forgotten. As a teacher, David encouraged women students to undertake geology, including involvement in field excursions as early as the 1890s. He regarded field excursions as an extremely important component of his geology course.

In 1895, David agreed to assist a project proposed by the British Association for the Advancement of Science and supported by the Royal Society. This involved testing Charles Darwin's theory of the formation of coral atolls. The atoll of Funafuti in the South Pacific was chosen as a site to drill down through the coral to try to reach the underlying basalt. David's knowledge of drilling technology from his coal surveying days and his contacts in government were essential requirements in getting the project underway, particularly after the failure of the first expedition under the leadership of Sollas. David supervised the next two expeditions to the atoll and was heavily involved in the subsequent publication of the results. His wife Clara also published a popular and readable account of her time spent on the second expedition. David's contribution to the success of this project was recognised by his election as Fellow of the Royal Society of London in 1900.

However, the activity that first brought David before the wider public was his participation in Ernest Shackleton's expedition to the Antarctic in the *Nimrod* in 1908. David raised funds for Shackleton and initially got permission to travel with the expedition south and then to return with the ship. All this during the University long vacation, but on the way south he notified his wife that Shackleton asked him to remain with the expedition and that he, David, had agreed. It says much for David's status within the University that his professorial position was not adversely affected by this unilateral decision, though it did cause great hardship for his wife. He spent his fiftieth birthday in Antarctica and led the first party to climb Mt. Erebus as well leading a party of three (including Mawson) to the South Magnetic Pole—an arduous expedition that took four months and nearly ended in disaster. David returned to Sydney as a hero, where he gave numerous lectures and public addresses on Antarctica that added to his fame.

Despite his age (57) David joined the Australian Tunnelling Corps following the outbreak of the First World War and was commissioned a major. He saw action on the Western Front, making geological maps, advising on water supplies, and supervising tunnelling under the German lines and trench problems. He returned to Sydney in 1919 with the rank of lieutenant colonel and resumed his university duties. The following year he was knighted. He retired from the University in 1924.

The last ten years of David's life involved two major projects, both of which were never completed in his lifetime. The first was his proposal to write a 'Geology of the Commonwealth of Australia.' He undertook much fieldwork for this and started taking notes from the published literature and also solicited contributions from other geologists. As a complement to the book he intended to publish a new geological map of Australia. Much of his time was spent on the map, which was published in 1932 to critical acclaim. He also drew on his work for the book to compile a superb summary of Australian geology to accompany the map. However, the book itself did not progress much beyond a huge pile of notes. After his death, this material was passed on to his former student W.R. Brown, who had the unenviable task of editing it. The book finally appeared in 1950.

The other project that absorbed an enormous amount of David's time from 1928 until his death in 1934 was his work on what he believed to be Precambrian fossils in South Australia. These supposed fossils were, it is now thought, sedimentary structures that David believed to be arthropods. He received funds from the Royal Society of London and spent his own money in excavating a quarry in the Adelaide Hills near Adelaide to obtain specimens. The time and money spent were essentially wasted and it took him away from the book. His collaborator in the work was the entomologist R.J. Tillyard. Their paper on the subject was rejected by the Royal Society of London, but eventually appeared in book form in 1936. In this reviewer's opinion Branagan lets David off somewhat lightly in evaluating this aspect of David's research career.

This is the first major biography of an Australian geologist. Branagan has been fortunate in his subject because there is an enormous amount of documentary material both written and pictorial to draw on. He has been assiduous in hunting this out, both in Australia and the United Kingdom and has used it to produce a very fine biography that covers all aspects of David's life both public and private. The book is well illustrated, with extensive end-notes, biographical notes on persons mentioned in the text, an extensive bibliography, and a good index.

Thomas A. Darragh, Melbourne

An Enjoyable 'Discovery'

Mohr, Paul, *Discoverers of Earth's History (from Greece to Darwin),* Millbrook Nova Press, Toin an Gharrain, Cor an Dola, Co. na Gaillimhe, 2005, 65 pp.

This enjoyable and informative booklet was initially produced as a set of handouts for Professor Mohr's students. It evolved into a published product that may be of interest to a wide spectrum of geology students, geologists, and historians of science. At the outset it might be noted that those desiring to purchase the paperback book should not worry about the perhaps cryptic Irish address of the publisher and are welcome to write directly to Prof. Paul Mohr, Department of Earth and Ocean Sciences, National University of Ireland, Galway; Galway, Ireland. And, yes, there are no postal ("Zip") codes in Ireland.

The booklet is not, of course, meant to be an encyclopedia of biographic data concerning naturalists stretching from the Ancient Greeks to Charles Darwin. Rather, it offers synopses of what key persons have said about the Earth, from Amennakht, chief scribe of Rameses IV (1160 BC) to Charles Darwin (1809–1882). The 149 authors included are a genuine "Who's Who" in the history of the geosciences, even if most of them pre-date formal use of the term "geology." A valuable service is provided as each entry contains dates and places of birth and death. A two-page index lists authors in alphabetical order, along with the relevant page numbers. Those new to the history of geology will appreciate a listing of fourteen pivotal "recommended readings."

How useful are brief commentaries on about 150 critical players in the history of geology? The compendium struck me as highly valuable. Mohr has picked out the primary messages in the writings of the selected authors, and he gives the reader nicely outlined overviews of their contributions to our understanding of the Earth and its history. My subjective view is that he has done a fine job of capturing the essential points made by those authors with whom I am quite familiar. Specialists will no doubt think of other issues to be covered, and some will even wish to have seen other names included, but in the space utilized the narrative is rich. As a convenient, informative, and enjoyable pool into which to dive, *Discoverers* is a delight.

Who might profit from such a non-exhaustive compilation? Anyone who wishes to be informed without being exhausted. A more serious response is that undergraduate and graduate students of geology will be well served by delving into the mini-histories. Professional geologists not schooled in the evolution of geoscience stand to benefit from a cover-to-cover reading, or even from picking out authors of particular interest. Historians of science may find valuable nuggets in the compilation. Even those steeped in the discipline of geo-history may find it invigorating to interact with Mohr's informative mini-biographies. One might learn something new and substantive, or at least have the pleasure of seeing the ideas of "old friends" outlined in a new and perhaps evocative way. Despite the brevity of treatment, the book contains enough material to enrich the reader's appreciation for the evolution of our discipline. For example, the depth of insight of the Greek naturalists concerning the observable workings of the world is palpable; it is instructive to watch notions of the Earth's age and modes of dating evolve through time; and a number of interesting interactions among the authors are highlighted. The text also contains many tidbits of intrinsic interest: Berzelius coining the term 'silicates'; Wollaston inventing the camera lucida and goniometer; or Amie Boué stating that professors have great difficulty ever changing their minds.

The book is not illustrated, so portraits of the "discoverers" should not be expected. Paper, printing, and binding are of high quality. Use of de Monet for Lamarck, and of Leclerc for Buffon, throughout the text and even in the index, may slow some readers down. Typos and infelicities of production are virtually non-existent. For true scholars of Greek, a post-index appendix contains two quotations, in Greek (with English translations), from Aristotle. One hints at great Earth-time and the operation of Uniformitarian processes; the other argues for the merit of developing a true "scientific community."

You will not find this booklet featured in commercial bookstores selling bestsellers, but you may wish to acquire a copy for pleasurable and stimulating perusing. At ten Euros, plus three Euros for handling and postage, it is a slim but rich resource.

Kennard Bork, Granville, Ohio

Dolomieu and the Geology of His Time

Gaudant, Jean (ed.), *Dolomieu et la géologie de son temps*, École des mines de Paris, Paris, 2005, 199 pages, 29 figures (5 in color). ISBN 2-911762-60-6. 38 €.

Among scientific figures active during the closing years of the eighteenth century, Déodat de Dolomieu was one of the most colorful and intriguing. A Commander of the Knights of Malta, he played key roles in some of the more contentious episodes forging the Order's fate in a turbulent period. An aristocratic bon-vivant, physically imposing and attractive to women, he had a liberal political outlook similar to that of his mentor and friend, Duke Louis-Alexandre de La Rochefoucauld d'Enville, whose lynching by an angry mob he witnessed in 1792. Dolomieu was an adventurous traveler, whose published writings about mountain regions and volcanic localities helped secure his scientific prestige. He evidently relished his celebrity.

Dolomieu's scientific stature was confirmed by membership in the Paris Academy of Sciences, first as correspondent in 1778, then as full member of the reorganized First Class of the National Institute in 1795. In the post-Revolutionary Agence des mines he was appointed as a mining engineer, and he taught at the École des mines in Paris. Appointed to succeed Daubenton as professor of mineralogy at the National Museum of Natural History, he had only begun exercising his duties in that post at the time of his premature death in 1801.

The misfortunes of Dolomieu, as well as his exploits, contributed to his mythic scientific stature. A duel in which, as a teen-ager in 1768, he had killed a fellow member of the Order of Malta, yielded a sentence of death, commuted to imprisonment lasting a year before his liberation was secured through royal and papal intervention. As a partisan of the Revolution (up to summer 1792), he endured hardships that included confiscation of his property and estrangement from family members. When he was imprisoned by Neapolitan authorities at Messina in 1799, after weather forced an unscheduled entry in the Taranto harbor on his early return from the Napoleonic expedition in Egypt, his plight became an international *cause célèbre*. By the time of his release in March of 1801, after nearly two years of captivity, his health was broken and he died just eight months later.

Contemporaries often mentioned Dolomieu as one of the finest examples (the patrician Genevese savant Horace-Bénédict de Saussure was frequently named as another) of the emerging ideal of locally-focused field investigation as fundamental to geology. Dolomieu was heartily interested in big theoretical questions—about the Earth's components and structure, about its past and its ongoing processes—but he also advocated cautious regulation of scientific speculation. He was known both as a keen collector of mineral specimens and as a seasoned observer of mountain ranges and volcanic sites, so he had great credibility as an analyst of those parts of the Earth's constituents that are available to direct inspection. Dolomieu's treatments of geological questions were often seen as exemplary efforts to subject broad theoretical problems to the discipline of empirical control.

Dolomieu thus looms large as a historical figure in geology's formative period, and in the culture of French science at the close of the century. Altogether fitting, then, was the convocation in November of 2001 of a bicentenary symposium at the École nationale supérieure des mines de Paris, for a celebration of Dolomieu, an exposition in his honor, and a set of scholarly presentations on his work and his significance. The event was co-organized, with the Société géologique de France, by the Comité français d'Histoire de la Géologie (COFRHIGEO), whose Secretary, Jean Gaudant, edited this book.

The volume's seventeen signed contributions are by twelve authors, altogether. Two of the authors are Italian (Enrico Rizzi and Ezio Vaccari), and the remaining ten are French. The sum of these efforts represents a highly significant contribution to the study of Dolomieu, probably the most extensive re-examination in a single work since the labors of Alfred Lacroix, whose two valuable volumes of narrative and documentation, published in 1921, continue to be fundamental.

Little more is possible here, of course, than a brief description of some of the articles composing this book. An admirably pervasive element, it should be said, is the close attention paid in many of the essays to historical evidence not yet fully published, notably Dolomieu's manuscript travel notebooks and correspondence. Michel Durand-Delga, for example, examines Dolomieu's journey through parts of the Pyrenees in 1782, and in the process sheds light on how Dolomieu's thinking about mountains related to that of two of the period's leading Pyrenean commentators, Pierre-Bernard Palassou and Philippe Picot de Lapeyrouse. In an essay by Jacques Debelmas on Dolomieu and the Alps, and in another by Gabriel Gohau (collaborating with Debelmas) on Dolomieu's views on Alpine tectonics, Dolomieu's manner of explaining his Alpine observations is investigated. Enrico Rizzi undertakes a reconstruction of Dolomieu's itinerary in a 1789 journey through Tyrol, and along the way offers details on a number of other travels Dolomieu made in the 1780s, including his encounters with eminent contemporaries such as Fortis, Lorgna, Volta, Spallanzani, and Arduino, not to mention Goethe and Angelica Kauffmann. (The volume's cover features the splendid Kauffmann portrait of Dolomieu, done in 1789.)

Other articles drawing conspicuously on manuscript evidence (as well as published materials not readily accessible to many historians of science) have to do with, among other things, the Dolomieu family, Dolomieu as

professor, and Dolomieu's investment in his science's new terminology. Debelmas and Durand-Delga assemble new information on Dolomieu's genealogy and financial condition. In an extended exposition of the post-Revolutionary École des mines and Dolomieu's service there as professor, Jacques Touret utilizes Dolomieu's own notes, and those of his student Louis Cordier, to characterize Dolomieu's way of synthesizing geological knowledge for the rising generation of mining engineers. Jean Gaudant presents a document from Dolomieu's instructional notes at the École des mines in which he elaborated his view on the meaning of *géologie*. Of much value for future Dolomieu studies, Florence Greffe provides an inventory of Dolomieu manuscript materials in the archives of the Académie des sciences, the École des mines, the library of the Muséum national d'Histoire naturelle, and the Sorbonne library.

Important aspects of Dolomieu's work and influence are examined by Ezio Vaccari (Dolomieu's studies of Italian volcanoes), Pascal Richet (the basis of volcanic phenomena in deep-seated lavas), Jean Vogt (the great 1783 Calabrian earthquake), and Philippe Grandchamp (Dolomieu and his accomplishments as seen in early-nineteenth-century geological courses taught in France). Readers will also appreciate Françoise G. Bourrouilh-Le Jan's detailed chronological outline of Dolomieu's life and activities. The volume includes, as well, a full chronological bibliography of Dolomieu's publications; a tabulation of the contents of the extremely rare, posthumous *Oeuvres de Dolomieu* published by his brother-in-law Étienne de Drée; a listing of the Dolomieu manuscripts published by Lacroix between 1917 and 1922; and a list of the main secondary studies on Dolomieu and his work.

Jean Gaudant's prefatory essay situates Dolomieu amidst some of the most famous (or notorious) circumstances through which he was destined to be remembered: his recognition of the rock (and its main mineral constituent) that Nicolas-Théodore de Saussure would later name Dolomite in his honor, and the concerted international effort to secure Dolomieu's rescue from his prison cell in Messina (1799–1801). The volume's nearest approaches to summative overviews on Dolomieu and his place in geology are in two of the three essays by Gabriel Gohau. Gohau first discusses the state of affairs in geological science at the time Dolomieu became active in its pursuit. He argues persuasively for identification of this moment, at the end of the 1770s, as a transformative point in the ways geological inquiry and explanation were coming to be framed. In some closing remarks, Gohau offers observations on Dolomieu's convictions regarding some of the great unresolved geological issues of the day—including such questions as the nature and rate of operation of the Earth's main dynamical processes, or the best way to define and distinguish mineral species.

This fine volume will be an indispensable resource for all future studies of Dolomieu. It will be read with much interest by those concerned to understand geology's early development, the ferment of scientific change during the late eighteenth century, or the ways of a charismatic scientific personality in an era of revolution.

Kenneth L. Taylor, Norman, Oklahoma

Visual Representations of the Great Lisbon Earthquake (1755)

Kozák, J.T., Moreira, V.S., and Oldroyd, D.R., *Iconography of the 1755 Lisbon Earthquake*, Geophysical Institute of the Academy of Sciences of the Czech Republic, Academia, The Publisher of the Academy of Sciences of the Czech Republic, Prague, 2005.

The catastrophe that struck Southeast Asia on 26 December 2004, causing the death of 300,000 people, opened up new philosophical and theological debates about the relationship between man and nature,[1] contributing to an increase in the interest in the Great Lisbon Earthquake (1755). This book, *Iconography of the 1755 Lisbon Earthquake,* is a meaningful contribution to such debates and at same time to the commemoration of the 250th anniversary of the Lisbon earthquake, giving special importance to the historical pictorial documentation concerned with this catastrophe. The first of its authors, Jan Kozák, a member of the Geophysical Institute of the Academy of Sciences of the Czech Republic, has dedicated many years to collecting and studying depictions of historical earthquakes. An extensive series of some 1,450 pre-photographic images, known as the Kozák Collection (http://nisee.berkeley.edu/kozak), which include 95 images of the 1755 Lisbon earthquake, served as a basis for the present work. The co-authors are the late Víctor Sousa Moreira (1925–2000), who was member of *Instituto Nacional de Meteorologia e Geofísica* (Portugal) and carried out some studies on the Lisbon earthquake during the 1960s and 1970s, and David Oldroyd, a well-known researcher, who has made great contributions to the history of the geological sciences in several areas, including the history of seismology.

Iconography of the 1755 Lisbon Earthquake (78 pages) has nine sections, some of them with several sub-sections. The work begins with a historical introduction, where some philosophical reactions to the Lisbon earthquake are presented. Unexpected and uncontrollable, the Lisbon catastrophe was a disturbing event to the European intellectual elite, which, in the first half of the eighteenth century, was dominated by optimistic feelings towards the future. It was commonly believed that the natural world had finally been understood through rational thought. Consequently, it was felt that mankind could command nature, leaving behind a view of it as a space of mysterious and inexplicable powers and forces. This philosophical and scientific context justified the great emotion

and interest provoked by the Lisbon event among European naturalists and philosophers, including Immanuel Kant (1724–1804), Voltaire (1694–1778) and Jean Jacques Rousseau (1712–1778). Voltaire, who wrote a *Poème sur la Destruction de Lisbonne* (1755), and also used the Lisbon earthquake as the theme of a satirical novel, *Candide* (1758),[2] is particularly highlighted by the authors. Kant's essays also are carefully examined and discussed.

Section 2 is dedicated to presenting early ideas on earthquakes causes, and is completed by Section 3, in which the authors briefly outline developments of seismology after 1755. Sections 4, 5, 7, and 8 are dedicated to the description of the Lisbon earthquake. It is not clear why the option was taken to place Section 6, concerned with earthquake depiction, between Sections 5 and 7. Probably it would have improved the book if this section and the catalogue of illustrations had been placed together and inserted after the historical view (Sections 2 and 3).

This is a carefully produced edition. To start with, it is important to highlight the attention given to the cover—it is made of a cardboard piece showing in red an old village collapsing under the effect of an earthquake. A transparent plastic overlay shows the same illustration, but in black, in such a way that the impression of destruction is really increased. In the text, the great care with the graphic quality of the illustrations may also be seen, some of them occupying an entire page or even a double page. A code based on colors has been created which helps the reader to identify and easily distinguish the captions of pictures from the notes; however the unusual location of the page numbers made it difficult for us to identify the pages.

After the Lisbon earthquake occurred, research into the subject was greatly stimulated, such as described in Section 3, 'More recent developments in seismology.' However, it is only the Lisbon earthquake that is analyzed in detail, with references to the precursory phenomena, the macroseismic effects, the tsunami and also other particular effects, such as the fire that raged through the city for five days and grew to catastrophic levels. Problems concerning the reconstruction of Lisbon, highlighting political and economic aspects, are also described.

It should be stressed that the Lisbon earthquake at different times motivated many writers and artists to paint and draw realistic and imagined pictures. Some of those historical depictions of earthquakes are in special cases used today as very important historical sources of scientific information.[3] It is also important to note that the authors of this book have made not only a description of illustrations, but also an attempt to decode the seismological messages included in them.

In the 'Catalogue of images of the 1755 Great Lisbon Earthquake,' included at the end of the book (section 9), each image is characterized by a short description and by information concerning location of its original, the name of the respective artist or engraver, the type of depiction (copper engraving, wood engraving, etc.), the year of production and later editions. Among the pictorial documents special attention is given to a series of six engraving of Jacques-Philippe Le Bas (1707–1783), 'principal engraver of the king of France.' The authors note that the engravings were based on drawings made by Messieurs Paris and Pedegache. Although there is no specific information on this, it is my personal belief that 'Monsieur Pedegache' is Miguel Thiberio Pedegache (~1730-?), a military man of Swiss origin, who wrote an essay (1756) on the causes of Lisbon earthquake, *Nova e Fiel Relação do Terremoto, que experimentou Lisboa e todo Portugal no I. de Novembro de 1755. Com algumas observaçoens curiosas, e a explicação das suas causas,* signed as M.T.P.[4] His text reveals a French influence, namely of the naturalist Georges-Louis Leclerc, Comte de Buffon (1707–1788) (*Théorie de la Terre*). Today, Pedegache is remembered by a curious statement in which he anticipated the possibility that another great earthquake could strike Portugal between 1977 and 1985; he made it based on the identification of a return period of two hundreds years. Concerning Portuguese authors coeval with the earthquake, it is regretted that some of them are not mentioned. Examples include António Nunes Ribeiro Sanches (1699–1783), a leading figure of the Portuguese Enlightenment, who also wrote an essay on the subject, the Protestant Francisco Xavier de Oliveira (1702–1783), and the Oratorian priest Teodoro de Almeida (1722–1804).

1. For a broader perspective, see Neiman, S., *Evil in Modern Thought: An Alternative History of Philosophy*, Princeton University Press, Princeton and Oxford, 2002.
2. In 1769, this book still remained on the list of books forbidden in Portugal. See J.M. Brumfitt (ed.), *Voltaire, Candide,* Oxford, 1968, 153–160; J. Medina, 'Cândido em Portugal ou Voltaire e o terremoto de Lisboa de 1755,' *História de Portugal dos tempos Pré-Históricos aos nossos dias*, Amadora, 1993, vol. VII, 371–411.
3. Eisinger, U., Gutdeutsch, R. Y., Hammerl, C., 'Historical Research—an Example of Interdisciplinary Cooperation between Geophysicists and Historians,' *Abhandlungen der Geologischen Bundesanstalt* (1992), 1992, *48*, 33–50.
4. M.T.P., *Nova e Fiel Relação do Terremoto, que experimentou Lisboa e todo Portugal no I. de Novembro de 1755. Com algumas observaçoens curiosas, e a explicação das suas causas*, Officina de Manoel Soares, Lisboa, 1756.

The History of the Great Lisbon Earthquake (1755): Before and After

Fonseca, João Duarte, *1755: The Lisbon Earthquake*, Argumentum, Lisbon, 2004.

The evolution of seismological research had been marked and influenced by some big earthquakes, such as the Lisbon earthquake of 1755, the 1906 San Francisco earthquake, and the 1960 Chilean earthquake, each one of them having contributed to the introduction of new problems and ideas.[1] After the Lisbon earthquake, 'old' explanations, strongly influenced by Aristotelian and theological views, were abandoned and earthquakes began to be studied as physical events. Thus, we can say that it marked the emergence of a new science—seismology. Moreover, it was after the Lisbon earthquake that a need for systematic and accurate collecting of seismic information started to exist. In this context, it is important to refer to the *Marquis of Pombal Inquiry*, the first seismological questionnaire prepared in modern terms about earthquake damage and its social effects. That document is analyzed in detail by the author of this book.

The main goal of *1755 The Lisbon Earthquake* is to provide wider public access to the most interesting excerpts of eighteenth-century coeval sources, while making references to modern seismology. This book was published at the end of 2004 in a bilingual edition (English and Portuguese), as part of the commemoration of the 250th anniversary of the Great Lisbon Earthquake. The author, João Duarte Fonseca, geophysicist and Fellow of the Royal Astronomical Society, is Assistant Professor at the Technical University of Lisbon. It is important, however, to point out that many of the illustrations of the book were taken from the Kozák collection (http://nisee.berkeley.edu/kozak), Jan Kozák being the co-author of another work reviewed in this newsletter, *Iconography of the 1755 Lisbon Earthquake*.

The Lisbon Earthquake (139 pages) is a carefully edited book, structured into 10 main sections. The first one gives a historical and introductory view: 'Portugal 1755: the painful birth of a modern state.' In this period the central figure, from a political and economic standpoint, was Sebastião José de Carvalho e Melo (1699–1782), Marquis of Pombal and Prime-Minister for José I, to whom is attributed the decision to elaborate the seismological questionnaire. But Pombal was also responsible for organizing the emergency response to the effects of the earthquake and subsequently for the reconstruction of Lisbon. It is usually mentioned that in replying to King Don José I, who asked what should be done in the aftermath of the earthquake, Pombal answered: "bury the dead, feed the living and close the ports." Although this statement is taken to reveal Pombal's pragmatism, it was probably not pronounced by him, but by Don Pedro Almeida, Marquis of Alorna.[2]

The next three sections are devoted to the moments in which the earthquake and the tsunami occurred, presenting a lot of excerpts of coeval accounts of what happened on 1 November 1755. The fact that many of the authors were often eye-witnesses to the earthquake makes their texts particularly valuable; although this does not necessarily mean greater objectivity and rigor in their comments, it adds much more detail and vivacity to their accounts, including aspects which could only be supplied by direct experience. The next two sections are dedicated 'to the response to the emergency' and 'to the reconstruction' of the city, highlighting the elements of modernity that characterized the management of the effects of the catastrophe.

In the following two sections, philosophical and theological impacts of the phenomena are discussed, both inside and outside Portugal. Although few examples of religious fanaticism (Catholic and Protestant) are given, it should be noted that there is an absence of important works of several Portuguese and Spanish authors in what concerns natural philosophy. This may have resulted from a need to reduce the text and give similar sizes to all sections.

The last two chapters are devoted to modern seismology, putting in evidence the contributions of the English physicist John Michell (1724–1793), who was the first, in 1760, to attribute earthquakes to wave motion. The author also emphasizes the work of Pereira de Sousa (1870–1931), published by the *Portuguese Geological Survey* between 1919 and 1932, who recovered and analyzed the answers to the seismological questionnaire of the Marquis of Pombal.

The last section of this book, entitled 'What do we know today?,' refers to the effort that has been made in recent years to locate the active tectonic structures that could be related to the Lisbon earthquake, not forgetting the debate that this problem has provoked between two groups of researchers. On the one hand, researchers of *Lisbon Technical University*, to which the author of the book belongs, suggest the possibility of two distinct earthquakes having occurred, separated only by a few minutes, attributing the Lisbon destruction mainly to the second one, with its epicenter near the city.[3] On the other hand, researchers of *Lisbon University*, geologists and geophysicists, who refute the idea that the Gorringe Bank area (on the Europe-Asia plate; known for its large gravity anomaly) was the source of the earthquake. This view is based on new data that reveals the existence of other active tectonic structures in SW Iberia (the *Marquês de Pombal Thrust* and *Ferradura Fault*). Ribeiro (2005) presents a very stimulating interpretation of the geodynamic Ibero/Atlantica-Magrebe area, suggesting that the origin of 1755 earthquake could

be related to the transition of the Western-Iberia margin from a passive to an active phase.[4] This is a very interesting discussion, which certainly will be of interest to the historians of this area in coming years.

1. Howell, B.F., Jr., *An Introduction to Seismological Research. History and Development*, Cambridge University Press, Cambridge, 1990.
2. Veríssimo Serrão, J., *História de Portugal*, 12 vols., Lisboa, 1996. vol. 7, p. 28.
3. Vilanova, S.P., Nunes, A.C., and Fonseca, J.F.B.D., 'Lisbon 1755: a case of triggered onshore rupture?,' *Bulletin of Seismological Society of America*, 2003, *93* (5), 2056–2068.
4. See: Baptista, M.A., Miranda, J.M., Chierici, and N. Zitellini, 'New Study of the 1755 Earthquake Source Based on Multi-Channel Seismic Survey Data and Tsunami Modeling,' *Natural hazards and Earth System Sciences*, 2003, *3*, 333–340; Ribeiro, A., 'O Sismo de 1755 e a Geodinâmica da Ibéria e Atlântico,' in *1755 O Grande Terramoto de Lisboa,* FLAD-Público, Lisbon, 2005, vol. I, 219–237.

Filomena Amador, Lisbon

A New View of Geology and Genesis

Rudwick, Martin J. S., *Geology and Genesis: A Historical Perspective on the Interaction of Two Historical Sciences*, The Herbert H. Reynolds Lectureship in the History and Philosophy of Science, March 1, 2005, Waco, TX, Baylor University, 2005, 20 pp.

One of the major theses promulgated in Martin Rudwick's recent writings is the utter inadequacy of generalizations about the "warfare of science and religion" to capture local and nuanced religious contexts surrounding the discovery of geohistory. For example, Rudwick's 700-page *Bursting the Limits of Time* (Chicago, 2005) explores the emergence of an appreciation of geohistory during the last half of the 18th century and the first decades of the 19th. This handsome book, beautifully produced in hard cover with breathtaking color illustrations, will likely become the definitive work on the subject. Yet readers familiar with an older historiography may initially balk at one of Rudwick's prominent claims in *Bursting the Limits of Time*, namely, that there was no intrinsic and perennial conflict between science and religion on this issue at this time. Of course, not everyone has read *Bursting the Limits of Time*, but if we need a brief discussion—perhaps to recommend to our students and colleagues—there is another option. The Philosophy Department of Baylor University has made Rudwick's Herbert H. Reynolds lecture available as a free download in pdf from their website: http://www.baylor.edu/philosophy/; click on "Events and Scholarly Opportunities."

In this readable and accessible speech, Rudwick offers many nuggets of insight in a selective overview of various religious contexts for the discovery of geohistory. The story begins with the practice of chronology often typified (or vilified) by Archbishop Ussher. Rudwick explains that the chronologists were not proto-fundamentalists, but that chronology was a rational science in its own right that included luminaries such as Isaac Newton among its proponents. Chronologists attempted to bring precision and rigor to a timeline of history complicated by gaps and conflicts between ancient texts. By rejecting eternalist notions, chronologers who were committed to the general reliability of biblical history established a universal framework in which it was possible to integrate evidence from natural antiquities, such as rocks and fossils, with the ancient texts both sacred and secular. The new kind of evidence supplemented the older, textual kind of evidence in contributing to a unified history of the world.

With the 18th century and the expansion of the geological timescale, Rudwick argues that generally there was "no unsettling crisis of faith." Rather, early on the biblical narrative was understood as allowing divine initiative over an unimaginably vast duration. Buffon's reconstruction of the "epochs" of geohistory, spanning a period of 75,000 years, represented a novel third option of "prehuman" earth history in contrast to the eternalism or the young-earth chronology of the 17th century. Because Buffon's last epoch heralded the advent of humanity, the deluge of Noah bore no explanatory burden. Nor was biblical literalism the reason for Buffon's reticence to publish his private estimate of 3 million years for the age of the earth, a caution which owed more to a lack of rigorous evidence than to a fear of suppression by the Church.

As the fields of biblical criticism, history, and archaeology matured into historical sciences, they provided naturalists with additional crucial resources for the interpretation of the history of nature. Biblical studies became historical in character by recognizing the need to establish the original meanings of the creation and flood stories according to their ancient cultural settings. With an appreciation of the alien, unfamiliar character of the past that was being recovered, critical methods also developed in historical scholarship. Simultaneously, the archaeology of Herculaneum and Pompeii dramatically supplemented the textual evidence from classic civilizations. Thus Desmarest and others transferred historical habits of inference from human history to the history of the Earth, from Pompeii to prehistoric lava flows in central France. Rudwick explains that "the whole vocabulary of human historiography was deliberately and explicitly transposed into the natural world."

The 18th-century naturalists' aim of deciphering a sequence of unique events in a long prehuman

geohistory went far beyond the Newtonian ideal of comprehending unchanging laws of nature. In this respect the Theory of the Earth of Hutton was an ahistorical throw-back to eternalism, a system analogous to the endless revolution of the planets rather than a geohistory. In Hutton's deistic teleology, the earth had no pre-human duration. Hutton's critic de Luc, the Genevan naturalist, emphatically refuted Hutton's eternalism by advocating a truly contingent history for the earth that could be known through the new science of geology. In contrast to the determinism of materialists and the rationalism of deists, de Luc's appreciation of a contingent geohistory was easily congruent with his Christian understanding of the deity. Rudwick argues that "the impact of de Luc's theistic commitments can be seen in the radical contingency that he attributed to earth history, and which he grounded in God's ultimate role as creator of everything." When Cuvier wrote that geologists should "burst the limits of time" in writing the history of the earth, he was extending just this kind of contingent sensibility pioneered by de Luc, Desmarest, Steno and others. Later geologists in turn extended Cuvier's geohistorical endeavors, without disrupting their religious convictions. So the emergence of geology fails to support the alleged essential conflict of science and religion. Rather, in the very idea of the contingency of history the "natural sciences were enriched by the human sciences."

In the historiography of geology and religion, Rudwick cautions in the introduction to the speech, we must be careful not to project onto the past present polarizations between science and fundamentalism. Rudwick points out that the rhetoric of conflict between science and religion, as championed by Andrew Dickson White, was rooted in the 19th-century struggle for the professionalization of the natural sciences. The varying appeal of later conflict rhetoric likewise must be understood as relative to changing local circumstances. In other words, the relations between science and religion are highly contingent products of local history and therefore varied widely in the past, just as they vary widely in the present. Whether speaking of 20th-century Cambridge and San Diego, or 19th-century France and Edinburgh, Rudwick cautions that even specific social groups may display wide local variations. In this way Rudwick does not simply replace the "conflict thesis" with a model of universal harmony between science and faith.

With Rudwick's rejection of oft-repeated tropes in the history of geology and religion, an important conversation has been rejoined. For a defense and elucidation of Rudwick's case we must turn to the fuller discussion in *Bursting the Limits of Time*. Yet because this superb introduction to the longer work is available as a free download, anyone willing to invest a single evening may join the author in that conversation.

Kerry Magruder, Norman, Oklahoma

Reversions of Geonomy

Dudich, Endre (scientific editor), *Geonomy: the Synthesizing Geoscience for the 21st Century,* Hungarian Academy of Sciences, Subcommission on Geonomy, UNICONSTANT, Budapest, 2005.

This book of 82 pages is an abridged English-language version of the 200-page Hungarian-language book *Geonomy After the Turn of Millennium* published in 2003. Both books were written by the multi-disciplinary eleven-member team (geologists, geophysicists, physicists, astronomers, chemists, biologists) of the above-mentioned Subcommission. They are dedicated to the 100th anniversary of E. Szádeczky-Kardoss, the author of the treatise "*Geonomy*," the very first one of this kind, which was published in Hungarian in 1974. Szádeczky-Kardoss was also an organizer of the above-mentioned Subcommission on Geonomy, founded in 1976, of the Hungarian Academy of Sciences. The present Chairman of the Subcommission, E. Dudich, who was Secretary-General of INHIGEO in 1984–1989, is an editor of the book. The aim of the book is "to provide the reader with a taste of E. Szádeczky-Kardoss' intellectual universe by means of a collection of papers presenting several aspects of his ideas and assessing their afterlife up to the present day," as noted by the editor (p. 5).

According to E. Dudich (see *INHIGEO Newsletter,* 1987, No. 20, p. 13), Professor Elemér Szádeczky-Kardoss (1903–1984) was "a Renaissance-style scientist of exceptional grandeur." As far as I can judge, there is no exaggeration in this statement. (But in brackets I have to admit that until recently I was acquainted only with his works on coal petrology, because in the 1960–'70s that was my professional line.) One can understand Szádeczky-Kardoss' striking range of vision by enumerating some of his major monographs, treatises and text-books in addition to his *Geonomy* (1974), mentioned above: *Coal Petrology* (1952); *Geochemistry* (1955); *Structure and Evolution of the Earth (1968)*; *and* posthumous works such as *Introduction to the Cycle View* (1986); *The Universal Interrelation of Phenomena* (1989); and *Introduction in the Cycle View* (1992). The three last books contain the results obtained during his efforts to reach the most ambitious aim, to establish a coherent view of the entire Universe by means of the so-called Universal Cycle Relation. Unfortunately, nearly all the books by Szádeczky-Kardoss mentioned above were published in Hungarian; the only exception is the last one, published in English. From my point of view, by his encyclopaedic knowledge E. Szádeczky-Kardoss might be related to the great

Russian naturalist, thinker and philosopher V.I. Vernadsky (1863–1945). It was E. Dudich, who earlier noticed the continuity of their basic ideas (see *INHIGEO Newsletter for 2001,* 2002, No. 34, pp. 46–48).

As to *geonomy*, the term, as well as agronomy, astronomy, economy and so on, was created from the Greek word "*nomos*," that means "law." During the last decades, geonomy was not broadly recognized or accepted. So, according to the *Glossary of Geology* (J.A. Jackson (ed.), Am. Geol. Inst.: Alexandria, Va., 1997), the term *geonomy* is "variously recommended as a synonym for geology, as the science of the dynamic Earth, as the science concerned exclusively with the physical forces relating to the Earth, and to denote the study of the Earth's upper mantle" (p. 266). There is also a broader term, *cosmogeonomy*, which was recently coined by L.I. Krasny (2002, 2005).

But what did geonomy mean *in statu nascendi?* As it was rightly reported by T. Póka in the book under review (p. 7), the term geonomy was coined as early as 1884. Its author was not a geologist, but a brilliant 32-year-old Russian philosopher, Nikolai Yakovlevich Groth (1852–1899), whose charming image was commemorated by Leo Tolstoy <sic!> in his recollections.

In the paper *Concerning classification of sciences*, published in Russian (1884, republished in 1904), Groth classified sciences according to a subject principle into such disciplines as cosmology, geology, zoology, and so on. In its turn, he categorized the scientific disciplines according to stages of development, into "stages." The first stage of every discipline is a positive one (Groth proposed to use *-graphy* as an ending of its name, e.g., crystallography); the second stage is a positive-abstract one (with the ending *-geny,* e.g., cosmogeny); the third stage is an abstract one (with the ending *-logy*, e.g., methodology); and the fourth, final stage is an abstract-positive one (with the ending *-nomy*, e.g., geonomy).

"The principal indication that a scientific discipline has attained its fourth stage is the discovery of comprehensive laws, as, for example, the Law of Universal Gravitation, from which it is possible to deduce all other special laws of related phenomena," Groth wrote. His general idea was far ahead of the general development of sciences, at least, the Earth sciences: at that time their factual evidence was insufficient for the discovery of such comprehensive laws. Only in the 1970s, as a result of accumulation of ample evidence in various branches of geosciences, and after the adoption of the plate tectonics concept as the new paradigm of the Earth sciences, did the time of geonomy arrive. The fundamental work "*Geonomy*" (1974), in 460 pages by Szádeczky-Kardoss, laid its groundwork. The term, which was made "with room for growth" by Groth, was at last called for. To speak figuratively, it was just E. Szádeczky-Kardoss, who "put the new 'wine'" produced in 1974 "into an old (but as yet empty) 'bottle'" made by N.Ya. Groth in 1884.

After this lengthy but necessary introduction let us return to the book under review. Excluding the *Preface, Introduction, Epilogue and Challenge,* the main text of the book is named *Geonomies and Geonomy.* It consists of two separate key papers and the following four chapters:

A. *The Earth and the other planets.*
B. *Present-day global dynamics.*
C. *Interactions of the fluid and "solid" geospheres and the biosphere.*
D. *Geonomy and society.*

In the first key paper, *Geonomy—past and present. A historical approach* (pp. 7–9), T. Póka briefly inspected the history of geonomy as a discipline, and gave the following definition of *geonomy*: "Geonomy is a theoretical discipline, which processes and transmits information obtained by other geosciences. Its aim is to discover structural and functional interrelations characterizing the Earth as a relatively closed system and as the bearer of Life. Geonomy has to study and interpret the dynamism and evolution history of the system Earth, to forecast its short-, medium-, and long-term changes, to transform this knowledge for the use by other sciences, and, finally, to establish a humanistic scientific concept of the world" (p. 8).

The second key paper, *The universal cycle relation* (pp. 10–13), by the late F. Benkő, is devoted to a description of attempts by E. Szádeczky-Kardoss and his followers to deduce the Universal Cycle Law. It seems reasonable to say that, on the one hand, searching for such *universal law* is conceptually relevant in the context of geonomy, which was established by Groth. On the other hand, the paper seems to be rather poorly connected with other branches of the geonomy concept considered in the book.

Chapter A, *The Earth and the other planets* (pp. 14–42), is a series of six papers on planetology written by Sz. Bérczi, E. Dudich, E. Illés-Almár, and B. Lukács. Special attention is paid there to the planetary system, to the geospheres of the Earth, to the geophysical phenomena in the past and present (solar activity, magnetic pole reversals and tidal phenomena), as well as to the evolution of the solar system, to comparative planetology, and finally to the extraterrestrial materials within the solar system. It has been stated that space research has considerably changed the previous ideas about the features of the solar system, and in particular concerning the specificities of the Earth as compared to the other planets.

The following chapters as a whole are firmly integrated into the geonomy concept as such. Chapter B, *Present-day global dynamics* (pp. 43–56), consists of six papers which were written by the late L. Cserepes, as well as Z. Ditrói-Puskás, E. Dudich, and B. Nagy. The papers have clearly demonstrated that the theory of plate tectonics is an inalienable part of the geonomy concept. At the same time, it should be noted that five of these papers, for reasons unknown, are too short (one page and less), but the last one, *Regional types of igneous petrogenesis* (pp. 45–52), is rather long and, as far as I can see, is beyond the scope of the geonomy concept.

Chapter C, *Interactions of the fluid and "solid" geospheres and the biosphere* (pp. 57–74), includes three papers, which are worthy of separate consideration. So, T. Póka in her paper *A crucial geospheric interaction: clay minerals and life* (pp. 58–59) reveals that one of the basic principles of the Szádeczky-Kardoss' geonomy concept is the permanent interaction between the "solid" Earth (lithosphere) and the fluid spheres (hydrosphere and atmosphere), as well as the biosphere. Leaning upon factual evidence, the author notes that clay minerals play an important role in these interactions. Consequently, the presence of clay minerals was indispensable for the origin and persistence of life on the Earth, and even for the global dynamics of the lithosphere. In the following paper, *The daring ideas of E. Szádeczky-Kardoss about the appearance of life and the exosphere* (pp. 60–68), G.Szöőr compares the statements made by E. Szádeczky-Kardoss to our recent knowledge and concludes that a good many of his ideas are in accordance with the latest achievements in the world of science. The last paper of the chapter, *Bilateralism of organic-inorganic chemical processes* by Cs. Sajgó (pp. 69–74), is a peculiar kind of supplement and commentary to the previous ones in the chapter. The author brings up to date the cardinal principle that living matter governs the inorganic kingdom and processes on and in the Earth (reverse effect), which was originally formulated by V.I. Vernadsky in *"The Biosphere"* in 1926. The author appropriately quoted Vernadsky's principal works and also two more recent books by J.E. Lovelock (1979, 1988) on the Gaia hypothesis.

Though the final Chapter D, *Geonomy and society* (pp. 76–79), is rather short, it contains the most important ideas. The chapter, written solely by E. Dudich, presents a condensed version of the 77-page chapter of the same title of "*Geonomy*" by E. Szádeczky-Kardoss. It calls attention to the relationship between Humankind and geosciences. Let us list only some primordial questions which are pertinent to this relationship: electromagnetic field and human health; geonomic factors acting upon and influencing the development of civilizations; geophysical factors (tidal phenomena, cosmic effects, solar activity, the cycloid motion of the Earth in our Galaxy); and so forth. Because the reviewer is not able to condense a coherent text of the entire chapter, he is forced to be confined only to its scanty rendering with his own short comments. Dudich wrote figuratively: "Even now we are living on the Earth like unconscious children, although we are striving hard to modify it dramatically. Our culture is yet an immature greenhouse product built on a rather insecure foundation" (p. 76). Just recently, in December 2004, we could see how insecure the foundation is: as a result of the earthquake-generated tsunami in the contact zone of tectonic plates in South-East Asia about 300,000 people were killed. Another geonomic threat for Humankind which was predicted by Szádeczky-Kardoss would be the forthcoming reversal of the Earth's geomagnetic field around 2230 A.D. Geonomy ought to become a convenient theoretical basis for elaboration of a system of practical measures to minimize the effects of these and other geonomic disasters.

Summarizing the review, it should be concluded that several weaknesses of the book, which are noted above, are compensated by its important strengths. Disciples and adherents of E. Szádeczky-Kardoss, headed by E. Dudich, have created a deserving monument to their great Master. At the same time, the book under review is of substantial value not only in terms of the history of geosciences. The geonomic concept, which is outlined in the book, has been very promising in prospect. As Vernadsky wrote once, geochemistry is a science of the 20th century. As the authors of this book clearly demonstrated, geonomy should become "the synthesizing geoscience for the 21st century."

Excessive specialization in the Earth sciences during the 20th century created gaps both between various branches of geology, and between geology and other natural sciences. The tendency for a synthesis of the Earth sciences which appeared in the 1960–'70s, for reasons not well understood, falls off in recent years. It can be demonstrated by the fact that in 2004, at the 32nd International Geological Congress in Florence, among more than eight thousand presentations, the appeal to integrate the Earth sciences emerged only in one poster, namely 'Specialization or a holistic way in geology: which is the best way?,' presented by C. Bandeira. However, even in this single poster the geonomy concept was not mentioned.

Geonomy should be an adequate reaction of geosciences to challenges of modernity. Hopefully, in 2008, at the 33rd International Geological Congress (Oslo), its participants will be able to discuss a presentation (or, even more, several presentations) by a team of the Subcommission on Geonomy of the Hungarian Academy of Sciences concerning their further development of a truly synthesizing geoscience for the 21st century—that is, geonomy.

Andrei Lapo, St Petersburg

Charles Darwin, Geologist

Herbert, Sandra, *Charles Darwin, Geologist*, Cornell University Press, Ithaca and London, 2005, 403 pp.

I came to the review of this book as a long-time amateur student of Darwin, had taught a college course for years on the man and his work, and had even written a short piece on the same subject a few years back for GSA's *GEOLOGY TODAY*. My Darwin library fills four meters of bookshelf and comprises some eighty volumes, large and small. Hence, I thought that Professor Herbert's book would cover fairly familiar ground and probably not teach me much that was either new or of genuine interest. *Not so!*

Sandra Herbert is director of the Program in the Human Context of Science and Technology, and Professor of History at the University of Maryland, Baltimore County. She has previously published a number of articles and book chapters on various aspects of Darwiniana, including glaciers, Genesis, natural selection, South American geology, his travels, Man and transmutation, and his geological studies in Shrewsbury. Her first study was her dissertation entitled, "The Logic of Darwin's Discovery," and although I haven't seen the thesis, I suspect that the book reviewed here is a fully developed and mature working out of insights and ideas she has nurtured since that initial research.

Herbert starts and ends with her acknowledgment of and full agreement with Darwin's claim that "I am a geologist" (p. 358). She points that this youthful belief remained with him all his life, citing in his own words his concern that his 1844 essay on species must have a geologist as editor, that he was accustomed to look at the world under a geological point of view, and that geologists were more converted to the *Origin* than simple naturalists because they were more accustomed to such reasoning (p. 319).

Her book, then, traces and documents both the geological discoveries that Darwin made—chiefly, but not only, on the *Beagle* voyage—and his musing and mulling over of what they signified with respect to geology *qua* geology in light of the state of the science in the 1830s and 1840s, and beyond. Because Darwin's *Origin* is such a major contribution to biology, his geology is easy to overlook, downplay in importance, or just used selectively in support of some part of his biological argument.

Because the book spans Darwin's long life (from Shrewsbury to South America to Down), is fine-grained in detail (with full review of primary and secondary sources), and rich in scope (in making connection with contemporary science), Herbert is thoughtfully punctilious in leading the reader carefully along the historical and intellectual path she has created. Her tone is didactic and she often pauses in the narrative with phrases and sentences like: "Let us pause now for a moment to assess how matters stood . . . " (p. 267), or ". . . my goal is to document that claim . . . " (p. 296), or "It is now 1835 in our account" (p. 311).

The book comprises ten chapters, "I a geologist," Geology, Specimens, The Romantic Thread, A Prospective Author, Negotiating Genesis and Geology, Toward Simplicity, Simplicity Challenged, Geology and Species, Geology and the *Origin of Species,* and ends with a short Conclusion.

The chapters on "Simplicity" and "Simplicity Challenged" I found particularly interesting—no doubt because I had recently reread the *Voyage of the Beagle*, where Darwin speculates much on the possible complementary action of large-scale elevation and subsidence. Herbert develops fully how Darwin sought a "simple" overarching theory—a paradigm if you will—for global geologic behavior linked to these and other phenomena, like volcanoes and coral reefs. His efforts in this regard delayed his recognition of the reality of continental glaciation, because of his insistence that the parallel roads of Glen Roy were due to marine erosion, not glacial ice. He eventually came around to Agassiz's glacial theory, and led to his admission that the Glen Roy paper "was a great failure, and I am ashamed of it" (p. 285).

As a scrupulous historian of science, Herbert places Darwin's geology within the full context of his time: the nature of supporting and conflicting evidence, who was thinking what, and what the contending schools of thought were. It is, therefore, a history of early and middle nineteenth-century geology, with all the usual characters, but seen in a light that radiates out from Darwin and his geology.

A final comment on the physical book itself. It is well designed, with a format that ensures you always know where you are, and has numerous informative illustrations—both in color and black and white—including a number from Darwin's notebooks and important geological sites, relevant to the argument. The endnotes are extensive, discursive, and informative.

I am delighted to give Herbert's fine book a prominent place in the Darwin corner of my library!

Léo Laporte, Redwood City, California

The Concept of Seeds in Renaissance Theories of Matter

HIRAI, Hiro, *Le concept de semence dans les théories de la matière à la Renaissance: de Marsile Ficin à Pierre Gassendi* [*The Concept of Seed in Renaissance Matter Theories: From Marsilio Ficino to Pierre Gassendi*], Brepol Publishers, Turnhout (Belgium), 2005, 576 pp.

This work is the product of a thesis submitted in 1999, after the author had spent five years in Liège (Belgium) working under Robert Halleux, and where he also had the benefit of consulting with Bernard Joly in Lille (France). The published version is amplified by references to works that appeared after 1999.

In his Introduction, Dr. Hirai reviews previous studies on the topic. He notes, with Joseph Needham—who benefited from the assistance of Walter Pagel, the well-known authority on Renaissance medicine—that the histories of atomism often pass directly from Epicurus to Gassendi without treating the Stoic/Cabbalistic notion of 'seeds.' A brief summary of the work of historians of the earth sciences enables him to refer especially to the work of Frank D. Adams (1938), as well as David Oldroyd, who encountered the work of the Neoplatonists, studying the work of Marsilio Ficino (1433–1499) in the course of his thesis on the relations between mineralogy and chemistry in the period between Paracelsus and Haüy (1974). Hirai contends that one should not restrict the subject to mineral 'seeds' alone, but should extend it to other natural things.

The body of the work is divided into five parts, devoted in turn to Ficino and his circle; then to Agricola, Cardan and Cesalpino; to Paracelsus and his followers, then a somewhat disparate group that includes notably the potter Bernard Palissy (1510–1590); and lastly Van Helmont and Gassendi.

Prior to Ficino, the concept of 'seeds' occurred among the Presocratics, and then in Plato. The Stoics added the concept of *logoi spermatikoi* ('seminal reasons') as corporeal entities that gave the power of reason to individuals. They became 'spiritualized' in Plotinus and St. Augustine. The concept continued in the work of the alchemists and Albertus Magnus and passed to Ficino's (Neo)platonic academy in Florence, where the works of Plato and Plotinus, and Hermetic philosophers, were translated and commented on. Ficino's circle included several other authors, of whom the best known are Pico de la Mirandolla and Girolamo Fracastori. Hirai here makes a link with the French physician Jean Fernel (1497–1558), who introduced the ideas of Ficino into medical philosophy, seeking a synthesis of Aristotle, Plato, and Christianity.

Nevertheless, the Aristotelian tradition of the period continued to be represented by the 'mineralists' who were unfamiliar with Ficino's Neoplatonic ideas. The best known, Agricola (1494–1555), with a rationalist outlook, rejected astrology and the lapidarists who ascribed magical powers (or 'virtues') to minerals. The transformation of plants and animals into stone was ascribed to a 'lapidifying juice.'

Cardan (1501–1576) differed from Agricola in accepting 'judicial astrology.' He supposed that the world was a gigantic animal, endowed with mind, which was the efficient cause, under the influence of celestial heat, for the formation of minerals. This notion brought Cardan towards Ficino and the Paracelsians, for whom he formed a transitional figure. The medical tradition distinguished two modes of growth: by the external addition of parts (juxtaposition) and internal assimilation (intussusception). Cardan chose the latter, which is the normal mode for living organisms. Among the Aristotelians, Cesalpino was similar in outlook to Agricola.

Paracelsus (ca 1397–1541), Hirai informs us, participated more than anyone else in establishing the concept of 'seeds.' His doctrine of 'correspondences' between macrocosm and microcosm is well known, as are his three principles of salt, sulphur, and mercury (the *tria prima*). He had similarities to the thinking of St. Augustine, and like Cardan he compared the growth of mineral and vegetable trees. The author cites the Dane Petrus Severinus (1540/42–1602), Joseph Duchesne (1546–1609), born in France, and Oswald Croll (ca 1566–1608) from Marburg as being close to him in their thinking.

Part 4 deals with the introduction of chemical ideas into 'mineral science.' The first of the authors studied is better known to geohistorians than are the preceding ones (Agricola excepted). He is difficult to understand clearly without knowing the features of his thought studied by Dr. Hirai. I can vouch for this, as I think I know something about the potter Bernard Palissy (and I live in a street named after him!), who was in the service of Queen Catherine of the Medicis, and mother of three kings of France; but I always wondered how to place his use of the fifth element, which was invoked for the formation of metals but not of stones, and to which he attributed a 'congelative' and 'vegetative' power. Now this principle is similar to those of the alchemists and of Paracelsus, whose ideas he knew, as Hirai indicates. The further parallel with Paracelsus is the thesis according to which the 'seeds' of minerals and metals have existed from the time of the Creation; but the 'seeds' are supposedly material, which is a point of difference between the two savants. Also close to Cardan (whom, however, Palissy treated in a somewhat casual manner) Palissy acknowledged that minerals can be formed by the juxtaposition of particles.

Part 5 is devoted to Jean-Baptiste van Helmont and Pierre Gassendi. We shall say only a few words about them since they are better known to historians of science than some of the other persons mentioned.; and they are allocated only a sixtieth part of the volume. For van Helmont, (1579–1644), the author notes that after 1607, in his

Isagoge, which was not published and is rarely cited, the concept of 'seed' is the pillar of his philosophy, inspired by Paracelsus, who (to him) would have been personally inspired by God. A line-by-line comparison with Severinus reveals his borrowings. As regards minerals, he allows only two elements: water and air (both reminiscent of van Helmont's willow-tree experiment, which is not, however, invoked on the work). For Pierre Gassendi, the philosopher from Digne and friend of Peiresc, matter was constituted of five elements: the three Paracelsian principles of the *tria prima* plus water and earth. From these two authors, there emerged a 'corpuscularisation' of 'seeds,' which led to "the mechanistic theory of molecules that was to be in vogue in the eighteenth century."

Hiro Hirai discusses the thesis of the French philosopher Oliver Bloch, who in a celebrated work of 1971 showed the connection between Gassendi and Étienne de Clave. Hirai, for his part, prefers to find a connection with Severinus. And he concludes his book:

> *In this way, we rediscover in the foundation of Gassendist atomism the manifest influence of the thought of Ficino, incorporated by Fernel and Paracelsus in their medical philosophies and admirably developed and disseminated by the Danish Paracelsian. We may thus conclude that the supposed 'mechanist' atomist of Digne drew on the same source as the Flemish chemist van Helmont, said to be a 'mystic'—a source that was the highest authority [source sublime] for both of them, which, to my [Hirai's] way of thinking 'crystallized' a beautiful idea from Renaissance philosophy.*

In sum, our colleague Hiro Hirai provides us with a very fine work, for which this brief and rather inadequate review by a historian who is not too well informed about the period, provides an imperfect account. But specialists will not fail to recognise the quality of the work. Historians of the earth sciences will know the necessity only to enter on the studies of ancient times with the guidance of authors who have a comprehensive knowledge of the ideas of the period being studied. Hiro Hirai concludes by reference to the continuation of the concept of 'seeds' in later writers, such as Boyle or Leibniz. He has himself, in collaboration with Hideyuki Yoshimoto, published an article entitled 'Anatomizing the Sceptical Chymist: Robert Boyle and the Secret of his Early Sources on the Growth of Metals,' which appeared in *Early Science and Medicine*, 2005, *10*, pp. 453–477, which warrants (or will warrant) analysis.

Gabriel Gohau, St Cloud, France
(translated by David Oldroyd)

A Russian View of the History and Philosophy of Geology—Again

Khain, Viktor E., and Anatoly G. Ryabukhin, *History and Methodology of Geological Sciences,* Moscow University Press, Moscow, 2004, 320 pp. (in Russian).

The authors of this textbook have been giving lectures on this topic to students of the Moscow State University for many years. Anatoly G. Ryabukhin continues to give lectures on this discipline.

The first edition of this book was published in 1997 (please see the review by Martin Guntau, entitled 'A Russian View of the History and Philosophy of Geology,' in *INHIGEO Newsletter* No. 30, for 1997, pp. 26–27). In recent years a new program of a 'history and methodology of geological sciences' for Russian classical universities has been developed, and the new textbook corresponds to this program. This book was significantly increased in volume, in comparison with the first edition of 224 pages.

The book contains two parts. The seven chapters of the first part (pp. 9–223) consider the history of geological sciences, from emerging elements of geological knowledge in Antiquity to the newest period of development of geological sciences. The historiographic chapters are revised in keeping with the latest scholarship. Information from a variety of works illuminates different stages in the history of geology. Memoirs of the well-known Russian geologists Yuri M. Pushcharovsky and Viktor E. Khain are also used to enrich the text. The authors analyze the current status and perspectives of geology. They also give considerable attention to international cooperation among geologists. Authors are reconsidered and interpretation of their work is revised for this second and updated discussion of the methodology and philosophical problems of geology.

The second part of the book (pp. 224–306) includes three chapters which look at 'General (common) questions of the methodology of geological sciences.' This section was doubled in comparison with the 1997 book. The chapter on 'Peculiarities of a Science' considers the concepts of science, objects and subjects of scientific research, and 'scientific revolutions.' Another chapter is devoted to principles of construction of a scientific research program.

The book is illustrated by forty-nine portraits of well-known Russian and foreign naturalists and geologists. It contains thirty-seven figures, including maps and diagrams illustrating ideas and outcomes of investigations of celebrated scientists. The book mentions 554 names of naturalists, geologists, and philosophers. Among them are 175 Russian and 375 foreign scientists.

The section titled 'About practical methodology in geological research' is written by Al'fred A. Neimark. He has underlined the point that up to 90% of the time expended for research is spent ineffectively, because of an inability to state the problem properly. Scientific research without a precisely formulated problem is ineffective, is vulnerable to criticism, and can not be recognized as being professionally competent. Facts that contradict theories are the most revolutionary element of scientific thinking.

In the chapter on 'Philosophical problems of geology,' the authors consider the causes and rules of geological processes. Examples include geological laws, understanding of time in geology, modern submissions about natural catastrophes, and special methods of geological research. Neimark also discusses such topics as 'About nonlinear processes in geology,' and 'About theory in geology.'

The task of a textbook is, in the authors' opinion, to give students (geologists) general understanding about a process, and its successes and perspectives in the development of the geological sciences. Knowledge of their status can show the dynamics of development of geological ideas and methods, as well as the logic of construction of scientific research. The authors manage to describe and analyze this problem. It is especially important now, when geology is lifted to a higher stage of knowledge concerning geological processes and structures.

Unfortunately, the book does not contain an abstract in English. I think that the book would be interesting to foreign experts in the history of geology, as well as for anyone interested in the history of natural sciences.

Zoya Bessudnova, Moscow

A Glorious Anniversary of the Moscow University Geological School

Milanovsky, Evgeniy Evgen'evich, *The Bicentenary of the Geological School of the Moscow University with portraits of its founders and outstanding scientists,* Akademichesky Proyekt, Moscow, 2004, 448 pp. [In Russian].

Academician Evgeniy E. Milanovsky—a geologist, encyclopaedist, top-ranking naturalist and a good sort—writes in his book about natural history and the start of oryktognosis (Edit. Note: This was a term that could be equated with 'geognosy,' or study of the Earth, its materials, and its composition) in the Moscow University (MU) at the end of eighteenth century, as well as the sources which laid the basis of the world-famous school of geology. The book begins with a wide preface describing the approach of the author to the science history methodology, the concept of the scientific school and circumstances under which universities and their schools are forming, as well as personalities and their relations, when an acquaintance or friendship is no less an important factor of science development than the research itself.

The basic part of the book embraces biographies of eighteen MU geology professors presented like an essay, including fourteen scholars Milanovsky knew himself. Nevertheless, from all these essays I would single out three celebrities—Grigoriy Ivanovich Fischer von Waldheim, Grigoriy Efimovich Shchurovsky, and Vladimir Onufriyevich Kovalevsky, who laid the foundation of the Moscow University geology school at the period, when they were somewhat related to the olden Vilnius University as well. We know their successors and followers better than Western readers, because those who did not cross the language barrier if even had heard these names, would tell little or nothing about such scholars as Alexei Pavlov, Alexander Chernov, Andrei Arkhangelsky, Oktaviy Lange, Alexander Mazarovich, Georgiy Mirchink, Vera Varsanofyeva, Evgeniy V.Milanovsky, Sr., Nikolai Shatsky, Vladimir Menner, Nikolai Nikolayev, Alexei Bogdanov, Mikhail Muratov, Georgy P. Leonov, Sr., and Vladimir Belousov (at least ten of them are familiar to the author of the present review). The book is published for the Russian reader. There is not a single line in English to announce the content of the book for non-Russian readers.

Grigoriy Ivanovich Fischer von Waldheim. In 1804, as the Moscow University history reminds us, an event happened that was very important for the development of natural sciences and geology in Russia. In that year, the Natural History Chair called *Demidovskaya* was founded. Gotthelf Fischer (1771–1853), a 33-year old Professor of the Mainz University Natural History Chair, was invited to head the Natural History Museum that was being newly formed. Quite young, but already widely known, Fischer accepted the invitation. In Russia he became Grigoriy Ivanovich Fischer, and later added "von Waldheim" (alluding to his birthplace in Saxony), after he was titled as a Russian nobleman. Having finished the Freiberg Gymnasium, Fischer studied in the Freiberg Mining Academy with the famous Abraham Gottlob Werner and graduated in 1792. During his studies he made friends with Alexander Humboldt and Leopold von Buch. Than he continued his studies in medicine, comparative anatomy, and mineralogy at the universities of Leipzig, Jena, Halle, and Göttingen, where in the latter he was granted a degree of doctor in medicine in 1797. The same year, together with the Humboldt brothers, he went to Vienna and a bit later to Paris, where he studied comparative anatomy at the Natural History Museum (Jardin des Plantes). He was interested in book publishing, got acquainted with Georges Cuvier, Étienne Geoffroy Saint-Hilaire, Jean Baptiste de Lamarck and the geologist Alexandre Brongniart. He was familiar with Johann W. von Goethe, Friedrich von

Schiller, and went in for German literature and music. In 1798 he was titled Professor of natural history and chief librarian at the Mainz University.

This educated, very active and hard-working scholar, well known in Europe, was well suited for Moscow University in the judgment of sponsor M.N. Murav'ev, who invited him for service in Russia. This was a very important turning point on his road of life. He never left this road, devoting nearly fifty years of his life to Russia. Working at the Moscow University and later at the Medical/Surgery Academy, Fischer gave lectures (in Latin) on mineralogy and zoology, published handbooks on oryktognosis, investigated the fauna, flora, geology and mineralogy of Central Russia and the Moscow Region, and described about 200 fossil genera and species. However, his most prominent achievements, as E. Milanovsky wrote, were two things: firstly, gathering priceless geological, mineralogical, and biological collections and systematizing them and storing them in the Moscow University collections; and secondly, fostering the Moscow Society of Nature Researchers, founded in 1805, and serving as the Director of the Society for 48 years.

We know very little about relations among the mineralogists of Moscow and Vilnius universities at the time of Fischer's work, although they had to be significant. The Mineralogy Cabinet at Vilnius University was founded in 1803. The first mineralogy lecturer, Roman Symonowicz, used to study with Werner at the Freiberg Mining Academy. They both, Symonowicz and Fischer, had collected large mineralogical collections and systematized them in accordance with Werner's system. According to Milanovsky, Fischer was a member of numerous different academies and societies, and also an honorary member of Vilnius University. Moreover, Georges Cuvier and Alexandre Brongniart also were honorary members of Vilnius University.

Fischer von Waldheim was very diligent and fully committed to the sciences, but he liked poetry, sometimes created music, had a good voice, and adored singing. He became blind in old age, but his spirit remained light, quiet, active and vital. In Russia, Fischer von Waldheim prepared and fostered the soil, which was seeded by his follower, Grigoriy Shchurovsky, to raise the Moscow University geology (Pavlov's) school. Fischer died at age 82 and was buried at the German Cemetery in Moscow.

Grigoriy Efimovich Shchurovsky. If an unnamed guy, born to a poor family and raised in a children's home, supported by the state to go to school and finish university studies, can become a university professor at 33 years of age, he must be an extraordinarily talented person. Such was Grigoriy Shchurovsky (1803–1884), who graduated from the Moscow University with a physician's diploma as a doctor in medicine, but who was also interested in zoology and comparative anatomy, paleozoology and mineralogy. In 1832 he took over the Natural History Chair from Fischer von Waldheim and published *The Organology of Animals*, in which the ideas of French zoologist and evolutionist Geoffroy Saint-Hilaire were developed further. However, after the famous dispute between Cuvier and Geoffroy Saint-Hilaire ended with a (temporary) victory of species invariability, as backed by Cuvier, Shchurovsky withdraw his book from the bookshops and never again wrote on biological issues.

In 1834 Shchurovsky went from the Faculty of Medicine to that of Physics/Mathematics, where he lectured on mineralogy. In 1835, after the independent Mineralogy and Geognosy Chair was founded at the Moscow University, he was proposed to take the post of professor extraordinary in it. The analogous post at the Vilnius University Mineralogy Chair was established in 1823 with Ignacy Horodecki taking it in 1824. According to E. Milanovsky there were no *highly qualified geognostics* in Moscow of that time. Therefore such a proposal meant a high evaluation of Shchurovsky's standing as a young adjunct. For 45 years (1835–1880) he headed the Chair of Mineralogy and Geognosy as well as later the Geognosy and Paleontology Chair (from 1861). (Editor's note: "Chair" in this sense refers to a Department.) Shchurovsky fulfilled all of his roles in the fullest sense. In 1880, due to health problems, Shchurovsky retired and passed the Chair of Geognosy and Paleontology to a prominent paleontologist and evolutionist, Vladimir Kovalevsky, whose scientific talent he appreciated greatly. Shchurovsky died in 1888 and was buried in Vagankovo Cemetery in Moscow.

Shchurovsky not only lectured and ran the university's mineralogy museum, but also organized expeditions to the Central and South Urals (1838), and to Altai, Salair, and Kuznetski Alatau (for 8 months in 1844). He also studied geology of the Moscow region, where he discovered and described many outcrops of Carboniferous, Jurassic and Lower Cretaceous deposits. He gave geological descriptions of the Caucasus and Transcaucasia, and later worked in the Donetsk region. He was among the first Russian authors who described recent oscillating tectonic movements, was greatly interested in the origin of erratic boulders, and he didn't back Charles Lyell's and Leopold von Buch's drift hypothesis. Shchurovsky, as well as his disciple, famous geologist and academician Friedrich Karl (Fedor Bogdanovich) Schmidt, were inclined to suppose that distribution of till deposits in the northern European part of Russia was related to Scandinavian continental ice sheets during the Quaternary. This supposition was later confirmed by glacial studies done by P.A. Kropotkin in Finland and Sweden.

Shchurovsky made a big contribution to the history of Russian geological researches. He had written splendid essays about Fischer von Waldheim, Leopold von Buch, Alexander von Humboldt, and Mikhail

Lomonosov as geologists and mineralogists. One of his speeches given in 1868 was titled 'About Popularisation and Availability of Nature Sciences.' In 1863 at the Moscow University he established the Society of Nature, Anthropology and Ethnography Lovers and was the first president of it. Such scholars as F. Schmidt, A.P. Pavlov, M.A. Tolstopyatov, K.O. Milashevich and S.N. Nikitin could be mentioned as most famous disciples of Shchurovsky. Despite being a self-educated geologist, he was a very good teacher, and a well-educated and intellectual scholar. He took part in science popularization, was an outstanding public man, and he drew a pleiad of talented students into scientific research and nurtured them, thus making a foundation for the Moscow geological school.

Vladimir Onufriyevich Kovalevsky. Sometimes it happens that two brothers create more fame for a family than the whole dynasty of relatives. Alexander and Vladimir Kovalevsky, whose origin was related to the Polish nobles of Vitebsk governorate, were educated in Russia and Europe and earned fame by their scientific works—Alexander in zoology and embryology, and Vladimir in paleontology and evolution science. Nevertheless, the fate of the brothers differed greatly.

Vladimir Kovalevsky (1842–1883) was extraordinarily talented personality, "a genius for paleontology," as Milanovsky wrote. However, his fate was tragic. He was devoted to science, but he was passionately engaged in many things—book translation and publication, construction and oil chemistry, and businesses. He translated into Russian and published books of Darwin, Brehm, Lyell, and Agassis. Publishing Darwin's works, Kovalevsky visited the great scholar in England. Sometimes he lived with a fair comfort, but most often he was immersed in debt. In 1868 he married Sofia Korvin-Krukovskaya, daughter of a retired general, who had owned an estate in Vitebsk region. Later Sofia became a prominent mathematician and a professor at the Stockholm University. She was the first woman elected as a corresponding member of the Russian Science of Academy.

In 1868 Vladimir and Sofia went to Heidelberg University, then studied at the universities of Munich, Würzburg and Berlin, investigated collections in the British Museum in London and at the Paris Museum of Natural History. In Paris, in 1871, Kovalevsky started investigating the rich Tertiary mammal fossils from the southern region of France, collected by Professor Larte, who had recently died. Studying the hoofed animal fossils, he discovered the transitional forms relating to the oldest ancestor of horses, *Palaeotherium*, described by Cuvier. He considered *Anchitherium*, found later by von Meyer, then the later genus *Hipparion*, all the way up to the latest link in the chain—*Equus,* the modern horse. Kovalevsky proved that the evolution of hoofed animals was tied to their adaptation to changing conditions and resulted in changes in horse leg skeleton construction—the middle finger turned into a hoof, while other fingers gradually atrophied or reduced. At that time, after the appearance of Darwin's *On the Origin of Species* (1859), such facts seemed to be the most satisfactory argument of the evolution. On this discovery Kovalevsky based the general law about adaptive and non-adaptive evolution types. In 1872, the Kovalevskys spent the winter session at Jena University, where he successfully defended his PhD dissertations on *Anchitherium*. This several-year period of intensive scientific work, from student to a PhD, made Vladimir Kovalevsky famous in Western Europe. He was recognized by biologists and Darwinists such as Ernst Haeckel, Thomas Huxley, and Hägenbauer, as well as paleontologists Jean Albert Gaudry, Karl Alfred Zittell, and Richard Owen. Kovalevsky's works, published in 1873–1878 in Russia, England and Germany, gave factual confirmation of Darwin's evolutionary theory that is inscribed in the annals of the world's paleontology. Darwin wrote him, as Milanovsky cited, that "… it is obvious that you and your brother have a great future in front of you, in the fields of each of you." In 1874 Kovalevsky came back to Saint Petersburg. Kovalevsky's new works were acknowledged by the Mineralogy Society Prize, and the gates of academic science opened before him. Unfortunately, at that moment, Kovalevsky, who was seeking riches, had chosen a wrong path. He got into business that was managed with sad and irredeemable mistakes, and he wandered away from scientific research. All this lead him to a tragic final end—suicide.

In 1880 Grigoriy Shchurovsky, by inviting Vladimir Kovalevsky, a Jena University Doctor and Kiev University Master, to head the Moscow University Geognosy and Paleontology Chair, paid a tribute to the glory of this genius of paleontology. Kovalevsky moved to Moscow and in the winter session of 1881 started giving lectures on geology. Unfortunately, too much was lost by then. Kovalevsky was pursued by enormous debts and the possibility of family bankruptcy and legal persecution. He, who was born to be a scholar, did not manage to match his scientific, pedagogical, and business activities. His periods of enthusiasm were increasingly alternating with depressions. In order to protect his wife from disgrace, disasters, and disappointment, and being unable to co-ordinate family, business, and science interests, Kovalevsky made a decisive step. On 15 April 1883, he left life's path at the age of 41. The university funded his burial, and his books and belongings were put up for sale.

Of the three above-mentioned Moscow University geology pioneers, the world celebrity was, of course, Kovalevsky. However the foundations of the so-called geological school were laid by Shchurovsky, who was hardly known in Europe, but who steadily, over many long years, nurtured the MU Chair, Museum, and Society. However,

the real upswing took place at the time when the Chair of Geognosy and Paleontology started to be headed by one of the latest and most talented disciples of Shchurovsky—geologist and paleontologist, Academician Alexei Petrovich Pavlov (1854–1929).

Algimantas Grigelis, Vilnius, Lithuania

John Phillips and Victorian Science

Morrell, Jack, *John Phillips and the Business of Victorian Science*, Ashgate Publishing Limited, Aldershot, England, 2006, xix + 437 pages, ISBN 1-84014-239-1

This is a most important book: the first full-length study of the career of John Phillips, who died Professor of Geology at the University of Oxford, but had started as an orphan taken in by his uncle William Smith. Smith had him well educated, with the help of the Reverend Benjamin Richardson, in the usual sense but also in geological terms: practical fieldwork; surveying; identification; description and depiction of fossils—even instrumentation and illustration. This led to an astonishingly diverse scientific career; and on this point, I should note without further delay that the title is perhaps a little misleading. 'Business' is an ambiguous word. Here, it should be read, not in its narrow meaning of 'commercial activity,' but in the wider meaning of activity—the various doings of the scientific administrator, contract worker for a Government department, and University professor, for instance, as well as commercial activity proper. And Phillips was born in 1800 and had been fully active for a while when Queen Victoria ascended the throne in 1837.

Morrell's approach considers science both as itself and in its social and organizational context. As Morrell notes, Smith also showed Phillips what *not* to do, if only by example, for Phillips evidently absorbed hard lessons about scientific publication, politics and patronage. Phillips ultimately struck off on his own as a 'practical man,' as his science shows: it was partly Smithian, inevitably, using fossils as stratum-labels, but it also had a more Cuvierian emphasis on fossils as living animals, and rocks as evidence for past environments. Lecturing to 'Literary and Philosophical' societies led to a job as Keeper and Secretary—and leading scientific performer—at the Yorkshire Philosophical Society. His new.patron, the Reverend Harcourt, sought to make the Society a centre for scientific research. The Society was thus not merely for liberal middle-class socialisation, important as that generally was in such societies' genesis, and here Morrell agrees with Knell (2000). Those important conclusions are by no means evident today to someone eyeing the surviving collections with modern preconceptions of museums and their roles.

Professorships at London, and later Dublin, were abortive but Phillips developed a second part-time job as assistant secretary of the British Association of the Advancement of Science (BAAS). This brought his managerial and scientific talents to a wide audience, both to the metropolitan figures of London, and to the scientifically minded in the provincial towns of the United Kingdom which hosted its annual meeting. He also became an active geological writer of both local memoirs and more commercially targeted texts.

Moreover, in 1836, Phillips became the first geological recruit to Henry De la Beche's infant Geological Survey. In an intermittent and troubled career, as Morrell shows, Phillips injected important skills such as those of field surveying—inherited from William Smith, no less!—at a critical time for the Survey. To this Phillips added the palaeontological expertise crystallised in *Palaeozoic Fossils* of 1841 and his statistical palaeontology attempting to discriminate between strata of different ages (and vice versa), not least his definition of the Mesozoic and Kainozoic to complement Sedgwick's Palaeozoic. Some of the Jurassic fossils in the Oxford University Museum still bear Phillips's 'MM' tag, for Middle Mesozoic.

Of course, some ground which Morrell covers has been visited by Hugh Torrens's work on William Smith (as in his introduction to the recent reprint of Phillips's memoir of Smith), Simon Knell's on museums and specimens in Philosophical Societies and the Geological Survey, Jim Secord's on the development of the Survey, and Morrell's own work with Arnold Thackray on the BAAS. But all is complementary, and there was much more to Phillips than that, for instance in areas which I barely discuss as being in fields less familiar to me: surveying, instrumentation, astronomy, geomagnetism and meteorology, all of which Morrell, quite rightly, covers.

Phillips was saved from reliance on his BAAS position and commercial writing when in 1853 he became Reader, later Professor, of Geology at the University of Oxford, and also Keeper of the Ashmolean Museum, and then of the new University Museum, by the chance of William Buckland's dementia and the death of his deputy, Hugh Strickland. I focus on this period as it happens to be fairly familiar to me (thanks to a DPhil at the University Museum working on, amongst other things, a plesiosaur from Yorkshire first described by Phillips!). It also happens to be relatively thinly covered, thanks to its chronological distance, by the inhabitant's-eye view history of Geology at Oxford by E.A. Vincent (1994). Incidentally, Vincent interestingly cites a near-contemporary report that Phillips allegedly never used a microscope and never taught microscopical petrography—but Vincent warns us that this was by a new professor with an axe to grind, and we may give more credence to Morrell's own evidence.

Morrell's section is excellent, notably on Phillips's role in developing the new University Museum complex. As he points out, this was more of a science faculty than a museum as we understand the latter term today. Morrell explores Phillips as the lecturer and teacher (group tutorials, even!), and deviser of exhibitions to meet the museum's perceived role (university teaching rather than general public edification). He also highlights Phillips's role as the administrator of the new science area. Morrell does not go into great detail about the physical appearance of the corporate scientific plant, rightly so, as various studies have recently covered the Museum's delightful architecture (which superbly harmonises visitor, object and building, if one ignores the conservation problems posed by the glass roof). But he makes some very interesting comments and corrections. Yet the Museum wasn't just a collection of dinosaurs in a delectably arcaded courtyard. Morrell discusses how the building worked in the less visible dimensions of communication and interchange, emphasising how placing so many science departments together facilitated mutual cooperation: but it did not in itself ensure it, of course, as is shown in the deterioration of relationships after Phillips's death and the loss of his harmonising influence. (Incidentally, the original building of the Clarendon Laboratory for Physics has been partly demolished and subsumed into that of the later Department of Geology and Mineralogy; that which bears the name today is a 1930s successor: Vincent 2000).

Phillips didn't just have to run what was effectively a science faculty: he had to keep up its support within the University, and in this he seems to have been notably successful, or at least as successful as anyone could be. Morrell highlights Phillips's religious tolerance and the way in which Phillips's general policy of gradually promoting science avoided challenging the primacy of the concept of a liberal and Anglican (Church of England, i.e., the state religion) education. Here Morrell rightly stresses the symbolism of the angel holding a cell and a Bible carved above the main entrance to the Museum. No doubt Phillips was being realistic, and it must have helped that he was a Christian and ecumenical in his sympathies, and no Darwinian. But I was fascinated to read about Phillips's good relationships with key local clerics and academics (at Oxford, often the same thing), such as Bishop Wilberforce and also William Pusey whom he briefed to preach relatively good sense (at least sometimes) on science and religion. It was no small thing to gain the support of Pusey, the arch-priest (so to speak) of the Tractarian Movement. Phillips's emollience was evidently far more positive in that climate than might have been the more confrontationist tactics of the scientific Young Turks such as John Tyndall (who upset Pusey by ridiculing the efficacy of prayer) or Thomas Henry Huxley (who engaged in bishop-baiting Wilberforce at the 1860 British Association meeting in the then very new University Museum, and whose Oxford honorary degree was blocked by Pusey).

I wonder a little if this, conversely, had something to do with Phillips's failure, which Morrell identifies, to develop a major research school of his own in terms of students whose work he oversaw and promoted—the only such student was William Boyd Dawkins. But here we must not forget Phillips's earlier influence on the Survey! In Morrell's view it stands to Oxford University's credit that the University should have done so much for science while there was so little justification in terms of undergraduate attendance given the degree examination statutes' overwhelming emphasis on the 'classics' (i.e., Graeco-Roman language, literature and history), and when the Natural Sciences degree was only instituted in 1850. Why this emphasis was there at all is another question, of course. Moreover, Oxford's achievement was relatively late, several decades after Edinburgh University, for instance, had built its own functionally analogous, if not quite so massive, scientific complex, as part of what is now Old College in Chambers Street (Fraser 1989).

One reason, of course, is the then totally different characters and roles of the two Universities. Edinburgh was a (relatively) democratic and partly vocational training school with a major output of doctors. Oxford, at least at that time, can be described with only some exaggeration as a seminary for Anglican priests combined with a finishing-school to teach upper-class youth to, amongst other things, hold its liquor in a gentlemanly manner. Yet a more fundamental reason was probably the very nature of Oxford's academic community, and this also bears upon the degree of Phillips's socio-economic achievement. This is, as Morrell says, and Hugh Torrens (2006) agrees, astonishing: an orphan apprentice to one of the 'practical men' of canal, mine and drain ending up as a Professor in the University of Oxford (mind you, that was in an *English* context; in Scotland it would still have been admirable, but not fundamentally surprising). And just as admirable was the contribution of his dear sister Anne, his housekeeper and hostess and at times also scientific assistant.

Morrell, indeed, compares Phillips to Dick Whittington, the legendary poor boy who rose to become Lord Mayor of London. It is, of course, unfair to take metaphors too literally! But this one provokes some interesting thoughts. Whittington, even as Mayor, remained a merchant. In one sense Phillips went further: he entered the realm of gentlemanly science, even becoming President of the BAAS—far from the commercial taint of the 'practical men' such as Smith (but still retaining sporadic commercial activity on the side, including his book royalties). But in another sense Whittington got further than Phillips: as the first of the other Aldermen [elected civic dignitaries] of

London, he would have been equivalent to the Vice-Chancellor of the University, selected from amongst the heads of the constituent Colleges. Phillips never got this far.

In any case, however, the University at this time had relatively little practical power given the predominance (which Morrell rightly emphasises) of the Colleges. Indeed, I get a real sense that science, the University Museum-cum-science campus, and—not least—Phillips himself, were, so to speak, bolted onto the outside of the conglomeration of self-governing colleges, each of which was, in many people's experience, far more 'real' to its inhabitants than the formal university. Certainly in some ways this perception of being outside continued, for geologists at least, well into the mid-20th century (Vincent 1994). Seemingly, Phillips had no real power base within this collegiate core (other than his very real talent for making friends and inculcating patronage), and far less power than (say) a Professor in a non-collegiate university. Morrell notes—I think very importantly—that Phillips was only an Honorary Fellow of his college, Magdalen (and, I assume, due to his friend Daubeny, the botanist, who *was* a Fellow). But otherwise he has little to say on Phillips's relations with Magdalen, maybe due to lack of material, which in itself suggests—though does not prove—a lack of any substantial relationship. I would have liked a more positive assessment of this issue, but I doubt it makes any real difference to the overall picture, given that science in Oxford was inherently a non-collegiate activity.

Plainly, part of Phillips's historical significance, from Oxford's point of view, is that he surely helped to accelerate the development of University teaching relatively independently of the colleges, ultimately creating today's more balanced University and helping to prevent it from degenerating into a mere liberal arts teaching institution, though, of course, one can hardly ascribe sole credit to him: there were many other factors, internal and external, pushing for reform. (I could however wish that further development had taken place with a Phillipsian guiding eye, if only to mitigate the crowded clash of building styles [and often none at all] forming the Science Area that accreted around the Museum over the decades, most recently complemented by what might as well be an atmosphere-generating factory on an exceptionally unpleasant planet in some science fiction film. What would Phillips have thought?)

Workaday matters, now: the book is plainly presented, without cover, on alkaline paper; illustrated with a useful selection of pictures; indexed; and fully referenced to a vast range of archives and publications up to about 2002. Why there has been some slight delay is hinted by the acknowledgements which thank the local medical practice "[f]or enabling me to finish the book"—and happily so! In any case this delay seems immaterial, apart possibly from an apparent reliance upon the old *Dictionary of National Biography* rather than its successor the *Oxford DNB*. There is, incidentally, no apparent attempt to provide a complete listing of Phillips's publications.

The book is nicely written, although occasionally assumes a familiarity with British culture—Camford and Ebor are unusual names for Oxford-and-Cambridge-Universities and York, while the English 'public school' was, and is, a socially and financially exclusive *private* school. The publisher's editor should have known that the genitive of the disyllabic Phillips is (at least traditionally) Phillips's, not Phillips'. Much more serious is the (presumably) publisher's decapitalisation of proper names and terms: an extraordinary modern fashion that leaches meaning. To give just one example, 'Reverend,' a formal title for ordained clergy, is *not* the same as the generic 'reverend'—no small matter when Christianity features strongly in this book. And when this simplification comes to formal taxonomies the book begins to founder. What is 'magnesian limestone'? Is it common or garden dolomite, or must the reader have the prior knowledge to guess from the context that what *might* be meant is the formal stratigraphical term 'Magnesian Limestone'? What are we also to make of millstone grit, or mountain limestone, or palaeozoic? And replacing the italic names of species and genera in roman script just adds insult: one might find a megalosaurus wandering up a foggy London road in a Dickens novel, but *Megalosaurus* is a highly specific intellectual construct credited to William Buckland in 1824. These really are sad practices in a book of such precise scholarship.

Indeed, that precise scholarship is a striking feature of Morrell's book. He certainly doesn't ignore matters such as Phillips's emotional life and personality, where clear evidence exists, but does not much allow himself to speculate beyond the evidence. The result is, inevitably, a slightly detached biography, observing Phillips from a distance. Such a viewpoint gives a clearer perspective of Phillips's role in the wider scheme of scientific things, and is in any case appropriate for its focus on Phillips's working life.

I found Morrell's scholarly austerity all the more refreshing after too many of that kind of popular "history of science" which patches up shaky history with outright fiction. For instance, Morrell avoids working through a futile checklist of hypotheses to 'explain' why Phillips never married. He simply points out that Phillips already had an efficient hostess and housekeeper in his dear sister, who was a known factor, too, compared with the risks of marriage shown all too clearly by the awful example of his insane aunt Mrs. Smith. Beyond that it is pretty much left to the reader, once Morrell has flagged up a letter by Phillips to his sister which is redolent of a feeling of being

two orphans alone together: I wonder if Phillips was also worried about what would happen to his sister, or about his ability to support her as well, if he did marry. But without evidence what is there to say?

However, Morrell has perhaps followed his self-denying ordinance (so to speak) a little too closely in one area: Phillips's finances. It is a great bonus that Morrell attempts to reconstruct Phillips's rather variable income. Such data are a welcome feature of modern studies such as the *Oxford Dictionary of National Biography*, as Hugh Torrens points out in his thought-provoking (and also very funny) study of the 'amateur' in geology (Torrens 2006). They give some feel for socio-economic status and financial security when compared with social histories such as Burnett (1969). But when we are told, without much comment, that Phillips's estate was valued at "about £14,000," which was a *lot* of money at 1870s values, two problems at once arise.

Firstly, Morrell does not tell us to whom Phillips left his money: a small but real deprivation of the thoughtful reader who is left to regret missing a possible, and *documented*, hint at who or what this man regarded, if anything at all, as his 'babies'—his (few) specialist students, his collections, his museum, Magdalen College, a scholarship fund …? Happily, Hugh Torrens has already found this particular rabbit in the hat, and has kindly showed me a copy of the probate records (official copy of the will on open access register). Phillips left his estate, valued at "under £14,000"—so presumably not so much below that as to be worth only £13K, to his cousin William Smith (nephew of the eponymous geologist) and William's children thereafter, subject to a small annual allowance of £100 to his brother Jenkin Phillips (evidently not trusted with any large sum of money). This was a mild surprise as Morrell's preface can be (and, by me, was) read to imply that the adult Phillips had no living relatives after the death of his sister Anne (which hit him hard). Indeed, Morrell fails to mention these relatives (or at any rate they are not in the index) except, briefly, for Jenkin in the discussion of John Phillips's origins. Very possibly there is no evidence one way or another, and I can well imagine that William Smith (the nephew), as executor, simply destroyed Phillips's more personal correspondence. But some assessment would have been nice.

Secondly, Morrell's own data—which, I stress, I am delighted that he provided—do not, in a sense, add up (and I am grateful to Simon Knell and Hugh Torrens for discussing this anomaly). £13,000 is about £0.7M in today's values at the acceptable if fairly conservative conversion factor of 50-60X which Morrell employs. Hugh Torrens and I tend to prefer a greater conversion factor than that based on purchase prices to reflect differences in taxation (Taylor and Torrens 1987), but it is not worth worrying too much about this given the various incommensurabilities involved. What *is* important is that a reasonably gentlemanly household could be run for several hundreds (rather than thousands or scores) of pounds a year (as indeed the professor's salary of £300 implied, though perhaps this assumed further income from a College as well). The Principal of Bristol University, for instance, was able to save £200 annually on a salary of £700 in the 1870s, and of course the Phillipses had no children (at least that we know about).

Now assume for a moment that Phillips had relatively minimal savings when he arrived at Oxford in 1853, if only because of his engaging in hackwork. But £13--14K corresponds pretty much to his *entire accumulated gross salaries from the University and the BAAS for the whole period till he died 21 years later*! Yet Phillips must surely have spent at least a few hundred pounds a year when his sister was keeping home for him for his first decade in Oxford, even if after her death he (hypothetically!) dined in Magdalen nightly and reduced his establishment to a bare minimum. Food and servants were then major components of household costs (and here the 1861 and 1871 censuses might throw light on the Phillips household). And that doesn't include the net hundreds he spent on a private astronomical observatory. It is true that his houses at York and Oxford (Museum House, demolished in the 1950s for the Inorganic Chemistry Laboratory: Vincent 2000) were cheap or free with the job, and that he rented out his York house, but housing was fairly cheap, and his estate would not have had the benefit of their capital value (except possibly the improvements he made). So, even if Phillips had been conspicuously miserly (for which Morrell makes no suggestion), there is still an anomaly of several thousand pounds which he either brought with him to Oxford or obtained from other sources.

Perhaps my assumption is wrong, and Phillips had in fact saved a far more substantial amount when he started at Oxford. Certainly, I can well believe that his uncle's catastrophic financial failures were always in Phillips's mind as the one fate he must avoid, especially in view of his intermittent work pattern, and that he saved what he could when he could. No doubt also he would have been anxious to provide for his somewhat younger sister in the event of his death. But, although my calculations can only be rough, and ignore elements such as interest rates and capital gain and loss in investments, I have real problems seeing how Phillips could have saved all of that money from known income before Oxford. There must be other, and very substantial, income about which we do not know, whether before or after 1853. Perhaps he earned far more from his books and from his 'commercial' geology, whether as consultancy, or even some unknown investment, than Morrell has been able to show. If he could get £200 from the University Press for a book on Vesuvius one enviously wonders what he got for his textbooks.

Simon Knell suggests the interesting possibility that he was being bankrolled by a wealthy patron—which would be unsurprising given his ability to please such beings. A possible candidate is John Edward Lee, a long-standing and rich friend who followed Phillips in his fieldwork around the country, at least on holidays (Knell 2000; Knell pers. comm. 2006), and who at least partly bankrolled several Continental trips that he and Phillips made, as Morrell notes. Lee was worth £160K when he died in 1887 (*Oxford Dictionary of National Biography*: this does not of course account for lifetime transfers). I also wonder about the fabulously wealthy Baroness Burdett-Coutts, who took a very supportive interest in his work and endowed the eponymous scholarships. But without evidence . . .

Whatever the answer, and it could well have lain simply in a combination of some or all of the above with moderate living and prudent spending, the will certainly raises the issue of why Phillips didn't retire if he could so easily afford it. Phillips remained in harness, his energy maintained almost to the end, when he died at the age of 74 falling down the stairs after dinner at All Souls' College. Indeed, Phillips had in a sense gone all the way from his roots. Plainly he was now in one very real sense of the word (but not all, in view of his salary and his royalties, and see Torrens 2006!) a true amateur, doing his geology for the love of it, and evidently not feeling too constrained by the Oxford situation. One could hardly get further from the 'practical man' who had been Smith's apprentice.

Those comments are, however, mostly minor points or reflections and expansions rather than criticisms of what is a fine biography. I was left feeling that this biography was too short—but that, rather, reflects the vast range of themes crammed into its 437 pages. And one should always leave the table a little hungry, or so I am told by traditional Scots family wisdom. Anyone with an interest in almost any aspect of British geology—and meteorology, astronomy and instrumentation of this period, right from Smith to the new professionals of the 1870s, in fact—will benefit from this book. This is not just a matter of having a special interest in, say, William Smith, Yorkshire, or Oxford: the issues are so diverse and the range covered by Phillips's career so great that even if one is not specifically interested in him, one can learn much to put otherwise unrelated figures into real context. And there is much of relevance to issues such as professionalization, social organization, the physical and conceptual design of museums and their collections, provincials versus metropolitans, 'practical men' versus the gentlemanly scientists, field survey techniques, and the popularisation of science.

To sum up, this is a most important book on a historical figure who crossed many boundaries, and who is not forced into the Procrustean bed of any one discipline. John Phillips was perhaps so prevalent and familiar in 19th century British science that he has been unwittingly forgotten, rather like the postman in the Father Brown story 'The Invisible Man' by G. K. Chesterton. In fact, Phillips, again and again, got on with the job and kept things running, it seems, while the gentlemen primped and displayed and squabbled.

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Michael Taylor, Penicuik, Scotland

Cultural Perspectives on American Fossils

Mayor, Adrienne, *Fossil Legends of the First Americans*, Princeton University Press, Princeton and Oxford, 2005, 480 pp.

Whatever you do, don't judge this book by its dust jacket. Both the title and the cover art make perfect sense in the context of the text itself, but by the time the potential reader understands their true meaning it may be too late. More than one casual observer, seeing the book on my desk, commented on my interest in 1950s science. This is neither a work of science fiction nor a sensationalized work of pseudoscientific speculation à la *Chariots of the Gods*, either of which one might reasonably expect based on the exterior of the dust jacket.

"Fossil legends," as defined by Mayor, are "tales about giant creatures or monsters" that "refer to physical evidence, to the bones or other traces of strange life-forms." (xxviii-xxix) With her eye firmly on the relationship to paleontological evidence that distinguishes a "fossil legend" from a myth, Mayor marshals a wide array of evidence, including oral tradition, written accounts across a range of several centuries, contemporary informants from the

cultures being discussed, and a variety of kinds of paleontological knowledge. One of the strengths of the volume is the way Mayor constantly keeps the reader apprised of what evidence is being used to support her analysis, what potential evidence is being used with caution or not accepted as trustworthy, and why. She does all this almost as a subtext to her readable and engaging narrative, and substantiated by extensive citations in the endnotes.

The second strength of this volume is its constant attention to cultural differences. Mayor provides the reader with a nuanced account of the many ways in which fossils have been understood in a number of Native American cultures. She also develops an insightful analysis of how Euro-American attitudes about the value of that Native American understanding have changed over time.

The third strength of the volume is its geographical organization, which helps to emphasize the important relationship between which fossils a culture regularly encounters and how that culture makes sense of the fossil record it finds. At the same time, this attention to the specifics of regional paleontologies makes patterns of understanding that are shared across regions all the more clear.

The concluding chapter, "Common Ground," takes two very different approaches to the relationship between Native cultural understanding and scientific understanding of fossils. The first section looks at the tension between these perspectives, including contemporary examples of both conflict and successful integration. The second, and more speculative, section attempts to make the case for four shared attributes common to both Native cultural understanding and scientific understanding: emphasis on context for understanding fossils; fossils as sources of broader understanding; an intrinsic relationship between rocks and life; and the importance of visions in understanding fossils. This second section, called "Consilience," was the least convincing part of Mayor's book but was also not necessary to the integrity of her larger arguments.

For anyone interested in the history of North American paleontology, in North American Native culture, or in understanding recent conflicts over paleontological work on Native lands, this book will be both enjoyable to read and a rich source of insight.

Julie Newell, Marietta, Georgia

A History of Sedimentology, Viewed from Japan

Okada, H., and Kenyon-Smith, A.J., *The Evolution of Clastic Sedimentology*, Dunedin Academic Press, Edinburgh, 2005.

When asked to review this book, my first reaction was: why me? I am not a sedimentologist, but rather an engineering geologist who happens to work mainly in sedimentary rocks. My last substantive contact with sedimentology *per se* was forty years ago, while an undergraduate at Sydney University. As it turned out, that period, in the late 1960s, marked the high noon of the geosynclinal theory of ocean trough sedimentation, soon to be swept away by the revolution in the geological sciences which followed the acceptance of continental drift. What we knew as the Tasman Geosyncline has been discreetly renamed the Tasman Fold Belt; geanticlines have been expunged from the textbooks.

We had indeed heard rumours of something called plate tectonics, which would soon make so much of sedimentary geology obsolete, but I remember being assured by a geophysics lecturer that however well the continents seemed to fit together superficially, this was no more than a jig-saw puzzle solution and there were sound physical reasons why this could not explain the distribution of crustal rocks. Okada and Smith's book took me back to those days of orogenies, miogeosynclines and eugeosynclines, and brought back names such as Marshall Kay, F.J. Pettijohn and our textbook *Stratigraphy and Sedimentation* by Krumbein and Sloss.

The title of Okada and Smith's book is misleading, but only because it is too modest. It implies that just one segment of sedimentary geology will be discussed, when in reality the authors' scope covers from the beginnings of geology as a distinct science up to the stratigraphy and sedimentary processes active on Mars. It goes back to Bishop Nicolaus Steno, that hero of the Counter-Reformation, through the credulous showman Abraham Werner and that most observant canal engineer and long-distance walker William Smith, and on to most of the great names of sedimentary geology of the twentieth century.

The authors have arranged their material into nine chapters, starting with a definition of sedimentology that ties it into most branches of geology other than igneous and metamorphic petrology; with a little ingenuity they might have wormed these in, too. Chapter 2 summarizes the development of sedimentary geology and stratigraphy from Steno to Hutton and Lyell. It introduces geosynclinal theory—the ideas developed to explain the origins of thick, highly deformed and in places metamorphosed sedimentary piles lying at the edges of continents (or at least where these edges used to be) and associated with deep sea troughs and island arcs. Nowadays we think of these as the 'bow waves' of drifting continents, but the geosynclinal explanation was that sediments accumulated rapidly in oceanic troughs adjacent to rising mountain chains, by a sort of isostatic see-saw action. Their self-weight and deep burial, rather than subduction by convection currents in the mantle, accounted for the observed degree of

deformation and alteration. In places, they became hot enough to squirt forth granite and acid lavas in the sedimentary piles several kilometres thick.

Chapter 3 takes us back from this Big Picture to the view at outcrop scale, to the observational methods originally used on sedimentary structures by Henry Sorby and E.B. Bailey in the UK. These emphasized the systematic recording and interpretation of structures such as current bedding, ripple marks, palaeocurrent directions, and basin analysis by comparison with present-day sedimentary environments. The importance of turbidity currents and their characteristic features such as graded bedding and Bouma sequences, and the findings of experimental work in laboratory flumes are also discussed. Recent developments in this field include sequence stratigraphy and seismic stratigraphy.

The focus narrows further in Chapter 4, which deals with thin-section description, granulometry, and fabric analysis at the micro-scale. R.L. Folk, W.C. Krumbein and P.D. Krynine were some of the early researchers in this field. Concepts such as mineralogical maturity and depositional fabric are used as environmental and source indicators. One issue raised is that of the definition of greywacke, and confusion between its usage and that of arkose. (How well I remember being bogged down in sub-greywacke in second year 'Seddy Pet.'!)

Chapter 5 broadens the scope of the book once again, dealing with the facies concept pioneered by Armand Gressly in the Swiss Jura, which combined lithological and palaeontological characteristics of large sedimentary bodies to deduce their depositional environment. Later Johannes Walter used the concept to explain lateral and vertical changes in sediment properties, such as are common in coal measures rocks. The use of modern sedimentary sequences to cast light on ancient ones was greatly facilitated by studies such as those of the Mississippi delta by N.H. Fisk and of the Niger delta by J.R.L. Allen.

Finally, in Chapter 6, sedimentology finds its name and triumphs over sedimentary petrology. Not of course without controversy in, surprisingly, the USA, where the term did not become fully accepted until the 1970s. The authors draw a distinction—though not a very clear one to this reader—between the Russian (and Japanese) approach and that of North American and European geologists. Chapter 7 relates the influence of deep-sea sampling on sedimentological research, beginning with the *Challenger* Expedition of 1872–76 and extending from 1968 to the present day with the Deep Sea Drilling Programs and the submarine exploration work by the late Bruce Heezen and others.

Okada summarizes the development of sedimentology in Japan, for the benefit of English-speaking geologists otherwise ignorant of its achievements, in Chapter 8. Finally, in Chapter 9, the authors touch on the latest research directions in the science. In particular, they highlight the study of sediments and sedimentary processes on extra-terrestrial bodies such as Mars, and what they describe as environmental and 'social' sedimentology. This encompasses issues such as nuclear waste disposal and the movement of contaminated sediments, with some emphasis on mercury-bearing muds in the Inland Sea of Japan.

This book is a revised and expanded version of one first published in Japanese in 2002. The translation is excellent and the book qualifies as a Good Read, even for geologists not especially knowledgeable in sedimentology. The approach taken is to trace the development of stratigraphy, sedimentary petrology and other field and laboratory disciplines that have contributed to what we now know as sedimentology. This is done by highlighting the research contributions of individuals most active in its development, mainly from the 1930s to the 1980s. An exceptionally comprehensive collection of photographs of these key players is provided, along with illustrations from their milestone papers.

Overall, Okada and Kenyon-Smith's book is a polite narrative and chronology rather than a critical history (which it does not claim to be, in any case). There is little here of academic feuds, and of the personalities and eccentricities of the key players. The book would probably be 'a must' for academic sedimentologists, petroleum geologists, and those whose work brings them into frequent contact with the concepts summarized. Those engaged in sedimentary basin studies or who simply find themselves involved with sedimentary rocks will find something of interest. Some, like me, will read with nostalgia of the geological orthodoxies which preceded the plate tectonics revolution and which formed the background to much of their geological education.

Greg McNally, Sydney

A New Book from Spain about the Philosophy of Geology

Álvarez-Muñoz, Evaristo, *Filosofía de las Ciencias de la Tierra—El Cierre Categorial de la Geología,* Gustavo Bueno Foundation, Pentalfa Ediciones, Oviedo (Spain), 2004, 355 pp.

On 14 June 2002 the author of this documented work, Evaristo Alvarez-Muñoz (b. 1958), a graduate in Geology and Philosophy, defended his Doctoral thesis before the Faculty of Philosophy at the University of Oviedo (Spain). His topic was the Philosophy of Geology. Recently (2004), publication of this work, aimed for the general public, has appeared. It is entitled *Earth Science Philosophy—The Categorical Closing of Geology.* The background of this

work is the investigation which Spanish professor and philosopher Gustavo Bueno had begun in the 1970s, and published in six volumes between 1992 and 1993. In that work he developed his philosophical hypotheses which he called "categorical closure" ("cierre categorial" in Spanish). This philosophical theory of materialistic and diverse matter considers science as different categorical spaces. It understands that science is not exclusively a human construct but one which makes up diverse materials. The materialistic analysis of science demands to be realized from the present science, like the materials emerging out of the history of the discipline.

From these hypotheses the author of this book has devised, from the extensive material of his thesis, a wide introduction and three major sections. In the introduction, the relative lack of a philosophy of geology is discussed, justifying the use of a spontaneous philosophy of geology whenever it arises. Likewise, the author chooses to define the science from its material area and never as determined by its assumed subject study. In the first section ("Materials for a new science") the author uses the work of his predecessors to examine the historical origins of geology. From here he ascertains the origins of the main concepts of geology: the theories and geological events; the investigations on the causes; the discovery of time in geology; and the use of scales and categories. Now, having justified the need of a philosophy of geology and postulated the categorical nature of geological science, in the second section ("Gnoseological analysis and categorical closing of geology") the author finally assumes the gnoseological analysis suggested for the categorical closing theory. This section, according to the author, is both an exploration and application of the concept of the above theory in the area of geology. Linking the concepts of both material and formal parts of the scientific field of geology with the above geological structures, there is hope in order to establish the geological correlates of the different gnoseological figures (syntactic, semantic, pragmatic), as defined by Gustavo Bueno. The aim is to facilitate the subsequent analysis of the history of the discipline. This section is completed with a discussion concerning the "laws" of geology, wherein it is verified that classifications and models are the general scientific tools most commonly used in geology. Some principles which constitute classical geology are also admitted. It is suggested that the theory of categorical closing helps the systematization of the epistemological statute of geology for specifying both its method and concept of hoped for scientific "truth." In the third section ("Historical construction of classical geology") two different categorical times of geological science are mentioned for reinforcing this approach: a first period, that of the classical geology, crystallizing at the beginning of the 20th century, and the other one, in the second half of the century, which concerns the redefinition of the closing, because of the Plate Tectonics theory. It will lead us to controversies that have taken place in the course of the history of the discipline. With a particular emphasis on Uniformitarianism versus Catastrophism, a double theoretical level is established. On the one hand, the author discusses the geological theories that could be called "internal" (in order to organize the concepts and relations of the field according to operations which are immanent to itself) and, on the other hand, he comments on the "external" theories (i.e., philosophical, methodological, historical and sociological theories). In this regard, the major part that William Whewell has had as the first philosopher of geology, in the author's mind, is emphasized.

A select bibliography, very well organized into large subjects (classical works and sources of the history of geology, philosophy of geology, philosophy of science) gives readers guidance to recent readings. Likewise, this book also contains a careful index of authors. In short, it is a dense work that is not easy for the layman to read, but it reveals a laudable attempt for rethinking the historical evolution of geology from several philosophical categories which, in their time, aroused controversy, causing opposing reactions between readers.

C. M. Garcia Cruz, L. Sequeiros, and L.W. Caruana, Spain

The First Spanish Translation of *Theory of the Earth* by James Hutton

Hutton, James, *Teoría de la Tierra (1785, 1788),* translated into Spanish by Cándido Manuel García Cruz, Enseñanza de las Ciencias de la Tierra, Revista de la AEPECT, vol. 12 (2), Madrid, 2004.

James Hutton's *Theory of the Earth*, originally published in the Transactions of the Royal Society of Edinburgh, is generally acknowledged to be one of the essential milestones in the foundation of modern geology. Its expanded version in two volumes (*Theory of the Earth*, 1795), the *Illustrations of the Huttonian Theory of the Earth* (1802) by his friend John Playfair, and the subsequent German and French translations of this work, have increased the decisive influence of the author's ideas in the development of geological sciences, up to the extent of considering James Hutton "the father of modern geology."

However, Hutton's work has not been a primary or broadly read bibliographic source, in spite of its importance among geologists. This is partly due to the complex and often cumbersome style, and perhaps it could be one of the reasons why *The Theory of the Earth* has not been translated into Spanish until now. Though late, the initiative has been worthwhile, and Cándido Manuel García Cruz has to be thanked for his praiseworthy effort to deal with the unabridged translation of Hutton's main work and make it available to the Hispanic world. García Cruz is a teacher in a state-run high school in Santa Cruz de Tenerife (Canary Islands) and is a member of

INHIGEO. This translation has appeared in a monographic issue of *Enseñanzas de las Ciencias de la Tierra*, the Journal of the Spanish Association for the Teaching of Earth Sciences, and the issue also includes other authors' articles about Hutton and his work.

The translation is structured in three parts: The first one is the *Abstract* of the lecture held in the Royal Society of Edinburgh (7 and 8 April 1785) about the Earth system, its duration and stability. It was anonymously published the same year. The second part includes (a) the unpublished *Memorial* "justifying the present Theory of the Earth from the suspicion of impiety" that Hutton wrote for the 1788 version, and (b) the *Preface* written by the historian and vice-chancellor of Edinburgh University, Reverend William Robertson. This *Preface* was also written for the 1788 version and it was not published at that time either. Finally, the third section consists of the whole version of the "Theory of the Earth" of 1788. Hutton's original notes as well as the translator's complete this translation.

García Cruz states in a preliminary note the difficulties he had to cope with when it came to translating Hutton's prose into Spanish. He took into account three basic considerations before undertaking this work. Firstly, the translation must be accurate to the author's statements; secondly, it must also be interesting and appealing for the reader; and finally, it must be not only as close as possible to the author's literary style but also clear enough to help with its reading. With regard to this, it can be stated that the translation easily fulfils the above-mentioned considerations. Anyway, many of the questions and doubts that may arise throughout the reading are solved with abundant explanatory footnotes.

The monographic issue includes other contributions related to Hutton: David Oldroyd sets the "Theory of the Earth" in its temporal and scientific context; Cándido Manuel García Cruz discourses on the cyclical approach of a changing world that can be inferred from Hutton's work; and Donald B. McIntyre describes the illustrated thought in Edinburgh in the second half of the XVIIIth century. Finally, Pedro Wagner Gonçalves, on his own, and Cándido Manuel García Cruz, with Margarita López Hernández, contribute with their educational proposals derived from the contents and reasonings developed by the Scottish author. All things considered, here is an attractive and important book. It is essential for Spanish-speaking readers interested in James Hutton's ideas, just as he stated them, as well as their practical applications in the field of Earth Sciences teaching.

Jorge Ordaz, Oviedo

Civilization's Building Stones

Skoczylas, Janusz, and Zyromski, Marek, *The Significance of Symbols of Stone in the Process of Legitimization of Power in the European Civilization,* Adam Mickiewicz University Press, Poznan, 2005, 178 pp. (in Polish, English summary).

The references enclosed at the end of this book clearly indicate that the problem of stone used in architecture is still very current. The authors are discussing the methods of examination and utility of rocks, organization of their transport and the significance of investigation of ruins for preservation purposes. However, the main problem considered is the meaning of stone as the symbol of the autocratic political-social system of the Roman Empire.

The geologic-petrographical part of this book was elaborated by J. Skoczylas, whilst the political problems are discussed by M. Zyromski. The studies were carried out in Italy and neighboring countries. The study is documented by the authors' own photographs of the objects examined. The first chapter deals with the general characteristics of rocks and stones. Successive chapters treat the problem of legitimization of power and its stony symbols. Detailed data on the use of stones in ancient Rome are presented in chapter 4, as well as the localization of quarries of building stones in nearly the entire Mediterranean area. The authors indicate the periods of exploitation of particular rocks and their use in building edifices in Rome, but also in ancient Greece and other areas. Chapter 5 contains detailed description of stones used in such selected Roman edifices as temples, triumphal arches, mausoleums, and sculptures. The authors consider the significance of stones as symbols of dignity and power, as evidenced by the continuation of experience of ancient Romans in the Byzantine state and, later, in the Christian world. This refers also to the legitimization of popes as an important element of the Mediterranean cultural heritage.

The book was intended to present the significance of detailed studies of rocks and stones as natural documents of history and culture, but understanding building stone can also be useful in the preservation and reconstruction of monuments of architecture and art.

Wojciech Narebski, Cracow, and Zbigniew Wojcik, Warsaw

Polish Geologists Around the Globe

Slizewski, Wieslaw, Salski, Wojciech, and Werner, Zbigniew (eds.), *Polish Geologists on Five Continents,* State Geological Institute Press, Warsaw, 2005, 528 pp. (in Polish).

This book is published in Polish, which unfortunately limits its international impact. However, a shortened version in English is now being prepared.

The book is devoted to the Polish geological exploration abroad after 1945. Until 1989, Poland was a satellite state of the USSR and, therefore, in the years 1945–1956 was strictly isolated from Western countries. Only very few of the best but generally trustworthy specialists could participate in international congresses and conferences. Later the conditions were improved and several state geologic and geophysical-service firms were formed to enrich the state's cash flow in foreign currency. Besides, Polish scientists were allowed to continue the pre-war polar program and to organize expeditions, first to Spitsbergen and, subsequently, to Antarctica (King George Island).

Geological service was rendered predominantly to African (e.g., Algeria, Tunis, Morocco, Egypt, Nigeria) and Middle Eastern (Syria, Iraq) countries. Some expeditions were organized to distant Socialist countries (China, Mongolia, Cuba). The results of these studies were elaborated and published in Poland, whereas the information obtained in capitalistic countries was usually kept secret because it was considered commercially important. That is the reason why the editorial staff of the book accepted the mode of presenting memoirs of geologists who took part in these investigations. Some of them represent excellent scientific descriptions (for example, those of M. Niec and K. Piotrowska) and others consist of interesting literary reports (that of S. Cieslinski). The most recent reports are devoted to seismic studies in Japan and the realization of an international program of resource-evaluation of the East Pacific Ocean bottom.

During the transformation of the political system in Poland after 1989, the majority of state geological firms were liquidated and their archives, unfortunately, were often destroyed. Therefore, the information contained in the book is sometimes the only published evidence of important activity of Polish geologists in various countries and continents.

Zbigniew Wojcik, Warsaw, and Wojciech Narebski, Cracow

Celebrating Horace-Bénédict de Saussure

Carozzi, Albert V., *Horace-Bénédict de Saussure (1740–1799): Un pionnier des sciences de la terre*, Éditions Slatkine, Geneva, 2005, 431 pp. (In French)

While James Hutton (1726–1797) was working to understand many large-scale, theoretical issues in geoscience, another eighteenth-century figure, Horace Bénédict de Saussure, was taking to the mountains around Geneva in order to observe closely how the natural world worked in detail. As many readers of this *Newsletter* know, Albert Carozzi has spent some four decades helping us understand why Saussure's work needs to be better understood and appreciated. This book celebrates Saussure's pioneering work in such fields as glaciology and structural geology, but, through meticulous attention to unpublished documents and honest appraisals of his shortcomings, it also offers rich historical insights and avoids being mere hagiography.

It is evident from the outset that Carozzi has an agenda for this capstone book in his studies of Saussure. He is quite clear that he wants to make the case for his subject's significance to several branches of earth science, while helping the reader understand why such a major contributor could be rather poorly known in the twenty-first century. The book succeeds in these endeavors. A case in point is Saussure's appreciation of compressional forces as the key factor in producing many complexly folded rock structures seen in mountainous regions. This is a theme that Carozzi has brought to our attention before, but here he lays out the cogent reasons why Saussure's astute vision did not have greater impact on later geologists. In part it is Saussure's own fault. His style of writing, his aversion to making clear and firm statements of interpretation, his genuine modesty, and his mixing of chronologies in reporting observations, so that a reader cannot easily decipher his chain of argument, all have made it difficult to decode his fundamental insights. Additionally, he was a perfectionist and did not publish rigorous professional papers, choosing instead to let many noteworthy observations reside in the sometimes painterly prose of *Voyages dans les Alpes*, the primary repository of his views. His aim finally to bring his rich conclusions together in a summary work, similar to a "theory of the earth" (à la Hutton) was undermined by ill health and procrastination that intersected with his death at age fifty-five. As a solitary walker and observer, without students or like-minded disciples, Saussure never had the human megaphones who trumpeted his visions, as did Abraham Gottlieb Werner (1749–1817) or Georges Cuvier (1769–1832). And when it came to agendas, Saussure generated numerous detailed lists of what to do and where to go in order to observe specific facets of nature, but he avoided large-scale agendas of the type that would chart out interpretive suggestions likely to inspire followers or foster controversy and make his name known. Nor did many of his observations and preliminary interpretations escape the pages of unpublished manuscripts, long

buried in the archives of the Bibliothèque publique et universitaire de Genève. Carozzi unearths those documents and beats the drum for our appreciation of Saussure's numerous contributions to glaciology, structural geology, meteorology, instrumentation, and the natural history of the Jura and Alps. But, as noted above, he is also clear as to why a modern audience may not fully appreciate those pioneering musings.

The outline of the book follows a clear chronology through Saussure's life and times—in other words, it does not fall into the confusing chronological morass of some of his own writing. Though straightforward, this mode of presentation does not come across as simplistic. It is, in fact, illuminating in a way that a complex multi-tiered or thematic approach might not be. For those new to eighteenth-century geology or to Saussure, the range of chapter headings and sub-topics may be surprising. Without offering a dry and complete listing, we can divulge that the reader will be introduced to: information-gathering hikes throughout the Jura and Alps; the Basalt Controversy; travels to Italy, the Auvergne, Provence, and numerous Swiss regions; chats with Benjamin Franklin in London; why Buffon and Saussure disliked each other so intensely; debates about how simple organisms reproduced; the ascent of Mont Blanc (accomplished by Saussure in 1787); seismicity and earth forces; a truly broad spectrum of interests and achievements in natural history and meteorology; political quagmires in Geneva and Paris; and a sobering account of Saussure's difficult last years. The book is devoted primarily to one person, but the range of topics considered opens windows onto many aspects of the scientific and political evolution of the eighteenth century in Europe.

This is a strong and evocative biography, targeted toward geologists, historians, and anyone interested in the evolution of earth sciences in the eighteenth century. It provides abundant commentary about geology as seen and analyzed by Saussure and his contemporaries. And, as we expect from Albert Carozzi, it shows how the observations and interpretations of previous workers fit into modern notions of how the world works. Those interested in historical context, a bit of Saussure family background, and a feeling for Horace-Bénédict as a man will not be disappointed. Paper, binding, printing, proof-reading and editing are all of high quality. The extremely rare typographic errors are not worth highlighting, beyond noting that in the section (p. 75) on "L'Angleterre et Benjamin Franklin" it would have been nice to have some mention of Ben! References are given for each chapter. Throughout the text, Prof. Carozzi quietly notes his previous works that can take the reader into greater depth on a given issue. One appendix provides details concerning the figures, and a second offers the reader a selection of letters written by Saussure to his wife. An index of places and one for proper names are provided. An illuminating table of contents is provided (in the back, in the French fashion), and serves as a nice overview of Saussure's life and times. The illustrations are numerous and superb. They are relevant to the text and they include photographs of Saussure's handwritten notes, many then-contemporary views of geology and instrumentation, informative modern shots of key geological features interpreted by Saussure, and several striking full-color plates. The French is clear and straightforward. At 37 Euros, most libraries and many INHIGEO members would be well served by obtaining a copy of this worthy summation of Saussure's life, times, and numerous contributions.

Kennard Bork, Granville, Ohio

The History of Geoscience in Brazil

Figueirôa, Silvia Fernanda de Mendonça, *As Ciências Geológicas no Brasil: Uma História Social e Institucional, 1875–1934*, Editora Hucitec, São Paulo, 1997.

Silvia Figueirôa's book on the institutionalization of geological sciences in Brazil, covering the period 1875–1934, has recently received a most favorable review by Adolfo Olea-Franco in the respected journal *Isis* (vol. *96*, 4, 2005), and that says it all about the high quality of her work. Having been published eight years before, the fact that the book is in Portuguese has probably to do with the long time gap between its issuing and the reviewing.

In a sense the title is misleading because, in fact, the book refers not only to that period, but fortunately it deals also with the beginning of geology's institutionalization, a period from late 18th century to 1870. That topic deserves a full chapter (the second one), in which mention is made of the foundation, in Rio de Janeiro, of the Museu Real (that later became the Museu Nacional), the Instituto Histórico e Geográfico Brasileiro, and the learned society Sociedade Velosiana, among other institutions.

Silvia correctly calls attention to the roles played previously by the royal Ajuda Museum (founded around 1768 in Lisbon), by the University of Coimbra (reformed in 1772), and by the Lisbon Academy of Sciences (founded in 1779) in the preparation of naturalists who would travel in Brazil and other Portuguese colonies in order to make observations and collect samples of the 'three kingdoms.' She also makes special mention of the importance of the move to Rio de Janeiro, from Lisbon, of the Portuguese royal family, in 1808, due to the threat of the invasion of Portugal by Napoleon's troops.

Chapter 3 tells us about the period 1870–1905, during which many institutions were created, either polytechnic schools (Rio, Ouro Preto, São Paulo) or museums (in Rio, Pará and S. Paulo). Special reference is made

to the foundation of the geological surveys of Brazil and of São Paulo, according to the United States Geological Survey model. This is definitely a period of expansion of the institutionalization of the geological sciences in the country.

Chapter 4 deals with the period 1905–1934, during which the institutions related to surveying referred to above carried out a lot of field work (and how adventurous this was, as seen in a couple of photos shown in the book). The Brazilian Academy of Sciences was then founded and the existing institutions were under a process of consolidation.

The book is an excellent repository of bibliographic references and just for that it deserves to be highly commended. But it is far, far more than that and it is worth quoting the first sentence of Adolfo Olea-Franco's review: "*Silvia Figueirôa traces a deeply interesting picture of the birth and development of the institutional structures and practices of the geological sciences in Brazil in the period from 1875 to 1834 . . .* "

Apart from being written in a most readable way, Silvia's comments and conclusions are judicious and in numerous cases really original. In the concluding remarks she lets us know that she has approached the theme of the book not with the current view that in Brazil little or no science practice had existed, and that she had found much more geoscientific activities than she had expected. This is in line with what she considers, in the first chapter, two related key questions concerning the history of science: the need of redefinition not only of the usually adopted concept of science but also of the current methodology in that field.

Silvia is a well-known historian of science, particularly of geological sciences, and a highly regarded member of INHIGEO and other societies.

Manuel S. Pinto, Aveiro

Publication of the Japanese Version of Steno's *Prodromus* (1669)

Nicolaus Steno, *PURODOROMUSU: KOTAI-RON* (*The prodromus to a dissertation on solid bodies naturally contained within solid bodies*), translated by Toshihiro Yamada, Tokai University Press, Hadano, Japan, 2004, 220 pp.

As I mentioned in the *JAHIGEO Newsletter* of 2005, a Japanese translation of the important seventeenth-century geological work, Steno's *Prodromus*, was published early in the twenty-first century. We welcome this publication, because so many important books on geology and paleontology have not yet been translated, though some important books, for example Agricola's *De re metallica* and Leibniz's *Protogaea* have previously appeared in Japanese. This is probably the first time that the *Prodromus* has been translated into a non-Western language. Since the first English translation by Henry Oldenburg (1671), there have been many versions of the *Prodromus*: French (Élie de Beaumont, 1832), Danish (A. Krogh and V. Maar, 1902), English (J. G. Winter, 1916), German (K. Mieleiterner, 1923), Italian (G. Montalenti, 1928), Russian (G.A. Stratanovskii, 1957), German (K. Mieleitner and G. Scherz, 1967), and English again (A.J. Pollck, 1969). But hitherto we have had no Eastern language version of the great work.

On the book's cover, the small but 'monstrous' (or charming?) image of a head of a large shark, *Lamia*, is printed in gold colored ink on the above left corner and a photograph of the surface of stone in pale claret is in the lower half. These suggest key elements of Steno's contribution, that is to say, the unveiling of the significance of fossils or *glossopetrae* (sharks' teeth) in rock strata. Steno's portrait at the Uffizi Gallery in Florence and the title page of *Prodromus* are also frontispieces.

The book consists of a bibliographical explanation, a table of contents, the translation of the text with two hundred notes, a thirty-eight-page translator's commentary, and an index. The Latin original *Prodromus* comprised only seventy-eight pages of text, one figure, and an explanation of the figure, but we find the translation takes up more than two hundred pages. Since the *Prodromus* is a seventeenth-century Western book, those notes and commentary are very useful for Japanese readers. In the notes, there are many new interpretations of Steno's life and works. They are not only adapted from previously published translations and studies by Western scholars such as Gustav Scherz, but new material is added by the translator. For instance, Notes 23 and 56 consist of information about Oriental views of *glossopetrae* and *aetites* (or eaglestone), by the Japanese fossil collector KINOUCHI Sekitei (1724–1808) and ethnologist MINAKATA Kumagusu (1867–1941) respectively. Minakata wrote the related articles in the British journals *Notes and Queries* and *Nature*.

The translator, INHIGEO Member Toshihiro Yamada, also gives a brief biography of Steno, comments on the contents of the *Prodromus*, and provides a postscript, including four photographs (the plaque of Steno's birth place in Copenhagen, his statue at St. Martin in Schwerin, the famous outcrop in Volterra, and the plaque in the Basilica of St. Lorenzo: unveiled in August 2004). Having recently completed a 458-page doctoral thesis on Steno and seventeenth-century theories of the Earth (University of Tokyo, 2004), Yamada utilizes the part of his dissertation that describes Steno's life and work. He specially emphasizes Steno's stay in France in 1664–1665 as a turning

point of his life and the *physiological* concepts that played a role in the structure of the *Prodromus*, though it was a prolegomenon to modern *geology*. Yamada also refers to the relationships between Steno and contemporary scholars such as Descartes, Gassendi, Kircher, Varenius, E. Bartholin, Hooke, Spinoza, and Leibniz.[1] To my surprise, the Japanese introduction to Steno's fame traces back to the Edo period, 1774, when some medical researchers tried to translate a Dutch anatomical textbook (see p. 192).

According to Yamada, the translation was first prepared for the teaching of earth sciences in high schools almost twenty years ago (the first version appeared in the late 1980s) and was then improved for general readers, based on the original Latin text. The Danish Research Agency and the Danish Research Councils supported the publication of this translation, which was launched during the Danish Queen's visit to Japan in the autumn of 2004.

Today Steno is attracting a growing worldwide interest. In 1986, the *Proceedings* commemorating the tercentenary of Steno's death were published in Denmark. In 2000, a European Steno symposium was held in Norway. Furthermore, a meeting paying tribute to Steno was held in Florence during the 32nd IGC in 2004.[2] In addition, the Danish Steno scholar Troels Kardel read an impressive paper on Steno's muscle studies at the University of Tokyo in April 2005.[3] In the meantime, Alan Cutler's *The Seashell on the Mountaintop* was also translated into Japanese by Toyoo SUZUKI and published in August 2005.[4]

Yamada has done well. Japanese people will enjoy Yamada's high quality translation and can read it very smoothly. The new Japanese version of Steno's *Prodromus* should attract attention of more geologists and historians in Japan, and will further enhance the reputation of the remarkable seventeenth-century natural philosopher in the Orient.

Michiko YAJIMA, Tokyo

V. V. Tikhomirov: INHIGEO's First President

Laverov, N.P. (ed.-in-chief), *V.V. Tikhomirov—A Geologist and a Historian of Science (90th Anniversary)*, "Ogni," Moscow, 2004, 172 pp., illust.

The collected articles appeared at the beginning of the 90th birth-anniversary of the remarkable historian of geology, Vladimir Tikhomirov (1915–1994), the first INHIGEO President. All of the authors were very close to Vladimir Tikhomirov, so you can find all details of his very interesting and heroic life.

Academician Victor E. Khain (Moscow State University), the famous Russian geologist, met young Vladimir Tikhomirov in 1935 on the Caucasus and they were very close friends and co-authors (for example, their 'Short Essay on the History of Geology,' appeared in 1956) for almost 60 years.

World War II stopped the successful geological career of the young geologist—he volunteered and became a pilot. His front-line comrades (F. Belozhenko, and I. Pelipas) tell about these years and the injury that made their friend blind. Boris Zoubarev, the former Deputy Minister of Geology of the USSR (volunteer and pilot, too) has written not only about the War but also of the civil heroism of Vladimir Tikhomirov, who received a Doctor's degree for his candidate thesis on the geology of the Caucasus.

In the Geological Institute of the USSR Academy of Sciences, Vladimir Tikhomirov set up the giant project "Geological Study of the USSR," with support of the Russian Ministry of Geology. Former officials of the

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1 For details, see the following papers: Toshihiro YAMADA, "Steno and Spinoza: History of Nature and History of Scripture," *Spinozana*, 2002, *3*, 47–68 (in Japanese); "Stenonian Revolution or Leibnizian Revival?: Constructing the Geo-History in the Seventeenth Century," *Historia Scientiarum*, 2003, *13*, 75–100; "Descartes versus Gassendi in Theories of the Earth with Special Reference to Nicolaus Steno," *Archive for Philosophy and the History of Science*, 2004, *6*, 131–167 (in Japanese); "Bernhard Varen's *Geographia Generalis* (1650) and Seventeenth-Century Theories of the Earth," *Kagakushi Kenkyu (Journal of History of Science, Japan)*, 2004, *43*, 1–12 (in Japanese); "Kircher and Steno on the 'Geocosm' with a Reassessment of the Role of Gassendi's Works", *GSA Special Paper 411* (forthcoming).

2 Also Steno's geological achievement was newly described and discussed in the following articles: Nicoletta Morello, "The Question on the Nature of Fossils in the 16th and 17th Centuries," in G.B. Vai and W. Cavazza (eds.), *Four Centuries of the Word Geology: Ulisse Aldrovandi 1603 in Bologna*, Minerva Edizioni, Bologna, 2003, 127–151; Jens Morten Hansen, "Steno" in R.C. Selley *et al.* (eds), *Encyclopedia of Geology*, Elsevier, Amsterdam, Vol. 2, 2005, 226–233.

3 Troels Kardel, "Steno's Myology 1667: The First Description of Muscle Contraction Caused by Fiber Shortening," *Seibutsugakushi Kenkyu (Japanese Journal of the History of Biology)*, 2005, *75*, 133–134.

4 Alan Cutler, *NAZE KAI NO KASEKI GA SANTYOU NI?: CHIKYUU NI REKISHI WO ATAETA OTOKO NIKORAUSU SUTENO*, translated by Toyoo Suzuki, Seiryu Publishing, Tokyo, 2005. For review of the original English edition, see: Toshihiro Yamada, "A Good Guide to Steno as a 'Geologist'," *INHIGEO Newsletter*, 2005, *37*, 41–43.

Ministry, V. Yarmolyuk and N. Laverov (now the Vice-President of the Russian Academy of Sciences) warmly recall these years and Vladimir Tikhomirov's activity.

In the 1950s the Laboratory on the History of Geology was founded in the Geological Institute of the Russian Academy of Sciences (now the Vernadsky State Geological Museum) with Vladimir Tikhomirov as a leader. His hard work made the Laboratory very famous in the field of the history of geosciences, and the scientific school rose to prominence (producing articles by V. Gerbova, Yu.Ya. Soloviev, and S. Komissarova). Either geologists felt the taste of the history (see the article by E. Milanovsky), or professional historians of geology (article by I. Rezanov, L. Lordkipanidze) joined under the leadership of Vladimir Tikhomirov.

International scientific cooperation was extremely interesting for Russian historians of science. Vladimir Tikhomirov was one of the INHIGEO founders and a very active member (see M. Guntau's memoirs). He also participated in the International Commission on the History of Science (article by A. Volodarsky).

Thirty photographs illustrate the book. The photo-gallery is a valuable supplement to the text.

Academician Boris Sokolov (a member of the Russian Academy of Sciences Board) mentioned that Vladimir Tikhomirov was a geologist thanks to God. But he was an historian thanks to himself.

Irena G. Malakhova, Moscow

History of Early Geology in the Low Countries

Touret, Jacques L.R., and Robert P.W. Visser (editors), *Dutch Pioneers of the Earth Sciences*, Royal Netherlands Academy of Arts and Sciences, History of Sciences and Scholarship in the Netherlands, Vol. 5, Amsterdam, 2004, 200 pp.

Founded in 1808 by King Louis Napoleon as a kind of copy of the French Academies, the Royal Netherlands Academy of Arts and Sciences is now a respected institution, with a number of important official missions. One of these, which took on relative importance in recent years, concerns the preservation and elaboration of the cultural heritage of the country. In 1974, a chemist and historian of science called R. Hooykaas had the idea to initiate a working group, including scientist and historians, that aimed at promoting the study of the history of the earth sciences. This working group organized a symposium on 10 November 2000 that considered the Dutch pioneers of the earth sciences. This superb book is directly issued from that symposium. In the first contribution, W.H. Zagwijn pays tribute to J. Le Francq van Berkhey, born in 1729, a medical doctor and author of a *Treatise of the grounds of Holland* (1771), influenced by Buffon's works. This treatise, of which only a few copies exist, is completed by four plates reproducing accurate geological sections, drawn before the term "geology" existed. Next, E. den Tex describes the debate between two colleagues on the neptunistic versus plutonistic interpretations of basalt. L. Touret, former keeper of the mineralogical collections of the Teyler Museum, stresses the importance of crystal models, and W. Saeijs, using these models, shows how they can be used for mineral determination.

Belgium became, after Napoleon's defeat at Waterloo (1815), for fifteen years, a part of the Dutch kingdom. D'Omalius d'Halloy had already drawn the Geological map of the French Empire and published on the geology of the Low Countries. He was Governor of the Namur province during the reign of the Duch king. At that time, prize competitions aiming at the geological description of the Belgian provinces were organized and contributed to the growth of geology as a distinctve discipline. G. Vanpaemel's contribution deals mainly with this period.

Other pioneers belong to a somewhat younger generation, as H. Vogelsang, of German origin. His life and works are described by J. Touret and W.C.H. Staring. Vogelsang is commonly regarded as the "father of Dutch geology." His lectures (1863) at Delft University are documented by F.R. Van Veen, whereas P. Faasse summarizes the history and importance of his geological map of Netherlands.

History of hydrogeology is documented by J.J. De Vries. The Maastricht Cretaceous finds and Dutch pioneers in vertebrate paleontology are discussed by E.W.A. Mulder, who emphasizes the (re)discovery of the first *Mosasaurus* in 1766 and discusses the 18th-century interpretation of mosasaurs. Finally, D. Visser relates the discovery of the manuscript of an unpublished article by C.E.A. Wichmann on a chloromelanit (a form of jadeite) found in New Guinea.

In total, an excellent and diversified book dealing with early geological work of colleagues whose task must have been quite difficult in the monotonous landscape of a country made only of gravel, sand, and peat.

Eric Groessens, Brussels

Goethe Converses with the Earth

Wolf von Engelhardt, *Goethe im Gespräch mit der Erde: Landschaft, Gesteine, Mineralien und Erdgeschichte in seinem Leben und Werk*, Verlag Hermann Böhlaus Nachfolger, Weimar, 2003. 375 pp. ISBN 3740012048. € 69.95

Johann Wolfgang von Goethe's fascination with the mineral kingdom has never received anything like the attention lavished upon his other scientific studies. This is no reflection on Goethe, who wrote dozens of essays on geognostic and mineralogical topics, kept up a correspondence that bristles with observations of the earth's crust, was a devoted collector of rocks and minerals, was instrumental in establishing the natural historical museums of Jena University, and had administrative responsibility for reopening and running a copper and silver mine in the Duchy of Saxe-Weimar, among other things. And yes, his literary work matters a great deal for coming to grips with how he thought about the earth. Wolf von Engelhardt, a senior German mineralogist and Goethe scholar, is keenly aware of all this, for he recently completed many years of work editing the geological and mineralogical volumes of the magisterial Leopoldina edition of Goethe's scientific works. The Leopoldina is a historical-critical edition with full textual apparatus, commentary and a vast body of supplementary materials (von Engelhardt's contribution amounts to about 2500 quarto pages). It is unlikely that it will ever be superseded.[5] Now von Engelhardt has gone beyond the boundaries of an edition and offers a rounded interpretation of Goethe's interactions with landscapes, rocks, minerals, the earth and its history.

The course taken by the book under review is revealed in its lovely title 'Goethe in Conversation with the Earth,' for here we see Goethe as a geognost and as a profound poet with a philosophical understanding of nature. Von Engelhardt traces this 'conversation' through Goethe's adult life, beginning with the emotive experience of landscape depicted in *The Sorrows of Young Werther* (1774) and the 1775 journey to Switzerland. The subsequent move to Weimar and travels in Thuringia and the Harz Mountains gave him a much deeper understanding of nature, as revealed in his early studies of granite and in his Italian journey. Goethe's encounter with Kant and Jena Idealism in the 1790s is given careful consideration, as are the landscapes of *The Elective Affinities* (1809) and *Wilhelm Meister's Wandering Years* (more or less completed by 1810), the travels in Bohemia, and along the Main and Rhine, and *Faust I* and *II*.

This is an admirable book that gives expression to the broad scope and the depth of Goethe's study of the earth. More than that, it unifies an often ungainly body of sources, and that through a very simple thesis encapsulated in its title. Goethe's conversation with the earth began haltingly in his early years at Weimar. In late 1780, overflowing with enthusiasm for the new way of observing the earth's crust he had learned from Freiberg, via the geognost Johann Carl Wilhelm Voigt, Goethe rejected sweeping theories of the earth's origin. All the same, he felt tied to the earth by an 'obscure' thread (76). By 1785, in what is arguably his most memorable scientific essay, 'On Granite II,' Goethe wrote of Nature 'speaking softly.' Von Engelhardt argues convincingly that Nature in this essay is nothing other than Spinoza's 'natura naturans,' a kind of infinite substance or God-Nature. Goethe read widely in geognosy and natural history in the 1780s, but it was his reading of Spinoza's *Ethics* that offered him a unifying picture of nature.

Goethe's most intense engagement with philosophy began in 1789, with the revolutionary philosophy of Immanuel Kant's *Critique of Pure Reason*. He then turned to the *Critique of Judgement*, which was to be of even greater moment for his thought. Kantian concepts left their mark, but he could not accept them in their entirety. The gulf between the empirical, sensible world and the noumenal world accessible only by the intellect, not the senses, ran against his sense of unity with nature. The philosophy of Johann Gottlob Fichte and Johann Friedrich Wilhelm Schelling, both of whom taught at Jena University, offered a way of overcoming this Kantian dualism. Based on a close reading of Goethe's annotated copy of one of Fichte's published lecture, von Engelhardt shows that Fichte's idea of an 'I' that was essentially linked to the 'not-I' (i.e., nature, or the world) held great appeal for Goethe, as did Schelling's notion of a transcendent identity of the subject and object. While he was not engaged specifically with geognostic or mineralogical problems in the 1790s, Goethe did pursue his morphological studies and, despite some

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5 Goethe, *Die Schriften zur Naturwissenschaft*, is published under the auspices of the Deutsche Akademie der Naturforscher, Leopoldina. It currently counts over twenty volumes and is now nearing completion. Part I of this edition consists of Goethe's scientific texts, part II of commentary volumes. Geohistorians should be warned to ignore the first two volumes of part I, as these are now obsolete. Goethe's geological texts are best consulted in Part I, vols. 8 and 11. The corresponding commentary volumes, all edited by Wolf von Engelhardt, with the assistance of Dorothea Kuhn, are: part II, vol. 7, *Zur Geologie und Mineralogie: von den Anfängen bis 1805*, Weimar, Hermann Böhlaus Nacholger, 1989; part II, vol. 8A, *Zur Geologie und Mineralogie: von 1806 bis 1820*, Weimar, Hermann Böhlaus Nacholger, 1997; part II, vol 8B, *Zur Geologie und Mineralogie: von 1820 bis 1832*, Weimar, Hermann Böhlaus Nachfolger, 1999.

uncertainty on the question, he eventually concluded that his notion of morphology applied only to the living world. This was also the time of Goethe's closest work with Schiller, yet for all the renown of this famous partnership, it did not really help Goethe frame a poetic account of his engagement with nature (261).

Von Engelhardt explicitly refrains from discussing the secondary literature on Goethe's geology. For the most part this is a wise choice, but a little more might have been done to place Goethe against the backdrop of some of the insights offered by historians of geology. For example, the idea of Werner's 'neptunist theory of earth history' (67) or 'neptunist geognosy' (288) might have come under a little more scrutiny. It is indisputable that Werner was in some sense a 'neptunist,' as was Goethe, but so was just about everyone studying rock formations in the 1780s, including the so called vulcanists, such as his student Voigt. Most rocks were thought to be of some aqueous or fluid origin; the dispute about neptunism involved the classification of only a few kinds of rock. Practically everyone in the late eighteenth-century who thought about it was a neptunist when it came to most of the rocks that make up the earth's crust. It is not always a helpful label. For example, in Italy Goethe observed the now famous 'Serapis Temple' of Pozzuoli and offered a creative interpretation of how very local phenomena might explain the puzzling boreholes in the three columns still standing to this day. Von Engelhardt says this was a case of Goethe seeking 'to rescue his neptunist conviction' (152) of a gradually receding ocean. Rescue it from what? This looks like reading history backwards from Lyell, since the very idea of local fluctuations of the earth's crust was not on the table in the 1780s. Along related lines, this book downplays a little too much the significance of Goethe's involvement with mining. It is true that most of Goethe's texts do not specifically address problems of finding ore and getting it out of the ground, but almost all of the geognostic community had some sort of connection to the Freiberg Mining Academy. It is unlikely that mining was insignificant for the ways in which many of Goethe's correspondents and friends thought about the earth.

Von Engelhardt observes that by the standards of our science practically all of Goethe's insights have been eclipsed, and that we do better to judge Goethe by the 'intentions' of his studies rather than their 'results.' (2–3) True enough, though arguably the same could be said of most geologists of Goethe's era. It would be worth knowing more about how science was changing in his lifetime, not just in terms of the major conceptual innovations and discoveries, but how its social structure was changing. The book under review claims Goethe put himself on a geological 'special path' (*Sonderweg*) (300) in 1820 when he claimed the neptunist origin of basalt was an irreducible 'Urphenomenon' (the only time, in fact, that Goethe applied this word to the mineral kingdom). To this one could add that Goethe was increasingly becoming an outsider because he lacked the formal credentials and institutional recognition that were already becoming the hallmark of the German-speaking scientific community, but that is a story for a social history of geology, a different kind of history than the one under review.

Here we have a richly textured portrait of Goethe engaging with the earth as geognost, traveller, and above all poet and philosopher. This book is a splendid capstone on von Engelhardt's long and profound study of Goethe's geological writings, and it also brims with insights into Goethe's life and literature. Above all, this is a book that is written for readers who love Goethe. Almost every page is graced with Goethe quotations and we readers are the beneficiaries. Von Engelhardt has allowed us to hear some of the beauty of Goethe's conversation with the earth.

E. P. Hamm, Clare Hall, Cambridge

Editor's Note: This review has also been published, in a cooperative venture agreed upon by the author and editors, in *Earth Sciences History*. Thanks are extended to Ernie Hamm and to *ESH* editor Patrick Wyse Jackson.

The Man who Moved Mountains

Nathan, Simon, *Harold Wellman: A Man who Moved New Zealand,* Victoria University Press, Wellington, 2005, 272 pp. NZ$ 49.95

This is a book about a remarkable New Zealand geologist, arguably the most innovative and influential in that country in the 20th century. Although his work was to the forefront of earth science research, Wellman gained surprisingly little recognition internationally. This extensive, well-written and well-produced biography puts on record Wellman's considerable achievements and conveys a vivid portrait of the man himself. A small indication of his complex character is that although born Harold William Wellman and known to his friends and contemporaries as Harold he was always Bill to his family.

As recounted by Harold himself in the first few chapters, he was born in 1909 in Devonport, England, of modest parents, his father being an engine-room artificier in the Royal Navy. Shortly after his birth the Wellman family moved to Chard, inland from the celebrated fossiliferous rocks at Lyme Regis and, when aged 11, he enrolled in Ilminster Grammar School. The school was a Church of England one and Harold was sent there in the expectation that he would that pass examinations that would allow him to enter the navy as an officer cadet. This was not to be, and it is difficult to imagine someone with Wellman's personality either conforming to naval discipline or being tolerated by the navy. However, his school days provided some valuable learning experiences,

and also showed that his independent personality had developed at an early age. One example was when he informed the school's matron that one's religious beliefs were likely to be the result of geography and that if he had been born in Saudi Arabia then he would have been a Muslim. Not the most tactful statement to make in an English church school but was to exemplify Wellman for the rest of his life.

More importantly was that he used to frequently walk the 10 km between the school and his home in Chard and in doing so crossed a sequence of richly fossiliferous Mesozoic rocks. With the help of one of the teachers at the Grammar School, Wellman was able to identify the various fossils he collected and from this he worked out where any particular rock was in the sequence. The value of fossils was something that he was to never lose sight off. The grammar school also imparted in him, or perhaps more correctly enhanced, a basic pragmatism and practicality. He also gained his first knowledge of New Zealand when in woodworking classes the superior native timbers of that country were sometimes used. However, for his coming to the antipodes he had to thank the navy when his father in 1927 obtained a commission in the New Zealand Navy and the family moved to Auckland.

In Auckland, Wellman was apprenticed to a land surveyor, being attracted by the outdoor life and the prospect of a comfortable income. Before qualifying, Wellman was sent to do land survey work following the destructive Napier Earthquake of 1931. In addition to killing 256 people, the earthquake lifted a large area of seabed to form land, a graphic demonstration to the young Wellman of active tectonics. By 1932 he was a registered surveyor but work was short with the advent of the Great Depression and instead he joined a government subsidised gold- mining scheme on the West Coast of the South Island, initially working alluvial deposits, then the iron-rich black sand on the sea beaches. From there he moved to the Collingwood District of Northwest Nelson and led prospecting parties into the rugged interior, which was still vividly displaying the landslides scars arising from the 1929 Murchison Earthquake. At that time he also undertook land survey work.

Although unsuccessful in mining, Wellman had now learnt a lot about rocks and, more particularly, what the rocks could reveal. He then applied for work as a temporary field assistant with the Geological Survey, which was undertaking geophysical surveys of potentially mineralised areas. However, on arriving in the field in Otago he found the survey had been completed and instead he was diverted to help a geologist undertake an assessment of a recently discovered copper prospect. While waiting for the arrival of the geologist he prepared a topographic map on which he accurately located all rock outcrops. The geologist was not overly impressed, told Wellman off for talking too much, and soon declared the mineralisation valueless. However, he was more impressed than he let on for he told his over-eager apprentice that if he wanted to get anywhere in geology he should obtain a degree. It was advice Wellman was to follow—but not immediately—for he had now gained temporary employment assisting in geophysical and geological surveys, mostly on the West Coast of the South Island. When the geologist who Wellman was assisting in a survey in the Buller Coalfield was called to other duties, he was left to do the geological mapping and was given co-authorship of the resulting paper.

Back at the Geological Survey headquarters in Wellington, Wellman in 1936 enrolled part time for a BSc at Victoria University. He was also offered a permanent position on the coal survey where his surveying expertise, in addition to his keen geological eye, would be valuable. However, the salary was not great and in a deal, which tells much for Wellman's growing reputation, the position was held open for him for a year, allowing him to take a better paid surveying job in the swamps of Papua for an oil survey being conducted by Shell. The extra money he earned came at a cost, for he contracted malaria but nevertheless completed his contract. Back in New Zealand, Wellman was in 1938 appointed assistant geophysicist in the Geological Survey and was over the next few years engaged in a number of economic and engineering projects, some of which he developed into scientific papers. He also married, after a short engagement, Joan Butler, who was an accountant from Dunedin who had recently moved to Wellington. The fact that Joan had an accountancy degree, at a time when women in that profession were a rarity, says much for her pleasant personality and ability. The couple purchased a car and caravan and Joan was able to join her husband in the field. This was to set the pattern for their lives for the next 50 years.

With his BSc completed, Harold enrolled for an MSc at Victoria University. His thesis topic was the deformation of a Tertiary peneplain cut in the basement rocks of Northwest Nelson and which he had observed during his prospecting days and geophysical surveys in the area. His thesis broke new ground in that it did not follow the traditional format of mapping an area in detail to see what might come from it. Instead, Wellman's thesis was problem-orientated in which the peneplain was a reference surface that could be used to measure the deformation of a large area. Here his surveying skills came to the fore in compiling topographic maps in rugged, poorly known terrain. While it was to be his first serious sortie into measuring deformation in the earth's crust, it also marked an interest in the Quaternary as Wellman assessed the glacial history of the area.

While the Northwest Nelson work was impressive, he was soon to make even more important discoveries. In 1941 he and another survey geologist, R. W. Willett, headed into the southern part of the West Coast of the South Island. With the start of the war in the Pacific, the search was on for many mineral commodities that had formerly

been imported. In the central South Island the Southern Alps are very close to the western coast and it had been earlier recognised that along part of the toe of the Alps there was a major discontinuity that had in places been named the Alpine Fault. Wellman and Willett were able to map the fault southwest through steep, rain-sodden mountainous country to the Tasman Sea near Milford Sound. They also discovered that many of the rivers that crossed the fault were consistently displaced by a kilometre or more. Although Wellman recognised the offsets for what they were, it was to be some time before their wider significance was to be appreciated.

With the coal survey getting into top gear, Wellman was sent to the Geological Survey's Greymouth office on the West Coast where there are two major and many minor coalfields with most of the latter being poorly known. The coals of Tertiary age range in rank from lignite to bituminous, and were consequently believed to be of different ages. By finding fossils in the overlying marine sediments, the unexpected discovery was made that the coals were in fact the same age and that the differences in rank were a function of burial. This led to considerable revision of the existing maps, new insights into understanding of how the Tertiary rocks accumulated, and again brought home to Wellman the importance of fossils in stratigraphy. Utilising a multitude of coal analyses, Wellman determined two parameters—a rank number and a type number. This showed that the high-rank, and thicker, seams were confined to the crests of mountains. From this he reasoned that they had been more deeply buried in fault angle depressions but, because of later tectonic eversion, were now on top of mountains. In contrast, the low-rank coals had been on the margin of the depressions and had been neither deeply buried nor subject to significant vertical movement. One other outcome of the coal survey, and for which all New Zealand geologists are forever grateful, was the initiation by Wellman of a standard method of recording all fossil localities. This national database, the Fossil Record File, is the envy of palaeontologists and stratigraphers around the world. It is now jointly run by the Institute of Geological & Nuclear Sciences and the Geological Society of New Zealand and documents over 60,000 fossil localities.

Following the war, Wellman was assigned to map the Permian-Triassic rocks of east Nelson, the stratigraphy of which had been the subject of argument since Ferdinand von Hochstetter, of *Novara* fame, first described them in the Maitai valley in 1859 (they are now interpreted as four juxtaposed terranes that had been accreted to the margin of Gondwanaland). Wellman, who had already examined some of the rocks when assessing serpentinite deposits during the Second World War, recognised that the rocks of Nelson and Otago, at opposite ends of the South Island, were identical. Pondering over the geology of the South Island one wet Sunday afternoon in 1948, Wellman suddenly had the idea of cutting a newly published 1:000,000 geological map of New Zealand in half along the Alpine Fault to see if opposite sides met. The fit was remarkable and from this he postulated that the two had been offset by 480 km of dextral shift on the Alpine Fault. Soon after, in May 1948, Wellman presented his hypothesis at a Geological Survey staff conference. The following year a Pacific Science Congress was held in Christchurch and one attendee recalled: "The highlight of the meeting was Harold Wellman. Word got around about his ideas, and the room was full. He displayed a large handsome geological map of the South Island, and then, after talking for a while, suddenly proceeded to slide southern Westland [Otago] 300 miles along the Alpine Fault to match up the strata near Nelson. It was a dramatic moment . . . " While dramatic, it was far from universally accepted. Part of the reason was that Wellman, in characteristic fashion, did not write a paper documenting all of the compelling field evidence, such as the rocks of Otago and Nelson being identical and the known horizontal shifts that he and Willett had observed earlier on the Alpine Fault.

Following his announcement of the Alpine Fault displacement, Wellman was diverted into mapping all of the Tertiary rocks of the West Coast and Nelson, and in the process resolved many stratigraphic problems and at the same time defined the paleogeography, particularly in delineating sedimentary basins. While a series of detailed conjoining maps with texts and stratigraphic columns were completed, none were published, although one sheet was actually printed. Again Wellman does not seem to have been perturbed about this. Instead he was thinking about the accumulating evidence of Quaternary movement on an increasing number of faults in New Zealand. By dating the various features offset, it was possible to determine rates of movement, both in a vertical and horizontal sense. This led to his ground-breaking concept that offset rates could be used as a measure of fault activity.

In 1952 Wellman and his family transferred from Greymouth to the Wellington head office of the Geological Survey. This allowed him greater interaction with geologists, including those at the nearby Victoria University. This was not always welcomed by his colleagues who had at times more pressing matters to deal with than listen to Wellman enthusiastically espousing on, what seemed to them, some unrelated aspect of geology. In Wellington he turned his attention to the Cretaceous rocks of New Zealand and using species of *Inoceramus*, including a number he had named, Wellman introduced nine new stages to the existing New Zealand two. It was a commendable piece of research and one he would have thoroughly enjoyed. It has not been significantly changed.

Wellman resigned from the Geological Survey in 1956 and worked for BP searching for oil in East Coast of New Zealand. However, a year later he was on the staff of Victoria University. There he was to prove a boon for

students completing theses, such as this reviewer, although a few found his blunt manner and often brutal editing of their writing hard to deal with. His formal lectures to undergraduates were sometimes not so successful but this was more than compensated by his ability to ensure that students received a thorough introduction to practical geology. His own research at the university used Devonian brachiopods from Reefton in the South Island to devise a method of measuring tectonic deformation. That technique is now known as the "Wellman Method." Other research involved the Stoke Magnetic Anomaly, which runs the length of New Zealand, except where offset by the Alpine Fault. He also pursued work relating to Antarctica, surveying the deformation of active volcanoes and continuing his work in Quaternary tectonics, or neotectonics, as it was to become known. In New Zealand he used raised and deformed beaches to measure uplift rates and date earthquake events. During a year- long sabbatical he recognised and analysed active faults in Asia. Except in Antarctica, Wellman was as usual accompanied by Joan who did most of the driving and in one instance paddling a canoe while her husband took measurements of the Stokes Magnetic Anomaly.

Wellman received recognition in New Zealand by being given a personal chair in geology at Victoria University, elected a Fellow of the Royal Society of New Zealand, and receiving the prestigious Hector Medal from that Society, as well as the Geological Society of New Zealand's premier McKay Hammer Award. However, he failed to gain the international recognition that he deserved. This was largely of his own making, as he rarely continued through with his discoveries and instead was looking around for, and readily finding, new challenges. It is also fair to say that Wellman, who had little time for institutional politics, administration and formal committees, would not have been in the slightest upset at this. However, this lack of recognition was partly rectified in 1992 when the BBC made a documentary aptly named "The Man Who Moved The Mountains." Such was his regard for geology that he and his family donated money to the Geological Society of New Zealand to fund a research grant to students as well as an annual prize for the finding of a significant fossil. These donations were to be anonymous but in a move Harold would not have approved of, the Society named them respectively the Wellman Research Award and the Wellman Prize.

Simon Nathan has, with the help of Wellman's own biographical notes and numerous interviews with the Wellman family, Harold's colleagues and former students, produced a very readable and fascinating account of a remarkable, unorthodox, and abrasive, even at times somewhat rude, geologist. Lacking jargon, which Wellman would have undoubtedly approved of, *A Man who Moved New Zealand* is a book for of considerable interest to geologists, historians of geology and all who enjoy a good read.

Mike Johnston, Nelson, New Zealand

Geophysicist Józef Łukaszewicz and his Concept of the Earth's Evolution

Žalūdienė, Gailė, *Juozo Lukoševičiaus Žemės gelmių raidos koncepcija,* Monografija, Geologijos ir geografijos institutas, Vilnius, 2005, 129 pp. (*Juozas Lukoševičius' View on the Earth's Evolution, A Monograph*; In Lithuanian with English summary)

Juozas Lukoševičius (in Poland—Józef Łukaszewicz; in Russia—Иосиф Дементьевич Лукашевич; 1863–1928) was one of the most prominent of our countryman, equally cherished by Lithuania, Poland and Russia. He was related with Lithuania by his birthplace in a little estate of Bikiškės, near Vilnius. However, he was born into a Polish family and was trained in Polish, Russian, and French. After he finished Vilnius Gymnasium in 1883 he studied at the Faculty of Natural Sciences in Saint Petersburg University. In 1887 he was arrested and sentenced to lifelong imprisonment for participating in the attempt on the life of Tsar Alexander III. After eighteen years spent in Schliesselburg fortress he was freed (in 1905) and lived in his Vilnius homeland for two years. In 1907 he moved again to Saint Petersburg, where he finished his university studies and was taking part in the scientific life. After the Bolshevik October revolution in 1917, he thought about returning to Lithuania. Thus, in 1920 he came back to Vilnius to work as a Professor of geology and geophysics at the Stefan Batory University. He died in Vilnius in 1928 and was buried there in the Cemetery of Bernadine's.

The scientific-historical study performed by Dr. Gailė Žalūdienė (Natural Sciences), who graduated from Vilnius University as a young historian of geology and a Lithuanian member of INHIGEO, deals with the analysis of Juozas Lukoševičius's concept on the evolution of the Earth's subsurface. Her research covers a controversial period of Lithuania's science history, from the fourth quarter of the nineteenth century to the beginning of the twentieth century. Geology as a scientific discipline has a 225-year history in Lithuania (from 1780) and its roots reach back to the Supreme School of the Grand Duchy of Lithuania (since 1781) and its successor, the old Vilnius University (since 1803). Famous professors and scholars were related to the activity of the Vilnius University from the end of 18th century. Such naturalists and mineralogists as Jean Emmanuel Gilibert, Johan Georg Adam Forster, Stanisław Bonifacy Jundziłł, Roman Symonowicz, Karl Eduard Eichwald, Felix Drzewinski, Ignacy Horodecki, Ignacy Jakowicki, and many others could be mentioned. Their activities have not as yet been extensively studied,

except for Ignacy Domeyko (1802–1889), who had acquired his education in Vilnius and who pursued higher education in Paris. His works and discoveries were made far away from his motherland of Chile.

Juozas Lukoševičius might be compared to other Lithuanian celebrities, first of all with Adam Mickiewicz and Ignacy Domeyko. They all became expatriates at a young age, although Lukoševičius lived and worked in another time period and under different circumstances. After Vilnius University and the Medical Surgical Academy were closed, in 1832 and 1842 respectively, geological research flagged significantly, since there were no researchers and no environment favorable for scientific development. By 1920 there was no university in Lithuania. This was the period when Lukoševičius lived and worked.

Lukoševičius was a very talented, well-educated young man, trained as a naturalist, geologist and philosopher. His tragic life, jail, and loneliness determined his scientific goals. Being in jail he planned to write a seven-volume treatise on *The Elements of the Philosophy of Science*. This was a grandiose undertaking. He did not finish this work, but he made very interesting and outstanding generalizations. He completed three volumes of the treatise and published them in Russian in 1908–1911, in Saint Petersburg (Vol. 1 in 1908; Vol. 2 in 1909; and Vol. 3, on *Inorganic Life of the Earth*, in 1911). Other volumes, their parts and fragments, remained in his manuscripts, which were brought by him to Vilnius. They are now stored in the Manuscript Department of the Vilnius University Library. This is invaluable material for those who study the heritage of this unique scholar. The archive data and published works of Lukoševičius provided the basis for the scientific historical investigation performed by Gailė Žalūdienė.

The author, when analyzing Lukoševičius's concept of the Earth's evolution, went deeply into the material and became familiar with that historical period of geosciences and philosophy. She thus managed to scientifically assess the work of Lukoševičius, including his large heritage of manuscripts and epistolary. The author showed good understanding of the epoch, when such famous scholars as Alexander Karpinsky, Léonce Élie de Beaumont, Emmanuel Haug, Charles Darwin, Vladimir Vernadsky, Albert Gaudry, Dimitriy Mendeleyev, Eduard Suess *et al.* were living and creating. Lukoševičius knew the works of his contemporaries and used them. Žalūdienė's monograph is written in a solid style, the texts are consequently linked and well reasoned, and are framed in the context of that epoch. The author leans purely upon Lukoševičius' works and manuscripts, cites archive data, and puts everything in order. It is very important that the author utilized original illustrations and schemes drawn and compiled by Lukoševičius. They depict both the evolution of the organic world and changes in the Earth's face during the geological periods and epochs. They also show the scope of Lukoševičius' scientific interests, from the evolution of life to inorganic changes through geological time. This is a big virtue of the monograph.

Lukoševičius was one of the pioneers of paleogeography, teaching on the nature of the biosphere. He also pursued an understanding of metamorphism in petrology. The raising of the personality of Lukoševičius and value of his works, based on primary sources and their scientific analysis, makes an important contribution into the history of Lithuanian science. It also places Lukoševičius in the context of history of science in the world. He is really a man of extraordinary fate, he made extraordinary contributions to science, and he is one of the most famous people in the history of Lithuanian science. The author of the monograph, Gailė Žalūdienė, showed in her work the historiographic significance of Juozas Lukoševičius as a scientist, revealing how his scientific achievements have present-day value. The monograph should be translated into English in order that it could become available to a Western reader.

Algimantas Grigelis, Vilnius

NOTES AND QUERIES

Lost and Found!

The 'Lost Work' of William Smith (1769–1839)—so-called 'father of English geology'

In 1942, Leslie Cox described Smith's failed, and 'long lost,' 1807 "publication" on Norfolk. He called it "Smith's lost work." Cox outlined the known history of its failure, and of the then only recorded copy. This was of a first printed part, of a work with which Smith was involved up to at least 1819, but of which no MSS has ever been found, and of which certainly nothing now survives among Smith's papers in Oxford.

In 1999 I lectured, appropriately with hindsight, in Cambridge, to the Library Association's Rare Books group and there raised the problem of printed books, or other such items, for which all attempts had failed to locate copies. I could then list at least eight of these... Since, with the coming of computer catalogues, the situation has eased and, of these eight items, unique copies of three have now been located, in Edinburgh and Washington, DC (this last, reprinted in the item on Hastings Elwin below, Torrens, 2005). But the one in which I was most interested, *Smith's Description of Norfolk, its Soil and Substrata*, remained stubbornly lost. The only copy that Cox knew of was that in the fine library of Dawson Turner (1775–1858), but sold at London auction in 1853, after his financial

problems. This copy was bought by the London booksellers, T & W Boone, who were in business at 29 Bond Street until 1872. This copy had also earlier been seen, and was listed instead, by the Norfolk geologist Samuel Woodward (1790–1838), in his posthumous *Norfolk Topographer's Manual* of 1842 (p. 3), as "A Description of Norfolk, Norwich, about 1810, only 56 pages were printed."

In 1969, when Joan Eyles published her *Bibliography* of Smith, she could only add that this had remained 'lost,' but that "a copy [had since] appeared in a London bookseller's catalogue in [March] 1957, but was sold without any record of the purchaser." This was Stanley Crowe, then of 5 Bloomsbury Street, London, who early in May 1957 informed Victor Eyles, Joan's husband, both then living in far away Jamaica, that this copy [had been earlier] sold, but that "he was unable to indicate where it has gone" (Eyles archive, Bristol University).

We now move to today. In mid January 2006, I was telephoned out of the blue by a man who owns an antique shop in Great Yarmouth (Dawson Turner's home town!). He told me that in the summer of 2004, an elderly lady, probably in her eighties, who lived in Cambridge, but whom he assumes was there on holiday, peddled in a small barrow to his shop. She had had previous dealings with this shop, which he had since bought. On the barrow was a box, containing "a loop of assorted brassware, i.e., candlesticks etc," wrapped in early 1960s newspapers (which could not have been disturbed since then). He purchased the candlesticks for £15 and, assuming the rest was junk, was about to pass it to a local charity shop. Mercifully his wife suggested they unpack the residue and so, by miraculous accident, they discovered a book inside, whose only use, to their surprise, was to strengthen the floor of the box, which had a hole in it....

This book carried the signature of "Dawson Turner esq," whom they knew to be a man of local significance, so decided to keep it. Then in 2005, he was lent a copy of Simon Winchester's best selling paperback on William Smith, whose geological map had supposedly "changed the world." This reminded him of the book he owned. Having failed to make contact with the author, he read that I was "latterly at Keele University," and tracked me down instead by telephone.

His book proves to be Turner's own copy of Smith's book! It comprises Dedication (p. i) and Preface (pp. iii-viii) with pp. 1–56 only. There is no title page, which explains the different titles it had acquired. It carries the title *Smith's Description of Norfolk* in ink up its spine. It had been lent by Turner, in March 1825, to his then bank clerk, the bibliographer, Samuel Woodward, according to Woodward's letter still preserved in it. It also contains a letter, of 26 May 1820, from Smith himself, at Wentbridge, near Ferrybridge in Yorkshire, almost certainly to Turner, still "trying to secure payment of a debt of 21 guineas" due to him "near twelve month since," and before he went to a debtor's prison.

Smith was then in northern exile, after this London imprisonment in 1819, for debt. This unpaid debt is clearly one in connection with the Diss and Bungay Navigation in Norfolk, on which Smith had been consulted from 1817 to 1819 and on which Smith had published his *Statement of Facts* in 1818. He had written to Turner on 10 June 1819 from London, then hoping "nothing will prevent the immediate settlement of my accounts and that I shall in a few days receive the balance, as I have legal proceedings against me which imperiously demand all the money I can get in" (Dawson Turner collection; Trinity College, Cambridge). But this debt had clearly still not been paid and had helped precipitate Smith's time in his London prison.

Also in this unique volume were letters which explain how it had got to Cambridge. These were
1) a typed copy letter of 28 December 1956 to A. G. Brighton (1900–1988), curator and librarian of the Sedgwick Museum there, requesting information on the volume: "do you have a copy, I think mine must be a proof before publication and have been wondering if it was ever actually put through the press" and published?
2) Brighton's brief reply of 1 January 1957, addressed to Mr. J. M. Wordie, Master's Lodge, St. John's College, Cambridge. This reads "Dear Master, Thank you for your letter. Mr. Brighton is unable to trace a copy . . . he has searched the *Catalogue of the Library of the British Museum (Natural history)*[etc.] without success. He regrets very much that he is unable to help you any further." James Mann Wordie (1889–1962—knighted 1957) is most famous as the Scottish geologist who joined the ill-fated (especially for a sea-locked geologist!) Antarctic *Endurance* expedition of Ernest Shackleton, between 1914 and 1917. Wordie later became Master of his old college, St. John's Cambridge, in 1952, which he held till 1959. It was Wordie who had purchased the Stanley Crowe copy, not in 1957, but late in 1956. Wordie's credentials as a bibliophile are well known and confirmed both by his biographer, Michael Smith in 2004, who wrote of "his passion for collecting books" and by Wordie's generous donation in 1959, to the National Library of Scotland, of the *Wordie Collection of Polar Exploration*, of which a catalogue was published by G.K. Hall, Boston, USA, in 1964. This discovery proves that only this one printed copy was ever preserved of any part of "Smith's lost work."

Peter Wordie, Sir James' son, kindly informs me that his father's geology books were sold either in 1959, when he had to move, from the Master's Lodge, into "cramped quarters in the University Arms Hotel," or in early 1962, after his death. The only remaining mystery is the identity of the lady who brought the box into the shop in

Great Yarmouth. The date of the box's wrapping paper suggests it was loaded with its Smith booty about the time of Wordie's death, on 16 January 1962 in Cambridge. It is exciting to record its re-discovery, after 199 years, during which time it has never been analysed. We hope to do this in 2007, its bicentenary year and also that of the Geological Society of London.

Postscript

The history of the equally unique, printed *Prospectus* for this lost Norfolk book of Smith's, proves equally amazing. Of this *Prospectus*, once again, only one original had seemed to survive, on which Smith wrote an accompanying letter. This was to his friend, the Wiltshire archaeologist William Cunnington (1754–1810), dated 14 December 1806. Cunnington's archives are still preserved at Devises Museum, Wiltshire, England, with the exception of this letter, which is now only represented there by a transcribed copy. This is because, by 1926, the original had somehow been acquired by a German professor, called Dr. Julius Schuster (1886–1949), who was a devoted collector and editor of such items. This *Prospectus*, and Smith's letter, were then miraculously printed by Erich Haarmann (1882–1945), on 28 September, 1942, in *Geologische Rundschau*, vol. 33, pp. 121–122 and 151–155 (although he understandably misidentified the actual book to which it was to form the *Prospectus*!).

Haarmann's wonderful, privately established and very valuable, "Geologen-Archiv," which then contained "25,000 MSS, Diaries, Maps, a fine library of geo-historical literature and all its catalogues," was completely destroyed when Haarmann's private home in Berlin-Schoeneberg, Am Park 11, was bombed during British raids on Berlin on 1 March 1943 (see *Geologische Rundschau*, vol. 33, p. 508, 1943). But Schuster had already given his unique Smith item, by 1926, to the manuscript collections of the Preussische Staats-Bibliothek, also in Berlin, of which he was the then Director. Since this item has been safely recorded in print, we will be able to reprint that too.

But we should, as historians, investigate whether this unique Smith item still survives and where! That same Preussische Staats-Bibliothek was world famous, as having held 'the world's most important collections of missing music manuscripts' (see on this Nigel Lewis' 1981 book, *Paperchase: Mozart, Beethoven, Bach... The search for their lost music*). These collections, and much more, were finally tracked down to the Jagiellonian Library of Krakow University in 1977 (see *The Sunday Times* (London), 3 April 1977, p. 17), as the result of the devoted searches made for some unique zoological MSS, by the zoologist, and my good friend, the late Peter Whitehead (1930–1992), of the Natural History Museum, London. Peter showed us what treasures had also survived in Krakow, in the fields of the History of Science, which had had identical Berlin origins. Maybe our German and Polish colleagues can now help us discover if Smith's unique *Prospectus* still survives, and *where*?

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Hugh S. Torrens, Keele

History of the Earth Sciences Society (HESS)

INHIGEO, as we all know, is the international umbrella for the many national groups that promote the history of the earth sciences in their respective countries; their diverse activities are recorded, as usual, in this annual *Newsletter*. The History of Earth Sciences Society (HESS) *complements* the work of INHIGEO and its constituent national groups by offering a *publishing* outlet for original research articles in our field. Its journal, *Earth Sciences History* (*ESH*), is the only established periodical to be devoted specifically to the history of the earth sciences. Although HESS and *ESH* were founded in the USA (in 1981–82), they were intended from the start to be international in scope. The current president of HESS (Martin Rudwick) lives in the United Kingdom, and the current editor of *ESH* (Patrick Wyse-Jackson) in the Republic of Ireland; so this seems a good moment to bring the worldwide character of the society and the journal to the attention of members of INHIGEO everywhere.

There is still a widespread impression—which I myself have encountered while talking to other participants on recent INHIGEO field trips—that HESS is a purely North American organisation, and that its journal only publishes articles on American topics. This is not true, as a glance at recent issues of *ESH* will confirm. Authors of recent articles are of many different nationalities, and the topics covered are equally international in

scope. The history of the earth sciences would be greatly strengthened worldwide, if you— INHIGEO members everywhere—would consider submitting your historical papers for possible publication in *ESH*. This would ensure that the results of your research reach a wide and international audience. But the future success of *ESH* depends financially on the subscriptions of the members of HESS. In my opinion, *all* members of INHIGEO should, if possible, support scholarly research in our field by becoming members of HESS (thereby receiving personal copies of *ESH*). In addition, or where personal subscriptions are not feasible for financial reasons, you could ask your libraries to become institutional subscribers to *ESH*. This would ensure a bright future for scholarly work on the history of the earth sciences. For more information on HESS and *ESH*, visit our website: www.historyearthscience.org

Martin Rudwick, Cambridge
President, History of Earth Sciences Society

New Book on the History of Meteorology

The proceedings of the first conference devoted to the history of meteorology have recently been published. The conference took place on 5–9 July 2003, and was organized by the International Commission on History of Meteorology. Nineteen selected papers were presented at the Benedictine monastery, Polling, close to Weilheim in Upper Bavaria.

Publication details.

Stefan Emeis and Cornelia Lüdecke (eds), *From Beaufort to Bjerknes and Beyond: critical perspectives on observing, analysing, and predicting weather and climate*, Erv Dr. Erwin Rauner Verlag, Augsburg, 2005, 256 pp. ISBN 3 936905 13 4; Paperback 19.50 EUR plus packaging. Available from: verlag@erwin-rauner.de. Information on the contents and the index is given in a flyer at: http://leute.server.de/unf403/flyer.pdf.

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A Bookseller's Note Concerning Marcel de Serres

Marcel de Serres was a little-known French Evolutionist (1780–1862). We, as specialists in rare books and periodicals in the Geosciences, have a unique collection for sale of about 135 manuscripts of this first Professor of Geology at the University of Montpellier (southern France). About 70 % of the manuscripts are unpublished, thus are important for the history of geology and evolution. Please ask for details and a special list from Dieter Schierenberg bv, Zamenhofstr. 150, Unit 320, 1022 AG Amsterdam, The Netherlands, or E-mail: dieter@schierenberg.nl

German Society for History of Geophysics and Cosmical Physics (2005)

During the year 2005, Professor Treder organized a scientific meeting on principles in geophysics. Members of the Society participated in the Symposium "Albert Einstein in Berlin," where Professor Treder spoke about Max Planck and Albert Einstein. In this connection, Hans-Jürgen Treder and Wilfried Schröder published a compilation of Einstein's works in geophysics in the "Contributions for History of Geophysics and Cosmical Physics." Wilfried Schröder was convener of an international meeting on historical events and people in geomagnetism, aeronomy, and solar-terrestrial physics. The papers, presented by scientists from fifteen countries, were published in late 2005. Further work has been done for the edition of the selected works by the geophysicist Hans Ertel. Part VI contains his important papers in oceanography and hydrography. Karl-Heinrich Wiederkehr continued his study on Wilhelm Weber and took part in an exhibition in Hamburg. Hans Scheurich, Rainer Burghardt and Karl Ernst Kunst continued their theoretical studies in physics and geophysics, parts of which have been published in the book "Relativity, Gravitation and Theoretical Physics" (2005). Further work has been done by Wilfried Schröder and Hans-Jürgen Treder on the Mach-Einstein doctrine with geophysical application and the connections of geophysics and cosmology. In 2005, Volume VI or the "Beiträge Geschichte der Geophysik und Kosmischen Physik / Contributions for the History of Geophysics and Cosmical Physics" has been edited by Wilfried Schröder. Contact for the Society: Wilfried Schröder, Geophysical Institute, Hechelstrasse 8, D-28777 Bremen, GERMANY.

Ertel's Collected Papers Now Complete

Wilfried Schröder further reports that with Volume VI, *Oceanography and Hydrography*, publication of the collected papers of Hans Ertel has been completed. Ertel was Professor of Geophysics and Theoretical Mechanics at the Humboldt University in Berlin. He also was Director of the Institute of Physical Hydrography of the German Academy of Science. The collected papers contain Ertel's work in hydrodynamics, meteorology, geomorphology, oceanography, and hydrography. It is also of note that Ertel was founder of the "Society for Geological Sciences" and was first chairman of the "Alexander von Humboldt Commission" of the German Academy of Sciences. Under his leadership an international Humboldt Conference was held in Berlin in 1959, and a memorial book entitled *Alexander von Humboldt* was published. Ertel was also editor of the scientific journals *Forschungen und Fortschritte* and *Deutsche Literaturzeitung*, which often published papers in the history of geology, geophysics, and meteorology. Ertel presented a lecture on 'Development phases of Geophysics,' in which he demonstrated the interdisciplinary relations of geophysics with other earth sciences. As editor of *Gerlands Beiträge für Geophysik* and *Zeitschrift für Meteorologie* he often published historical papers and he opened the journals for historical studies.

History of a Quotation

Google the name "Petrus Severinus" and you will find a large number of hits, many of them to geologists citing a single quotation. Perhaps the most common form of the quotation is the following (often somewhat abridged):

> *Go my sons, buy stout shoes, climb the mountains, search the valleys, the deserts, the sea shores, and the deep recesses of the earth. Look for the various kinds of minerals, note their characters and mark their origin. Lastly, buy coal, build furnaces, observe and experiment without ceasing, for in this way and in no other will you arrive at knowledge of the nature and properties of things.*

This is the form in which the quotation appears in Frank Dawson Adams' book *The Birth and Development of the Geological Sciences* (1938, reprinted 1954 by Dover, p. 210); and Adams added, "Thus Field Geology had its birth."

The quotation does not appear in many earlier books on the history of geology, such as that by Karl von Zittel, translated as *History of Geology and Palaeontology* (1902, reprinted by J. Cramer, 1962). Adams' wording can be found in Alan L. MacKay's *A Dictionary of Scientific Quotations* (Bristol, Adam Hilger; no source given), in Alan Cutler's *The Seashell on the Mountain*, (Dutton, 2003, p. 17), and in corrupted form in many web pages, so there is little doubt that in modern times, its popularity derives originally from Adams. Adams took his quotation, not from the original, but from the preface of a book by J.G. Wallerius *Systema Mineralogicum* (Vienna, 1778; for Wallerius, 1709–1785, see Rachel Laudan, *From Mineralogy to Geology*, University of Chicago Press, 1987).

The original book published by Petrus Severinus, in 1571, is rare, but it is the subject of a recent study by Jole Shackelford, Professor of the History of Medicine, University of Minnesota, Twin Cities, who kindly sent me both the original (sixteenth century) Latin version and his translation:

> *Ite filij, vendite agros, ædes, vestes, annulos, comburite libros, emite calceos, montes accedite, valles, solitudines, littora maris, terræ profundos sinus inquirite: animalium discrimina, plantarum differentias, mineralium ordines, omnium proprietates, nascendi modos notate: rusticorum Astronomiam & terrestrem*

Philosophiam diligenter ediscite, nec vos pudeat: tandem carbones emite, fornaces construite, vigilate & coquite sine tædio. Ita enim pervenietis ad corporum proprietatumque cognitionem, alias non.

Petrus Severinus, 1571, *Idea medicinæ philosophicae*, p. 73

Go, my sons, sell your fields, your houses, your clothes, and your rings. Burn your books, buy shoes, come to the mountains, investigate the valleys, the wildernesses, the shores of the sea, and the deep hollows of the earth. Observe the distinctions among the animals, the differences of the plants, the orders of the minerals, and the properties of all things and the ways they come into existence. Carefully learn the astronomy and terrestrial philosophy of the peasants, and do not be ashamed. Finally, purchase coals, build furnaces, be vigilant and tend to your preparations without weariness. For thus will you come to an understanding of bodies and their properties, and not otherwise.

It is clear that the original was extensively edited, presumably by Wallerinus, to eliminate references to animals, plants and astronomy: note particularly the substitution of "things" for "bodies" in the last line. The full version was, however, given in English much earlier by Archibald Geikie (*The Founders of Geology*, McMillan, 1897, p. 6—who gives as his source, D'Aubuisson, presumably his *Traité de Geognosie*, 1819). Geikie's book was based on a memorial lecture at The Johns Hopkins University, and we know that Adams was present on this occasion and met Geikie (Pettijohn, 1988, p. 24: Adams also appears in the group photograph reproduced as Figure 2-10 on p. 23: he is fourth from the left in the fourth row). Adams also cited both Geikie's and D'Aubuisson's books, though not as a source for his version of the quotation.

Perhaps this is a case of involuntary mental censorship. The shorter, revised version gives the impression that Severinus was one of the founders of mineralogy and geology, or at least an early field geologist. Alas, he was not.

A short biography can be found in the *Dictionary of Scientific Biography*. Severinus was a Dane, Peder Sørenson (1540–1602) who traveled in Germany, France and Italy from 1565 to 1571, when he published his major work, the book in which the quotation appears. After this he practiced medicine in the court of the Danish King. His interest was mainly in medicine, and his book was a defense of the approach taken by Paracelsus, as opposed to the "traditional methods" of the time. The influence of the alchemical works can also be seen in the book. His medical work was later discussed by Allen G. Debus in *The English Paracelsians* (London, 1965). For the Paracelsian approach to chemistry, see Debus' article in *Toward a History of Geology*, edited by C.J. Schneer, MIT Press, 1969, pp. 100–121) and J.R. Partington in *A History of Chemistry*, (London, 1961, v. 2, pp. 163–164). There is some evidence that Francis Bacon read Severinus, and was influenced by him; but little evidence that he had much direct influence on the founders of geology or mineralogy. Shackelford further comments (private communication):

> As a follower of Paracelus, [Severinus] was interested in the medical/chemical properties of plants, animals, and minerals, the traditional 'three kingdoms' that also traditionally provided the pharmaceuticals (mostly plants, but some 'earths' and animal parts as well). He was, during the 70s and perhaps the 80s (1570s, that is), friendly with Tycho Brahe, the noble Danish astronomer and alchemist, and it is entirely possible that he may have shared chemical/medical information or recipes with him, though I have no evidence that Severinus actually set foot in Tycho's house. In any case, I think his injunction to 'know the orders of the mineral' (i.e., the different kinds of minerals) really is a general rhetorical plea to understand the chemical properties and medical effects of minerals as well as plants and animals, for their possible use as medicines. The medical world in which he was working regarded these chemical properties as bound up with astrological properties and therefore also directed toward certain effects in the body. I rather doubt that Severinus ever undertook any 'field research' himself—he was too much a part of the bookish humanist tradition of the 16th century, though he had a reputation for making chemical drugs in the laboratory; the two generations that followed him in Copenhagen, including the collector Ole Worm and physician/bishop Niels Stensen (Steno), took a decidedly closer interest in specimens and geology. I do not demean the earnestness of his plea for empirical study of nature, but I think it must be located in the empirical medical context (and also in his case part of the rhetoric of the day) rather than in a research geological context."

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Gerard V. Middleton, Hamilton, Canada

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COUNTRY REPORTS (2005)

Australia

- *Carol Bacon* continues with her interest in the history of Tasmanian geology and has recently contributed a number of articles to *The Companion to Tasmanian History*. She attended the 2005 INHIGEO meeting in Prague and continues to work on a *Dictionary of Tasmanian Mining*. *Publications*: Contributions on various mines in: A. Alexander (ed.), *The Companion to Tasmanian History*, Centre for Tasmanian Historical Studies, Hobart, 2005.

- *David Branagan.* My main project for the year has been the completion of a volume on the life of Sir T.W. Edgeworth David, long-time Professor of Geology at Sydney University (1891–1924), Antarctic explorer, and WW-I geological hero, entitled *T.W. Edgeworth David: A Life*, published by the National Library of Australia. The book was launched on 21 October 2005, at the Nicholson Museum of Classical Antiquities at the University of Sydney, by Dr. Paul Willis, palaeontologist, science writer, and a former student of mine, following the 18th annual Edgeworth David Day. I have since made numerous radio and newspaper interviews about his effort and the book has received favourable reviews.

A paper on the enigmatic Russian oil geologist and journalist Captain Eugene de Hautpick was presented at the annual meeting of the Australian Mining History Association at Bendigo, Victoria, in July. The paper presented at the meeting of the Mineralogical Society of Russia in St. Petersburg in 2002 was published (largely in Russian) in

the *Journal of the Mineralogical Society of Russia*. Biographical articles on the geologist/ metallurgist Joseph Campbell (1856–1933), and the sea captain/earthquake observer Joseph Thompson (c.1784–1839) were published in the *Australian Dictionary of Biography Supplement (1580–1850)*. A paper on Broken Hill metallurgists was published in the *Australian Mining History Journal*. A paper on the writing of the Edgeworth David biography was published in the *National Library News*. A paper ('The End of an Era') on the recent history of the Department of Geology, University of Sydney was presented on 19 November 2005, as the final lecture in the old geology department's Edgeworth David Building (1960–2005), prior to its demolition. A paper on my involvement in the Australian coal industry was presented at the Department of Mineral Resources, Maitland, Hunter Valley, on 5 December, on the occasion of an Award for Excellence in Coal Geology by the Coalfield Geology Council of New South Wales. A Joint paper with deceased colleague Dr. K.H.R. Moelle was presented at a meeting of the Hunter Valley Branch of the Geomechanics Society of Australia, recording work carried out in the Newcastle region during the 1970s. It was subsequently published by the Society. In June, a meeting celebrating the twenty years of awards of the Harold White Fellowships by the National Library of Australia was held at the Library, where I spoke on the preparation of my biography of Edgeworth David, and presented a paper 'Imagining the Earth—A Few Moments from Edgeworth David's Life-long Quest.' A paper outlining the contribution by David to the exploration and geology of Antarctica was completed for a forthcoming encyclopaedia of Antarctica. I attended a meeting of the Basser Library Committee (Australian Academy of Science), where consideration was given to a number of aspects of the curation of Academy and other historic documents.

My research has been facilitated by help from many colleagues, particularly David R. Oldroyd, Hugh Torrens, and Sue Turner.

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- *Barry Cooper* continues his interest in the history of geology in South Australia and the historical use of building stone, and fields a number of enquiries in these areas. He is building up a large photographic catalogue of historical stone use and applications world-wide, although especially in South Australia. In October 2005, he gave a lecture to the local Field Geology Club on 'Early Geological Mapping in South Australia,' a synopsis of which was subsequently published in the Club's Bulletin. Recently he has been elected as a Councilor of the History of Earth Sciences Society (HESS). He is also Vice Chairman of the Adelaide-based History of Science Technology and Ideas Group.

- *Tom Darragh* has, at the request of a colleague at the Queensland Herbarium, been transcribing and translating four diaries of the explorer Ludwig Leichhardt, covering the period 1842–1844. The diaries or notebooks include Leichhardt's observations on botany and geology, with some notes on station life and Aborigines. They were compiled as Leichhardt moved from Glendon on the Hunter River near Newcastle, New South Wales, through northern New South Wales to Brisbane, Morton Bay district, in what is now Queensland. Leichhardt then remained in the Moreton Bay district for some months, travelling as far north as present-day Maryborough. He then returned to Sydney via New England and Newcastle, with a detour through the Darling Downs. The diaries are written in old German script with numerous abbreviations, so the transcription has not been easy. A draft translation is nearly finished. Future work on the project will involve identifying place-names, people and plants mentioned in the text. A biographical entry was published on the graptolite palaeontologist and stratigrapher, Dr. W.J. Harris: "William John Harris," *Australian Dictionary of Biography Supplement 1580–1980*, p. 165.

- *Homer Le Grand* will soon finish his long stint as Dean of the Faculty of Arts at Monash University in Melbourne and will take up his work on the history of geology again next year with a study of the history of the terrane concept.

- *David Oldroyd* attended the fine INHIGEO meeting in Prague, and presented a paper on the work of John Michell, one of the pioneers of seismology. He enjoyed an extension to his time in Czechia with a stay *chez* Kozák. Their joint volume on the Lisbon Earthquake was published and distributed to Members attending the meeting. Since his return to Australia, he has co-authored a paper with Dr. Kozák, Filomena Amador, Ana Carneiro, and Manuel Pinto on studies of earthquakes from 1755 to 1855.

David also represented INHIGEO at the International Congress for the History of Science, in Beijing. While in China, he was kindly received by the editorial staff of *Episodes*, with whom he has been collaborating for several years on matters to do with the history of geology; also some Chinese historians of geoscience. He was taken on excursions to several places of interest by his collaborator Yang Jing-Yi, including Taishan, which has the oldest rocks in China, and about which they had written in a paper on the work of Bailey Willis in China (without either of them ever having had the opportunity to visit the most interesting locality—hmm!). Professor Yang's translation of David's *Thinking About the Earth* (1996) is in press in Shanghai; and David discovered (to his pleasure) that a Turkish edition was published in 2004 without his being aware of the fact! (The translation was undertaken at the instigation of INHIGEO colleague, Professor Şengör, Istanbul, to whom he is greatly indebted.) His volume *Earth Cycles: An Historical Approach* was completed in 2005 and is in press at the time of writing.

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- *Susan Turner* gained a commission from UNESCO in early 2006 to write a chapter on the history of the International Geoscience Programme (IGCP), for an upcoming book celebrating the history of UNESCO and sixty years of work of the Natural Sciences Division (to be edited by Gisbert Glaser). Her work this year on the history of Australians in IGCP (unfortunately curtailed with the cessation of an Australian Research Council grant at the end of 2004) has included transcription of interviews with the late John Shergold.

But 2005 was "Women's History Year"—she finished a memorial for one Australian palaeontologist, Dr. Betty Ripper, at the beginning of the year and sadly assisted in the recording of the memory of another, Dr. Mary Wade, towards the end. She is also working on a biography of Dr. Joan Crockford-Beattie, with regular conversations and input from Joan. At the request of the Royal Historical Society of Queensland, Susan gave a talk in August on "Queensland Women Scientists" for a celebratory women's day commemorating a hundred years of suffrage in that State. In late November, she participated in the History of Geology Group (HOGG) of the Geological Society's special symposium on women's contributions to geology, organised by Professor Cynthia Burek, with a talk on "Invincible but mostly invisible: Australian women's contribution to palaeontology." This paper will be presented to a special publication of the GSL.

2005 saw the culmination of work done on a first assessment of the achievements of Dr. Margarethe Brongersma-Sanders (1905–1996), the Dutch scientist who did pioneer work on fish-kills and their significance for petroleum formation and who was a pioneer in organic geochemistry. The museum *Leiden naturalis* was unable to publish in the mid-year of the hundredth anniversary of her birth because of budget cuts, but a reversal of the decision means the study will still gain a late-2005 publication date.

Sue was also commissioned to write an article on Dorothy Hill for Charles Scribner's Sons *The New Dictionary of Scientific Biography* and, with David Oldroyd, she is looking at the importance of the Ediacara fauna and the role of Reginald Sprigg, for a Chicago UP book, *Paleontology at the High Table.*

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It is with deep regret that we record the death of our colleague Neil Archbold (see p. 33).

David Oldroyd, Sydney

Belarus

Scientific Conferences

On 1–3 July 2005 an International Scientific Conference devoted to "Problems of Water Resources, Geothermy and Geoecology" was held in the Presidium of the National Academy of Science in Minsk. The Conference was dedicated to the 100th anniversary of academician Gerasim Vasilievich Bogomolov (1905–1981). The Conference was organized by National Academy of Sciences of the Republic of Belarus, Russian Academy of Sciences, Parliamentary Meeting of the Union of Belarus and Russia, and the National UNESCO Committees of Russia and Belarus. Scientists from Argentina, Belarus, Germany, Iran, Yemen, Canada, Lithuania, Mexico, Poland, Russia, Uzbekistan, and the Ukraine participated in the Conference. The participants presented 289 reports that were divided between several topical sections: 1) Contributions made by Academician Bogomolov to the development of Hydrogeology, Geoecology, Geological Mapping and International Cooperation; 2) Contemporary problems of Hydrogeology, Water Resources and Engineering Geology; 3) Regional and Applied Geothermy; 4) Geoecology; 5) Geology and Hydrogeology of the potassium deposits, oil-bearing capacity and oil and gas Hydrogeology; and 6) General Problems of Geology. Before the Conference, its materials were published as Volume I (344 pages) and Volume II (302 pages), as well as *The Selected Works of Academician G.V.Bogomolov* in 2 Volumes.

A Republican Stratigraphic Conference was held on 29–30 September 2005, in the Institute of Geochemistry and Geophysics of the National Academy of Sciences of Belarus. Scientists from Belarus, Estonia, Lithuania, Latvia, Poland, Russia and the Ukraine took part.

Belarusian Geologists also participated in a number of scientific meetings: 1) 1–4 February 2005, the 38th meeting concerning "The Earth's Crust and Mantle Tectonics" (Moscow); 2) 4–8 April 2005, the 51st session of the Paleontologists' Society, attached to the Russian Academy of Sciences (St. Petersburg); 3) 20-24 June 2005, the 10th All-Russian conference on "Petrography of the XXI Century" (Apatity, Russia).

Jubilees

The Geological Society of Belarus celebrated the 70th birthday of stratigraphers Nikolai Veretennikov and Roza Zinova, the 60th birthday of geochemist Natalia Petrova, and the 60th birthday of lithologician Svetlana Obrovets.

Publications

The book by academician R. Garestki titled *Academician Yanshin—My Dear Teacher and Friend*, devoted to a well-known Russian geologist A.L.Yanshin, was published in Moscow.

Memory Dates

Two hundred years have passed since the birthday of Stepan Kutorga (1805–1861)—an outstanding geologist in nineteenth-century Russia, a professor of the University of St. Petersburg, and the founder of the Russian Mineralogical Society. He founded (in 1842) the first regular edition of the Society's journal *Verhandlungen der Russischen Mineralogishen Gesellschaft zu St. Petersburg* and had been its Chief editor till his death. S. Kutorga was born on 24 February1805 in Mstislavl, Mogilew province. He was a Belarusian. The most significant of S. Kutorga's work was the 10-verst (= 3500 ft.) map of St. Petersburg province, marked by his receiving the Demidov Prize of the St. Petersburg Academy of Sciences. He was also awarded a Konstantinov Medal of the Russian Geographic Society (1852). He was a member of many Russian and foreign natural-scientific societies. In the journal *Lithosphere* (Minsk; 2005, Nr 2) there was an article by V. Ermolenko about S. Kutorga.

Valeri Ermolenko, Minsk

Bolivia 2005

During 2005 the ASUR group (Anthropologists from the South), with the sponsorship of the Institute de Recherche pour le Dévelopment (IRD-France), fostered "Anthropological Mondays," a cycle of lectures that took place at the Museum of Indigenous Art in the city of Sucre. On 29 August 2005, I presented a paper on the topic 'Illness and mining work: A historical perspective,' for which a select group of researchers was present.

The Faculty of Engineering of the city of Oruro has published the article 'Professional Illnesses in the Colony' (*Metallurgical Journal*, 2005, August 26, 5–13). It deals with the subject of the influence of mining-metallurgical activities on the processes of health-illness. In order to investigate the origins of the labor diseases and others from different sources (alcoholism, asthma, hydrargirism or aging caused by mercury, altitude diseases, pneumoconiosis, pneumonia, rheumatism, cold, saturnism or aging caused by lead, silicosis, tuberculosis, etc.) we took into account two fundamental factors: (a) the technology that was used in the process of extraction-exploitation, processing and melting of the argentiferous minerals; and (b) the particular way in which the exploitation was organized in Potosi: that is, the coerced labor or "mita" and its repercussions on the health conditions of the workers.

On 24–25 September, the Restoration Plan of Historical Areas (PRAHP) offered national and international tourists two days of sightseeing, on what was called a "Patrimonial Tourist Bus." It was a tour that lasted 4 hours, showing the industrial archaeology of the city, the entrance to the Caracoles mine, the Royal Gallery, the ruins of the River Bank, the San Marcos Café Restaurant (a project for reutilizing a plant for processing tin, built on the premises of a former mill for the amalgamation of silver during colonial times), the San Sebastián lake and the dam of wastes of Laguna Pampa. The tour was guided by Carlos Serrano.

The Italian Cooperation in Potosi and other institutions organized the Second Postgraduate Course on Intercultural Health. Several modules were offered by national specialists and foreign guests. The module on History of the Imperial Villa was delivered by C. Serrano and three other professionals, from 20–23 October.

In 4–5 November, the Bolivian Academy of the History of Medicine, Chapter Potosi, carried out the III National Workshop, considering the topic "History of Medicine for Disease in the Altitude of Bolivia." Sixteen papers were presented, and among them, my paper dealt with the topic 'Mining and Health.' This contribution will be published in 2006.

As part of the functions of the People's Defender, divulging and promoting human rights, the institution organized a cycle in the TV program "Talking with the People's Defender." In November I was invited to talk on 'Potosi, before and after 1810.' We discussed topics related to the history of one the most important silver deposits in the world. Its exploitations were made possible thanks to the compulsory work imposed by the Spanish conquerors on the natives and black slaves who were brought purposely to perform a great variety of tasks (mining, trade, transportation, etc.).

Commemorating the centenary of the publication of the *Journal of the Medical Institute* called "*Sucre*," the journal presented a series of contributions related to this celebration. A work by me was included ('The other face of the contact: Diseases in the Colony,' *Journal of the Medical Institute "Sucre,"* 2005, *70,* April-December 126, 111–120; or in the electronic sites www.inmedsuc.com.mx and www.inbiomed.mx.com). In this contribution, I was able to show the magnitude, intensity and duration of certain epidemics that affected the inhabitants and the labor class of the Imperial Village of Potosi. These epidemics quantitatively influenced the city's demographic decline.

I have looked for the main epidemic diseases that are still known: croup, measles, typhoid fever ("tabardillo"), smallpox, respiratory diseases, and other "plagues and pestilences." The resurgence of labor and professional diseases is of great importance: alcoholism, asthma, aging by mercury, diseases caused by the absorption of mineral substances, saturnism, silicosis, tuberculosis, and other diseases related to mining and metallurgical activities.

In December, a mission of UNESCO and ICOMOS arrived in Potosi in order to closely investigate the mining work, which has an effect on the Cerro Rico (Rich Hill) and the city itself. Together with other technicians, I accompanied Dr. Josep Matta Perello around the Cerro Rico, the Mint, the PRAHP office (where index cards are being prepared of the ruins of the colonial and republican mills), and the plants of the dam for waste at Laguna Pampa (built to prevent the pollution of the River Bank). This report will be useful for UNESCO in order to take measures to protect the cultural, historical, and industrial heritage of the city of Potosi nominated as Heritage of Mankind in 1987.

Carlos Serrano, Potosi

Canada

- Ernst Hamm

The past year was one of unusual administrative activity in my academic unit, the Science and Technology Studies Program of York University. For many years our home has been in the Atkinson Faculty of Liberal and Professional

Studies (formerly Atkinson College), but this year we initiated a process of moving to the Faculty of Science and Engineering. At the same time we have restructured our program so as to include our historian of science colleagues in the Faculty of Arts. These changes offer exciting possibilities for building bridges between historians of science, including historians of the geosciences, and scientists and science students. On another note I am happy to report that three papers on the history of geology were on the program of the annual meeting of the Canadian Society for the History and Philosophy of Science: Richard England, 'The Scientific Accuracy of the Bible: Authority, Honesty and Deference in Debates over Kinns' *Moses and Geology* (1882)'; Rob-Roy Douglas, 'Imaginary Mountains and National Frontiers: George Mercer Dawson on the Geography of British Columbia'; and E. Hamm, 'The "Temple of Serapis" as Icon in the History of Science.'

I spent the last five months on 2005 on sabbatical in Vancouver, as a Visiting Scholar in the Philosophy Department of the University of British Columbia and as a Visiting Member of Green College. In 2005 I also continued to serve as Councilor for the History of the Earth Sciences Society.

Papers presented by Hamm

E. P. Hamm, 'The "Temple of Serapis" as Icon in the History of Science and the Historical Sciences,' History and Philosophy of Science – Science and Technology Studies Collective, University of British Columbia, 2 December 2005.

E. P. Hamm, 'The "Temple of Serapis" as Icon in the History of Science,' Canadian Society for the History and Philosophy of Science, Annual Meeting, London (Ontario), 29–31 May 2005.

Publications by Hamm

E. P. Hamm, 'Romantic Life and Science,' essay review of Robert J. Richards, *The Romantic Conception of Life: Science and Philosophy in the Age of Goethe*, *Annals of Science*, 2005, *62*, 377–385.

E. P. Hamm, book review of Claudine Cohen, *The Fate of the Mammoth: Fossils, Myth and History*, *Annals of Science*, 2005, *62*, 127–129.

E. P. Hamm, Alan Richardson, and Catherine Crawford, 'Eloge to Stephen Straker,' *Isis*, 2005, *96*, 615–617.

- *Gerard V. Middleton*

Much of my time during the last year has been spent examining old stone buildings in southern Ontario, in an attempt to discover the source of the stone. Southern Ontario was not settled by people of European origin until the late eighteenth century. The earliest stone buildings date from the early 1800s and most were built during the period 1850–1880. The use of stone in buildings was stimulated by the need for stone in the construction of canals (1820–1880s) and railroads (1840–1850s). Stone masons were mainly ethnic Scottish, English, and Irish, and immigrated to Canada either directly or by way of the U.S.A., often in order to work on major engineering projects. Use of stone was at first very local because of transportation difficulties. Bedrock was quarried where the drift cover was thin; elsewhere buildings were constructed from wood or brick. Along the Grand River from Paris to Galt (now Cambridge), extensive use was also made of granite and amphibolite derived from boulders, transported south from the Canadian Shield in the Georgian Bay lobe of the Laurentian ice sheet.

Publications by Middleton

Middleton, G.V., 'Geologists elected Fellows of the Royal Society of Canada, 1883–1932,' *Northeastern Geology & Environmental Sciences*, 2005, *27(3)*, 187–190.

Middleton, G.V., 'Timetable of petroleum geology,' *Oil-Industry History*, 2005, *6(1)*, 123–128.

Middleton, G.V., 'Spencer, Joseph William Winthrop,' *Dictionary of Canadian Biography*, University of Toronto Press, *XV*, 2005.

Middleton, G.V., 'Andrew Cowper Lawson (1861–1952): how a boy from Canada became a legendary Professor of Geology at Berkeley,' *GSA Today*, 2006, *16*, 4/5, 50-51.

- *David Spalding*

Dinosaur Provincial Park celebrates 50 years and Royal Tyrrell Museum 20 years. Alberta's two premier vertebrate palaeontology sites both celebrated anniversaries in 2005. The fossil beds of Dinosaur Provincial Park were probably those recognized by First Nations in the 19th century, while the first scientific acknowledgement was made of their importance by Thomas Chesmer Weston in 1889. It was not until 1955 that the park was formally established as a result of advocacy from local doctor Frank Anderson, and scientific assistance from Charles Mortram Sternberg. In 1979 the park became the first World Heritage Site to be acknowledged on the basis of its fossil remains. Intensive research by the Universities of Alberta and Calgary, the Provincial Museum of Alberta and subsequently the Tyrrell Museum, the Canadian Museum for Nature, and numerous other agencies, have led to detailed documentation of this most important window into the Late Cretaceous, which is arguably the richest and most intensely studied vertebrate fossil site in the world.

The Royal Tyrrell Museum developed from the palaeontology program of the Provincial Museum of Alberta, and was opened in 1985 in Midland Provincial Park near Drumheller, Alberta. It received its "royal" status

in 1990. It exhibits remains of fossils from the province and elsewhere, including more than 30 substantially complete dinosaur fossils.

The anniversaries were jointly celebrated by a symposium on Dinosaur Park held at the Tyrrell Museum on 24–25 September 2005. More than 160 participants gathered for two days of papers, followed by a field trip to the park. Many had been involved in the park for decades, and two, Wann Langston and Hope Johnson, had also been at the 1963 meeting on vertebrate palaeontology in Alberta that stimulated development of the new programs. Others at the symposium worked on sites of comparable age elsewhere in North America. I was privileged to open the conference with a keynote presentation on the history of the park. The occasion also celebrated publication of a most substantial book on the park, edited by Phil Currie and Eva Koppelhaus, containing 28 papers and a CD-ROM with additional data.

References re the Dinosaur Park Symposium

Currie, Philip J., and Eva B. Koppelhus, (eds.), *Dinosaur Provincial Park: A Spectacular Ancient Ecosystem Revealed*, Indiana University Press, Bloomington & Indianapolis, 2005.

Braman, Dennis R., *The Palaeontology and Geology of the Dinosaur Provincial Park Area, Alberta.* Royal Tyrrell Museum of Palaeontology Twentieth Anniversary Fieldtrip, Drumheller, Alberta, Canada, 2005.

Braman, D.R., F. Therrien, E.B. Koppelhaus, and W. Taylor, (eds.), *Dinosaur Park Symposium: Short Papers, Abstracts, and Program*, Special Publication of the Royal Tyrrell Museum, Drumheller, Alberta, Canada, 2005.

Reid, Gordon, *Dinosaur Provincial Park*, The Boston Mills Press, Erin, Ontario, 1986.

Spalding. David A.E., *Into the Dinosaurs' Graveyard: Canadian Digs and Discoveries*, Doubleday Canada, Toronto, 1999.

Spalding, David A.E., 'The Most Important [fossil] Field in Canada: Dinosaur Provincial Park through 116 years,' in: Braman, D.R., F. Therrien, E.B. Koppelhaus, and W. Taylor, (eds.), *Dinosaur Park Symposium: Short Papers, Abstracts, and Program.* Drumheller, Alberta, Canada, 2005, 108–112.

In November 2005 the Federal Government announced that a mountain near Valemount, British Columbia (formerly called Twin Peaks) will be named Mount Pierre Elliott Trudeau after Canada's former prime minister. We reported previously on an earlier attempt to rename Mount Logan, Canada's highest, in the Yukon, in Trudeau's honour. Mount Logan, is of course named after Sir William Edward Logan (1798–1875), the first director of Canada's Geological Survey, and the plan to replace his name gave rise to considerable criticism.

On a smaller scale, INHIGEO members may be interested to know that a park in Saskatoon, Saskatchewan, has been named William Sarjeant Park in honour of our former member, Professor William Sarjeant of the University of Saskatchewan. This honour does not recognize Bill's noble contribution to the earth sciences and their history, but acknowledges his considerable contribution to the preservation of historic buildings in the city.

In addition to my appearance at the Dinosaur Park symposium, I delivered popular talks on the history of dinosaur discovery in Edmonton, Alberta, and Tumbler Ridge, British Columbia. A number of ongoing research and presentation projects related to Bill Sarjeant's affairs and Canadian dinosaur research will be reported on in future newsletters.

Publications by Spalding (all in press)

Spalding, David A.E., and William A.S.Sarjeant, 'Dinosaurs: The Earliest Discoveries,' For *The Complete Dinosaur* (second edition, no publication date announced).

Spalding, David A.E., 'Two Tyrrells cross the Barren Lands of Canada: 1893,' *INHIGEO Dublin Conference Proceedings*.

Lucas, Spencer G., *Chinese Fossil Vertebrates*, Columbia University Press, New York, 375 pp., Review in *Earth Sciences History*.

Ernst Hamm, Toronto, ON; Gerard Middleton, Hamilton, ON; and David Spalding, Pender Island, BC

China

After a meticulous preparation, the symposium on "Earth Science and Culture," in combination with the 17th Annual meeting of the History of Geology of the Geological Society of China (HGGSC), was held at China University of Geosciences (Beijing) on 15–16 October 2005. The symposium was sponsored by the Geological Survey Bureau (GSB) of China. The conveners were the China Library of Geosciences, the Commission of HGGSC and the Development and Research Center of the GSB. The symposium covered a large field of research topics. More than forty abstracts had been received. There were four people invited to give keynote talks at the meeting, thirty people gave talks at separate sessions, and twenty-six people attended the salon on discovery of oil fields in China. The contents of this symposium cover not only the disciplinary history in geosciences, history of geological education, and the history of geological organizations, but also some major fields of research, such as the

development of Earth Science and culture, scientific concepts of development, the establishment of a harmonic society, environmental protection, and the preservation of geological relics. The symposium was a mingling of multi-disciplines under the general topic of "Earth Science and Culture." The invited speakers are listed below:
Meng Xianlai (responsible for GSB): Devoting major efforts to promote the development of Earth Science culture;
Liu Dongsheng (representing The Institute of Geology and Geophysics, *Academia Sinica*): Energetically carrying out the study of the history of geosciences;
Zhao Pengda, Fang Yi (China University of Geosciences): Social geology: a new foundation for the development of Geoscience Culture;
Chang Jiang (responsible for The Writer's Union of Ministry of Land and Resources (MLR) China): Exploiting literary treasure of Earth Sciences: a perspective on Zhang Heng phenomena in the past and present. (Editor's Note: Zhang Heng (78–139 B.C.) is famous for inventing an early seismograph.)
Professor Wang Hongzhen gave some remarks at the meeting. He emphasized the importance of the systematic nature and the complexity of the earth sciences in studying earth science culture. A number of young scientists attended and gave talks at the meeting. Their involvement was a distinguishing feature of this symposium.

To sum up, this symposium was of high scientific value. Many talks given in the symposium are important in the construction of the national economy. And the salon on the early history of the discovery of large oil fields in China provided a successful mode of scientific exchange.

Publications

1. *Selected works of Wang Hongzhen*

Academician *Academia Sinica*, Professor Wang Hongzhen is a famous geologist and educator. He had been honored to take the post of President of Wuhan College of Geology, the President of the Paleontological Society of China, President of the Commission of History of Geology of Geological Society of China and the Vice-President of INHIGEO. He had published seven monographs and collected works, some 248 papers and research results. The content of the selected works covers twenty-nine papers in four categories: paleontology, stratigraphy and paleo-geography, geotectonics, and history of geology. The book *Selected works of Wang Hongzhen* (485 pages with 12 plates), was published in 2005 by Science Press, Beijing.

2. *Selected works of Cheng Yuqi*

Academician *Academia Sinica*, Professor Cheng Yuqi (1912–2002) was one of the pioneers of modern geology in China. He was the founder of metamorphic geology and Precambrian geology in China. For many years he took the leading post in the Geological Society of China, Chinese Academy of Geological Sciences and Ministry of Geology and Mineral Resources. He was honored as president of the IGCP Chinese Commission and was the chief editor of the leading geological journals in China: *Acta Geologica Sinica* and *Geology in China*. His 175 research papers published during 1935–2002 are enclosed in the selected works, composed of almost four million words. It consists of the research results on geology of ore deposits and the prospecting of mineral resources, metamorphic petrology and metamorphic geology, as well as Precambrian geology. In the selected works some forty-three papers on the management in science and technology are also included. *Selected works of Cheng Yuqi* was published in 2005 by the Geological Publishing House, Beijing.

YOU Zhendong, Beijing

Costa Rica

Gerardo J. Soto was appointed INHIGEO Vice-President for Latin America in 2004. His duties have included frequent communication with regional members of INHIGEO. The efforts to recruit new members from Latin American countries not yet represented in INHIGEO are still waiting for future negotiations. Cooperation with the Board in its business has been active through 2005.

The agreement between INHIGEO member G.J. Soto and the Colegio de Geólogos de Costa Rica allowed the organization of the 'Colloquium Karl Sapper on the History of Geology.' Sapper (1866–1945) was a German geologist who widely contributed to the knowledge of Central American geology through almost fifty years, from 1888 to the late 1930s. Thus, his name was honored with the colloquium title. The first colloquium was held on 4 March 2005, with the theme 'Evolution of the ideas related to the Nicoya Ophiolitic Complex,' presented by Prof. Percy Denyer (University of Costa Rica), commented upon by Guillermo E. Alvarado (INHIGEO member), and moderated by G.J. Soto. A second colloquium was held on 10 June 2005, with the theme 'Historical account of tunnels and underground works constructed by the Costa Rican Institute of Electricity (1953–2005),' presented by Eng. Geol. José Francisco Cervantes (Costa Rican Institute of Electricity and University of Costa Rica), commented upon by Eng. Marlon Jiménez (Costa Rican Institute of Electricity), and moderated by G.J. Soto. A short review of the first colloquium was presented by G.J. Soto (2005a).

Despite his absence during the INHIGEO meeting in Prague and South Moravia in July, G.J. Soto sent an abstract for a potential poster presentation (Soto, 2005b).

On 4 October, the book *Costa Rica: Land of Volcanoes*, written by INHIGEO member Guillermo Alvarado, was presented. This book contains a chapter (*Volcanology in Costa Rica*: pp. 15–46) with a historical review of volcanology in this country. The book was commented upon by the President of the Academy of Sciences of Costa Rica, Dr. Walter Fernández, and INHIGEO member G.J. Soto.

The *Centro de Investigaciones Geofísicas* (CIGEFI, Center for Geophysical Research) from the University of Costa Rica, organized the II-2005 CIGEFI Minicongress and the II National Meeting on Social Studies of Science, Technic and Environment, on 1–2 December. Two talks related to the history of geosciences were presented: 'El legado científico del Lic. Geómetra Pedro Nolasco Gutiérrez' [The scientific legacy of the geometrist Pedro Nolasco Gutiérrez] by Ronald Díaz, Flora Solano, and Giovanni Peraldo, and 'Contribución de geocientíficos japoneses en Costa Rica durante los decenios de 1960–70' [Contribution of Japanese geoscientists in Costa Rica during the decades of 1960s and 1970s] by G.J. Soto.

A paper pertaining to the history and present state of the art of volcanological studies in Costa Rica was published by Alvarado & Soto (2005) at University of Costa Rica, celebrating the international day for the reduction of risks and mitigation of disasters, on 13 October. Another paper discussing the past development and future challenges of Geology in Costa Rica was published by G.J. Soto (2005d).

References

Alvarado, Guillermo E., *Costa Rica: Land of Volcanoes*, Editorial Universidad Estatal a Distancia, San José, Costa Rica, 2005.

Alvarado, Guillermo E., and Soto, Gerardo J., 'Los estudios vulcanológicos en Costa Rica,' in: Hermann Hess, (ed.), *Celebración Día Internacional de Reducción de Riesgos y Mitigación de Desastres, 13 de octubre 2005*, Universidad de Costa Rica, Vicerrectoría de Administración, Programa de Gestión del Riesgo y Reducción de Desastres, 2005, 13–17.

Díaz, Ronald, Solano, Flora, and Peraldo, Giovanni, 'El legado científico del Lic. Geómetra Pedro Nolasco Gutiérrez,' *II Mini-Congreso 2005 del Centro de Investigaciones Geofísicas de la Universidad de Costa Rica y II Encuentro Nacional Estudios Sociales de la Ciencia, la Técnica y el Medio Ambiente*, 1–2 de diciembre del 2005, San José, *Resúmenes de Presentaciones*, 2005, 4.

Soto, Gerardo J. (a), 'Coloquio Karl Sapper sobre Historia de la Geología,' *Boletín de la Comisión de Historia de la Geología de España*, 2005, *26*, 6–7.

Soto, Gerardo J. (b), 'Cradle Institutions in Geophysics in Costa Rica in the Late 19th and Early 20th Centuries,' *INHIGEO Symposium on History of Geophysics*, July 2–12, 2005. *Program and Abstracts*, Prague and South Moravia, 2005.

Soto, Gerardo J. (c), 'Contribución de geocientíficos japoneses en Costa Rica durante los decenios de 1960–70,' *II Mini-Congreso 2005 del Centro de Investigaciones Geofísicas de la Universidad de Costa Rica y II Encuentro Nacional Estudios Sociales de la Ciencia, la Técnica y el Medio Ambiente*, 1–2 de diciembre del 2005, San José, *Resúmenes de Presentaciones*, 2005, 10.

Soto, Gerardo J. (d), 'Contribución de la Geología para el desarrollo futuro de Costa Rica,' *Umbral, revista electrónica de ciencia y tecnología costarricense* [www.umbralciencia.net/agosto05/futurogeologia.htm], 2005, *2*.

Gerardo J. Soto, San José

Czech Republic

The main activity of 2005 consisted in organizing the meetings and field excursions associated with the annual INHIGEO Symposium, hosted in the Czech Republic. The Symposium, entitled "History of Geophysics" was held in Prague and in south Moravia (Valtice), 2–12 July 2005. Forty-one INHIGEO members from fourteen countries and four continents participated in the meeting. The Symposium program consisted of two days of lectures (at the Geophysical Institute in Prague) and a round-table-discussion during the Business Meeting (Valtice). Seven excursions were organized before, during, and after the Symposium itself. Localities of special geological and geophysical interest were visited. The Local Organizing Committee was composed of O. Jäger, J. Haubelt, M. Pondělíček and Jan Kozák. At the Business Meeting it was decided to publish several of the papers that best fit the Symposium topics. A Special Issue of *Earth Sciences History* will be devoted to "The History of Geophysics." (The Symposium and field excursions are described in more detail in a separate report by Mike Johnson, published elsewhere in this *Newsletter*.)

In June-July 2005, Jan Kozák organized a pictorial exhibit concerning "La terra trema" ("Trembling earth") in Trento, northern Italy. The series of thirty-six historical and original engravings of earthquake effects and

volcanic eruptions, selected from the *Kozak Collection,* were displayed in Trento University's exhibition palace. The exhibit, which was accompanied by a specially prepared book (see below) was highly appreciated by the local press.

In September-December 2005, Jan Kozák participated in four international conferences held to commemorate the 250-year anniversary of the 1755 Lisbon earthquake. One of the meetings was organized by the Geo Forschung Potsdam (Germany) on 21 September. Two other conferences were organized by Portuguese seismologists in Lisbon, in November 2005. Lastly, a Czech-Portuguese Symposium was organized in Prague by the Czech Academy of Sciences, on 9 December 2005. In these meetings Kozák presented his new results in the field of the Lisbon earthquake's original iconography, and he introduced the book prepared and published for this occasion (see *Publications* below).

Joseph Haubelt has produced a second edition of the monograph entitled *Jakub Krčín z Jelčan (1535-1604)*. The book was launched in Prague. It analyzes and discusses the geotechnical and ecological impact of the work of this noted 16th-century pool-constructer. (Editor's Note: a "pool" was a means of irrigating land for agriculture.) In the annual Symposium on "Mining Pribram in science and technique" (Editor's Note: Pribram is a famous town in central Bohemia, known for its silver mining.) Haubelt presented a paper on 'Early years of the mining-school system in Czech countries in the 18th century.' He also presented a lecture in the National Technical Museum in Prague on 'Geological Interests of Johann Wolfgang Goethe.' At that same occasion, Claudia Schweizer (Austrian INHIGEO member) presented an excellent paper entitled 'Johann Wolfgang von Goethe and Kaspar Maria von Sternberg, Naturforscher und Gleichgesinnte' (published in Vienna 2005).

A beautiful and informative calendar (2006), devoted to "Geological Maps, 1829–1922," was produced in 2005 and published by the Czech Geological Survey (CGS), Prague, and the Geological Survey of the Slovak Republic, Bratislava. The scientific and historical work was overseen by S. Kacer, R. Tomas, J. Benes, L. Martinovsky, A. Cejchanova, and T. Sidorinova, and the layout was done by H. Ballakova.

Publications:

Giacomoni, P., A. Tagliapietre, and J. Kozák, *La Terra trema* (in Italian), [English: The Earth shaking], INTERART, Rovereto 2005, 114 pp.

Jakeš, P., and J. Kozák, *Vlny hrůzy* (in Czech) [English: Waves of terror], Lidové noviny, Prague 2005, 220 pp.

James, Ch., and J. Kozák, "Representations of the 1755 Lisbon Earthquake," in *The Lisbon Earthquake of 1755*, pp. 21–33, edited by T. E. D. Brown and J. B. Radner, Voltaire Foundation, Oxford, 2005.

Kozák, J., V. Moreira, D. Oldroyd, *Iconography of the 1755 Lisbon Earthquake*, Geophysical Institute and ACADEMIA, Prague, 2005, 83 pp.

Jan Kozák, Prague

France

Again, in 2005, the French Committee on the History of Geology (COFRHIGEO) held three meetings. The annual volume of "Travaux" is currently being prepared. It is expected to include:

- Babin, C., 'Édouard de Verneuil (1805–1873), un pionnier de la biostratigraphie du Paléozoïque'
- Gohau, G., 'Jules Verne (1828–1905), disciple de Buffon?'
- Gaudant, J., and Bouillet, G., 'La paléontologie de la Renaissance'
- Ray, N., 'Pierre Termier et la mobilité continentale'
- Schaer, J.-P., 'Les recherches d'Alexander Agassiz (1835–1910) sur les récifs et la participation suisse aux premières investigations océanographiques américaines'
- Mayer, W., 'Deux géologues français en Australie: Louis Depuch et Charles Bailly, membres de l'expédition Baudin (1801–1803)'
- Pichard, G., 'La découverte géologique de la Camargue, du XVIIe siècle au début du XIXe siècle'
- Jacqué, M., 'P.-W. Stuart-Menteath (1843–1923) ou cinquante ans de controverses géologiques en Pays Basque'
- Grandchamp, Ph., 'Le cours de géologie professé par Brochant de Villiers à l'École des mines dans les années 1810'

Additionally, it is worth noting that Claude Babin published a book entitled *Autour du catastrophisme: Des mythes et légendes aux sciences de la vie et de la Terre*, published by Éditions Vuibert-Adapt, Paris.

Two of our foreign members have also published books in 2005:

Evaristo Álvarez Muñoz (Spain): *Filosofía de las ciencias de la tierra: El cierre categorial de la geología*, Biblioteca Filosofía en español, Fundación Gustavo Bueno, Oviedo. (* See the review in this *Newsletter.*)

Albert V. Carozzi (USA): *Horace-Bénédict de Saussure (1740–1799): un pionnier des sciences de la Terre*, Slatkine, Genève. (* See the review in this *Newsletter.*)

Finally, Jean Gaudant enjoys informing the readership that, after a long struggle, the book *Dolomieu et la géologie de son temps*, issued from a symposium held in November of 2001, celebrating the bicentenary of Dolomieu's death, was at last published by Les Presses de l'École des mines. (* See the review in this *Newsletter*.)

Jean Gaudant, Paris

Germany

Meetings

The German working group on the "History of Earth sciences" held its annual meeting on 18–19 November at the Otto-von-Guericke-University at Magdeburg on the 'History of Earth Sciences in Eastern Germany, 1945–1990,' organized by Martin Guntau, Olaf Hartmann, and Werner Paelchen. With about 80 participants (mainly from the eastern parts of Germany), the meeting was very successful. Twelve lectures were given on different aspects of geoscientific work in the former "German Democratic Republic," for instance on geological work at the Academy of Sciences, on geophysical prospecting, on coal mining, and on University education of geologists and mineralogists. Notwithstanding some critical comments in the preliminary stages, due to the political implications of the topic, all the papers gave serious and informative insights into the working conditions of Eastern German earth scientists at this time. And the lively discussions showed that it was the right time to choose this topic for an annual meeting. INHIGEO member Cornelia Lüdecke organized two workshops, the first one at the Bavarian Academy of Sciences, Munich, 2–3 June (*1st SCAR Workshop on the History of Antarctic Research*), and a second one on 'Source materials and studies on the history of meteorology,' on occasion of the 5th FAGEM-meeting at the Meteorological Observatory at Lindenberg, 11–12 October).

Publication

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Engelhardt, W. von, 'Struktur und fruehe Morphologie des Rieskraters,' *Geologica Bavarica* 2003, *108*, 159–200.

Engelhardt, W. von, 'Chemistry, small-scale inhomogeneity, and formation of moldavites as condensates from sands vaporized by the Ries impact,' *Geochimica et Cosmochimica Acta*, 2005, *69*, No. 23, 5611–5626.

Fritscher, B., Article on 'Eduard Suess,' in: Richard C. Selley, L. Robin M. Cocks, Ian R. Plimer (eds), *Encyclopedia of Geology*, vol. 2, Elsevier Academic Press, Amsterdam, London, 2005, 233–242.

Fritscher, B., Article 'Alfred Wegener,' in: Richard C. Selley, L. Robin M. Cocks, Ian R. Plimer (eds), *Encyclopedia of Geology*, vol. 2, Elsevier Academic Press, Amsterdam, London, 2005, 246–253.

Fritscher, B., (together with H.-P. Brogiato and U. Wardenga), 'Visualisierungen in der deutschen Geographie des 19. Jahrhunderts: Die Beispiele Robert Schlagintweit und Hans Meyer,' *Berichte zur Wissenschaftsgeschichte*, 2005, *28*, 237–254.

Fritscher, B., 'The dialectic of the atmosphere: Heinrich Wilhelm Dove in context,' in: Emeis, S., and Luedecke, C., *From Beaufort to Bjerknes and beyond: Critical perspectives on observing, analyzing and predicting weather and climate*, Algorismus, *52*, Augsburg, Rauner, 2005, 91–102.

Fritscher, B., Review of Ilse Seibold: *Die Geologen und die Kuenste*, Kleine Senckenberg-Reihe, Bd. 39, Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung 2001. 154 Seiten, 76 Abbildungen. In: *Berichte zur Wissenschaftsgeschichte*, 2005, *28*, 235–236.

Guntau, M., 'Georgius Agricola und der Geist seiner Zeit (2),' in: 'Georgius Agricola und der Geist seiner Zeit. Zum 450. Todestag des großen Gelehrten' (*Mitteilungen des Chemnitzer Geschichtsvereins*), Jahrbuch 2005, *75*, new series 14, 7–19.

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Guntau, M., Review of Walter, Hans-Henning (ed.), *Janderson, Verzeichnis und Erklärung der vornehmsten Wörter/Werkzeuge/Gebäude und anderer Sachen so bey dem Saltz=Sieden gebraucht werden und jetzo ueblich sind, auf das Deutlichste entworffen und nach dem Alphabeth eingerichtet. Aufgesetzt von einem Liebhaber der Saltz= Werke. Magdeburg, gedruckt und zu finden, bey Andreas Mueller, Im gueldenen A.B.C.1720.* Mit einem Nachwort, Drei Birken Verlag, Freiberg, 2003, 38 pp. + xv, ISBN 3-936980-01-2, *Internationale Zeitschrift fuer Geschichte und Ethik der Naturwissenschaften, Technik und Medizin (NTM),*

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Luedecke, C., 'Living in an extreme environment—Development of Wintering Stations of German Polar Expeditions (1900 – 1945),' *Annalen der Meteorologie*, 2005, *41*, No.1, 254–257.
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Luedecke, C., 'Antarctic research—No longer a historic matter in the science community. On the establishment of a new action group and its first workshop,' *Earth Science History*, 2005, *24*, No. 2, 281–286.
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Schroeder, W., *Geophysical fluid dynamics (selected papers by Hans Ertel)*, Science Edition, Bremen, 2005, 317 pp.

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Lectures

Fritscher, B., 'Prussian legacy: The "German prehistory" of the Geophysical Laboratory of the Carnegie Institution,' Prague, Geophysical Institute, International Commission on the History of Geological Sciences (INHIGEO), *Symposium on History of Geophysics* (2–12 July) (4 July).

Fritscher, B., 'Konstruktionen der Gewalt: Erdbeben und Vulkane im politischen Diskurs um 1800, Göttingen, Jahrestagung der deutschen Gesellschaft fuer die Erforschung des 18. Jahrhunderts,' *Das Erdbeben von Lissabon und der Katastrophendiskurs im 18. Jahrhundert* (6–8 October) (7 October).

Fritscher, B., 'The geological survey of Alsace-Lorraine and the making of the German Empire,' Paris, Centre de recherche en histoire des sciences et des techniques (Cité des sciences et de l'industrie / Université Paris), Colloque international, *The first big science: European geological maps (XIX c.)* (18–19 November) (11 November).

Guntau, M., Hartmann, O., and Paelchen, W., 'Geschichte der Geowissenschaften im Osten Deutschlands 1945 bis 1990' (Einfuehrung in die Tagung des Arbeitskreises Geschichte der Geowissenschaften der Deutschen Gesellschaft fuer Geowissenschaften zu dem Thema: *Geschichte der Geowissenschaften im Osten Deutschlands 1945 bis 1990*) Magdeburg (18–19 November) (18 November)

Kölbl-Ebert, M., 'Lissabon 1755—Anatomie einer Erderschuetterung,' Eichstaett, Jura-Museum, (17 November).

Luedecke, C., 'Planung und Improvisation—Deutsche Polarstationen gestern und heute,' University of Hamburg, Kolloqium des Schwerpunktes Geschichte der Naturwissenschaften (4 April).

Luedecke, C., 'Von der Kanoldsammlung (1717–1730) bis zu den Ephemeriden der Societas Meteorologica Palatina (1781–1792)—Meteorologische Quellen zur Umweltgeschichte,' Potsdam, Forschungszentrum Europäische Aufklärung e.V, *Landschaften agraisch-ökonomischen Wissens* (22–24 April) (23 April).

Luedecke, C., 'Karl Maria Herrligkoffer's private "German South Pole Expedition" 1957/58—a failed initiative,' Munich, Bavarian Academy of Science, 1st SCAR Workshop on the History of Antarctic Research (2–3 June) (3 June).

Luedecke, C., 'Kurfuerst Karl Theodor (1724–1799) in Förderer moderner meteorologischer Meßnetze zum Nutzen der Landwirtschaft,' Universität Göttingen (21 June).

Luedecke, C., 'East meets west: Meteorological observations of the Moravians in Greenland and Labrador in the 18th century,' 22nd International Congress on History of Science, Beijing, China, 24-30 July) (25 July).

Luedecke, C., 'Living in an extreme environment—Development of Wintering Stations of German Polar Expeditions (1900–1945),' Garmisch-Partenkirchen, 17th International Congress of Biometeorology (5–9 September) (7 September).

Luedecke, C., 'New Weather Data for the Cape Horn Route: A Result of the International Meteorological Co-operation in Antarctica (1901-1904),' Utrecht, 5th Annual Meeting of the European Meteorological Society (12–16 September) (16 September).

Luedecke, C. (together with Tammiksaar, E.), 'Holzkajaks fuer Polarexpeditionen—Eine technische Entwicklung um 1900,' Jena, 22nd Internationale Polartagung (19–24 September) (9 September).

Luedecke, C., 'Die erste permanente aerologische Station auf Spitzbergen (1911–1914),' Lindenberg, Observatorium, 5. FAGEM Tagung (11–12 October) (12 October).

Luedecke, C., 'Alfred Wegener's meteorological programme—A challenge in logistics and station building in Greenland,' Bremerhaven, 2nd International Alfred Wegener Symposium (30 October –2 November) (1 November).

Luedecke, C., (together with Dotzek, N., Holzer, A.M., Peterson, R.E.), 'Alfred Wegener's tornado research and the influence on Johannes Letzmann's scientific achievements decades ahead of their time,' Bremerhaven, 2nd International Alfred Wegener Symposium (30 October–2 November) (1 November).

Further Activities

On occasion of the National Monumental Heritage Day, INHIGEO Honorary member Wolfhart Langer organized a guided tour at the neogothic castle near Bonn, where up to 1870 the estate of the famous Bonn paleontologist Georg August Goldfuss (1782–1848) had been. Furthermore, he is engaged in a series of papers (mainly biographical studies on lesser known geologists) which (we hope) will soon be published. INHIGEO member Wilfried Schroeder acted as Scientific Secretary of the "Society for the History of Geophysics and Cosmical Physics." Also available is volume 16 of the *Nachrichtenblatt zur Geschichte der Geowissenschaften*, compiled by Oskar Burghardt, containing a lot of valuable information on what happens in the history of earth sciences in Germany. The volume can be ordered from O. Burghardt, Taubenstr. 47, D-47800 Krefeld-Bockum, e-mail: obu.burghardt@t-online.de.

INHIGEO member Cornelia Luedecke presented scientific posters on the 'German marine meteorological station on Spitzbergen (1941–1945): A case for a polar national monument' on the "22nd International Polar Meeting at Jena" (19–24 September), and (together with Helmut Hornik) on 'Wilhelm Filchner and Antarctica' at the "1st SCAR Workshop on the History of Antarctic Research" at the Bavarian Academy of Science, Munich (2–3 June). Furthermore, Cornelia Luedecke gave two lecture courses at the university of Hamburg (entitled 'History of meteorology,' and 'Science without boundaries—International relations in the earth sciences since the 17th century).' Several lecture courses were also given by INHIGEO member Bernhard Fritscher, both at the History Department, and the Department of Earth and Environmental Sciences of the University of Munich. The help of the German members of INHIGEO in the compilation of this report is much appreciated.

Bernhard Fritscher, Munich, and Martina Koelbl-Ebert, Eichstätt

Ireland

It has been a relatively quiet year in Ireland. Paul Mohr had published the book *Discovers of Earth's History*. Patrick Wyse Jackson gave papers at the HOGG 'Women in Geology' Meeting in London. His book *The Chronologers' Quest: episodes in the search for the age of the Earth* is to be published by Cambridge University Press in September 2006. Gordon Herries Davies has completed the bicentennial history of the Geological Society (of London) and it is due to be published in 2007.

Publications and presentations

Higgs, B., and Wyse Jackson, P.N., 'The role of women in the history of geology in Ireland,' *Abstracts History of Geology Group Symposium, Geological Society of London,* 28 November 2005.

Higgs, B., Burek, C., and Wyse Jackson, P.N., 'Is there gender bias in geology?,' *Irish Journal of Earth Sciences*, 2005, *23*, 134–135.

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Wyse Jackson, P.N., 'Irish "Rock Stars": James Ernest Richey (1886–1968),' *ES2k*, 2005, *11*, 12.

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Wyse Jackson, P.N., 'Irish "Rock Stars": Thomas Oldham (1816–1878),' *ES2k*, 2005, *12*, 12.

Patrick Wyse Jackson, Dublin

Italy

Due to the extended illness and death, on Sunday, 16 April 2006, of Nicoletta Morello, long-time member of INHIGEO and our Vice President for Europe, the country report from Italy will not appear this year. A report from Italy, incorporating events of 2005 and 2006 will be published in next year's *Newsletter*.

Our condolences and best wishes go out to Nicoletta's family, her Italian colleagues, and her INHIGEO friends around the world.

Japan

The Japanese Association for History of Geological Sciences (JAHIGEO) held its ordinary meeting at Hokutopia, Tokyo, on 18 June 2005, its evening session at the annual meeting of the Geological Society of Japan at Kyoto University on 19 September 2005, and its general meeting at Hokutopia on 23 December 2005.

The following presentations were made at the general meeting in June. Yoshio KATSUI, spoke on 'A historical note of the volcanological study in Japan and the path to the first hazard map in Japan on a volcano in Hokkaido,' and Ryoji ISHII spoke on 'Sven Anders HEDIN and the wandering lake.'

Two lectures relating to the universities in Kyoto were presented at the evening meeting at Kyoto University. Keiji NAKAZAWA spoke on 'The brief history of the Geological and Mineralogical Department, Kyoto University,' and Nobuhiro IMOTO presented 'On the history of education of geosciences in the Kyoto University of Education.'

The following two lectures were given at the general meeting in December: Naotoshi YAMADA presented 'The historical review of surveys and studies of Cretaceous Nohi Rhyolites,' and Saburo AKAGI spoke on 'A life of Sadakazu TOKUDA (1889–1945).' The Nohi Rhyolites, distributed widely in the central part of Honshu, were identified as a porphyrite at first, but later considered a welded tuff by YAMADA *et al.* TOKUDA was a mining geologist of Mitsui Mining Company. He was interested in echelon arrangement of geomorphology and geologic structures, and tried to make them on wet Japanese paper by pushing with his fingers. He was invited to discuss those studies at the International Geological Congress held at Washington D.C., USA, in 1933.

Seminars on the history of the geosciences were held on four occasions, under the leadership of the younger members of the Association, on 19 March, 11 June, 1 October, and 17 December at Aogaku-kaikan, Tokyo. The presentations were as follows: 1) Tomiro TATEZAWA, 'Traveling around the Himalayas'; 2) Masumi OSAWA, 'Wandering studies—from geochemistry to archeological chemistry and history of geosciences'; 3) Toshiaki OSADA, 'History of geological study in Taiwan before World War II'; and 4) Hiroo MIZUNO, 'Historical review of measurement of distance from the earth to the sun—The first step for the universe spreading in 15 billion light years.' The Seminars held a study tour of history of geological sciences at Shiga Prefecture, where Sekitei KIUCHI (1724–1808) collected many kinds of stones, ore minerals, fossils and archeological remains, and Anou's stone masons have lived, playing an active role all over the Japanese islands.

Michiko YAJIMA and Toshihiro YAMADA attended at the 22nd International Congress of History of Sciences held at Beijing from 24 to 30 July 2005 and gave speeches there.

The Japanese Association for History of Geological Sciences issued its *Bulletin* nos. 24 and 25, and JAHIGEO *Newsletter* no. 8 in 2005.

It is very sad that Dr. Daikichiro SHIMIZU, a member of INHIGEO and an active member of the Association passed away on 17 February 2005.

Yasumoto SUZUKI, Ichikawa and Hakuyu OKADA, Fukuoka

Lithuania

Prof. Algimantas Grigelis and Dr. Gailė Žalūdienė, INHIGEO Members, took part in the 11th Lithuanian Conference on *Scientia et Historia*, organized by the National Association of History and Philosophy of Sciences in Vilnius, 31 March–1 April 2005. Prof. Grigelis gave a keynote lecture on 'Jewels and Gemstones in the Past of the Lithuanian Elite.'

Dr. Žalūdienė gave a report on 'Historical Data of the Earthquakes in Lithuania' at the 13th World Lithuanian Symposium on the Arts and Sciences that was held in Vilnius, 30 June–5 July 2005. Three reports on the heritage of geological and ground water subjects were presented.

The third annual meeting of the Lithuanian Ignotas Domeika Society (LIDS) that was held in the Lithuanian Academy of Sciences, Vilnius, 13 April 2005, had a keynote presentation made by Prof. Grigelis on 'Old Estates of Domeyko's Family in the XIX Century (Footmarks of the Three Branches of Danguel Arm).' Another joint meeting of Domeika Society and Chamber of Scientists, held on 12 December 2005, was devoted to Paz Domeyko's (Sydney, Australia) book *Life in Exile: Ignacy Domeyko 1802–1889*. Details concerning the book were presented by Prof. Grigelis. At this meeting Paz Domeyko was unanimously elected an Honorary Member of the LIDS. In 2005 a new website was opened on the internet site of the Lithuanian National Commission for UNESCO (www.unesco.lt) devoted to Ignotas Domeika and studies of his heritage. Prof. Grigelis was re-elected President of this Society for two more years.

Prof. Grigelis and his wife, Dr. Leonora Živilė Gelumbauskaitė, participated in the INHIGEO Symposium 'History of Geophysics,' held in Prague, Czech Republic, 2–12 July 2005, and in the post-symposium field excursion. Prof. Grigelis presented a talk on 'Earliest Geophysical Investigations in Lithuania.'

Miscellaneous matters

Prof. Grigelis, as a past-Chairman of the Lithuanian National Committee of Geologists and present Chairman of the Section on Geosciences of the Lithuanian Academy of Sciences, gave an interview on national goals of 'The International Year of Planet Earth' published in *Geological Horizons*, 2005, No. 3, 10–13.

Two bits of information on activity of the LIDS were published in the Polish weekly *Nasz Czas (Our Time)* in Vilnius, entitled 'Ignacy Domeyko nie zapomniany' (No. 8, 2005, p. 1; 'Ignacy Domeyko is not forgotten'); 'Życie na zesłaniu: Ignacy Domejko 1802–1889' (No. 25, 2005, p. 2.; 'Life in Exile').

Professor Grigelis is Editor and Publisher of *BALTICA: International Journal on Earth Sciences of the circum-Baltic States*. Two numbers of Volume 18 were published in English in 2005: No. 1, June, 46 pp., and No. 2, December, 52 pp.

A "Classic Paper" on Ignacy Domeyko's work 'A View of the Chilean Cordilleras,' originally published in Polish in 1878, was published by Professor Grigelis in *EPISODES*, 2005. In this article, Ignacy Domeyko's (1802–1889) ideas, as a one of earliest investigators of Andean geology, are considered. Born into a Polish-speaking Lithuanian family, Domeyko graduated from Vilnius University (1822) and the *École des Mines* (Paris, 1837). He worked in Chile for forty-six years (1838–1884), as a mining geologist, mineralogist, and chemist. He was elected Rector of the Chilean University in Santiago.

An International Conference on 'The Oldest Vilnius Water-Supply and its Historical Significance' was held in Vilnius, September 2005. The conference was hosted by the Lithuanian Academy of Sciences, Vilnius

University, and Lithuanian Society of Nature Conservation. A paper on 'Vision of the legacy of preservation of an old Vilnius water supply (since 1501)' was presented by Prof. Vytautas Juodkazis, Vilnius University.

INHIGEO's 31st International Conference will focus on 'The History of Quaternary Geology and Geomorphology,' and will be held in Vilnius, 28 July–4 August 2006, with a Field excursion on Quaternary and geomorphologic phenomena in Lithuania, Latvia and Estonia. The Conference organizers are the Lithuanian Academy of Sciences and the Institute of Geology and Geography (Vilnius), the University of Latvia (Riga), Tartu University (Tartu), and the Estonian Academy of Sciences (Tallinn). The First Circular was published in *Geological Horizons,* 2005, No. 3, 73–74; more information can be checked on the IUGS website: http://www.iugs.org/iugs/calendar/cal06.htm.

A 22nd Baltic Conference on the History of Science is to be held in Vilnius, 5–7 October, 2006. The Conference coincides with the historical date of publication of the General Relativity Theory (1916); a contact website will be available beginning in April 2006: http://www.kfmi.lt/eng/conf/baltconf.htm.

Publications

Grigelis, A., '32nd International Geological Congress in Firenza, Italy,' *Geologija,* 2005, *T. 49*, 59–66.

Grigelis, A., 'Ignacy Domeyko—an early investigator of Andean geology,' *Episodes,* 2005, *28*, no. 4, 279–285.

Grigelis, A., 'Gallery of famous Russian geologists and paleontologists,' International Commission on the History of Geological Sciences INHIGEO, *Newsletter No. 37*, 2005, 56–57. (Book review)

Grigelis, A., 'Lithuania,' International Commission on the History of Geological Sciences INHIGEO, *Newsletter No. 37,* 2005, 88–89. (Country report)

Grigelis, A., 'Apropos of spelling of stratigraphical terms,' *Geological Horizons*, No. 1, 2005, 70. (In Lithuanian)

Grigelis, A., 'Problems of use of geothermal energy in Lithuania,' *Geological Horizons*, No. 3, 2005, 57–58. (In Lithuanian)

Grigelis, A., 'Antanas Ražinskas—80,' *Geological Horizons*, No. 3, 2005, 61–63. (In Lithuanian)

Grigelis, A., 'Pro Memoria. Tadas Rimas Jankauskas (1938–2005),' *Geological Horizons,* No. 4, 2005, xx. (In Lithuanian)

Grigelis, A., 'Well-known geodesist on the course of geophysics,' *Geodezija ir kartografija,* XXXI t., 2005, Ia–Ic. (In Lithuanian)

Grigelis, A., 'Two manuscripts of Roman Symonowicz and Department of Mineralogy of the Vilnius University,' *Vilniaus universiteto bibliotekos metraštis 2004, Vilnius,* 2005, *7*, 117–141. (In Lithuanian with English summary)

Harff, J., and Grigelis, A., 'Farewell to Dr. Wolfram Lemke (1955–2005),' *BALTICA*, *18*, No. 1, 2005, 44–45.

Žalūdienė, G., 'Historical data on the Earthquakes,' *13th World Lithuanian Symposium on the Arts and Sciences. Abstracts,* Vilnius, 2005, 106. (In Lithuanian; Istoriniai žemės drebėjimų duomenys. *XIII pasaulio lietuvių mokslo ir kūrybos simpoziumas. Tezių rinkinys*)

Žalūdienė, G., 'Juozas Lukoševičius' view on the Earth evolution' (Juozo Lukoševičiaus žemės gelmių raidos koncepcija), Monograph, Vilnius, 2005, Geologijos ir geografijos institutas, 129 pp. (In Lithuanian with English summary)

Algimantas Grigelis, Gailė Žalūdienė, Lithuania

New Zealand

Years of research have been rewarded by the publication during 2005 of three substantial, well-written and illustrated biographies, as well as a history of the Geological Society of New Zealand. One of the biographies is *Julius Haast in the Southern Alps*, by Colin J. Burrows and published by Canterbury University Press. Although von Haast (1822–1887) had studied geology at Bonn, his arrival in New Zealand in 1858 was in connection with German immigration. Fortuitously for geology this was at the same time as the Austrian *Novara* expedition reached Auckland carrying the geologist Ferdinand von Hochstetter. Haast assisted Hochstetter in surveys in the provinces of Auckland and Nelson in 1859, and the following year he was engaged to undertake a major topographical and geological survey of western Nelson before being appointed Canterbury Provincial Geologist. He was later director of the Canterbury Museum and involved with the establishment of Canterbury University. He was instrumental in recognising the major role of glaciation in shaping the mountainous South Island of New Zealand. Haast received many honours, including a knighthood.

The other two biographies are of 20th century geologists Charles Alexander Fleming (1916–1987) and Harold William Wellman (1909–1999), both of whom had long associations with the New Zealand Geological Survey. *Charles Fleming— Environmental Patriot* is written by his daughter Mary McEwen and produced by Craig Potton Publishing. Fleming was appointed to the Geological Survey in 1940 and rose to be Chief Paleontologist. He became a leader in unravelling the paleogeography of New Zealand and the origin of the country's unique flora and

fauna. In later years he took a deep interest in the history of geology and was very active in conservation. In many respects his career was very much like Haast's, and amongst the honours he received was a knighthood. On the other hand, Wellman received few honours and probably would not have welcomed them if he had. Wellman is best remembered as the man who discovered the Alpine Fault in the South Island and recognised that there had been 480 km of horizontal movement on it. Blunt, at times rude, Wellman unhesitatingly challenged existing concepts, and he put forward unconventional new ideas involving a wide range of topics. His biography, *Harold Wellman—A Man who Moved New Zealand* (Victoria University Press), by INHIGEO member Simon Nathan, is reviewed is this Newsletter. Two other biographies, both of 19th century geologists, have been completed and are scheduled for publication in 2006. They are of Alexander McKay (1841–1917), by Graham Bishop, and Edward Heydelbach Davis (1845–1871), by Mike Johnston.

During 2005, Bruce Hayward wrote an informative history of the Geological Society of New Zealand (gsnz@paradise.net.nz) as part of celebrations marking the 50th anniversary of its founding. In addition, the Society's November newsletter was largely devoted to historical reminiscences about early members. Both it and the history give good backgrounds to prominent members of the earth science community over the past 50 years. Because of the expanded historical content of the November newsletter, the Historical Studies Group of the Geological Society decided to issue only one of its newsletters (March) for the year.

With the approaching bicentenary of the departure of the *Novara* Expedition in 1867, interest in Hochstetter (1829–1884) is gaining momentum. Sascha Nolden is completing a PhD thesis at Auckland University on a new biography of Hochstetter, along with an annotated edition of the correspondence between Hochstetter and Haast and Hochstetter's works relating to New Zealand. Leonore Hoke, in collaboration with Sascha and James Bade of the University of Auckland, continues her work on Hochstetter, including in Vienna, on Hochstetter's fifth diary.

Other research in progress is a biography of James Hector, inaugural director of the New Zealand Geological Survey and a member of the Palliser expedition to western Canada. This is part of Tony Hocken's PhD thesis at University of Otago. Alan Mason of Auckland is researching Charles Heaphy and Richard Taylor, and aspects of the Permian and Triassic rocks in New Zealand are being investigated by Doug Coombs, Bruce Waterhouse, and Jack Grant-Mackie. Keith Lewis of Wellington is documenting the history of marine geology, and Bob Brathwaite and David Skinner are pursuing various aspects of mining. In addition, Bob is accumulating information for a biography of P.G. Morgan, an early 20th century director of the Geological Survey.

Mike Johnston, Nelson

Poland

The most important events in the field of the history of geosciences in our country were related to the 250th anniversary of the birth of the "father of Polish geology" Stanislaw Staszic (1755–1826). After natural scientific studies at the College de France in Paris (1779–1781) he was a home teacher in the aristocratic Zamoyski family (1781–1797) and soon became an outstanding scientist—a geologist and philosopher. During his stay in Paris, Staszic made acquaintance with Georges Buffon and translated Buffon's monograph *Les époques de la nature*, as well as other French geologic and pedagogic publications, into Polish. When translating these books he became familiar with the geology of France, Italy, Switzerland and Austria (mainly the Alps and Apennines). Therefore, the Polish editions of Buffon's monograph, which appeared in 1796, 1803, and 1816, contained numerous notes on geology of Polish territories. Staszic was a warm votary of stratigraphic conceptions of French geoscientists of the 18th century, such as J.E. Guettard and G. Buffon. His mineralogical ideas came primarily from R.J. Haüy, his supplementary teacher in 1805. After 1803 Staszic accepted Werner's neptunistic theory.

Beginning in 1806 Staszic started to publish his papers on the geology of Poland. The most important was the monograph *On geognosy of the Carpathians and other mountains and lowlands of Poland* (1815), with his pioneer geologic map of Central Europe. On the other hand, his most important work on history of philosophy, entitled *The Human Race* (in three volumes), was published in the years 1819–1820.

When Poland lost its independence in 1795, Staszic concentrated his activity in writing papers and in large-scale geologic studies of the areas of Central Europe, i.e., the present territories of Austria, Slovakia, Hungary, Romania, Ukraine, Byelorussia, and Lithuania. In 1807 Staszic became a member of the government of the Duchy of Warsaw under French dependence. After 1815 the Kingdom of Poland became incorporated into the Russian Empire. Since 1800 he was the member and, later (1808–1826), the president of the Society of Friends of Sciences in Warsaw. In the government he was first engaged with the problem of education by reforming the University of Cracow, organizing the Academic Mining School in Kielce, as well as improving three academic institutions in Warsaw: the university, the polytechnics school, and the college of agronomy. In the period 1816–1824 Staszic was the head of the industrial department, contributing significantly to the development of mining and metallurgy, flood-control and road building in the Kingdom of Poland.

Stanislaw Staszic was, unquestionably, a man of renaissance nature: versatile scientist, novelist, poet, translator, patron of sciences, and protector and reformer of education and industry. As already mentioned, he is considered to be "the father of Polish geology." Numerous scientific conferences and exhibitions in Poland and in Scientific Centres of the Polish Academy of Sciences abroad (Vienna, Paris) were organized in the "Staszic's Year," proclaimed by this Academy. During these conferences Polish historians of geosciences (S. Czarniecki, R. Tarkowski, A.J. Wojcik, Z. Wojcik, and others) have presented contributions concerning various aspects of Staszic's activity and merits. This anniversary was also celebrated by publishing of several books that will be included into the publication list below.

As indicated by this list, in 2005, Polish geoscientists, among them several INHIGEO members and candidates, were studying various historical problems related with geological and mineralogical sciences. For example, Andrzej Grodzicki and Janusz Skoczylas were examining the problem of historical significance of rocks and stones used in the construction of important edifices in Poland (Wroclaw Cathedral and University) and in Italy and Mediterranean area (see the book review in this *Newsletter*).

The Museum of the Earth of the Polish Academy of Sciences, one of the main centres of studies on history of geosciences in Poland, has published the 48th historical volume of its *Proceedings*, containing papers by K. Jakubowski, J, Garbowska, W. Narebski, R. Tarkowski & J.-P. Bellier, and Z. Wojcik, which are included into the publication list below.

It could be mentioned that the Institute of Geological Sciences of the Jagellonian University organized, in April 2005, an informal party to celebrate the 80th birthday of INHIGEO member (since 1980) Prof. Wojciech Narebski. During this party it was proposed to recommend one of very few living INHIGEO founding-chapter members (since the founder's meeting in Erevan, 1967) Dr. Stanislaw Czarniecki to be nominated as an Honorary Senior Member of this Commission. Dr. Czarniecki (currently 85 years old!) has informed us that in view of the approaching 40th anniversary of INHIGEO he would like to present a jubilee poster with historical photographs, if invited by INHIGEO Board.

Publications

Alexandrowicz, S.W., 'The history of Starunia—a palaentologic site and old ozokerite mine,' in: J.M. Kotarba (ed.), *Polish and Ukrainian Geological Studies (2004–2005) of Starunia—the area of discoveries of woolly Rhinoceroses,* State Geological Institute Press, Cracow-Warsaw, 2005, 21–36.

Alexandrowicz, S.W., 'Commission on Quaternary Palaeogeography—roots and activity,' *Prace Komisji Paleogeografii Czwartorzędu PAU,* 2005, *3,* 9–18 (in Polish).

Alexandrowicz, S.W., 'Progress of Quaternary Malacology in Poland,' *Prace Komisji Paleogeografii Czwartorzędu,* 2005, *3,* 41–47, (in Polish).

Alexandrowicz, S.W., History and last years of activity of the earth wax mine in Starunia,' *Prace Komisji Historii Nauki PAU,* 2005, *7,* 51–78, (in Polish, English summary).

Alexandrowicz, S.W., 'History of malacological investigations in the Cracow-Czestochowa Upland,' in: J. Partyka (ed.), *Zroznicowanie i przemiany srodowiska przyrdoniczo-kulturowego Wyzyny Krakowsko-Czestochowskiej,* 2005, 110–126.

Garbowska, J., 'Antoni Andrzejewski—investigator of Volhynia and Podolia,' *Proceedings of the Museum of the Earth (Prace Muzeum Ziemi),* 2005, *48,* 19–28 (in Polish, English summary).

Jakubowski, K., 'Regina Kardas (1949–2005)—obituary notice,' *Proceedings of the Museum of the Earth (Prace Muzeum Ziemi),* 2005, *48,* 3–4, (in Polish).

Narebski, W., 'Important historical anniversaries: Stanislaw Dunin-Borkowski (1782–1850) and Ignacy Domeyko (1802–1889)—Polish pioneers of chemical mineralogy,' *Proceedings of the Museum of the Earth (Prace Muzeum Ziemi),* 2005, *48,* 5–18.

Popiolek, J., 'The origin of amber in the views of Polish naturalists till the middle of the19th century,' *Quarterly of History of Science and Technics (Kwartalnik Historii Nauki i Techniki),* 2005, *50* (3–4), 135–141.

Skoczylas, J., and Zyromski, M., *The significance of symbols of stone in the process of legitimization of power in the European civilization,* Adam Mickiewicz University Press, Poznan, 2005, 178 pp. (in Polish, English summary).

Slizewski, W., Salski, W., and Werner, Z. (ed.) *Polish geologists on five continents,* State Geological Institute Press, Warsaw, 2005, 528 pp. (in Polish).

Tarkowski, R., 'New materials on the trip of French naturalist J.-E. Guettard to Poland (1760-1762),' *Przeglad Geologiczny,* 2005, *53* (11), 41–46, (in Polish, English summary).

Tarkowski, R., and Daszkiewicz P., 'On the traces of the stay of Stanislaw Staszic in France,' *Przeglad Geologiczny* 2005, *53* (11), 1021–1025 (in Polish, English summary).

Tarkowski, R., and Bellier, J-P., 'Les fossiles de la Collection de la Sorbonne recoltes en Pologne au XIXe siecle,' *Proceedings of the Museum of the Earth (Prace Muzeum Ziemi),* 2005, *48*, 45–50, (in French).

Wojcik, A.J., 'The organization of the authorities of governmental mining and metallurgical industry in the Kingdom of Poland in the first half of 19th century,' *Analecta—studies and materials on the history of sciences,* 2005, no.1–2, 227–308, (in Polish).

Wojcik, A.J., 'Draft of mining law by Stanislaw Staszic,' *Budownictwo Gornicze i Tunelowe,* 2005, no.1, 39–46 (in Polish).

Wojcik, A.J., 'The miners of Stanislaw Staszic—organization of mining authorities in the Kingdom of Poland,' *Budownictwo Gornicze i Tunelowe,* 2005, no.2, 41–50 (in Polish).

Wojcik, A.J., 'Geological-mining exploration of the Siewierz Kingdom in the times of publication of Staszic's monograph on geology of Poland,' *Budownictwo Gornicze i Tunelowe,* 2005, no. 3, 34–41 (in Polish).

Wojcik, Z., 'Polish graduates and teachers of Dorpat (Yuryev) higher education institutions merited for the development of natural and exact sciences,' *Proceedings of the Museum of the Earth (Prace Muzeum Ziemi),* 2005, *48,* 29–44 (in Polish, English summary).

Wojcik, Z., *Stanislaw Staszic geologist—bibliographical materials,* Museum of the Earth, Polish Academy of Sciences Press, Warsaw, 2005, 28 pp.

Wojciech Narebski, Cracow and Zbigniew Wojcik, Warsaw

Portugal

Miscellaneous matters

INHIGEO members Ana Carneiro, Filomena Amador and Manuel S. Pinto attended the INHIGEO meeting "History of Geophysics" held in Prague, July 2005. Other meetings related to the history of geological sciences were attended by various INHIGEO members from Portugal, as seen below. In 2005 many activities, mostly meetings, commemorating the 250 years of the great Lisbon earthquake were carried out.

Publications

Books

Araújo, Ana Cristina, *O Terramoto de 1755: Lisboa e Europa,* CTT Correios de Portugal, Lisboa, 2005.

Buesco, Helena Carvalhão, and Cordeiro, Gonçalo (coord.), *O Grande Terramoto de Lisboa—Ficar Diferente*, Editorial Gradiva, Lisboa, 2005. Several papers make up this book that is about the great Lisbon earthquake. The preface and six of the papers are of special interest.

Cardoso, Arnaldo Pinto, *O Terrível Terramoto da Cidade que foi Lisboa. Correspondência do Núncio Filippo Acciaiuoli (Arquivo Secreto do Vaticano)*, Alêtheia Editores, Lisboa, 2005

Clemente, D. Manuel, *Memórias de uma Cidade Destruída. Testemunhos das Igrejas da Baixa-Chiado*. Alêtheia Editores, Lisboa, 2005

Fonseca, João Duarte D., *1755 O Terramoto de Lisboa,* Argumentum, Lisboa, 2004. (* See the review in this *Newsletter.*)

Fundação Luso-Americana para o Desenvolvimento (ed.), 1755 *O Grande Terramoto de Lisboa, Vol. I, II, III*, FLAD and Público, Lisboa, 2005. A total of 22 papers of historical interest on the great Lisbon earthquake make up volumes I and II. Vol. III is about the measures taken by the Portuguese government to combat the effects of earthquake. The publishing of a *facsimile* of John Mitchell's manuscript *Conjectures concerning the cause, & observations upon the phoenomena of Earthquakes, particularly of that great Earthquake of the 1st of Nov.ber 1755, which proved so fatal to the city of Lisbon ...*, kept in Lisbon in the National Library, is expected in 2006 as Vol. IV.

Moura, Vasco Graça, *O Poema sobre o Desastre de Lisboa de Voltaire* (Transl. of Voltaire´s *Poème sur le Désastre de Lisbonne*), Alêtheia Editores, Lisboa, 2005.

Neiman, Susan, *O Mal no Pensamento Moderno* (Transl. of *Evil in Modern Thought. An alternative History of Philosophy*), Princeton University Press, 2002, Editorial Gradiva, Lisboa, 2005.

Pardal, Maria João Martins, *O Terramoto de 1755 – A Urbanização da Nova Lisboa*, Setecaminhos, Lisboa, 2005.

Tavares, Rui, *O Pequeno Livro do Grande Terramoto*, Tinta da China, Lisboa, 2005.

Chapters in books

Aires-Barros, Luís, 'O Termalismo e a Preservação do Património Cultural e Natural,' in: *Caldas da Rainha: Património das Águas*, Assírio e Alvim, Lisboa, 2005, 47–80.

Carneiro, Ana, 'The Museum of the Geological Survey of Portugal: The Role of the "Bilobites" Collection in a 19th-century Palaeoichnological Controversy,' in: *From Private to Public, Natural Collections and Museums*, Marco Beretta, ed., Science History Publications/USA, New York, 2005, 189–234.

Carvalho, António, and M. Galopim, 'Geologia Sedimentar,' Âncora Editores, Lisboa, 2005. In the Introduction and in several chapters references are made to the history of Sedimentary Geology.

Articles in journals

Aires-Barros, Luís, 'As Teorias Científicas e o Paradigma de Kühn,' *Boletim da Academia Internacional da Cultura Portuguesa, 31*, 1–16 *(Reprint).*

Amador, Filomena, 'Los Volcanes de Nicholas Lémery (1645-1715),' *Enseñanza de las Ciencias de la Tierra*, 2005, *12*, 253–259.

Carneiro, Ana, 'Outside Government Science, "Not a Single Tiny Bone to Cheer Us Up!" The Geological Survey of Portugal (1857–1908), the Involvement of Common Men, and the Reaction of Civil Society to Geological Research,' *Annals of Science*, 2005, *62*, 141–204.

Pinto, Manuel S., Malaquias, Isabel, Cecchini, Marco António, Moreira-Nordemann, Lycia, and Pita, João R., 'O Médico Brasileiro José Pinto de Azeredo (1766?–1810) e o Exame Químico da Atmosfera do Rio de Janeiro,' *História, Ciências, Saúde -Manguinhos*, 2005, *12*, 617–673.

Proceedings

Andrade, António Soares, *A 'Geoquímica Recreativa' de A. Fersman e a Emergência de uma Disciplina Geológica*, Actas, Congresso de Geoquímica dos Países de Língua Portuguesa, Departamento de Geociências, Universidade de Aveiro, Aveiro, 2005, *II*, 791–794.

Pinto, Manuel S., *Contribuição para a História da Geoquímica do Ambiente em Portugal,* Actas, Congresso de Geoquímica dos Países de Língua Portuguesa, Departamento de Geociências, Universidade de Aveiro, Aveiro, 2005, *II*, 785–789.

Abstracts

Amador, Filomena, *Explicar as Causas Naturais do Terramoto de Lisboa de 1755: o Papel Retórico das Novas Concepções e Métodos Científicos, em Particular da Experimentação, em Textos Portugueses e Espanhóis da Época,* Book of Abstracts, *O Grande Terramoto de Lisboa – Ficar Diferente,* Faculdade de Letras, Universidade de Lisboa, 2005, 31. (Proceedings in press).

Amador, Filomena, *Autores Españoles Presentes en Compilaciones de Textos Portugueses sobre el Terremoto del 1 de Noviembre de 1755*, Libro de Resúmenes, IX Congreso de la Sociedad Española de Historia de la Ciencia y de las Técnicas, 5. Sociedad Española de Historia de la Ciencia y de las Técnicas, 5. (Proceedings in press).

Amador, Filomena, *Los Modelos Mentales de Nicolás Steno (1638–1686): Abordaje Histórico de Algunos Contenidos Geológicos en Enseñanza Secundaria*, Libro de Resúmenes, IX Congreso de la Sociedad Española de Historia de la Ciencia y de las Técnicas, Sociedad Española de Historia de la Ciencia y de las Técnicas, 59. (Proceedings in press).

Carneiro, Ana, *The Historical Archive of the Institute of Geology and Mining (Portugal)*, Vol. Abstracts, *Archives de Recherche: Recherche et Valorisation*, European Science Foundation, Paris, 2005.

Carneiro, Ana, and Mota, Teresa Salomé, *Francisco Luiz Pereira de Sousa (1870–1931): 1755, um Terramoto para uma Vida*, Vol. Abstracts, *The 1755 Lisbon Earthquake: Historical Impacts*, Instituto Superior de Ciências do Trabalho e da Empresa, Lisboa, 2005.

Carneiro, Ana, and Mota, Teresa Salomé, *The Role of Historical Records in the Construction of Scientific Interpretations: Pereira de Sousa's (1870–1931) studies on the Lisbon Earthquake of 1755*, Vol. Abstracts, *30th INHIGEO Symposium*, Geophysical Institute, Prague, 2005.

Mota, Teresa Salomé, *The Eyes of Geology Versus the Knowledge of the Geologist: Using Geophysical Methods in Geological Prospecting in Portugal for the First Time*, Vol. Abstracts, *30th INHIGEO Symposium*, Geophysical Institute, Prague, 2005.

Pinto, Manuel S., *O Intercâmbio Científico e Técnico Portugal-China (Séc. XVI a Séc. XVIII) - Alguns Aspectos*, Vol. Abstracts, *VIII Semana Cultural da China*, Instituto Superior de Ciências Sociais e Políticas, Lisboa, 2005.

Pinto, Manuel S., *Prevailing Ideas in Portugal about the Nature of the Earth's Interior (16th and 18th Centuries)*, Vol. Abstracts, *30th INHIGEO Symposium*, Geophysical Institute, Prague, 2005.

Pinto, Manuel S., *Georg Hartung and Charles Lyell and The Geology of the Madeira Islands*, Vol. Abstracts, *Simpósio As Ilhas e a História da Ciência e da Técnica*, Centro de Estudos de História do Atlântico, Funchal, 2005.

Pinto, Manuel S., and Andrade, António Soares, *Uma Revolução na Geologia e Seus Antecedentes: A Teoria da Tectónica de Placas*, Vol. Abstracts, *Colóquio Interdisciplinar Revoluções Científicas, Artísticas e Políticas no Início do Século XX*, Universidade Nova de Lisboa, Lisboa, 2005.

Pinto, Manuel S., Malaquias, Isabel, Cecchini, Marco António, Moreira-Nordemann, Lycia, and Pita, João R., *Chemical Analysis of the Air of Rio de Janeiro in Late 18th Century by José Pinto de Azeredo*, Book of Abstracts, *5th International Conference on the History of Chemistry*, Maria Elvira Calapez and others (eds.), Lisboa, 2005, 21–22.

Talks, Seminars and Oral presentations (not abstracted) in meetings

Andrade, António Soares, *A Formação de um Planeta Habitável: uma Perspectiva Histórica*, Instituto Superior de Educação de Cabo Verde, Praia, 2005. (Talk).

Aires-Barros, Luís, *A Terra é uma Fábrica Química*, Instituto Superior Técnico, 2004, Fundação Eng. Eugénio de Almeida, Porto, 2005. (Lição Jubilar)

Carneiro, Ana, *A História da Comissão Geológica 1868–1908*, Instituto Nacional de Tecnologia e Inovação/IGM, Lisbon, 2005. (Talk included in a series of talks entitled *O Museu Geológico e a sua História*).

Carneiro, Ana, *Objectos Naturais e suas Representações Visuais numa Controvérsia Paleontológica do Século XIX*, Universidade de Lisboa, Faculdade de Ciências, 2005. (Talk).

Carneiro, Ana, *A Crença na Controvérsia sobre a Origem das Cruziana*, Universidade Nova de Lisboa - Faculdade de Ciências e Tecnologia, Rede Interdisciplinar de Centros de Investigação da UNL, 2005. (Talk).

Carneiro, Ana, and Mota, Teresa Salomé, *The Geological Survey of Portugal (1857–1948), an Overview*, Meeting of the *Réseau Européen pour l'Histoire des Cartes Géologiques, The First Big Science*, Centre de Recherche en Histoire des Sciences et des Techniques, Université de Paris 1 and European Science Foundation, Paris, 2005. (Oral presentation; proceedings in press).

Leitão, Vanda, *A História da Comissão Geológica, 1848–1868*, Instituto Nacional de Tecnologia e Inovação/IGM, Lisbon, 2005. (Talk included in a series of talks entitled *O Museu Geológico e a sua História*).

Mota, Teresa Salomé, *Os Serviços Geológicos entre 1918 e 1948: uma Instituição em Suspenso em que Nada de Verdadeiramente Novo Acontecia...*, Instituto Nacional de Tecnologia e Inovação/IGM, Lisbon, 2005. (Talk included in a series of talks entitled *O Museu Geológico e a sua História*).

Manuel S. Pinto, Aveiro

Russia

Meetings

INHIGEO members participated with presentations in the following meetings: (a) the INHIGEO Symposium on "History of Geophysics" and its disciplines, at the Geophysical Institute, Prague (Zoya Bessudnova gave a with paper on 'Boris Golitsyn (1862–1916)—Russian Geophysicist, Founder of Seismology in Russia and Creator of the Electrodynamic Seismograph'); (b) the 8th International Symposium on "Cultural Heritage in the Geosciences: Mining and Metallurgy, Libraries, Archives, Collections," held in the Tirol, Austria (attended by Zoya Bessudnova and Tatiana Ivanova). Zoya Bessudnova presented a paper on 'Edward Suess's letters to the first Russian female geologist, Maria Pavlova (1854–1938), in the Archive of the Russian Academy of Sciences'; and (c) Tatiana Ivanova took part in the International Conference on "Mineralogical Museums," held in St. Petersburg, Russia.

Other Activities

Tatiana Ivanova was involved in preparation of a text for the jubilee book about *Moscow University: Lomonosov Moscow State University, 1755–2005*, Moscow, 2005, 175 pp.; Chief editor of the book was Victor Sadovnichii, MSU Rector.

Tatiana Ivanova and Zoya Bessudnova also took part in creating a jubilee exhibition devoted to the 250th Anniversary of MSU. The opening ceremony of the exhibition, including a geological exposition (authored by T.K. Ivanova), took place in the MSU History Museum, located in the New Library Building, on the memorable day of 25 January 2005. Participating in the opening ceremony of the exhibition were: President of the Russian Federation Vladimir V. Putin; academician Victor A. Sadovnichii, MSU Rector; the Mayor of Moscow Yuri M. Luzhkov; MSU Honored Professor, P. Rovis; Members of the Russian Government; the director of MSU History Museum, Alexander S. Orlov; and numerous MSU employees. Tatiana Ivanova received notes of gratitude from Rector Victor A. Sadovnichii for the organization and preparation of the Jubilee of the 250th Anniversary of Lomonosov Moscow University.

New appointments

- Institute of the History of Sciences & Technology (Moscow)

Director – Ph.D. Alexey V. Postnikov

Head of Department for the History of Geosciences – Dr. Vera Shirokova

- Vernadsky State Geological Museum (Moscow)

Head of Department for the History of Geology – Dr. Irena Malakhova

Publications of INHIGEO Members

Andreeva, I.P., and Bessudnova, Z.A., 'Mineralogical part' in: *On good enlightenment: To the 250th anniversary of count N.P. Rumyantsev*, Album/catalogue, Pashkov House, Moscow, Indrik, 2005, Part 2, 62–68.

Bessudnova, Z.A., 'Researches of Michail Tolstopyatov (1836–1890) in the Mineralogical cabinet of the Moscow University'(in English), in: *Mineralogical Museums,* Saint Petersburg: Department of Mineralogy, SPbSU, 2005, 4. (In English)

Ivanova, T.K., 'About the Collection of Primo Rovis, a Famous Italian Patron of Art, MSU Honored Professor,' in: *Mineralogical Museums,* Saint Petersburg, Department of Mineralogy, SPbSU, 2005, 10–11.

Ivanova, T.K., 'Geological exposition in the new building of the Moscow University Fundamental Library, for the 250th Anniversary of Lomonosov Moscow State University,' 8th International Symposium: Cultural Heritage in Geosciences, Mining and Metallurgy. Libraries- Archives-Collections, Schwaz, Tyrol, Austria, 3 to 7 October 2005, 90–91.

Khain, V.E., and Ryabukhin, A.G., *History and Methodology of Geological Sience. Handbook*, 2nd ed., Moscow State University Publishing House, Moscow, 2004, 320 pp.

Khomizuri, G.P., 7 biographies on prominent geologists and geographers (Abich, G.V.; Abramovich, M.V.; Abu-l'-Fida, I.; Adushkin, V.V.; Amalitsky, V.P.; Andrée, S.; Andrussov, N.I.), in: *the Big Russian Encyclopaedia,* 2005, Vol. 1.

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Commemoration Day Report: Corresponding-member of the Russian Academy of Sciences, Professor, Ph.D. Vladimir V.Tikhomirov (1915–1994)

The Meeting on the 90th Anniversary of Valdimir Tikhomirov's birthday took place on the 27th of October, 2005, in the Vernadsky State Geological Museum of the Russian Academy of Sciences (Moscow).

There were about 50 friends and colleagues of Vladimir Tikhomirov on this meeting. The whole life of the prominent man was remembered. Three followers of Vladimir Tikomirov, Prof. Ph.D. Yuri Soloviev, Ph.D. George Khomizuri, and Dr. Irena Malakhova, told about his work before World War II, his heroism during the Leningrad defense and labor defense after his serious injury. All his prominent scientific works were named. The key role of Vladimir Tikhomirov in the history of geological sciences in Russia and in the world was celebrated. A lot of kind words were told about his influence on different people who worked with Vladimir Tikhomirov: Prof. Eugenij Milanovsky, Dr. Valentina Gerbova, and Dr. Svetlana Komissarova.

We are very thankful to our foreign colleagues who have sent letters on this Day: Prof. Dr. Kennard Bork, the INHIGEO Secretary-General; Prof. Martin Guntau, former Secretary-General and President of the INHIGEO and true friend of Vladimir Tikhomirov; and HR. Dr. Tillfried Cernajsek, an INHIGEO member .

Both Mrs. Galina Tikhomirova, and Ms. Irina Tikhomirova were on the meeting.

Representing the Department for the History of Geology at the Vernadsky State Geological Museum were: Professor Yuri Soloviev, INHIGEO member; Ph.D George Khomizuri, INHIGEO member; and Dr. Irena Malakhova, Head of Department.

The Russian Academy Portrait Gallery presented the big portrait of the outstanding scientist to the Museum.

George Khomizuri, Moscow

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Serbia and Montenegro

During 2005, history of geology and mining in this country was treated in one meeting and two monographs.

From 20 to 21 June the "Third Meeting on the Natural and Mathematical Sciences in Serbia until 1918" was held in the old building of Matica Srpska in Novi Sad. At that meeting there were three lectures with geological content:

1. B.D. Jovanovic: 'Life and work of Stevan Milovanov, professor in the Serbian Grammar School in Novi Sad';
2. T. Milic-Bobic: 'Petrologic collections of Natural History Museums in Belgrade (1901–1905)';
3. A. Grubic: 'Geology of the 18th century in works of Serbian authors.'

In the last lecture there was an analytical presentation concerning how different authors between 1783 and 1850 very successfully transmitted geological knowledge from the 18th century to modern Serbian readers. It was also stressed that some among those authors had their own original and interesting ideas (for example P. Kengyelatc).

On 14 April 2005, A. Grubic also gave a special lecture in Matica Srpska in Novi Sad, on 'Two centuries of geology in the Physica of Atanasije Stojkovic.'

In the two monographs dedicated to the two largest European copper mines, in Bor and Majdanpek, Serbia, there were special chapters written about the history of geological exploration of those areas.

One monograph, *Majdanpek Copper Mine*, was written by S. Vujic, M. Grujic, D. Salatic, S. Radivojevic, and R. Jelenkovic. It stressed that in the wider area of this mine there were confirmed findings of mining works from early Eneolith (end of the 6th and beginning of the 5th millennia BC). Then, the mining works were done with interruptions during Roman times, during the Serbian medieval Kingdom, and also during Turkish and Austrian occupation. In the middle of the 19th century, Majdanpek had the first established geological research unit. However, modern exploration and considerable exploitation of copper was done between 1961 and 1991, when yearly production was 13 million tons of ore. Today this mine is in stagnation, with a good chance to renew production. The influence of geological work was very important in all this.

The second monograph, *One century of mining in Bor*, was written by B. Jovanovic and M. Djurdjevic. This 650-page book starts with a chapter about the history of geological research in the wider Bor area. First, the results of the work by Baron C.A.B. Herder are discussed. He was a famous mining geologist from Freiberg, Germany, working in Bor beginning in 1835. Then, the efforts of subsequent mining specialists are described: Dj. Brankovic, K. Heyrovski, A. Breithaut, J. Zujovic, S. Stevanovic, D. Antula, F. Hoffman and others. Until World War Two, the mine was held by a French company. After that it was government owned and the mass production of copper was developed, founded on the research of about one hundred geologists, who worked in a specialized Institute for Copper. In the last fifteen years the Bor Mine has been in deep crisis.

Aleksandar Grubic, Belgrade

Spain

During the year 2005, the Spanish group of INHIGEO has conducted many activities related to the History of Geology. The Commission on History of Spanish Geology (supported by the Spanish Society of Geology) has published numbers 25 and 26 of our *Bulletin* about the History of Geology in Spain. On 15 November 2005, in the "Museo Geominero" (Geomines Museum), a tribute was held in honor of the geologist Guillermo Schulz, on the 200th anniversary of his birth. Guillermo Schulz was an engineer of mines. He was born in Germany but lived in Spain from the age of 20 years until his death. He held high responsibilities in the main Spanish geological and mining organizations. Schulz attained the positions of Director of the Mining School, President of the Commission for the Geological Map of Spain (antecedent of the Spanish Geological Survey), and Vice President of the Higher Tribunal for Mining. Schulz, according to the most recent research, was born in Dörnberg in 1805, and he died in Aranjuez, Spain, in 1877.

The second centennial of the birth of Guillermo Schulz was contemporaneous with the 150th anniversary of the famed Escuela de Capataces de Minas de Mieres (Technical School of Mining), in Asturias, northern Spain, where the first director was Schulz. Lectures, expositions and professional meetings were held in the University School of Technical Engineering in Mieres (Oviedo University). Another event related to the History of Geology in Spain was the Symposium in honor of a Spanish naturalist and geologist, Daniel Jiménez de Cisneros y Hervás, who died in 1941. His scientific contributions have been recently published by Tent and collaborators (see below). One other interesting contribution to the History of Geology has been the Spanish translation of James Hutton's *Theory of the Earth*, published by the journal *Enseñanza de las Ciencias de la Tierra (Earth Sciences Teaching)*, as volume 12, number 2, 2004.

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Leandro Sequeiros, Granada

United Kingdom

History of Geology Group

Anne O'Connor reports that HOGG continues to grow. Many new members were encouraged to join after our three-day meeting in April 2005 on "The History of Geological Speleology and Cave Finds" in Torquay, convened by

John Mather. Members listened to papers on caves, their formation and exploration, visited the Buckfastleigh Caves, drank champagne at a memorable reception in Kent's Cavern; and the next day a few survivors examined the contorted strata and fossils of the cliffs nearby. Another successful meeting was held in November on "The Role of Women in Geology," convened by Cynthia Burek. Shadowy geological figures were drawn into the light, and some remarkable stories were told of the part women played in the development of geology. The publication by A.J. Bowden, C.V. Burek and R. Wilding (eds), *History of Palaeobotany: Selected Essays*, Special Publication 241, The Geological Society, London (2005) is a result of a previous HOGG meeting on the topic.

News from Scotland

Michael Taylor writes that The National Trust for Scotland's (NTS) book for the Hugh Miller Museum at Cromarty is now published (Gostwick, M., *Hugh Miller Museum & Birthplace Cottage Cromarty,* National Trust for Scotland, Edinburgh, 2005). Martin Gostwick and his colleagues at NTS are to be congratulated on this very attractive full colour paperback, which gives the interested general reader an account of Miller's life and work, as well as of Miller's two contiguous houses and the displays therein (themselves reported last year, in *Newsletter* 37).

Also on the Millerian front, the 2002 bicentenary has stimulated two very welcome papers: Taylor's National Museums of Scotland (NMS) colleague Lyall Anderson has reviewed Miller's palaeobotanical activities (Anderson, L.I., 'Hugh Miller: introducing palaeobotany to a wider audience,' in: Bowden, A.J., Burek, C.V., and Wilding, R. (eds.), *History of Palaeobotany: Selected Essays*, Geological Society Special Publication 241, 2005, 63–90), both his writings and his collecting work. Anderson notably puts Miller's doings in the context of the actual sites at Cromarty and Eathie, including the nature of the exposures and specimens, and his own experience of NMS fieldwork in the area, both for the 2002 centenary and for modern research. He comments amongst other things on how Miller's finding of plants in the Old Red Sandstone at Cromarty were then amongst the oldest plant fossils then known, and how Miller was developing a notable sideline in the fossil plants of the Jurassic rocks of Scotland when he died. Miller's collection's research potential has not yet been fully exploited even today, although it is currently being worked on by Professor Gar Rothwell of Ohio University.

Ian Campbell and Julian Holden (Campbell, I., and Holder, J., 'Hugh Miller's last house and museum: the enigma of Shrub Mount, Portobello,' *Architectural Heritage*, 2005, *16*, 51–71) of the Edinburgh College of Art have made an architectural study of Shrub Mount, Miller's last house in Portobello (now a seaside suburb of Edinburgh). This 18th-century building has been much modified and divided over the years, both before, during, and after Miller's time. The result is, as Taylor can confirm from his own experience, utterly confusing. Indeed, in recent decades the original Shrub Mount was thought to have been demolished, until Frieda and Martin Gostwick of Hugh Miller's Cottage (Cromarty) looked into the matter some years ago and pointed out that it was still apparently extant. Campbell and Holden confirm that the 18th-century core remains as the only survivor of Portobello's seaside cottages of that era. After Miller's death the building had its street frontage extended into shops and now does duty as, amongst other things, a kebab shop, café and amusement arcade. In particular, it has had a tenement block built up against its façade, which was at right angles to the main road, so that the original entrance can only be reached by a 'close' (communal through passage) in the new block; it is above the doorway to this passage that the memorial plaque was placed in 2002. Campbell and Holden attempt to make sense of the various changes over the years, although the extensive internal remodelling and lack of access to parts of the house make it unclear quite how much remains from Miller's time. Amongst the changes which Miller himself made was, notably, the private 'museum' for his collection which he had built in the garden. Campbell and Holden have at last located this museum—but they found, sadly, that it has long been demolished, apparently in the 1970s.

The 2002 conference volume edited by Lester Borley (*Celebrating the life and times of Hugh Miller. Scotland in the early 19th century, ethnography and folklore, geology and natural history, church and society*; Cromarty, 2003) has been placed on the Net by its benevolent publishers, the Cromarty Arts Trust http://www.cromartyartstrust.org.uk/downloads/papers.pdf (although paper copies may still be available, see www.cromartyartstrust.org.uk)

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Richard J. Howarth, London

United States of America

Activities of the Geological Society of America, History of Geology Division

At the Annual Meeting of GSA in Salt Lake City, 16–19 October, the HoG Division's *Mary C. Rabbitt History of Geology Award* was presented to Gerald M. Friedman, Distinguished Professor Emeritus of Brooklyn College, City University of New York, and director of the Northeastern Science Foundation, Troy, NY. Dr. Friedman, who was one of the founders of the History of Earth Sciences Society, and who served for a dozen years as the first editor of its journal *Earth Sciences History*, is the first to receive the Division's award under its new name (in honor of the late Mary Rabbitt of the U.S. Geological Survey, author of a three-volume history of USGS, and a generous benefactor of the Division). The citation for Dr. Friedman's award, prepared by Kennard B. Bork and read by Julie Newell, made special note of the broad range of the awardee's contributions in several disciplines within the

geological sciences, and in educational endeavors and in organization of numerous valuable symposia, as well as in the history of geology. The citation and response can be accessed at: http://www.geosociety.org/aboutus/awards/05speeches/HISTORY.htm.

The Division's *Student Award in the History of Geology* was presented to Mr. Lee J. Florea, Department of Geology, University of South Florida, for his paper (co-authored with H. L. Vacher) on 'The Role of Communication in the Evolution of Thinking about Caves and Groundwater.'

The HoG Division's topical session at the Annual Meeting, chaired by Patrick Wyse Jackson and Stephen M. Rowland, was entitled "Thinking about Fossils: The Emergence and Development of Paleontological Thought in North America from Native American Customs to the End of the Great Western Surveys." The program consisted of nine papers, and the session drew a substantial attendance. In a general session eight papers were presented, again with an impressive audience. Both sessions were co-sponsored by the History of Earth Sciences Society (HESS).

The Division's annual reception drew nearly 100 participants. The tradition of distributing door prizes among student attendees continued.

At one of the GSA regional meetings, that of the Northeastern Section in March at Saratoga Springs, NY, the HoG Division sponsored a session on "History of Geology of Northeastern North America," with nine papers presented.

HoG Division officers elected for 2006 are: Gary Rosenberg, Chair; Julie Newell, First Vice-Chair; Stephen Rowland, Second Vice-Chair. Continuing in their Division roles are William Brice as Secretary-Treasurer and Newsletter Editor, and Hugh Rance as Web Master. The Division continues to publish its Newsletter quarterly.

The Division reports that its newly-established Distinguished Service Award will be presented for the first time in 2006. Members of the international community of historians of geology may wish to note that there are no limitations of nationality for nominees for this award, which has no stipulated period of regularity, but "may be given from time to time to an individual or individuals, for exceptional service to the advancement of our knowledge of the history of geological sciences." The statement of criteria for the award indicates that relevant service may include (but is not limited to) discovery or publication of rare source materials, production of comprehensive bibliographic surveys, organization of meetings and symposia, and exceptional service to organizations serving or promoting the history of geology. Nominations from any informed person or group are invited. They should be sent to W.R. Brice, Geology & Planetary Sciences, University of Pittsburgh at Johnstown, Johnstown, PA 15904, USA (email: wbrice@pitt.edu).

Activities of the Petroleum History Institute

An international symposium, co-sponsored by the History of Geology Division of GSA, was held in April at Morgantown, West Virginia. The meeting was organized by Larry Woodfork (retired State Geologist for West Virginia) and David L. McKain (Director and Founder of the Parkersburg Oil Museum). A number of papers from the symposium appear in Volume 6 of *Oil-Industry History* (August 2005). Subscription to the journal is included with membership in the Petroleum History Institute. (Information can be accessed at the web site: http://www.petroleumhistory.org/.)

Several awards were presented by the Petroleum History Institute in 2005. The "Keeper of the Flame Award" was presented to David L. McKain. The award recognizes contributions to historical preservation relating to the oil and gas industry. Besides his founding of the Oil and Gas Museum of Parkersburg, McKain served as President of the Oil, Gas and Industrial Historical Association. He was instrumental in the successful effort to preserve the oldest well in West Virginia, the Rathbone Well at Burning Springs, which is now open to visitors. William R. Brice received the "Distinguished Service Award." He is the founding President of PHI, and editor of its journal *Oil-Industry History*.

The "Col. Edwin L. Drake Legendary Oilman Award" was presented jointly to Marlon W. Downey and John C. Wright, in honor of their contributions to the petroleum industry.

The international symposium for 2006 is co-sponsored by the American Oil and Gas Historical Society. Founded in 2003, AOGHS is "dedicated to preserving the history of U.S. oil and natural gas exploration and production by providing advocacy and service for organizations that work to preserve that history through exhibition, educational programming, and material preservation." It distributes a quarterly newsletter, *The Petroleum Age*, to members. More can be learned about AOGHS at its web site: http://www.aoghs.org/.

Communications from Members

- *Victor R. Baker* continued as Book Review Editor for *Earth Sciences History*. It was rewarding to see a historical re-enactment of "The Great Scablands Debate" of 1927, plus relevant aspects of the seminal research of J Harlen Bretz (1882–1981), incorporated into the NOVA (PBS) television documentary *Mystery of the Megaflood*. Baker contributed historical advice to the production, which aired in late 2005. Baker's work on Bretz continues, with a paper in preparation for the 2006 Lithuania INHIGEO meeting, plus a contribution to the *New Dictionary of*

Scientific Biography. A second contribution to the *NDSB* will concern Ralph A. Bagnold (1896–1990). Baker's research on Charles S. Peirce (1839–1914) involved Peirce's 1897 analysis of the logic and physics of alternative models for the origin of slaty cleavage proposed by George F. Becker (1847–1919) and Charles R. Van Hise (1857–1918). Peirce's report, originally prepared for the U.S. Geological Survey, was invited to be a contribution to the *Journal of Geology*. Though the report was never published, it provides an interesting perspective on the logic used by physicists (Becker) versus that of geologists (Van Hise). This is a topic that continues to be relevant today, and an extended essay is in preparation.

- *Kennard B. Bork* continues his service to INHIGEO as Secretary-General (2004-2008). He also retains his position on the Editorial Board of the "Rock Star" Committee of the Geological Society of America. Research productivity was minimal in 2005, but involved re-kindling interest in the work of eighteenth-century "natural theologians" and naturalists interested in fusing their appreciation of nascent geoscience with their faith in scriptural commentaries.

- *Albert V. Carozzi* reports the completion of his full-length scientific biography of Horace-Bénédict de Saussure. It was published in October 2005 by Editions Slatkine in Geneva, under the title *Horace-Bénédict de Saussure (1740–1799): Un pionnier des sciences de la terre* (456 pages, with color plates). It is intended for a broad public readership, in hopes that it will be given a welcome comparable to that accorded not long ago to Carozzi's popular edition of an anonymously-prepared abridgement (originally published 1834, second edition in 1852) of Saussure's classic account of his Alpine studies (*Voyages dans les Alpes, Partie pittoresque des ouvrages de H.-B. De Saussure,* with a foreword by A.V. Carozzi (Cherbuliez, Paris, and Slatkine, Geneva, 2002). Carozzi now envisions production of a facsimile of Saussure's original four-volume quarto edition of 1779–1796. Carozzi's professional activity includes many years of consulting for the exploration of oil and mineral deposits in the Far East, Africa and Latin America. A first volume on the major unexpected geological, industrial and social problems encountered in these early explorations was published under the title *Exploration minière, développement technique et animisme en Côte d'Ivoire (1960–1977), ou Kumba m'a dit,* Editions L'Harmattan, Paris, 2005.

- *Robert H. Dott, Jr.*, was asked to write a much-belated memoir on James Hall for the U.S. National Academy of Sciences Memorial series. William R. Dickinson, an Academy geologist member, had discovered that, although Hall had been one of the founders of the Academy, no memorial had ever been published. With permission, Dott revised a similar article he had written in 2004 for the *Encylopedia of Geology*, Elsevier, 2004, 194–200, for the Academy series. It appeared as 'James Hall 1811–1898,' *Biographical Memoirs*, 2005, *87*, 3–19, The National Academies Press, Washington. At the annual meeting of the Geological Society of America, Dott presented an oral paper about vertebrate paleontologist Ermine Cowles Case, of the University of Michigan, in a History of Geology symposium about the development of paleontological thought in North America during the nineteenth century. The title was 'Ermine Cowles Case—Turn of the Century Master of Permo-Carboniferous Life.' Case had been a favorite professor of Dott's father and a legendary grandfather-like figure to him as a child. Dott, Jr. continued to write short articles about his University of Wisconsin department's history for an annual alumni newsletter, *The Outcrop*. After years of dithering, he decided to try to write a book about the history of geology for students and lay readers interested in the science. This long-deferred decision was finally prompted by Dott's perceived need for a generally accessible reference that might help counter the negative propaganda coming from the USA's ultraconservative evangelical religious community, which alleges that the geological time scale is a fiction, that the age of the earth is really only 10,000 years at the most, that major geological changes have been catastrophic and miraculous, and that the fossil record does not support organic evolution. The book is not intended to compete with the numerous fine, scholarly treatises about the history of geology, which have been appearing during the past 20 years or so. Those have tended to treat very specific topics or people, whereas Dott hopes to provide a broadly comprehensive introduction to our history for non-professional audiences.

- *Gregory A. Good*: At the INHIGEO Symposium at Prague in July 2005 Greg presented a keynote talk, titled 'Magnetic World: The Historiography of Disciplinary Transformations in Geomagnetism in the 20th Century.' He also presented an invited seminar at the University of Aarhus, Denmark, titled 'Geophysical Travellers: The Magneticians of the Carnegie Institution of Washington.' He submitted four essays to *Encyclopedia of Geomagnetism and Paleomagnetism* (Kluwer Academic Publishers, Encyclopedia of Earth Sciences Series): 'Carnegie Research Vessel'; 'Carnegie Institution of Washington's Department of Terrestrial Magnetism'; 'History of (geomagnetic) Instrumentation'; and 'Louis Agricola Bauer (1865–1932).' He published a review of Martin J.S. Rudwick, *The New Science of Geology: Studies in the Earth Sciences in an Age of Revolution,* in *Earth Sciences History*, 2005, *24*, 265–266. He began a research project, funded by the U.S. National Science Foundation (0432202). The title of the project is: 'Magnetic World: Consensus, Separation, and Re-connection in Disciplinary Transformations of Geomagnetism in the 20th Century.' This research will result in an academic book. In autumn 2005 he was a visiting scholar and fellow at Clare Hall, University of Cambridge, UK. He was also asked to be an Associate Editor, *New Dictionary of Scientific Biography*, for Geology & Solid-Earth Geophysics. Over thirty late

20th-century geologists and geophysicists will be included in the volumes, which will appear in 2007.
- *Léo F. Laporte* published 'Looking Back at the Record: George Gaylord Simpson and Paleomammalogy,' in *The Rise of Placental Mammals: Origins and Relationships of the Major Extant Clades*, edited by Kenneth D. Rose and J. David Archibald (Johns Hopkins Press, 2005), pp. 9–14. He also reports that he taught a fall quarter course on Darwin for two dozen docents of the Jasper Ridge Biological Preserve (Stanford University), followed up by a reading discussion group during the winter quarter of Darwin's *Voyage of the Beagle* (aka *Journal of Researches)*, and scheduled a day-long Darwin Marathon on the British naturalist's 197th birthday (Feb. 12), featuring a showing of all seven hour-long videos on the *Beagle* voyage, produced by BBC in 1978 (and in rare circulation).
- *Kerry V. Magruder* writes that the year's most exciting event was attending his first INHIGEO annual Symposium, in Prague, along with the pre- and post-symposium excursions. Catching up with old friends and colleagues, meeting new ones, and enjoying the rich sights of the Czech Republic as participants were conducted about by Jan Kozak and the other Czech organizers, was an unforgettable experience, he says. In 2005, Kerry presented two papers that he hopes to publish shortly. The first is a case study of mid-17th century Jesuit cosmology, 'The Sphaera of Gabriele Beati,' presented on April 2 as a banquet address for the Midwest Junto for History of Science. This study is relevant to Kircher's visual representations of the Earth. The second is an analysis of the development of whole-Earth visual representations in the 17th century and their role in the establishment of Theories of the Earth as a diverse tradition of critical debate. The latter paper was presented at the INHIGEO symposium at Prague.
- *Ursula B. Marvin* was awarded the Sue Tyler Friedman Medal by the Geological Society of London (see the Citation and Response elsewhere in this Newsletter). She published 'History of Geology Since 1962,' in *Encyclopedia of Geology*, edited by Richard C. Selley, L. Robin M. Cocks, and Ian R. Plimer (Amsterdam & New York, Elsevier Academic, 2005), pp. 197–207.
- *Clifford M. Nelson* continued to work toward completing the fourth volume (1939–1979) of the history of the U.S. Geological Survey. During non-duty hours, and with USGS approval, he added pages to the draft article for *Episodes* about the 5th International Geological Congress and began a brief review of a book for *The Western Historical Quarterly*.
- *Sarah (Sally) Newcomb* is nearing completion of her book manuscript, *The World in a Crucible: Laboratory Practice and Geological Theory at the Beginning of Geology*, with one chapter remaining to be drafted. Meanwhile, in 2005, in addition to her participation in the INHIGEO Symposium in the Czech Republic, Sally presented a paper at the annual meeting of the Geological Society of America in Salt Lake City, October, 2005, titled 'The Long Record of Fusibility' (*GSA Abstracts With Programs,* vol. 37, no. 7, p. 231). The property of fusibility was employed in both science and technology for a very long period, and numerical tables were published for it from the mid-eighteenth through the twentieth century. Thermometers were rarely of use, but Wedgwood's pyrometer and various descendants were employed. Von Kobell published his still-used fusion scale consisting of a series of minerals in 1837. John Joly originated the meldometer, and optical and gas pyrometers as well as thermocouples were eventually used. In collaboration with Luisa Crawford of Bryn Mawr College, Sally is also organizing a topical session for the 2006 GSA meeting in Philadelphia, on the history of studies about the Wissahickon Formation, underlying the city. This formation has been, and continues to be, a subject of much controversy, involving the sub-disciplines of mapping, stratigraphy, mineralogy, metamorphic petrology, geochemistry, structure/tectonics, age dating, hydrogeology, engineering properties, and geophysics. Plans for the session include, in addition to oral presentations, posting of a chart of related nomenclature changes that have been applied in three states and the District of Columbia over more than a century. As of this writing, Sally is at work on a review of Martin Rudwick's new book (which she believes is "completely splendid"), *Bursting the Limits of Time*, for the *Journal of Interdisciplinary History*.
- *Julie R. Newell* has been quite active in disciplinary societies and organizations. Her service work includes the History of Earth Sciences Society (as Associate Editor of *Earth Sciences History*), the Geological Society of America's History of Geology Division (Second Vice-Chair in 2005, First Vice-Chair in 2006), the History of Science Society (Committee on Education), and the Forum for the History of Science in America (Secretary-Treasurer, and Assistant Editor of the Forum's *News and Views*). In connection with these offices, she co-chaired the session of the GSA History of Geology Division at its annual meeting, and at the History of Science Society's annual meeting she chaired the Education Committee's workshop session. Julie published an article, 'The Troost Crinoids: Lost, Found, and (Finally) Published,' in *Earth Sciences History*, 2005, *24* (1), 15–34. In April, at the University of South Carolina she gave a pair of invited lectures: 'A Member in Name Only: Geology as a Component in 19th Century American Natural History,' and 'Building Public Support for Geology: A 19th Century Problem in the 21st Century.'

- *Alexander M. Ospovat*: In 2004 Alex, an Honorary Senior Member of INHIGEO, suffered the total loss by fire of his home of 41 years in Stillwater, Oklahoma. Fortunately Alex escaped unharmed. And the story has a happy ending: his home has been rebuilt on the original plan.
- *Kenneth L. Taylor* greatly enjoyed participating in the INHIGEO Symposium in the Czech Republic (especially from the point when his luggage arrived at Prague, three days later than he did). At the Symposium he presented a paper on 'Marivetz, Goussier, and Planet Earth: A Late Enlightenment Geo-Physical Project.' He also served as an editorial consultant for the *New Dictionary of Scientific Biography,* centering on figures in his area (17th through 19th centuries, with emphasis on the earth sciences) where updates on their treatment in the original *DSB* are particularly warranted by scholarly advances of the past generation.

Kenneth L. Taylor, Norman, Oklahoma

Uzbekistan

A number of activities relevant to the history of geology took place in Uzbekistan during 2005. An international conference was scheduled for 3–5 May 2005, in commemoration of the 85th birth-anniversary of academician I.Kh. Khamrabaev (1920–2002). L.N. Lordkipanidze served as Reviewer for the theses of this conference and also was the chief editor of the monograph about him. A memorial tablet honoring academician I. Kh. Khamrabaev was installed on the wall of the Institute of Geology and Geophysics in the Academy of Sciences, Republic of Uzbekistan. On 5 May 2005, in the Tashkent State Technical University of Raihon Beruny, a commemoration was held for the 80th birthday of geology professor I.M. Mirkhodjaev. A conference was also scheduled for 25 November 2005, devoted to celebrating the 85th birthday of Mirzo Ulugbek, of the geological faculty at the National University of Uzbekistan. L.N. Lordkipanidze was a consultant and Reviewer of the monograph by A.S. Khasanov concerning hydrogeology and engineering geology in Uzbekistan. During 2005, work was in progress on a monograph by L.N. Lordkipanidze, treating the 70th anniversary (1937–2007) of the Institute of Geology and Geophysics of the Academy of Sciences of Uzbekistan.

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Lora Lordkipanidze, Tashkent

Venezuela 2003–2005

Between 2003 and 2005 several activities took place in Venezuela related to the history of the geological sciences. The following listing of events and publications demonstrates the level of activity.

Events

The *IV Jornadas Venezolanas de Sismología Histórica* and the *V Simposio Venezolano de Historia de las Geociencias* took place in the city of Trujillo in October 2004 as a unified event organized by the *Universidad de los Andes* (ULA), *Universidad Central de Venezuela* (UCV), *Fundación Venezolana de Investigaciones Sismológicas* (FUNVISIS), *Fundación para la Prevención del Riesgo Sísmico de Mérida* (FUNDAPRIS), and the *Sociedad Venezolana de Historia de las Geociencias* (SVHGC). Several works were presented there on the topics of seismic history, history of geosciences, and other topics not in the realm of INHIGEO. The proceedings of the event were published in a special issue in 2005 of the *Revista Geográfica Venezolana*, a publication of the Universidad de los Andes,

Contents of the *Boletín de Historia de las Geociencias en Venezuela*

Altez, Rogelio, José Antonio Rodríguez, y Franco Urbani, 'Las ciencias naturales en la Venezuela del siglo XIX,' *Boletín de Historia de las Geociencias en Venezuela*, 2005, *97*, 37–47.

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Urbani, Franco, 2004, 'El consumidero del río Guaire: un caso histórico de taponamiento de una cueva,' *Boletín de Historia de las Geociencias en Venezuela, 94*, 135–141.

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Rogelio Altez, Caraballeda, Estado Vargas

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Professor Wolfhart Langer, Germany
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