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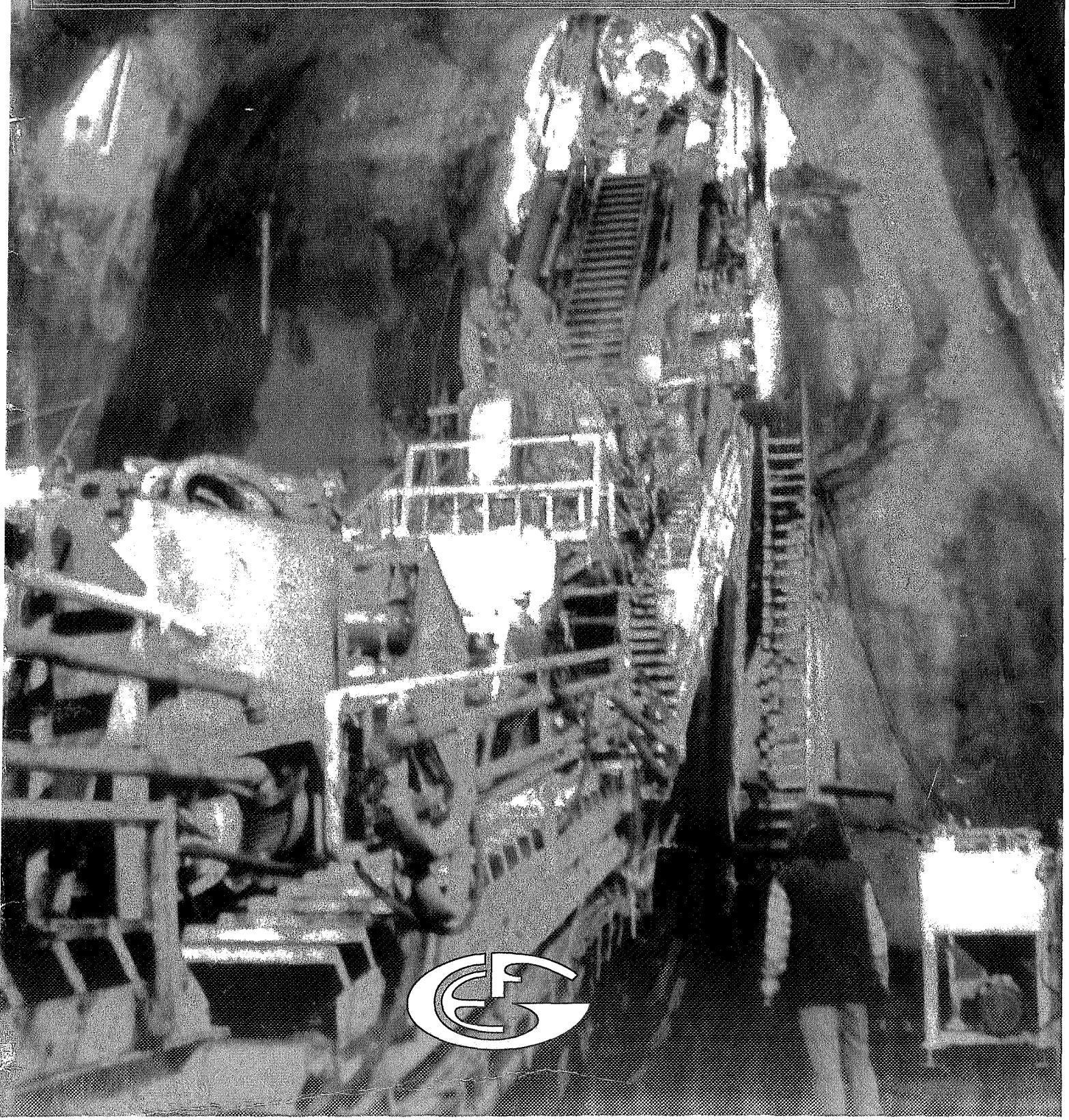

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Foreword

Making Geology understandable

by Christer Åkerman, President

The Green Week Conference of the European Commission DG Environment will take place on 2-5 June this year. The theme is *"Changing our Behaviour"* with regard to three main issues: 'sustainable consumption and production', 'renewable energy & climate change' and 'water'. These issues certainly concern geologists and geoscientists, as does the environment as a topic, and yet we notice, as did our Brussels office Agency Chief at the Green Week last year, that geological aspects of environment are most often missing. This demonstrates the unsatisfactory state of things but here I will confine myself to just one aspect.

With the aim of changing this situation, the Board has discussed what EFG could contribute, and through our Agency Chief we are looking at what the organizers will let us do. It appears that we will have a stand at the Exhibition, but our other preference, having a charismatic top quality speaker giving a lecture on, for instance 'the geological record on climate change', will be difficult to accomodate. This, I think, is precisely one of the most critical tasks that we have before us: the skill to present all the different aspects of geology in such a manner that politicians, decision-makers and the public really can understand what geology is all about, and hence begin to realize the breadth and importance of geological knowledge for the development of society and its prosperity.

The mission of the EFG is to promote the profession and practice of geology and its relevance, and for that reason we set standards and award quality marks (the EurGeol. title), which are tied to ethical rules and life-long learning (CPD). We market this to the European Commission and other political and high-level administrators in order to become a recognized voice for professionals working in the field of geology. But this is probably not enough. I believe that promoting the profession should also include marketing and making presentations of our work to the public in an understandable way. We must learn how to explain to the man in the street, that all interference in the natural environment concerns the geology of the area, that flora and fauna are superficial features of an environment consisting of geological material and that national parks most often are founded on the basis of spectacular features, which have a geological background. This must be taught to children in school.

If we are to become broadly recognized by society, with increasing networks of labour opportunities for geologists, leading to higher status and better salaries, efforts must also be made to participate in Geology Days, Working groups and Expert Panels, as well as participating in the public debate. And of course CPD programmes should include training in the art of presentation. It has been said that geologists are storytellers. I think we must become actors! Yes, we must probably "Change our Behaviour.

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Although the articles in this Magazine are subjected to scientific editing, they are not peer-reviewed.

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Cover photograph
Roadheader in its initial position for the excavation of the power station cavern, Premadio, N. Italy.
Photo: Quadrio Curzio Ltd.

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President's report for 2002

by EurGeol. Christer Åkerman

Summary
Setting up of five bodies required by the new regulations
International Licensed Body legally formed and operating
Continued increase of applications for EurGeol. title
Drafting of a new Five Year Strategic Plan
Awarding of the first EFG Medal of Merit
Meetings on co-operation with IAEG
Development of new EFG Leaflet
Elaboration of an Events Page to web site
Setting up of an Expert Panel on Flooding in Europe
Planning for a 2nd International Professional Geology Conference in UK
Development of relationships with the European Commission and other organizations

Serving on the EFG Board gives the possibility of coming in contact with all kinds of aspects connected to the promotion of the geological profession and the practice of geology and its relevance. This involves a lot of hard work, including chasing and encouraging busy Council members and others to volunteer for and to nominate national associate members to EFG bodies and parties that need to be set up. At the Council meeting in Berne, five such bodies, with delegates from national associations, were introduced, necessary for meeting the requirements of the new regulations when authorizing the Federations International Licensed Body (ILB) to award the EurGeol. title. In the late autumn the ILB was legally formed and operating, and five applications for the EurGeol. title were approved.

Another reason for appointing delegates to these bodies as soon as possible is that EFG has applied to the Australian Stock Exchange to become a 'recognized overseas professional organisation' (ROPO). Some of the criteria that we need to satisfy for gaining recognition are having the International Licensed Body, an Ethics Committee and disciplinary powers.

The printing and distribution of the European Geologist magazine No 13 and 14 involved problems causing much work, especially for the Vice-President, thanks to whom the price was kept reasonably low, in spite of the non-transparent financial system. Considering the threat to the health of Uros Herlec that the prevailing circumstances provoked and the non-existing possibility to present to advertisers in advance the exact price and date of distribution, it was decided to leave the Slovenian printers and transfer the whole process to the editor from No 15. A contract was signed with the editor, Maureen McCorry defining her basic fee and principles for commission on advertising as to years 2002 and 2003. Although the magazine is considered by most of our members to be an important tool, providing articles to the editor, it is constantly struggling for its survival due to insufficient advertising income.

The main reason for moving the office from Paris to Brussels was to be able to have better communications with the European Commission, to influence its policies with respect to geoscientific matters. Thanks to the enthusiastic work by the Agency Chief Isabel Fernandes, at our Brussels office, and the effective work by our EU delegate John Clifford, relationships have been developed with various EC officials - particularly in Directorate-Generals Environment, Enterprise, Education and Internal Market. A submission was made to the DG Environment on the Mine Waste Directive emphasizing the importance of the "competent person" concept and suggesting that it be spelt out in greater detail in the Directive. A dossier on the Beck case was presented to DG Internal Market who agreed to take up the case. Application was made to be represented on the European Committee for Standardization (CEN) in CEN/TC 250 (Sub-Committee Eurocode 7) and CEN/TC 341, of which the latter (Sub-Committee Geotechnical Investigation and Testing) has been approved. We have also presented ourselves to the Raw Mate-

Delegates (and friend) at the informal Council meeting in Brussels, December 2002

rials Supply Group (RMSG) at DG Enterprise. EFG is now registered on the CONECCS internet database maintained by the Commission, a listing of European organizations that make policy recommendations and submissions to the Commission.

For the sake of coordinating efforts in areas of mutual interest, contacts have been elaborated and maintained with Emile Elewaut, Secretary General of EuroGeoSurveys, with Corina Hebestreit, director at the EuroMines office, Pieter Laga, director at the Service Geologique de Belgique and Michel Rousselot, president of EuroCadres. We have also maintained contact with the Australian Joint Ore Reserve Committee (JORC) and, with the help of past EFG presidents Gareth Jones and Gunnar Hultquist, participated at AIPG and CCPG annual meetings in North America. Through Istvan Berczi we continue to participate at the annual sessions of the Committee on Sustainable Energy of the United Nations Economic Commission for Europe in Geneva.

At the Brussels informal Council meeting on 7-8 December we had the opportunity to discuss collaboration between EFG and the International Association of Engineering Geologists and Environment (IAEG) with the IAEG President elect Niek Rengers and the WG chairman Helmut Bock. The discussion on collaborating in finalizing the EFG prepared draft dossier on Engineering Geology in Europe had started earlier and was followed up by the EFG Secretary General David Norbury at the IAEG Congress in Durban in September 2002. A working group for the preparation of a broader based document, starting with the EFG draft dossier, will include David Norbury representing EFG in an observer role.

It was also with great pleasure that the informal Council meeting could welcome Finish representatives whom we have been missing for several years. The happiness was further increased by the encouraging renewed contacts with a new board for the Association of Greek Geologists and with CNG of Italy.

Preceding the Council meeting, a reception was held at which the first EFG Medal of Merit was presented to Eric Groessens. The event included a special and unique wine contest accompanied by delicious 'bocadillos' and which was arranged at the offices of Service Geologique de Belgique with the help of Pieter Laga, Director.

The Board's draft Five Year Strategic Plan was presented and discussed at length at the informal Council meeting. The deliverables for 2003 were agreed and responsibilities for achieving them were assigned. The key issues of the discussion included the need to focus on and deliver a few objectives, provide feedback from Council, Board and office activities to the National Associations in order to help them improve the image of EFG and sharing member benefits, with enhanced benefits level for EurGeols.

And it was noted that there are now 454 EurGeols.

EFG Seals

Make your reports official

One of the benefits you gain from holding the EurGeol. title is the validation of your training and experience by your peers, as well as the associated public recognition. Apart from including this on your business card or CV, how many readers of your reports know about this important recognition of your professional standing.

EFG now offers you the opportunity to emphasize your standing and maximize the benefit of the title by enhancing all your reports with your own EFG stamp. The design of this embossed stamp (see illustration) provides confirmation of your title, and is personalized with your EurGeol. Membership number.

Use of the stamp in addition to your signature provides reassurance to your clients that they are employing a Competent Professional.

The seal is 40 mm in diameter and embosses the paper; there is no ink or colour so that the seal does not show on a photocopy, thereby clearly identifying the original document that you signed and issued.

You can order your seal either through the Secretary General or the Brussels office, and you should submit the payment of £65 STG or Euro100 with your order. Orders will normally be despatched within about 3 working weeks of receipt of payment.

EU Delegate and EFG Brussels Office report

by EurGeol. John A Clifford PGeo and EurGeol. Dr. Isabel Fernandez Fuentes

The period since our last report in European Geologist Issue No. 14 has seen an increased level of activity in the Brussels Office.

The Office and EU Delegate continued to promote the value of the European Geologist title through participation in a number of meetings and in submissions to the European Commission and Parliament. The principal thrust of our presentations has been to promote the title as a Common Platform along the lines enunciated in the Draft Directive on Professional Titles, which was published by the European Commission in March 2002.

Notwithstanding a policy to ensure mobility in employment within the European Union there is continuing difficulty in implementation. A detailed submission was made to DG Internal Market on one such case. The Commission has decided that, even though the individual concerned has practised as a geologist for over 20 years, is a holder of the EurGeol. title, and that his application for registration as a geologist was supported by the *Illustre Colegio Oficial de Geologos* (ICOG) the Spanish authorities acted within the legal context of the Directives in rejecting the application. The EFG Board considers that such a decision is completely at variance with the spirit of the Community policies and intends to take the matter further.

Participation has continued in the Raw Materials Supply Group (RMSG) organized by DG Enterprise. In that group we have continued to monitor the progress of the draft mine waste directive, made submission through Slavko Solar (Slovenia) on Sustainable Development Indicators. A number of meetings are planned by the RMSG including a Conference on Sustainable Development in Enlargement countries on 25/26 April in Bucharest and a Conference on Mining Waste Management in Wroclaw on 2/3 June. Another issue receiving increased attention within the RMSG is the decreasing numbers of mining students and mining courses in the EU. Some of the programmes, such as *European Mining Course* (EMC) and *European Mineral Engineering Course* (EMEC), have been set up to counter these problems. As a result of these initiatives mining students can now take courses in different mining universities in the EU. Universities, industry and the Commission are financing the programmes. Similar initiatives would be welcomed in the geological sphere.

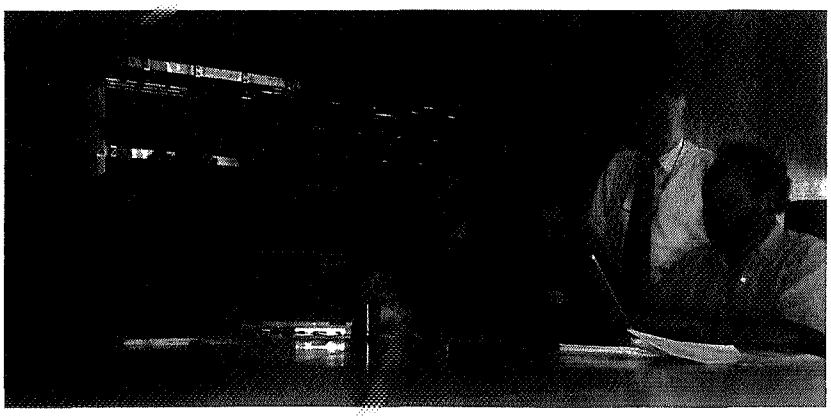
The European Commission is planning to adopt a Communication on Civil Protection and Environmental Accidents. After the major impact of flooding in Germany, Austria and several applicant countries last year, the European Commission became increasingly aware of the necessity to improve civil protection from these and other natural hazards. Based on a Communication from the European Commission to the European Parliament and Council on these floods, an initiative has evolved to work on integrated EU strategy on prevention, preparedness and response to natural, man-made and other hazards. Herald Ligtenberg (Netherlands) and the EU Delegate are currently preparing a detailed submission. The main thrust of the submission will be to highlight the central role that geology has in identifying areas of natural hazard risk and recommending the appropriate mitigation measures.

The importance of geology on a range of issues has also been stressed at various meetings within DG Environment. These include the strategic review of the implementation of the environmental impact directives and on the evolving policy on sustainable development.

DG Environment has also indicated their acceptance of EFG participation in Green Week on June 2 – 6. Participation will include provision of a stand as well as a speaker to one of the seminars. The stand will emphasize how geology contributes to ensuring sustainable water resources and understanding the geological implications resulting from climate change.

At the request of ICOG, the Brussels' Office made a successful application for the EFG to be represented in the CEN Technical Committee 341. The EFG was represented at a recent meeting of this body in Prague by Jan Schrofel and Manuel Reguiero.

On the administrative front the Brussels' Office is now processing applications for the EurGeol. title which are submitted through the International Licensed Body (ILB) and are developing an Events Page for the EFG website. The Events Page will include details on geological activities that are being planned. The success of this initiative depends on Council delegates arranging for details of such activities to be submitted.



Christer Åkerman, Uros Herlec, Carlo Bravi, Isabel Fuentes, John Clifford and David Norbury plan Green Week, Brussels 2003.

Secretary General's report

(2002-2003)

by EurGeol. David Norbury

My introduction to EFG Council business was rather a baptism of fire. Having never attended a Council meeting, I was busy taking notes within a few minutes of sitting down at the meeting in Berne in June 2002. For business reasons, the previous Secretary General had given up this role unexpectedly and, as he was unable to attend the meeting, there was no hand over. Antoine Bouvier is to be thanked for all his hard work in fulfilling his obligations on the Board and Council of EFG.

I have spent a large proportion of my first year in the Secretary General role getting to grips with the job and the requirements of servicing the Board and Council meetings, and in liaison with the Brussels office. Firstly, there was the matter of preparing the minutes of the Berne meeting – condensing the results of two days discussions into the key decisions made. In addition, there were a total of 39 attached papers to obtain and circulate as part of the record of the meeting. I thank the assistance provided by other members of the Board, past and present, for their help in compiling these papers.

The list below gives a flavour of the tasks that fall to the Secretary General, and which have been occupying my time.

EFG Council and the Board

- Preparation of Agenda and papers for Board Meetings
- Compilation of the Agenda and Papers for the Council meetings
- Preparation and circulation of minutes of meetings
- Co-operation with Registration Authority on listings of EFG members
- Updating and maintenance of EurGeol. listings
- Liaison with National Associations (NAs) for membership of Standing Committees
- Assembly of database on Council members' areas of interest and expertise

Board initiatives

- Contribution to drafting of Strategic Plan, for discussion by Council
- Chasing NAs for reports on Strategic Plan
- Preparation of new EFG Leaflet (with assistance from Council members)

Internal communication

- Collection of mail addresses for circulation of information of interest to EFG members
- Liaison with web master as to content of web site, and updating as necessary
- Update and maintenance of Council mail list, establishment of EFG CONTACTS mail list
- Liaison with Brussels Agency Chief in establishing Events Page on EFG web site
- Re-establishment of availability of EFG Seals for EurGeols for embossing your reports to prove they are genuine, as the embossed seals do not photocopy. Details are provided in a separate article in this issue of the magazine

External liaison

- Liaison with CCPG regarding mutual recognition of qualifications
- Support to ANGI for suggested inclusions on geological hazard to Eurocode 7
- Support for ANGI on inclusion of specific geological requirements in Directive on Recognition of Professional Qualifications

Engineering Geology in Europe

At discussions with IAEG officers in South Africa in September 2002, EFG were invited to contribute to a Joint Working Group set up by the Presidents of the International Society of Engineering Geology (IAEG), the International Society of Rock Mechanics (ISRM) and the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) to review the position of engineering geology in Europe. The start up meeting of the Working Group (March 2003) confirmed the urgent need for a Dossier to report on Ground Engineering in Europe (including the Geotechnical Engineers as well as the Engineering Geologists), building on the existing EFG draft Dossier. A broader dossier is required in the context of achieving better co-operation between and within the professional associations that represent Ground Engineering. EFG participated actively in the start up meeting, and are encouraging FEANI to also provide active participation.

The framework within which Ground Engineering is carried out is changing rapidly at this time, with various parts of Eurocode 7 being drafted, published, and incorporated into National Standards, and thus practice, over the next five years and proposed Directives emanating from Brussels. There is a pressing need to prepare a statement of the competencies and qualifications that are required to practise as Engineering Geologists and Geotechnical Engineers, in particular to define the interfaces and areas of co-operation, not the boundaries. This statement will be needed for presentation to the European Parliament to pursue the establishment of a Common Platform in Ground Engineering in connection with the Proposal for a Directive on Recognition of Professional Qualifications.

It is intended that the strands of Codes, Professional Qualifications and education (in accordance with the Bologna Declaration) are pulled together in a report to be signed by Presidents of the three Learned Societies, and by Presidents of the two Professional Associations (EFG and FEANI). Milestones for publicizing the dossier in preparation will be the member meetings in Prague (8/2003), South Africa (9/2003), Liege (5/2004) and Osaka (9/2004).

Directive on professional qualifications

A Proposal for a Directive on Professional Qualifications was published in 2002, and commented on by EFG. In February

2003, I contributed to a meeting on the subject, representing the European view and speaking on behalf of EFG at the Geological Society in London. This involvement has continued and included discussions and contact with FEANI. An alternative proposal has been published (February 2003) which conflicts with the agreed parliamentary recommendations to the proposed Directive. EFG and FEANI submitted position papers to the relevant Commission. The EFG paper, submitted on 24 March 2003, reinforced the previously stated preference for a Common Platform to be established for Geology, in which the educational, training and experience requirements for a professional geologist would be identified. These requirements are essentially the same as those already applying to validation as a EurGeol.

I look forward to entering my second year as your Secretary General working at a better pace to achieve the requirements and challenges that the role presents

EFG Medal of Merit

by EurGeol. Gareth Ll. Jones

In July 2000, at the Council Meeting in Alicante, Spain, Council approved the creation of the title of Honorary European Geologist. This was to be awarded to geologists or others whom it considered to have made a significant contribution to professional geology in Europe. At that meeting EurGeol. John Shanklin of the UK was approved to be awarded the first Honorary European Geologist title.

Later on, as the requirements for our professional title of EurGeol. developed and included CPD, it was felt that it was confusing and inappropriate for this honorary title to appear to overlap the professional title. Consequently it was decided to end the honorary title and replace it with the EFG Medal of Merit. This was agreed by Council at their meeting in Berne, Switzerland in June 2002.

The first medal was awarded to EurGeol. Eric Groessens in Brussels, Belgium in December 2002, whilst a second medal is to be awarded to EurGeol. John Shanklin in May this year to replace his original Honorary European Geologist title. Below you will find the formal proposals which were made for these awards.

This award is not a regular honour, but is to be made when appropriate. A candidate's nomination should be sent to the Board, who will make a proposal to the Council. Council will then approve the award if they consider that the candidate has indeed made a significant contribution to professional geology in Europe.

John Shanklin

Proposal for Honorary European Geologist.

John Shanklin has for along time been deeply involved in the politics of geology in the UK. He helped to create the Institution of Geologists (IG) and later was involved in the merger of that organization with the Geological Society. This led to the establishment of the title Chartered Geologist.

John Shanklin has given over 20 years of his life to the EFG. At the end of the 70s, he was one of the group of farsighted geologists who understood the necessity for geologists across Europe to join together to protect and to develop their profession. Thus in July 1980, when the Federation was born, John was elected to be the first President. He successfully guided the EFG through its formative years, helping to develop its policies, to draft the first dossiers and to start the process of enlargement. So in 1983 he was able to hand over to the late Renzo Zia a fast-growing organization.

Then in 1989 when he was attending the World Geological Congress in Washington, USA, he met Bill Knight and other members of the American Institute of Professional Geologists. This lead to the exchange of information and visits which culminated in the establishment of reciprocal associate membership in 1998 between the two organizations.

When John ceased to be the UK's delegate, he was soon drafted in to serve on the Registration Committee for the EurGeol. title. Here he has served diligently,

first under Franz Goerlich and now under Eric Groessens.

The EFG owes a huge debt to John Shanklin and I am proud to propose him to be awarded the first Honorary European Geologist title, on the EFG's 20th. birthday.

PROPOSER: EurGeol. Gareth Ll. Jones, President

SECONDER: EurGeol. Gunnar Hultquist, Past President

July 2000, Alicante, Spain

EurGeol. Prof Eric Groessens

Proposal for EFG Medal of Merit.

Professor Eric Groessens is a distinguished worker at the University of Louvain la Neuve where he specializes in Carboniferous limestones and in conodont microfossils. He is also a senior member of the Service Géologique de Belgique. However it is for his contribution to the field of professional geology that we propose to honour him. Eric Groessens was one of the original delegates representing Belgium at the foundation of the Federation in Paris in July 1980 and he has been involved with the Federation in many ways ever since.

In 1995 he became the Chair of the Federation's Registration Committee and oversaw the scrutiny of applications for the EurGeol. title, with his panel of committee members; a role that developed as the title developed and which he passed on to Richard Fox in June 2001. Whenever the EFG has met in Brussels in recent years, Board and Council venues in the Belgian Geological Survey or the National History Museum, have been organized by him. We are deeply indebted to him for this also.

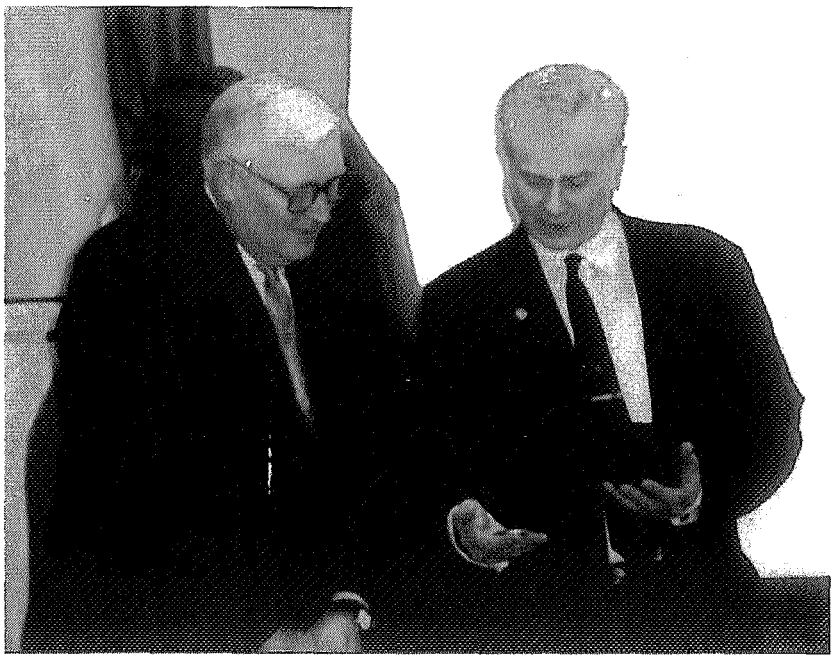
However the culmination of his contribution to professional geology in Europe has been the quiet organization of a situation whereby the EFG, through the collaboration of the national member, the UBLG, has opened its new office in the Belgian Geological Survey in 2001.

We are proud to propose Eric as an Honorary European Geologist.

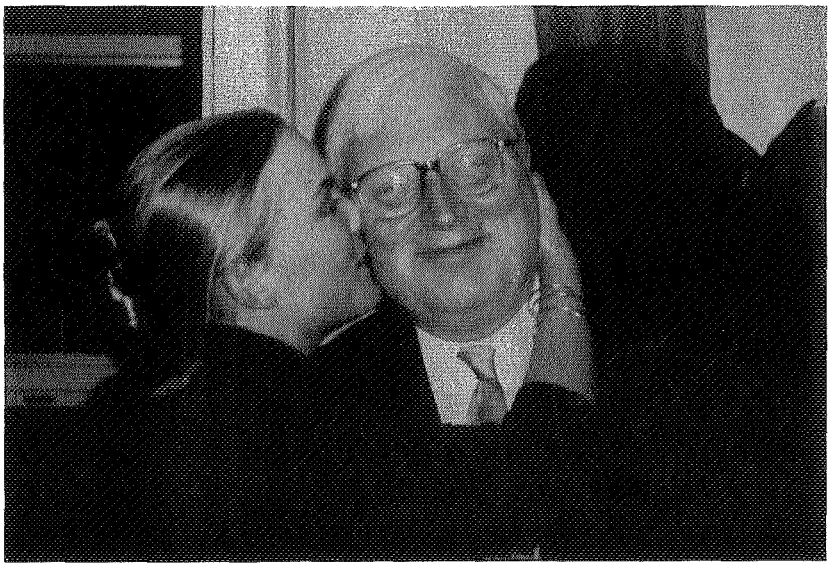
PROPOSER: EurGeol. Gareth Ll. Jones, President

SECONDER: EurGeol. Manuel Regueiro, Past President

June 2002, Bern, Switzerland



EFG President, Christer Åkerman (right) presents the Medal of Merit to Eric Groessens, Brussels, December 2002



Eric is congratulated by his daughter

Treasurer's report:

Statement of accounts, 2002

by EurGeol.Carlo Enrico Bravi, EFG Treasurer

The enclosed document shows the "YEAR 2002 FINANCIAL STATEMENTS", with a comparison to the "Year 2002 Budget", approved at the Council Meeting in Krakow and published in European Geologist 12, Nov. 2001, and the "Year 2001 Statement of Accounts".

Some of the items have been slightly modified, in order to make a more homogeneous reading.

In 2002 Budget the item "Benefit in kind" has been added.

As shown, at the time of issue, 2002 Budget did not include the EG Magazine, which appears in the 2002 real accounting situation, where the INCOME are referred to issues 11 and 12, published in 2001, and EXPENSES are referred to the costs (Editor, printing, distribution) for issues 13 and 14.

During the year all remaining costs related to Paris Office were resolved.

The item "contingencies" corresponds to the cost of casting the 25 "EFG Medals of Merit", (23 are still in stock).

More expenses than foreseen have been faced for EFG leaflets, visit cards, EurGeol. Cards, etc.

The item "Different costs related to previous years ....." of Euro 6,990.30 corresponds to payments made in 2002 but mainly referred to 2001; namely Editor costs, distribution of EGM 12, film preparation of issues 11 and 12 of the Magazine, etc.

All other items are keeping to the Budget and do not need any special comment.

The "STATEMENT OF ACCOUNTS YEAR 2002" was sent on time, together with some explanatory bank and cash documents, to the "Commissaires aux Comptes" (Thomas Imbach, Slavko Solar, Luis Suarez).

ACCOUNTING YEAR 2003

When present Report was prepared to be published on EGM n° 15 (5th May 2003), the financial situation was the following:

INCOME	
2003 Fees	23.352,79
(6 National Associations still owe their Fees, 6 May)	
Magazine n° 13 and n° 14 advertisements	4.883,16
Magazine extra copies distribution costs (1.663,00 still due)	13.952,00
European Geologist's Fees (ILB approvals)	190,74
(Net received on 225 invoiced)	
(still due 150,00 for two new applications)	
Other income	
(Magazine subscriptions/ads n° 15)	570,19
TOTAL INCOME (5 May 2003)	**42.948,88**
EXPENSES	
Board expenses	4.708,75
Bruxelles office	3.000,00
Extra travel to Bruxelles	165,98
GREEN WEEK participation	
(Budget decided by the Board March 2003)	2.500,00
Magazine costs (Editor etc.)	4.657,84
Other costs	
(phone, fax, stationery,mailing, secretarial work, etc)	596,36
TOTAL EXPENSES (5TH May 2003)	**15.628,93**

Bank interest compensates, more or less, bank costs.

On the 5th May 2003:	Bank	+ 29.628,00
	Cash	+52,00

Accounts are mainly keeping to the approved Budget 2003 (published EGM 14 - Dec. 2002).

An update of 2003 Account will be examined during the Council Meeting in Ljubljana (June 2003) together with the Financial Budget for the year 2004.

Year 2002 Financial Statements 01 JAN. - 31 DEC. *currency EURO*

ITEMS	BUDGET 2002	2002 real	2001
INCOME			
Bank + cash from previous year	2.000,00	5.417,00	3.066,00
Fees from National Associations (net received)	27.500,00	30.118,87	32.809,00
EurGeol Fees + Renewals	5.250,00	1.250,16	2.775,00
Magazine n° 11 and n° 12 Extra Copies + refunds for mailing costs	-	10.300,57	-
Magazine Advertisements (11 and 12)	-	2.008,23	-
Magazine copies + EurGeol Fees referred to previous periods	-	1.851,74	-
Benefit in kind / sponsorship:			
Activities and work accomplished by the Board	80.000,00	80.000,00	15.000,00 President's Sponsorship
Web page	100,00	-	-
Other income: contribution 2001 AIPG (USA)	-	-	500,00
Bank interest	20,00	301,96	20,00
TOTAL	**114.870,00**	**131.248,53**	**54.170,00**
EXPENSES			
Various costs related to previous years paid in the period: magazine printing, Editor, travel expenses, magazine distribution, etc.	-	6.990,33	-
PARIS: legal seat administration costs	500,00	500,00	1.290,00
PARIS: secretarial work + final allowance	1.500,00	2.041,57	1.850,00
BRUXELLES OFFICE			
Activities connected with EU commission / chief agent	9.500,00	10.000,00	6.850,00
Running costs: telecom, stationery, mailing, promotion.	2.000,00	2.000,00	1.240,00
Extra travelling expenses	2.000,00	-	732,00
Accounting / Treasurer's expenses	3.000,00	750,08	2.550,00
EurGeol Title processing costs	700,00	-	1.140,00
Registration Committee expenses	200,00	-	180,00
European Geologist Magazine (issues n° 13 and n° 14)	1.500,00	-	-
Editor	-	3.513,42	-
Printing - connected costs (Films, etc.) - distribution	-	10.143,75	8.611,00
Travel and lodging expenses:			
Board, Editor, Bruxelles chief agent	12.000,00	11.939,00	11.627,00
Board expenses for:			
photocopies, visit cards, EFG leaflets, Eur Geol cards, etc.	-	1.273,33	1.480,00
Contingencies	1.000,00	1.072,64	258,00
Web page	100,00	-	-
Benefit in kind: board work for meetings and activities	80.000,00	80.000,00	15.000,00 President's Sponsorship
Bank costs + credit card charges	650,00	69,19	426,00
TOTAL	**114.650,00**	**130.293,31**	**52.234,00**
SURPLUS	***220,00***	***955,22***	***1.936,00***

NOTE : EFG FINANCE 31.12.2002

CASH	69,15
- BANK:	
Popolare Bergamo/ Credito Varesino - Milano	3.333,09
Credit Lyonnaise - Paris (closed)	-

Globalization: an industrial aspect of the new world order

by Jürgen Faupel [1]

Basically initiated by Western countries and companies globalization has encroached in all walks of everyone's life and is irreversible. But globalization is not a one-way street. It will see Western domains successfully rivaled by those 80% of the world population now about to enter and shape a new world order of unprecedented equal opportunities. Impacts will be profound and unparalleled, challenging Western imagination and innovation to its limits. Taking the petroleum industry as an example, it is discussed how the Western global players, motivated by profit, are being curtailed by the new global players, motivated by national identification and ownership of resources. New global players could even become employers of choice for geologists.

Initiée par les pays et entreprises occidentaux, la globalisation s'est immiscée dans la vie quotidienne de chacun et apparaît comme un phénomène irréversible. Cependant, la globalisation ne constitue pas une route à sens unique. Elle va être témoin du succès de 80% de la population mondiale qui va venir rivaliser avec l'Ouest dans des domaines jusqu'ici protégés, en participant à et en façonnant un nouvel ordre mondial caractérisé par l'égalité des opportunités. Les conséquences seront profondes et sans précédent, poussant à leurs limites les capacités d'imagination et d'innovation des Occidentaux. En prenant comme exemple l'industrie pétrolière, il est montré comment les principaux acteurs occidentaux, motivés par le seul profit, sont en train d'être mis au pas par de nouveaux acteurs, motivés par un sentiment national et par les droits de propriété des ressources.
Ces nouveaux acteurs pourraient même devenir des employeurs de choix pour les géologues.

Iniciada por los países y las empresas occidentales, la globalización ha invadido la vida de todos y es irreversible. Pero la globalización no es una calle de un solo sentido. Permitirá ver como el 80% de la población del mundo está a punto de incorporarse y constituir un nuevo orden mundial de igualdad de oportunidades sin precedentes que competirá con éxito en los dominios occidentales. Los impactos serán profundos y sin parangón, y desafiarán la imaginación y la innovación occidental hasta sus límites. Tomando la industria de petróleo como ejemplo, en este articulo se discute, cómo los principales actores globales occidentales – motivados por el beneficio económico – son sobrepasados por los nuevos actores globales– motivados por el nacionalismo y la propiedad de los recursos. ¡Los nuevos actores globales podrían llegar a ser los principales empleadores de geólogos.

Globalization has been labeled "new colonization" by some experts. At first glance, it seems to be convincing, since globalization was initiated and driven by the West, the First World - representing only 20 % of the world population. Most obviously, globalization can be realized by mega-mergers of the industry, by the worldwide web supplying communication with and accessibility to products, services, events, information and data and by a perceived internationalization, around the clock and around the globe! The telecommunication industry jointly with the media and computer industries have created the feeling of boundless transparency and connectedness and the claim for ubiquitous participation in even the remotest events and opportunities. On the downside, that goes along with new types of crime on a global scale.

Western nations very efficiently support the growth and spread of globalization by political moves enhancing the impression of a new colonization strategy. However, an analysis of the impacts and results of the various historic phases of colonization by Western super powers clearly makes another such phase undesirable.

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Mergers

There have always been mergers between companies in the past, and always with the same intentions. However, nowadays they have reached a global dimension and a condensation to merely a few "global players" dissolving any national contours. The natural resources industry is a classic "global player" due to the geologically driven distribution of resources, heedless of any borders. Other industries, e.g. insurance companies, banks, car manufacturers, IT-concerns, etc. have joined in later.

Mergers increase neither the world crude oil reserves, for example, nor the number of potential bank customers. Above all, the "global players" represent

a concentration of capital and technology. They also dominate marketing and logistics. The best experts are at their command to execute their business plans. The annual budget of most "majors" among the "global players" exceeds by far the national budget of those countries they work in. But they lack a crucial asset, the ownership of the natural resources. They need to lease temporary licences for the exploration and production of those resources, which are situated increasingly beyond their traditional sphere of influence and business activities. Under these changed auspices, the "global players" are enlarging vigorously their accumulation of capital and technology, their biggest assets, while reducing the head count and improving profits. Thus, they are diligently preparing for the looming challenges and creating ever-larger corporate entities. Shareholders and stock markets are most appreciative.

New global players

The West has pledged to support the development of Second and Third World countries, with visible success in some areas. A considerable number of resource-rich countries have grasped the opportunity and have gathered capital and know-how or are about to do that. Most countries, driven by a national identification motive, try to follow the unique and successful strategy of Norway in dealing with their resources and profits.

Numerous national and private companies of resource-rich developing nations have emerged as "new global players" and are more seriously vying with the classic "global players" than is commonly noticed. The developing countries and nations are highly efficient in actively supporting each other in their competitive approach. In licensing and tendering rounds for natural resources and technical projects, national authorities are not necessarily rewarding the highest bidder, but favour bidders from other developing countries, or make them a partner of a Western operator for leverage of know-how and business procedures. Frequently, bidders are prioritized by technological competence, and licences are awarded based on the most prolific program for technology transfer to and infrastructural development of the host country, plus mandatory employment of nationals. Being in the driver's seat, local authorities are also permanently optimizing their profit from contracts and agreements with foreign awardees by royalty schemes, taxes and production shares.

Changeover

Unlike the "new global players" the classic "global players" are also disadvantaged by political restrictions imposed on certain countries by Western governments. Presently, embargoes, "axis of evil", "rogue states", muddled friend/enemy images, impending war scenarios and other world political developments, paralyse the Western energy "majors", despite high world oil prices. Unencumbered by this political situation the "new

Globalization: the shape of things to come

global players" are positioning themselves without difficulty in these political gaps. Undoubtedly, democracy and free market economy are not constituents of the globalization process. There are strong indications that a globalized economy resulting in a new world order will not function after the Western model we are familiar with. A true global system will carry the characteristics of all dominant cultures and powers. Any other expectation would be deceptive and would be rooted only in ignorance or arrogance.

Within about the next ten years, the "new global players" will have grown to sufficient size and number to catch up with the classic "global players" and will seriously infringe even on their Western business domains. This will not only happen, in the case of the petroleum industry, in the upstream, but also in the downstream sections. This will be facilitated by the classic "global players'" negligence of their identification with ancestral markets and customers and by industrialized countries increasing their dependence on energy and resources imports from the Second and Third World (instead of developing alternative, regenerative sources). As an odd example, the German "red/green" Government has decided to shut down all nuclear and coal fired power plants within the next ten to fifteen years due to alleged environmental concerns, without publishing plans for a substitute for the 60% of total electricity presently produced by these power plants. The "majors" of the petroleum industry relinquish oil and gas fields in the North Sea before depletion once they are generating less than a few million dollars profit annually. With the human and monetary resources saved, the "majors" would rather be engaged in exploration with the most potential for giant discoveries offshore, e.g. in West Africa, Brazil, etc. We should not deceive ourselves that North American or European "majors" will stand loyally to support our domestic resource base.

Europe will continually fall behind. Our dwindling resource base (recently, there was a new discovery made after seven years in the British North Sea) and increasing imports will see us in a Japan-like situation. However, we are lacking the power of innovation and the uncompromised work ethic necessary to survive and to succeed. Additionally, our political as well as economic power is undermined. We will soon belong to the caste of highly civilized "have-nots". On the contrary, the USA is still enjoying a comfortable domestic resource base, with Canada as a fallback, immense innovation and creativity skills and undisputed military and economic power. North America will be considerably less vulnerable than Europe in case of loss of supremacy of its classic "global players".

New colonization

Realistically, globalization will not turn into a "new colonization" in the historic Western sense of the term. Most likely, globalization will introduce a "colonization" of the Western economies by the 80% of world population in the Second and Third World. As history shows, world superpowers rise and fall. China, for instance, is working very patiently but tenaciously to become an (economic) world power supported by Western companies flocking into this highly populated country and generously sharing their know-how in expectation of huge future profits. In pursuit of its industrialization, China will inevitably become the most serious competitor for access to the - limited - international sources of energy and resources. Russia will eventually overcome the confusion and aberration of communism and will be vying for world leadership, too, based on an educated populace and the world's richest natural resources in its vast country. Brazil can also be regarded as a potential contender in this race, like other resource-rich countries, once they will get their act together.

On the lighter side of this new global paradigm, the soccer world championship 2002 in South Korea and Japan might help to bring the point across. Much to the dismay of many well established, traditional soccer nations they were dwarfed by the teams of "uncharted" countries, who had learned their lessons well and were driven by a fresh, motivating spirit and a healthy self-esteem. It was not by chance that they claimed half of the final places. And this is not an odd "mishap".

Globalization implies opening up and dismantling barriers, which will create new opportunities for everyone prepared and aware and will benefit particularly those who are put in jeopardy to be "globalized" or "colonized". This opening-up is not a one-way street, but will lead to a true globalization of competing peers and partners. There will even be cooperation and mergers between classic and new "global players" (e.g. Gazprom and Wintershall in Germany), as coexistence will need to be redefined. Actually, globalization will usher in a new world (and social) order and has developed an irreversible momentum of its own. Such a genuine and fair globalization has the potential to work in favour of a more peaceful world.

The future

Implications and consequences are huge, revolutionary, and are still neither fully appreciated nor understood in detail. From the Western point of view, reliability and stability of supply of energy and resources, for example, is certainly of concern under the new world order. A new "resources roulette" will need to be dealt with. Western susceptibility to terrorism, political blackmailing and other pressures will increase and will demand proper precautionary measures. Among many other aspects, the new world order will present geologists with new employers of unfamiliar culture, corporate philosophy and novel work requirements while jobs in customary fields continue to decline. In order to qualify for employment we need to expand our horizon to match those new requirements and conditions.

Globalization and the resulting new world order represent a profound "change of paradigm" and will interfere directly or indirectly with everyone's life. It demands our full and undivided attention. We need to position ourselves appropriately and prudently now, that is, right now. Such a reorientation in order to maintain/improve our status has to happen in all walks of life and in all aspects of our society, especially in the EU as our most potent entity and home country. How will the EFG cope with the effects and implications of globalization and turn them into opportunities for the geoscientific community and our society? Will our industries come to grips with the new world order? In which disciplines will we become "global players"?

Deep seismic reflection survey in Finland: a major scientific co-operation between Finland and Russia

by Elias Ekdahl [1] and Ilmo Kukkonen [1]

FIRE (deep seismic relection survey) is one of the largest geological projects ever conducted in Finland. Transects will cross the major geotectonic units of the Precambrian, including several metallogenic provinces. The seismic fieldwork, with a total length of 1800 km, will be carried out in three years 2001 - 2003, at a cost of 17 million Euros. The contractor's costs will be paid out of the Russian Federation's debt to Finland. A national consortium has been formed for the project between the GTK, Institute of Seismology of the University of Helsinki, Institute of Geoscience of the University of Oulu and the Sodankylä Geophysical Observatory. The interpretation of the seismic transects will continue until the end of 2005.

FIRE (Etude Sismique Réflexion Profonde) représente l'un des plus grands projets jamais entrepris en Finlande. Les profils et sections sismiques vont traverser les principales unités géotectoniques du Précambrien, comprenant plusieurs provinces métallogéniques. Les travaux d'acquisition sur le terrain totalisant 1800 kilomètres de profils s'échelonnent sur trois années, de 2001 à 2003, pour un coût de 17 millions d'euros. Les dépenses de l' Entrepreneur seront réglées à partir de la dette contractée par la Fédération de Russie vis-à-vis de la Finlande. Un groupement national a été constitué dans le cadre de ce Projet comprenant le GTK, l'Institut de séismologie de l'Université d'Helsinki, l'Institut des Géosciences de l'Université d'Oulu et l'Observatoire Géophysique de Sodankylà. L'interprétation des sections sismiques va se poursuivre jusqu'à la fin de l'année 2005.

FIRE (Investigación sísmica profunda por reflexión) es uno de los mayores proyectos geológicos que se haya realizado nunca en Finlandia. Los perfiles atravesarán las principales unidades tectónicas del Precámbrico, incluidas varias provincias metalogenéticas. El trabajo de campo de los perfiles sísmicos, que tendrán una longitud total de 1800 km, se llevará a cabo durante tres años, del 2001 al 2003, con un coste de 17 millones de euros. Los costes de la contratista se pagarán de los fondos de la deuda de la Federación Rusa con Finlandia. Se ha constituido un consorcio nacional formado para este proyecto entre el Servicio Geológico de Finlandia (GTK), el Instituo de Sismología de la Universidad de Helsinki, el Instituto de Ciencias de la Tierra de la Universidad de Oulu y el Observatorio Geofísico de Sodankylä. La interpretación de los perfiles sísmicos continuará hasta el final del 2005.

The deep seismic reflection survey has opened a new phase in crustal scale geological studies in Finland. In June 2001, the agreement of a huge scientific project was signed between the Geological Survey of Finland (GTK), as a client, and Machinoexport, the Foreign Economic Association of Russian Federation, as a supplier, and the Russian company Spetsgeofizika, as a contactor. The fieldwork started in September 2001, and by the end of that year, about 400 km of the first transect were surveyed. The project has been named The Finnish Reflection Experiment (FIRE). The project is expected to provide a lot of new structural information on several geological problems in the central part of the Fennoscandian Shield. Seismic lines of the FIRE project are connectable with the seismic results of the Kola Peninsula and Karelia and also with the BABEL project on the Gulf of Bothnia. FIRE results will have special significance for the understanding of the structure and evolution of the whole Fennoscandian Shield

Seismic measurements are carried out using the vibroseismic method. Explosion sources are not used. The seismic signal is produced with five hydraulic vibrator trucks weighing each 15.4 tons (Fig. 1). The applied signal is a linear sweep ranging from 12 to 80 Hz, and the maximum applied force is up to 60% of the vibrator weight. The sweep duration and the correlated record length are 30 s, which corresponds to about 90 km in depth. Eight sweeps are stacked together at each shot point. The applied sounding geometry is the common depth point method, and with 360 active channels at 50 m intervals and shot points at 100 m intervals, the resulting fold is as high as 90. Thus each reflector will be recorded 90 times, which is very useful in improving the final signal to noise ratio. The recording line is 18.4 km long.

Acquisition is done on public roads, and the geophones are installed on the road bank, typically at a distance of about 1-2 m from the edge of the road metalling. Each geophone channel consists of 12 vertical geophones connected in series.

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Finland

The signals are recorded digitally using the *INPUT/OUTPUT* Telemetric system. The sampling interval is 2 m/s, which allows recording of high frequencies and results in a good resolution. Field processing is done with the *Seismic Viewer* software (Fig. 2).

The locations of the FIRE profiles are shown in Figure 3. Selection of the profile locations was based on three major arguments: (1) geological and geophysical relevance, (2) previously existing seismic wide-angle data (absolute velocity information required), and (3) road network in the transect areas. All these factors cannot be ideally satisfied at the same time, but pragmatic compromises could be found. According to the project plan, the acquisition of FIRE 1 was planned for 2001, FIRE 2 and 3 in 2002, and FIRE 4 in 2003. In December 2002, the fieldwork was finished when FIRE 3 across Central Finland was completed.

The transects FIRE 1 and FIRE 3 start in Eastern Finland in the central part of the Archaean craton, and cross the Early Proterozoic Kainuu–Outokumpu schist belt, the Archaean-Proterozoic boundary (the Raahe-Ladoga zone) with primitive Pyhäsalmi island arc system and Kotalahti nickel belt and ends on the Central Finland Granitoid Complex. FIRE 2 continues to the south crossing the east-west trending schist belts of southern Finland. In Lapland, FIRE 4 starts in the Archaean Pudasjärvi Block again crossing the Archaean-Proterozoic boundary, layered intrusions, Peräpohja Schist Belt, Central Lapland Granitoid Complex, Greenstone Belt, and overthrusted Inari Granulite Belt.

In addition to a crustal-scale seismic survey, a special high frequency, high-resolution survey (20 km) was carried out across the Outokumpu nappe structure on the eastern part of FIRE 3. Some of the topics to be investigated in the FIRE project in Eastern and Central Finland can be briefly described as (profiles FIRE 1 and FIRE 3):

(1) Crustal reflective structures in general and their correlation with surface geology and geophysics

(2) The subduction and collision structures between the Archaean craton and the primitive island arc system of the Pyhäsalmi area

(3) General relations between the Archaean and Proterozoic crust, particularly in the area of thick crust

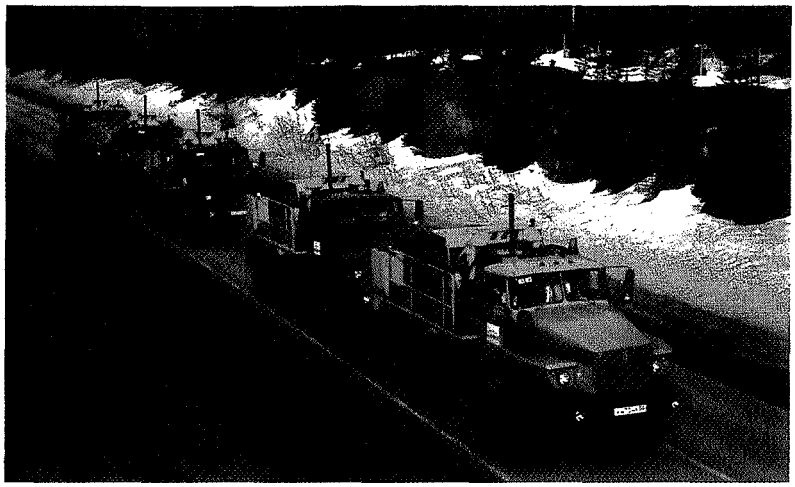


Figure 1. The vibrator trucks of Spetsgeofizika in action in Keuruu, central Finland in March 2002. (Photo: I. Kukkonen

(4) Shear and fracture systems at the Archaean-Proterozoic boundary

(5) Properties and structure of the Archaean craton in the area of the Proterozoic overprint and outside of it

(6) The middle and lower crustal characteristics of the Central Finland Arc Complex (the Central Finland Granitoid Complex)

(7) Relations between the Central Finland Arc Complex and the Tampere Schist belt

(8) Structure and tectonic setting of the high-grade Archaean and Proterozoic blocks cropping out in central-eastern Finland

(9) Structure and depth extent of the Proterozoic metasedimentary units and ophiolite complexes close to the border of the Archaean craton (including the Outokumpu nappe)

(10) Possible reflections related to kimberlite and alkaline magmatism

(11) Relations between possible upper mantle reflectors and lower crustal reflectors

(12) Correlation of seismic reflections with deep electromagnetic conductors and thermal regime of the lithosphere

(13) Correlation of reflectors recorded on FIRE transects on continent and BABEL transects in the Bothnian Bay

(14) Deep structure of metallogenic provinces (e.g., Kuhmo and Ilomantsi greenstone belts, Pyhäsalmi area, Outokumpu, Kotalahti nickel belt)

Respectively, thematic topics to be investigated in southern Finland can be listed as follows (FIRE 2):

(1) Correlation of crustal reflectors with surface geology and geophysics

(2) Deep structure of the southern Finland volcanic-sedimentary complex

(3) Structure and relations of the Tampere Svecofennian collisional zone with the Central Finland Granitoid complex, as well as with the southern Finland volcanic-sedimentary complex

(4) Structure and tectonic characteristics of the Hyvinkää-Mäntsälä layered intrusion

(5) Deep structure of the potassium-rich granitoid belt in southern Finland

(6) Lower crustal properties in the area of thick crust and 'normal' crust

(7) Correlation of reflectors recorded in the FIRE and BABEL projects

(8) Deep structure of ore bearing areas (e.g. eastern part of the Vammala Ni belt, Hyvinkää-Mäntsälä layered intrusion, southern Finland leptite belt)

In northern Finland, the preliminary list of questions to be solved with the aid of FIRE 4 data is as follows:

(1) Correlation of crustal reflectors with surface geology and geophysics

(2) Deep structure of the Archaean Pudasjärvi Block

(3) Tectonic structure and characteristics of 2.4 Ga basic layered intrusion complexes

(4) The deep structure of the Central Lapland Granitoid Complex, its relations

Figure 2. Spetsgeofizika's seismic field station on a heavy truck with the instrumentation used for controlling the vibrators (rear wall) and the hardware for recording the seismograms (left).

with the Greenstone Belt, and with the Peräpohja schist belt and the origin of the migmatitic granitoid complex itself

(5) Deep structure of metallogenic provinces (e.g. polymetallic zones of Kittilä and Kolari)

(6) Structures of the Archaean basement below the Central Lapland Greenstone Belt

(7) Internal structure of the Central Lapland Greenstone belt and continuation of the metamorphic zones in depth

(8) Factors contributing to the higher crustal thickness under the Central Lapland Granitoid Complex in comparison to the Greenstone belt

(9) Correlation of deep crustal structures with the seismically active zones and young (postglacial) faulting in central Lapland

(10) Depth extent of the Lapland Granulite belt and its contacts with the Archaean basement

(11) Whether the Lapland Granulite belt and the Tanaelv Belt blocks are overthrust from the NE, or only rootless nappes

The deep seismic reflection survey in Finland, carried out by the Russian company Spetsgeofizika, has proceeded very efficiently. The obtained data are of very good quality and several previously unknown structural features have already been discovered in the brute stack plots. At the moment the final processing and migration of the data FIRE 1 is completed. The first scientific manuscripts are in preparation and were submitted to an international journal in 2002.

The project FIRE is expected to provide a lot of new structural information on several geological problems in the central part of the Fennoscandian Shield. Seismic lines of the FIRE project are connectable with the seismic results of Kola Peninsula and Karelia and also with the BABEL project on the Gulf of Bothnia. FIRE results will have special significance for the understanding of the structure and evolution of the whole Fennoscandian Shield.

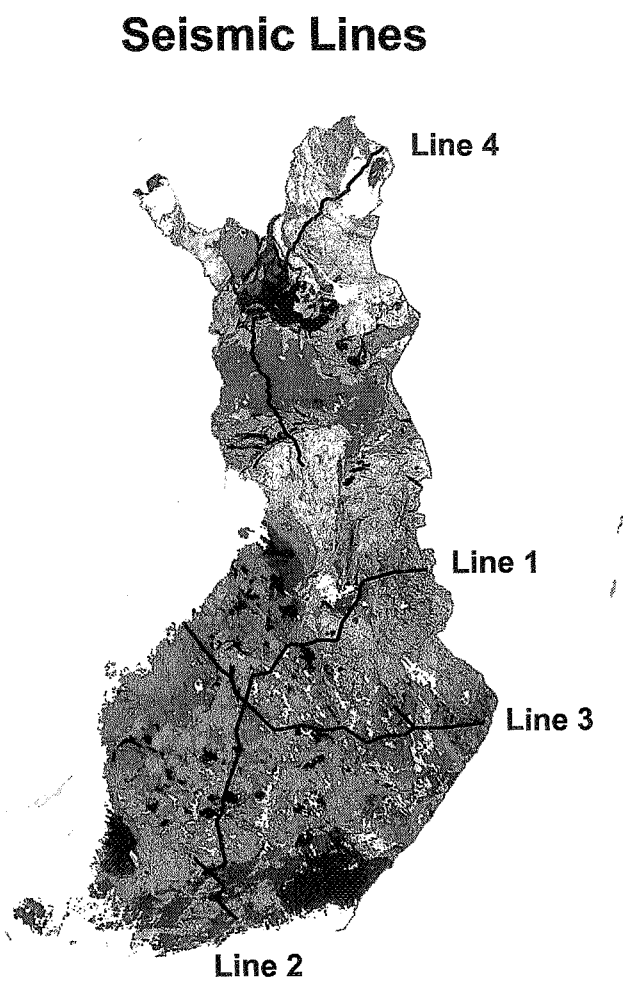
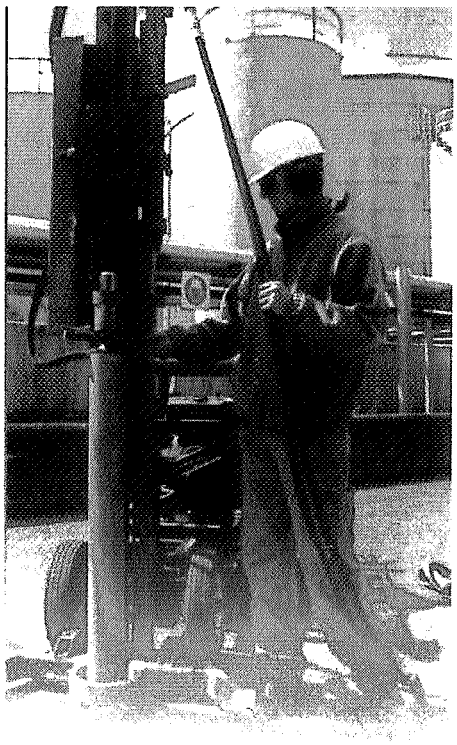
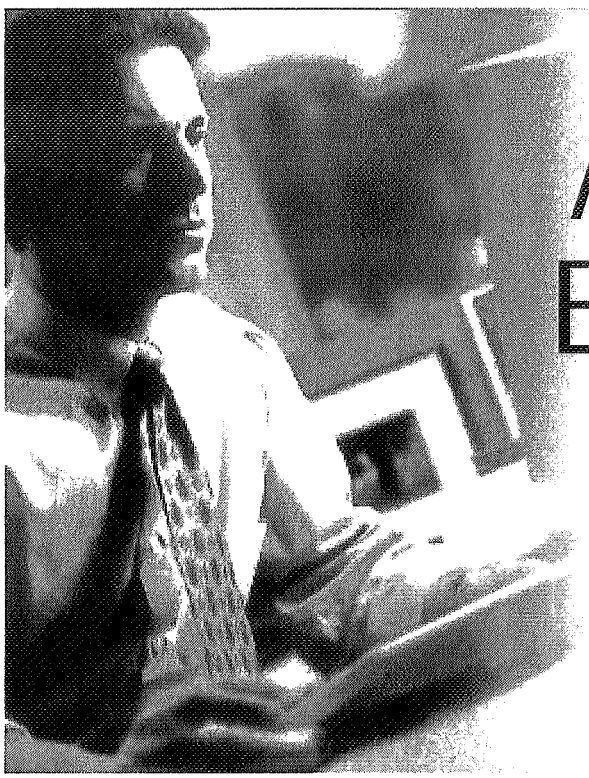


Figure 3. The location of the FIRE transects on the bedrock map of Finland (GTK).

ENVIRONMENTAL

White
Young
Green





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Hydrogeological and geomechanical aspects of hydroelectric plant expansion in the Italian Alpine Arc

by Dott. Luigi Gonsalvi [1]
Coordinator: EurGeol. Dott. Carlo Enrico Bravi [2]

For some years, the author has been involved in the geological aspects of the expansion of some important hydrelectric plants in Italy located along the Alpine Arc. In the article, the Premadio Plant (Lombardia Region, Sandrio Province) is discussed. The use of instruments for measuring geological and geomechanical conditions and the development of new technologies, either in the field of the boring machines (TBM) or in that of acquisition and data processing, allows monitoring of the geostructural evolution of rock masses during the excavation phases. Moreover, the possibility of providing such constant monitoring permits the acquisition of new technical skills and provides the best assurances for safety provision and maintenance, in difficult conditions. Under these conditions, the development of and improvement to hydroelectric plants in the alpine arc, is considered, with the construction of strongly inclined shafts and power stations in caverns.

Depuis plusieurs années, l'auteur étudie les conditions géologiques existant au niveau du développement de quelques centrales hydroélectriques importantes en Italie, le long de l'Arc alpin. Cet article concerne la centrale de Premadio, située dans la province de Sandrio, en Lombardie. La mesure des paramètres géologiques et géotechniques ainsi que le développement de nouvelles techniques de mesure, soit pendant la période de forage (TBM) soit durant les phases d'acquisition ou de traitement des données, autorisent le contrôle de l'évolution *géostructurale* du rocher pendant le creusement. De plus, disposer de ce contrôle permanent permet d'acquérir, dans des conditions difficiles, de nouvelles compétences avec garantie du respect des conditions propres à la sécurité et à la maintenance. Ainsi, se trouvent évalués le développement et l'amélioration des centrales hydroélectriques de l'arc alpin avec construction de puits très inclinés et de centrales électriques souterraines

Durante algunos años el autor ha trabajado en los aspectos geológicos de las ampliaciones de importantes centrales hidroeléctricas en Italia, localizadas en el Arco Alpino. En este artículo se discute sobre la de Premadio (Región de Lombardía, Provincia de Sandrio). El empleo de instrumentos para medir las condiciones geológicas y geomecánicas y el desarrollo de nuevas tecnologías tanto en el campo de equipos de perforación (TBM) como en el de adquisición y procesado de datos, permite controlar la evolución geoestructural de las masas rocosas durante las fases de la excavación. Más aún, la posibilidad de disponer de dicho control permanente, permite la adquisición de nuevos conocimientos técnicos y proporciona la mejor garantía de seguridad y mantenimiento en condiciones difíciles. Bajo estas condiciones se analiza el desarrollo y la mejora de las plantas hidroeléctricas en el arco alpino con la construcción de planos muy inclinados y plantas de energía en cavernas.

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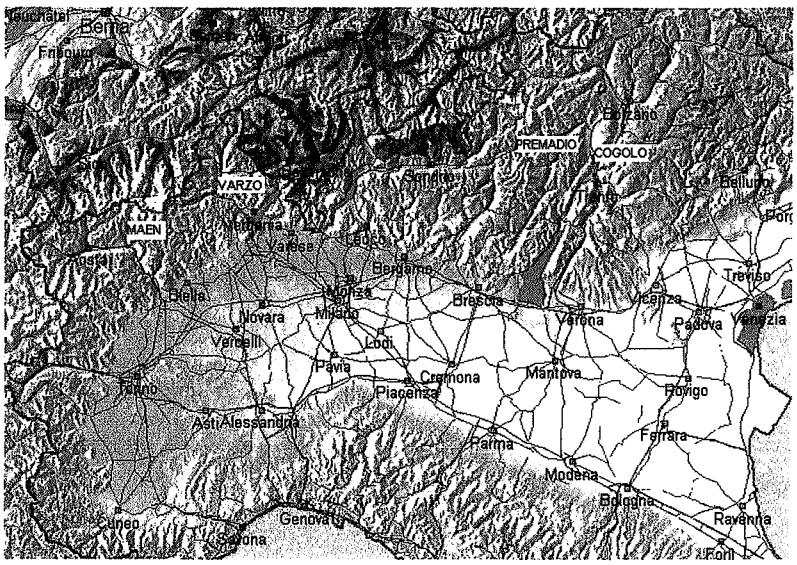
[2] Idomin SRL: Whole Earth Service Consulting Group. Via Ugo Foscolo 8, 20120, Milan

In recent years, works on hydroelectric plants mainly concerned either expansion or the improvement of current situations, as for example construction of the inclined shafts in Maen (Aosta) and in Cogolo (Trento) and the expansion of the hydroelectric plants in Varzo (Verbania) and in Premadio (Sondrio) (See map). In Premadio, works are in progress and are planned to finish in September 2005. Quadrio Curzio S.p.A. is the company responsible for the excavation and for civil works.

Premadio hydroelectric plant expansion

The hydroelectric plant in Premadio, Commune of Valdidentro (in Sondrio province), allows Milan AEM S.p.A, holder of the concession of use, to exploit the water of the Spol River and its tributaries in the area of Livigno. Through works of intake and conveyance, waters are brought to the San Giacomo and Cancano resevoirs, in the Fraele Valley; from here (at an altitude of 1,875.06 m.a.s.l.) waters are channelled to the main power



Map of Northern Italy showing the position of the mentioned hydroelectric plants

house of Premadio, using a derivation and penstock system with a geodetic drop equal to 646.8 m.

The works, which are ongoing, are:

- a diversion tunnel
- a Sassalta junction
- an inclined shaft
- enlargement of the existing power house cavern and its adducting tunnels
- an open discharge channel, including an outlet channel into the Adda River, an overflow pipe and a sub-riverbed siphon.

The left diversion tunnel runs alongside the already existing adduction tunnel and is linked with it by means of the hydraulic tunnels connections, about 300 m to the north-east. The hydraulic tunnels and the first part of the left diversion are being built by conventional methods, while the construction of the 3 km long adduction tunnel employes a TBM shield. At the end of the excavation phase, a concrete lining will be laid down in the derivation and hydraulic tunnels connections, followed by grouting between the lining concrete and the rock. Finally, in order to allow independent maintenance procedures in both the diversion tunnels, metal, sectioning plates will be installed.

Sassalta junction, located at 1,800 m.a.s.l., includes the new compensation chamber, the valve chamber and the insertion works; these tunnels have been excavated using traditional methods and the reinforced concrete lining will be installed only in the tunnels, not in the valve chamber.

The 830 m long shafts, inclined at 43.65° have been excavated by means of a TBM with a diameter of 3.9 m. A 2.1 m diameter hydraulic pipe will be installed inside the shaft, anchored by filling the ring space between the excavation wall and the pipe with concrete of *C25/30* resistance.

The enlargement of the existing cavern has a global volume of about 21,000m^3 and is being excavated with a boom-type roadheader, operating step by step downwards from the vault to the bottom, after consolidation with Dywidag rock bolts, wiremesh and shotcrete. Works related to the powerhouse include the main chamber at the bottom of the inclined shaft, the two channels feeding the third group and other tunnels connecting various areas.

Two channel outlets pass water from the power station through turbines to an outlet outside, linked to a channel flowing into the Adda River and to an overflow pipe, straight to the sub-riverbed siphon. This feeds a channel for the AEM power stations in Grosio, Lovero and Stazzona, located downvalley to optimize the water drop.

Geological setting

The construction work involves rock units belonging to a part of the "Austroalpine domain" bordered by two important tectonic lines, the Insubric Line southward and Engadina Line northwestward. In the area closest to the works located on the east side of the Engadina Line, middle Austroalpine units of the "System Ortles-Quatervals-Languard" crop out. From the bottom to the top, this system consists of:

- a lower unit (Cristallino dell'Ortles) of low to middle metamorphic grade, characterized by philladic metapelites locally intercalated by quartzites, amphibolitic gneiss, marbles and prasinites;
- a middle unit, mainly represented by quartz-sericite bearing schists,

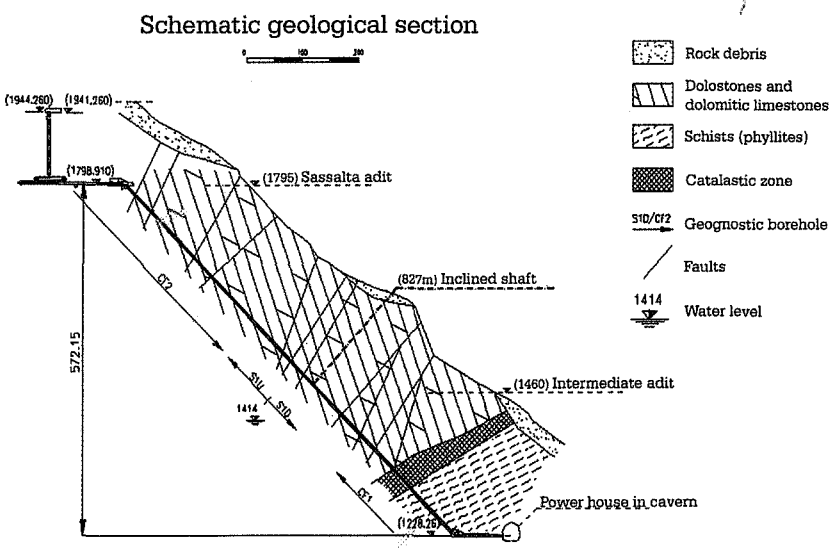


Figure 1: The inclined shaft – geological setting

quartzites, conglomerates (Verrucano);
- Noric to Liassic units on top, made up of a thick, dolomitic-calcareous sedimentary sequence (Sedimentario dell'Ortles).

The transition from the metamorphic units of the basement (Cristallino dell'Ortles) to the upper dolomitic-calcareous Mesozoic (Sedimetario dell'Ortles) is represented by an important shear zone called "Faglia dello Zebrú".

This tectonic element is east-west oriented, with a mean dip of 40° to the north and it is characterized by a thick band of faults, associated with decimetric to decametric thick portions of the basement and the sedimentary sequence.

The excavation for the cavern enlargement of the power house in Premadio, located at about 1230/1260 m.a.s.l., concerns the lower units (phillites and micaschists) at a depth of about 150 m below the shear zone. The lithotypes crossed by the project are mainly metapelites (phyllites-micaschists), locally intercalated by very fine-grained quartzites with translucent surfaces along the plane of schistosity. More phylladic rocks show a pervasive foliated texture, which determines a strong cleavage in the rocks, especially in the lithofacies enriched with graphitic partings, sub-parallel to the main rock foliation.

In the first stretch (up to about 1450 m.a.s.l.), the tunnelling for the new inclined shaft encountered (Fig. 1) metamorphic rocks (phyllites and micaschists) while in the remaining part, up to the top (about 1800 m.a.s.l.) it encountered a sedimentary complex made up of dolomites, limestones and dolomitic limestones; as expected, the tunnel also passed through the tectonic contact between the phyllites of the basement and the sedimentary rocks of the cover at about 1316 m.a.s.l. This zone consists of a 40 m thick band, with a dip of about 30° to the north, of phyllites and dolomitic rocks with a heavy cataclastic texture, locally recemented by narrow quartz and calcite veins.

The new diversion tunnel will be excavated for c.3 km, in a north-westerly direction (from the water intake of Cancano at 1804 m.a.s.l., and the valve chamber at 1796 m.a.s.l.) inside Monte delle Scale, which is made up of a sedimentary calcareous-dolomitic complex. Such a rock mass is generally fractured and is characterized by a series of faults and joints related to the structure of Monte delle Scale; along the entire tunnel, rock strata plunge NNW with a dip ranging from 40° to 70°, in a monocline structure only locally affected by small scale folds. Major water inflow into the tunnel is not expected, only minor dripping near karstic cavities, already observed during the excavation of the existing right diversion tunnel.

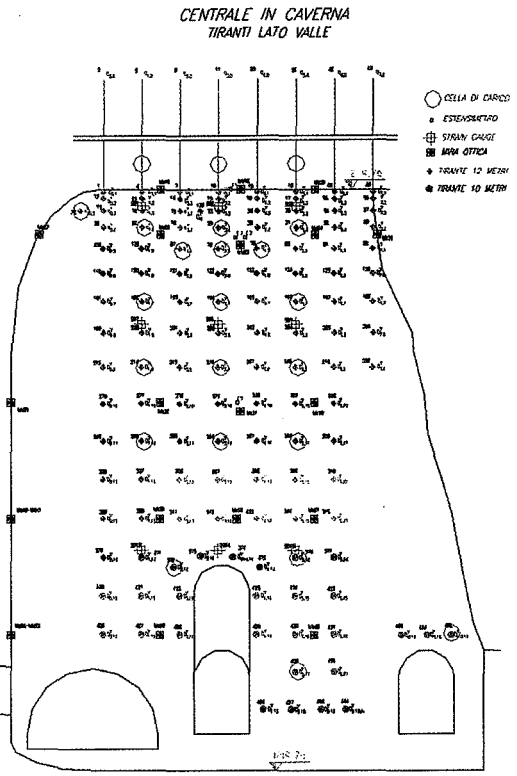


Figure 2: Power house in cavern – rockbolts and downstream instruments

Preliminary investigation

Before starting excavation, a large number of preliminary investigations were conducted, providing a fully-detailed geological description of both the areas involved in the power house enlargement and in the new inclined tunnelling; since the new diversion tunnel runs parallel to the existent one, it has been possible to evaluate and consider the information collected during the previous construction work.

The new inclined shaft

Preliminary investigations involved many core borings which determined the rock mass hosting the new inclined shaft; from the top to the bottom, a 375 m long core boring inclined at 43° and coaxial with the projected tunnel was first drilled out, allowing the collection of information about the last stretch of tunnel. A further 260 m long core boring, starting from an access tunnel located at 1460 m.a.s.l.

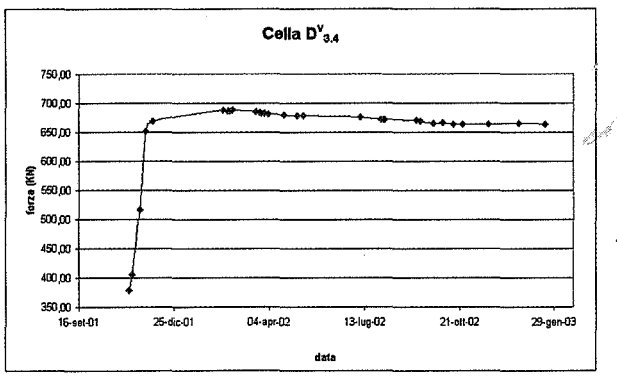


Figure 3: Power house in cavern – stress cell applied to the bolt $D^V_{3,4}$

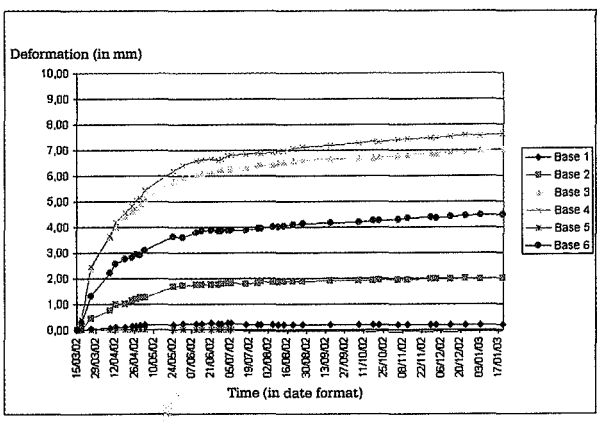


Figure 4: 6 bases extensometer E5

provided data on the intermediate stretch of the work.

Once the TBM launch chamber was adapted at the base of the future tunnel, another 140 m, upward oriented, core boring (CF1) was drilled, while assembling the TBM at the launch shaft; this produced innovative data about the rock mass properties, and it confirmed the presence of water under pressure.

Finally, a pilot borehole, 70 m long (at 1460 m.a.s.l.), was used to perform two other exploratory borings (S1U and S1D) along the inclined shaft axis. More than 80% of the tunnel was explored, thanks to core borings.

Cavern power house

Here preliminary investigations consisted of a series of five core borings, starting from the existent power station; the rock mass tensional state was measured by means of flat jack tests and borehole dilatometers.

After the completion of the access tunnel to the power house cap, previously investigated, three 45 m long cores were bored, followed by sonic boring and cross-hole measurements. This kind of investigation allowed a complete characterization of the rock volume over the power house cap.

Measurements recorded during the excavation of the power house

Continuous geostructural mapping provided information aimed at reconstructing the geometric condition of the metamorphic rock mass. Such tests consist of three electronic measurements (stress cells, strain gauges and extensometers) and an optical 3D topographic reading. Measuring instruments, made up of 43 stress cells, 18 strain gauges and 8 extensometers with 39 bases (Fig. 2), provided the following:

- necessary data for implementing a finite elements numerical model which describes the rock mass behaviour during tunnelling; the model allowed the simulation of the power house excavation, in order to check the final stability of cavities and the maximum short-term/long-term stress level in the lining just laid down.
- control of the rock decompression phenomena which results from such a large rock mass excavation, thus permitting continuous electric energy production in the nearby existent station, even during the enlargement tunnelling, with vibrometric monitoring as the only caution.

The above instruments provided constant monitoring with a portable datalogger in the first five months, while in the following period all instruments were connected (in four different steps) to a multiplexer with complex wiring, which will be left running when the project ends. The multiplexer, placed in the existent power station, allowed central signal reception as well as simultaneous data processing.

Figure 3, for example, shows readings from a rock bolt stress cell positioned in the cap. This figure graphically represents the stress/strain path of one of the 43 instrumented rock bolts as a function of the distance from the processing front. The importance of constant monitoring of the rock mass stresses caused by boring is immediately evident from the columns labeled "Zone" and "Level", where the stress variation can be obtained as a function of the volume of excavation up to the complete opening of the hole.

Figure 4 shows the deformation of every 6 bases of a borehole extensometer as a function of time. To monitor the deformations, 8 extensometers were placed in total (E1-E8 as in Figure 2), the first 5 of which with 6 bases, located at 1, 3, 5, 6, 9, 12 and 30 m, the last with 3 bases at 3, 6 and 20 m.

In this innovative work, where concrete lining of the cavern top has not been designed, monitoring of the deformations in the shotcrete fiber-reinforced, using 18 strain gauges, is very important.

The analysis, performed after this instrument monitoring, stressed the necessity of using a pre-lining and the use of further control instruments. Therefore, gewi rock rivets 6 m long and 28 mm in diameter, dywidag rock bolts 12 m long with 36 mm diameter and shotcrete fiber, reinforced with metal needles, have been adopted as a final lining during tunnelling of the cap. For the excavation along the abutments, for which a reinforced concrete lining is prescribed, 499 dywidag rock bolts of two types have been laid down, 10 m and 12 m long with 32 mm and 36 mm diameters respectively, together with shotcrete.

Conclusion

Experiments, performed as indicated above, showed how the behavior of the excavation was always consistent with predictions, either during the cap tunnelling or the following widening, without finding any anomalies needing further reinforcement, except for minor bolts at the borders, especially on the cap.

Thanks to developing new technologies and progressive expertise, constant geological, geohydrological and geomechanical monitoring allowed operators to proceed quickly, solving the immediate problems encountered during the work; this provided a fundamental contribution to large cavity excavations and strongly inclined tunneling, thus reducing the completion time and ensuring greater safety.

Moreover, the cooperation between the technical staff and those responsible for the executive phase allowed the company to create a successful team, which completed the contracted upward tunnels. For this reason, Quadrio Curzio S.p.A., contractor for the works over the past ten years, has become a leader in the field of mechanical tunneling of inclined penstock. It has been enlarging its expertise in civil engineering since 1929. The recent completion of the underpass in Lecco, the subway tunnels and Lodi and Zara stations for the third line of the Milan Underground and the work of adapting the present railway in the outer stretch of Rogoredo station (Milan) to the new high-speed technologies are the most significant examples of their expertise.

Acknowledgments

Thanks to:

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Fluid migration path detection in seismic data: a valuable tool in oil and gas exploration

by Herald Ligtenberg

Understanding hydrocarbon migration in the subsurface is a key aspect of oil and gas exploration. It is well known that conventional 3D seismics contain information about hydrocarbon migration. A method has been developed to detect fluid migration paths semi-automatically, using assemblies of seismic attributes and neural networks. The resulting seismic chimney cube yields valuable information about the origin of hydrocarbons, migration into prospects and leakage from prospects whereby features at or near the seabed are created. Indications of over-pressured zones, sealing quality of faults and areas of active hydrocarbon expulsion are also feasible. Such information is invaluable for basin modeling studies and for increased understanding of the petroleum system.

La compréhension de la migration d'hydrocarbures vers la subsurface est un point clef dans l'exploration pétrolière et gazière. On sait que les sismiques 3D conventionnelles contiennent de l'information sur cette migration. Une méthode a été développée pour détecter semi-automatiquement les chemins de migration de fluides par l'utilisation de sets d'attributs sismiques et réseaux de neurones. Le cube de cheminée sismique résultant donne une bonne connaissance sur l'origine des hydrocarbures, la migration dans le champ et les fuites qui créent ces signes caractéristiques à la surface (fond de mer) ou subsurface. On peut aussi repérer des indications sur les zones surpressurisées, les qualités hermétiques des failles et les zones d'expulsion d'hydrocarbures. De telles informations sont inestimables pour les études de modélisation bassin et une meilleure compréhension du système pétrolier.

Comprender la migración de hidrocarburos en el subsuelo es un aspecto clave en la exploración de petróleo y gas. Es bien conocido que la sísmica 3D convencional contiene información acerca de la migración de hidrocarburos. Se ha desarrollado un método para detectar semiautomáticamente pautas de migración de fluidos, usando combinaciones de atributos sísmicos y redes neuronales. El conducto sísmico cúbico proporciona valiosa información sobre el origen de los hidrocarburos, su migración a las zonas de prospección y las pérdidas desde zonas donde se desarrollen detrminadas características en la superficie del fondo marino o cerca de ella. También es posible obtener información de zonas de sobrepresión, la capacidad de sellado de fallas y áreas con posibilidad de expulsar hidrocarburos de modo activo. Esta información es muy apreciada para estudios de modelización de cuencas y para un mejor entendimiento del sistema del petróleo.

Unraveling the petroleum system is the key to exploration success. Recently, Statoil explorationists introduced seismic chimney interpretation as a new tool to help unravel the petroleum system. Initially, seismic chimneys were interpreted manually but this proved to be a difficult and labour intensive task. To facilitate this task, a new seismic volume TheChimneyCube® highlights fluid migration paths in seismic data by combining various seismic attributes through neural network modelling. The method is used in conjunction with other geological and geophysical data, such as well logs, pressure data and other relevant information, to confirm the observed structures. Chimney cubes have been processed and interpreted with success in many basins all over the world, a/o in the North Sea, Gulf of Mexico, Mediterranean and Niger delta.

The Method

The detection method uses an assembly of directive, multi-trace seismic attributes and supervised neural networks (Meldahl et al., 1998). The method can be applied to detecting fluid migration paths, but can also be used for detecting faults, salt bodies and other seismic objects (Meldahl et al., 2001). In this article I will focus on the detection and interpretation of fluid migration paths. First, the interpreter selects example locations inside as well as outside interpreted gas chimneys. For chimneys, these locations normally exhibit low energy, high variance of the local dip and low coherency (Fig. 1A). At the manually picked example locations the selected seismic attributes are calculated and given to a neural network, which will train itself to distinguish chimneys from non-chimneys. Finally, the trained neural network is applied to the seismic volume, creating a chimney "probability" volume (a so-called ChimneyCube), which is used for further interpretation (Fig. 1B).

The results

The principal achievements from the analysis of fluid migration detection on seismic data are the determination of sealing quality of faults, detecting areas with active hydrocarbon expulsion, indication of possible charging of reservoirs and indication of possible spillage or leakage from these reservoirs.

In many basins, hydrocarbon migration is fault-related. Surface maps show that faults associated with hydrocarbon seeps have a distinctive pockmarked character. The same pockmarked character can be observed in time-slices of *TheChim-*

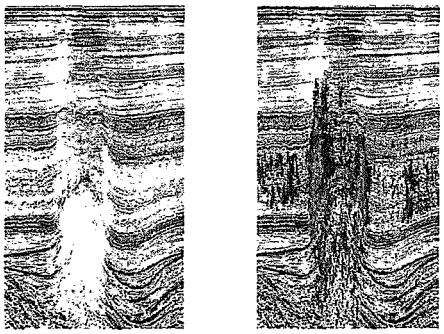

Figure 1A. Original seismic section (left) and results of fluid migration path detection (TheChimneyCube) overlain on original seismic (Figure 1B) (right), indicating active hydrocarbon migration along flanks of a salt dome.

neyCube, which may be associated with vertical fluid movement along the fault. Comparing *TheChimneyCube* data with structural data provides other diagnostics for distinguishing sealing and leaking faults. Overlays, as in figure 2, provide direct information on the sealing quality of each fault. The results show if faults

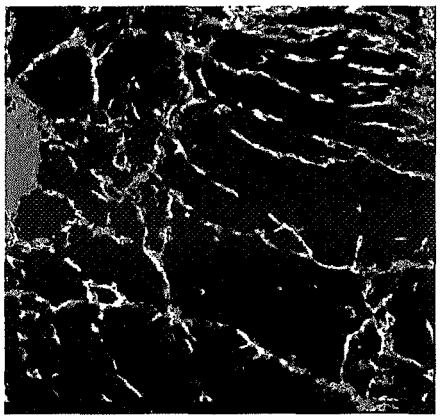

Figure 2. Chimney probability (in yellow) is overlain on top of fault pattern, indicating sealing and leaking faults.

are part of the fluid migration path or if they form a barrier and have good sealing quality (Ligtenberg & Connolly, 2003).

Areas interpreted as locations of active hydrocarbon expulsion are enhanced by the fluid migration path detection. Strong activity is seen in areas where known source rocks have reached maturity level where generation and expulsion of hydrocarbons takes place (Ligtenberg & Thomsen, 2003). Fluid migration detection results show

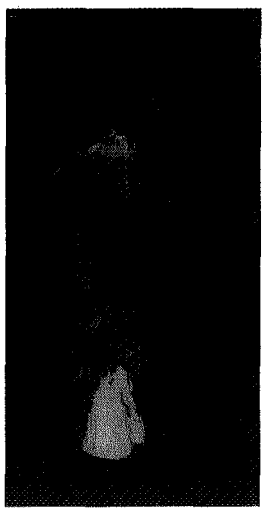

Figure 3. Fluid migration paths (in yellow) indicate migration from deep reservoir (red) along flanks of salt dome to shallow reservoir (red) and leakage from shallow reservoir to the sea floor. (Courtesy Roar Heggland, Statoil)

the spatial relationship between source rock and reservoir and leakage from reservoirs. In conjunction with other structural and reservoir-property information the geological interpretations can be validated. An example of such an interpretation is given in figure 3. In the deeper section, a salt dome is highlighted in lightblue. Along its flanks we see a red cloud with high amplitudes, corresponding to a deep reservoir. The shallow red cloud of high amplitudes is interpreted to represent a hydrocarbon-charged reservoir. Chimneys (in yellow) surrounding the salt dome indicate upward fluid migration from the deeper reservoir. The high density of shallower chimneys indicates charging of the shallow reservoir. Chimneys are visible up to the seabed (brown) where it has developed a small mud volcano, generated by transport of sediments, fluid and/or gas to the sea floor. In some cases the gas reaches the sea floor and creates characteristic mud volcanoes or pockmarks. In other cases, the gas does not reach the sea floor, but develops shallow gas zones that form a significant hazard for offshore activities. These shallow gas zones may be difficult to distinguish on seismic data, but can be detected with the described method for fluid migration detection (Aminzadeh et al., 2002).

Basin modelling

Recently, the detection of fluid migration paths in seismic data has been used with success in a basin modelling study. To construct a basin model, many assumptions have to be made. ChimneyCube results can provide relevant information, such as better estimations of the hydraulic properties of faults, location of areas of high overpressure, knowledge on outlines of petroleum kitchens and information on charge of reservoirs and leakage or spillage from reservoirs (Ligtenberg & Thomsen, 2003).

In summary

The detection of fluid migration paths in seismic data using chimney cube data has proven to be a successful tool in oil and gas exploration. Its application is manyfold, ranging from fault permeability analysis to charge/no-charge information on potential reservoirs, detection of geo-hazards and contribution to basin modelling studies.

For more information on the technique and interpretations, please contact the author at: herald@dgb.nl

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Changing Times

by Drew Diefendorf

Years ago, while rummaging through my parents' attic in Upstate New York, I came across a trunk containing some of my grandfather's memorabilia. Among the items found was a copy of a geology text that he used in public school in the middle 1890s. This piqued my curiosity about the teaching of geology in elementary and high school. I was surprised to learn that geology was a basic part of the curriculum in New York's public schools until the beginning of the twentieth century. In fact, it was a core science - influenced in no small part by the scientific advances, popularity and controversies of many of the great nineteenth century scientists such as Lyell, Hall, Powell and Darwin. The demise of geology as a core science took place early in the twentieth century when it was replaced by the teaching of the "traditional" sciences of physics, chemistry and biology.

The evolution and devolution of geology as a core science became more apparent while I was working at Oak Ridge National Laboratory in the 1990s. To introduce visiting family and friends to the culture and history of East Tennessee, I would take them to the Museum of Appalachia in Norris Tennessee. A recreated "Southern Mountain Pioneer Farm-Village," the museum includes a typical one-room schoolhouse. On one of my visits I noticed a diploma from a local public school hanging on the schoolhouse wall. I was surprised and pleased to see the "required" inclusion of geology in the course of study. At my request I received a photocopy of that diploma (right) from John Rice Irwin, the founder and director of the Museum of Appalachia.

This diploma, however, significantly predates that hot summer in 1925 when science education in Tennessee received national attention in the "Trial of the Century." Perhaps sharing this document will shed some light on the importance and tradition of the teaching of geoscience in public schools in the past, as our profession argues for its survival in the future. For the curious - orthography, as a course of study, refers to the technique of correct spelling and sounding of letters in the English language. Some also may recognize a weakening in the teaching of most of the other common branches of study listed in the document. So much for the use of the hickory stick!

Tennessee Common School Diploma

This is to Certify, that Thomas Elbert Gibbs, of District No. 2, School No. 1, County of Anderson, has Completed the Course of Study in the Common Branches required by Law to be taught in the Public Schools of the State, viz:

Orthography, Reading, Writing, Arithmetic, English Grammar, Geography, United States History, Elementary Geology of Tennessee, and Elementary Principles of Agriculture.

Witness our Signatures:

Given at Andersonville, in the County of Anderson, State of Tennessee, This thirteenth day of May, A.D. 1889.

Reprinted from the American Institute of Professional Geologist's journal The Professional Geologist, November 2002, Vol. 39, No. 10, pp14.

Audible Geology

by Jan Audun Rasmussen [1]

Is geology audible? Well, for most of us it is not. Fossils are generally calm and silent. Crystals are not talking. Not much at least. Sediments may occasionally produce a little noise when they rush down a cliff because of erosion. But the most impressive sounds related to geology - although a little distant - are probably the singing and thundering echoes from the borders of glaciers and icecaps. Volcanic activity may create scary, deep melodies from boiling and moving lava masses. But are these sounds sufficient to satisfy our daily needs for geological, thunderous events?

I think not. I believe that the majority of geologists are begging for a little more daily noise both at work and after work. In the three Copenhagen-based geological institutions, the Geological Survey of Denmark and Greenland, the Geological Institute and the Geological Museum - the latter two of the Copenhagen University - geologists have tried to establish a little more audible disturbance during the past many years. Their weapons have been instruments and their ammunition music. It is striking that the number of noise-creating employees seems relatively high in the geological institutions.

More than twenty years ago, when I started as a young, relatively attentive student of geology, classical music and traditional jazz were played regularly in the corridors and offices at the Geological Institute after work. Jazz of the New Orleans type was especially popular, with a mixture of palaeontologists and technicians as the most zealous participants. Other more sedimentology-oriented members of staff inclined heavily towards Bee Bop jazz. Today, Irish folk music is also becoming increasingly popular. I am not in any doubt that the persistent sound barrier that flourished so often at night and in the late afternoon kept the ears working and was good for the overall working atmosphere at the site. In special cases, evil tongues claim, the ear-plug industry may have profited strongly from the musical activities as well.

I had the pleasure to become part of a jazz quartet in the mid-eighties when I was a cand. scient. (MSc) student. It was formed in the Micropalaeontology Lab. in the institute basement and consisted of two doctors of geology together with two students, a carbonate sedimentology student and myself. The proud name was "De 4 Kælderkolde", which means "the Four Cellar-cool". It refers to the constant but always arctic temperature that existed in the basement in those days, but incidentally, it is also an expression for the right consumption temperature for a bottled beer. Oh, me oh my! Saxophone, double bass, percussion, guitar and vocals. I played badly. My capo was all over the guitar in a breathless struggle to play the right chords at the right time. Often with pure noise as a result. My luck was that the three others, especially the two seniors, were skilful and experienced players which were able to cover for me, and pull me through the surprisingly regular jobs we had during those days.

One of my most extraordinary experiences with "De 4 Kælderkolde" was our gig at a geological conference in the Geological Institute. It was at the Nordic Geological Winter Meeting in the year of 1988. We were asked to play about one hour during the late afternoon 'ice-breaker' party. The audience counted probably about 500 people. We used to play acoustically, but after having received the hammering sounds from 500 very active, ice-breaking tongues we decided to turn our two 50 W briefcase-sized amplifiers on. The resonance from the conference participants was impressive, indeed. This was true audible geology. Our modest amplifiers were working hard to try to compete with the 500 pairs of lungs in front of us, but to be honest, only the thirty nearest people were able to hear the scattered, vague residues of the first tune, "Making Whoopee". Most geologists are nice, well-behaved people, meaning that the subsequent applause was the most astonishing I ever heard, thanks to the owners of the 470 pair of hands, who didn't hear us at all. A warm thank you for that! I have tried ever since to convince myself that they were clapping because of the music and not because they were happy that they couldn't hear it. "De 4 Kælderkolde" played their last gig in 1990, but all of us have continued playing in various other groups.

Earlier this year, I had the great pleasure to see the saxophone player in action again in one of the most extraordinary scientific talks I have experienced ever. The paper, which was presented at the Geological Institute in Copenhagen dealt with the Cretaceous-Palaeogene boundary and concentrated on stratigraphy and correlations between different terrestrial boundary sections based on susceptibility curves. The speaker showed us various introductory figures and locality photographs before he demonstrated the actual susceptibility curves. After this quite traditional opening, the talk turned in a highly unexpected direction. As far as I understood it, the measured data was divided into a number of different classes, each one representing a certain range of susceptibility values. Subsequently, each class was given a certain frequency or note, and as a result, the susceptibility curve was turned into a sheet of music!

The first example was a boundary section from southern France. The speaker launched a computer-based music programme that simulated a piano, and the audience could essentially hear how the susceptibility values fluctuated across the studied boundary interval. The resulting melody was very strange, but in my opinion perhaps not so different from the ear-splitting sounds that are being produced by some of our present-day composers. The speaker made it very easy for us to realize the results fully, because the susceptibility curve was shown in an overhead transparency at the same time as the resulting melody was played and shown by the computer. Maybe this example of audio-visualization represents a new growing field: audible geology?

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European and cross-disciplinary dimensions to Geology at the University of Brighton

by Prof. Rory Mortimore [1] and EurGeol. Dr. Norman Moles PGeo [1]

Brighton is famous as a popular seaside resort and conference centre on the south coast of England, sometimes dubbed "London by the Sea". However the term "Brighton Rock" – usually applied to a sugar-rich confection much-loved by young seaside visitors – has recently taken on a new meaning in the world of geology, as this subject area is showing a healthy expansion at the University of Brighton.

Geology has been an essential subject on Brighton's ***BEng Civil Engineering*** degree course since the early 1960s. For many years geology was also a key component of our BSc Geophysics run jointly between the former Departments of Physics and of Civil Engineering. A ***joint Geography-Geology BSc honours degree*** was started in 1999 within a newly formed School of the Environment. Encouraged by the success of this course and by the rising popularity of geology in local schools, in 2002 we launched a ***single honours BSc Geology degree*** course. In designing the new course, we incorporated features of 'traditional' courses that we considered as vital, such as an emphasis on fieldwork and practical skills, but also novel features such as final year modules on marine and planetary geology, palaeoecology, hydrogeology and geohazards. We build in modules on professional development and career planning. We focus on current European and global issues such as resource development, pollution and climate change. In modules such as 'Geology of major civil engineering projects', we specifically link theoretical and practical aspects of the course. We promote the development of investigative and reporting skills throughout the degree programme, not just in the final year.

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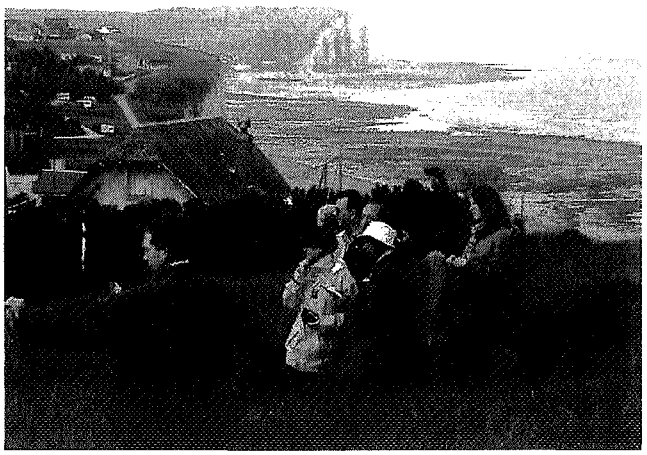
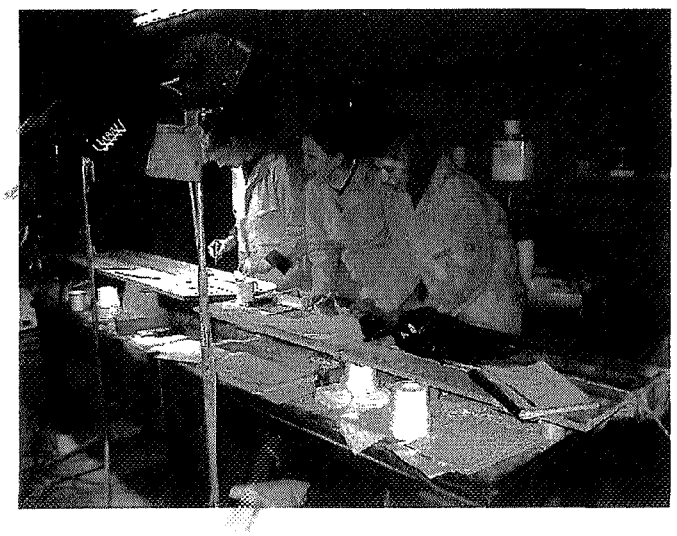
At postgraduate level, the ***MSc Geoframeworks*** provides a route for students with a background in Earth Science, Geography, Environmental Science or Engineering, to become applied earth scientists and to work in the water, construction, environmental geology and mining areas. The undergraduate and postgraduate courses benefit greatly from being closely allied with our colleagues in Civil Engineering, Geography and Environmental Science and we share field courses in Wales, SW England, Spain and elsewhere. Staff and students benefit from strong cross-disciplinary linkages within the School of the Environment.



Members of the ROCC team discussing cliff collapse and erosion of the chalk cliffs of Brighton.

Geology research in the School of the Environment is organized through the Applied Geology Research Unit (AGRU). We have expertise in Cretaceous geology, engineering geology - especially applied to construction in the Chalk - hydrogeology, environmental geology, ore genesis and geochemistry of ocean floor processes. AGRU is led by Professor Rory Mortimore who is an acknowledged world expert on the stratigraphy and engineering geology of the Chalk, with recent publications including books on British Upper Cretaceous Stratigraphy (558pp) and the CIRIA Engineering Properties of Chalk (279pp). In addition, his research contracts on the Stonehenge Tunnel and the SNCF TGV-



Geologists log rock core obtained in the site investigations for the proposed Stonehenge tunnels.

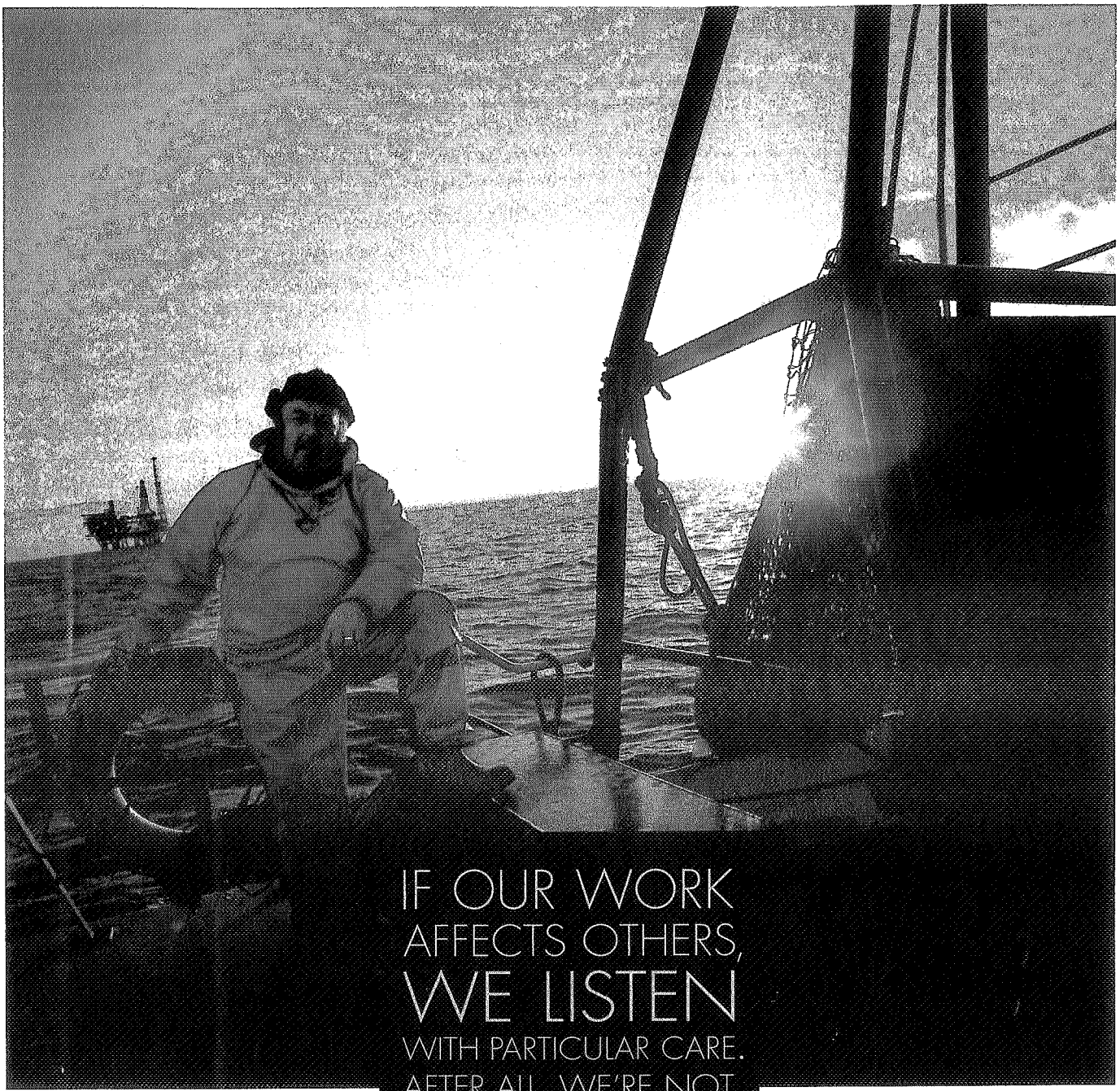
Nord have given AGRU a high profile in both civil engineering and geology.

Given Brighton's location along the rapidly eroding Chalk cliffs of the Channel, it is not surprising that coastal erosion processes and hazards are a major research theme. AGRU staff and research assistants are contributing to the INTERREG II ROCC (Risk of cliff collapse) programme and the European 5th Framework PROTECT (Prediction of timing of failures in cliffed terrains) programme. In addition to staff internal to the University, AGRU has developed a team on the European programmes with the French Geological Survey (BRGM), University of Le Havre, the Danish Geological Survey (GEUS) and the British Geological Survey (BGS). We have also fostered links with geologists at City University London, the Camborne School of Mines, and in local companies such as Southern Water. These are more than simply co-operative ventures, as the personnel involved have become long-term research colleagues.

Ore genesis and environmental geochemistry research has also linked staff at the sister universities of Sussex and Brighton, at the Natural History Museum (NHM) in London, and with colleagues in Ireland, Sweden and Austria. Research applying electrochemical methods to the remediation of metal-contaminated sediments has resulted in two patents pending and a number of potentially very exciting applications that are attracting interest and funding from research councils and industry.

AGRU was involved with planning the British Army's Antarctic Expedition 2001-02, which explored the Danco Coast of the Antarctic Peninsula and offshore islands. Rock samples brought back by the expedition are a unique collection from areas not previously sampled and these rocks will help unravel the geological processes leading to the Jurassic-Cretaceous break-up of the southern supercontinent of Gondwanaland.

In summary, there are several crossing threads of research within the group, ranging from geotechnics, engineering geology, hydrogeology, geochemistry, mineralogy and Cretaceous to Quaternary Geology. It is a diverse range with Chalk forming a link in many cases. Part of the engineering geology research is concentrated in currently topical areas of coastal processes, flooding and tunnelling, while research on mineral extraction and remediation is closely related to waste disposal, environmental systems and pollution monitoring and control. These are areas of core business within a 'School of the Environment'. A common feature of both teaching and research in geology at the University of Brighton is the way that fundamental scientific principles are applied in the 'real world'. We look forward to a bright future!



IF OUR WORK AFFECTS OTHERS, WE LISTEN WITH PARTICULAR CARE. AFTER ALL, WE'RE NOT THE ONLY FISH IN THE SEA.

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At Shell we believe that exploration of natural resources should benefit everyone and harm no one; and that by working with other experts, we can create a safer environment for everyone. To find out more, see the Shell Report "People, planet and profits" at www.shell.com

Web-based training on Geoinformatics: a new dimension on qualification in the professional environment

by D. Doherr [1] and M. Schilli [1]

The geological profession requires life long learning and the continuous development of professional knowledge worldwide. Accordingly, many efforts for professional education are undertaken by commercial, scientific or national professional organizations, which offer a lot of training courses. In this paper the practicability of online education for professional education is pointed out. Following an introduction about online learning systems and methods, an appropriate platform for the targeted online education is described. Web-based training is used as a communication and learning platform on the Internet, integrating a portal, a database, and several modules together with authoring and examination tools. So there is no need to be a computer science expert to use the interface to the education system.

La profession de géologue requiert de longues études et le développement continu des connaissances professionnelles sur des sujets divers et concernant le monde entier. En conséquence, les organisations professionnelles, scientifiques, commerciales, nationales et internationales s'efforcent de développer une éducation professionnelle au travers de cours adaptés. Dans l'article ci-dessous, l'utilisation pratique d'une éducation professionnelle en ligne est discutée. Après une introduction sur les systèmes et les modalités d'une éducation en ligne, une plateforme appropriée est décrite pour une utilisation en ligne. Un des résultats apparents est le fait qu'une formation à partir du Web correspond à une plateforme de communication et d'éducation et que les possibilités d'Internet : intégration d'un portail, disponibilité d'une base de données et de plusieurs modules, représentent un formidable outil d'apprentissage et de contrôle des connaissances.

La profesión de geólogo requiere en todo el mundo un largo periodo de aprendizaje asi como el desarrollo permenente de conocimientos profesionales. Teniendo en cuenta lo anteriór, hoy en dia las organizaciones profesionales y cientificas realizan considerables esfuerzos para ofrecer una amplia variedad de cursos de formación. En este sentido es importante el uso aplicado de la educación on-line en la formación profesionál. Una vez que se dispone de una adecuada introducción a los sistemas de aprendizaje on-line, es posibel describir la plataforma adecuada para un programa determinado. Una de las conclusiones a las que se llega, es que la formación basado en la red se utiliza como una plataforma de comunicación y de aprendizaje, integrando un portál, una base de datos y diversos modulos asi como herramientas de verificación para los autores. Se puede afirmarque no es necesario ser un experto en sistemas informáticos para usar una interface de un sistema de educación on-line.

E-Learning is a subset of the larger worlds of both "information technology" and "education and training". It can be valuable when used as a part of a well-planned and properly supported education and training environment, but e-learning is not a magic bullet that replaces nor renders obsolete existing pedagogical theories and approaches (Collier, 2002). Checking the Internet for concepts of online learning, one can find many definitions and statements describing the methods of Web-based training (WBT) as training delivered using TCP/IP and HTTP protocols, the protocols that define the World Wide Web. (See www.webbasedtraining.com)

So WBT is an innovative approach to distance learning using the capabilities of the World Wide Web to present live content in a structure allowing self-directed, self-paced instruction. It is media-rich training, and independent of time, place and computer platforms.

It is a perfect tool for delivering training to people anywhere in the world at any time for any purpose. Advances in computer network technology and improvements in bandwidth will increase the possibilities of multimedia training. Web browsers that support animation, interactions and chat and conferencing will offer many new ways of learning. With these tools, we can develop highly effective WBT to meet the training needs of a diverse population.

These technologies include Interactive multimedia instruction (IMI), which generally means any highly participatory, media rich computer-based instruction, whether networked or not. Blended learning is a concept that has emerged with the learning that is delivered across the Internet, which combines more traditional methods of teaching with Internet-delivered content that is learner-driven and self-paced (Voci, 2001). Overall studies

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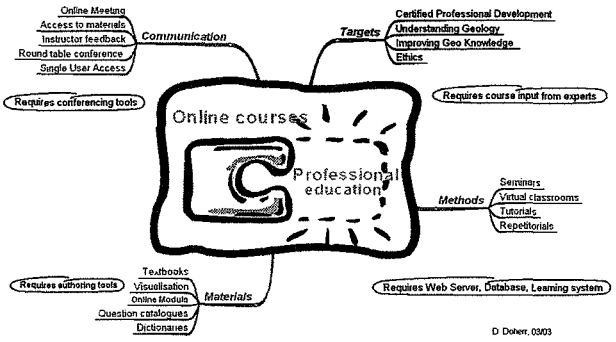


Figure 1. Structure of concepts on online education and requirements for an appropriate system for the EFG

include an increased sense of teamwork and camaraderie, establishment of common concepts and language, and greater efficiency in "jump starting" group learning.

Targets for geological professional development

It is obvious, that there is a need for certified professional development inside the community based on high standards of qualification. So the EFG is targeting the increasing of EFG benefits for members and improvement of qualification on a European level. Based on existing platforms, a concept of an educational system can be designed as a puzzle, where the pieces must fit together (Fig. 1):

- Targets: What types of courses are requested, what is needed?
- Methods: What type of course is appropriate for the particular module?
- Materials: Which type of information represents the content in the best way?
- Communication: Which communication is useful for the particular course?

These questions can be answered only by the authors of courses, professional geologists from industry and universities, together with other organizations, which are engaged in online education. Independently from the course contents, the requirements for a technical platform can be described (see circled text in Figure 1) to establish an appropriate system.

Web-based Training experiences

The appropriate technical server platform can be established on several servers on Windows or Linux. There are many commercial products available, which integrate tools for course user management, access to multimedial documents and authoring tools for the development of course modules. The Bildungsakademie from the BDG is using a system from the AFZ (Akademisches Fortbildungszentrum an der FH Offenburg) to provide courses and course material (See London.rz.fh-offenburg.de).

This system is based on a Linux platform. On this platform there is an Apache webserver and a MySQL database installed. The application program and the linkage between these two systems are developed with the programming language PERL. The system integrates also a multiuser interface as an Internet portal to the system.

The following components of online courses are integrated into education system (Fig. 2):

- PDF files for the syllabus
- PPT files for the course story
- Texts and images for laboratory tasks
- Self assessment questions catalogue
- Multiple choice evaluation
- Chat and communication during courses
- Email requests during courses
- Personalized examination with multiple choice

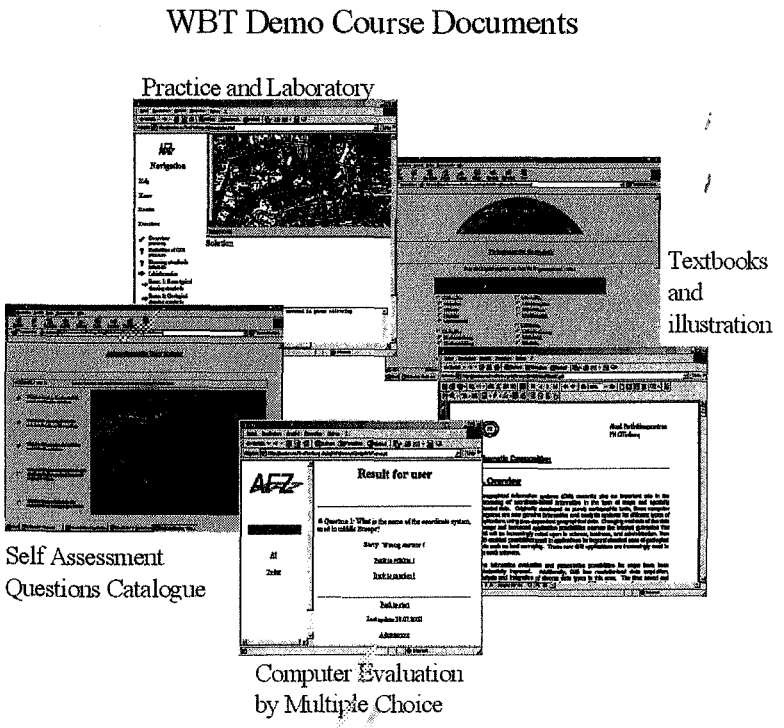
The system is divided into two areas:

1) A practical area with a navigation frame for learning units, where the participant can work on prepared exercises described with text, images or links. The browser contains an answering area for the user's solution and a result area, which gives information about completed exercises.

2) A tutorial area, which provides an online manuscript and a self-assessment questions catalogue. Participants can check their knowledge (Fig. 2) by answering the questions, which then would be evaluated automatically by multiple choice. If an answer was wrong, the user can go back to the question and try again or check for solutions in the syllabus.

A study from A. Naermann (Naermann, 2003) based on 21 companies in Germany, suggests there is no real alternative to online learning. This is accepted by managers as well as employees, with some restrictions to learning control methods. The BDG has already started first attempts in online education with nationwide course offerings in Germany and

Figure 2. Provided course documents and modules in the WBT at AFZ, Germany



inside the EFG a demonstration course was offered successfully.

Conclusions

An appropriate online education server is available and accessable for demonstration and professional use for the BDG and international course offerings. The WBT provides all course material such as textbooks, illustrations, self-assessment questions catalogue, laboratory management system and examination tool. Still to be established is the communication platform for online courses for participants and conferencing with tutors. In this area first experiences inside the EFG were made by the demonstration of an online course this year.

To provide this as mainstream professional education requires course modules written by experienced authors, who can overview the requirements for professional geologists world wide. Due to the encouragement of the European Federation, establishment of online systems is becoming a reality and increases the possibility of establishish continuous education in the geological profession Europe wide.

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Towards a European Higher Education Area

by Seppo Gehör[1]

As the course of European integration continues, the higher education structure has faced the need for reform. The European education ministers announced the Bologna Declaration in June 1999. This statement calls for the establishment by 2010 of a coherent, compatible and competitive European Higher Education Area. The accepted principles of the Bologna meeting were later enlarged in Prague in May 2001. Currently, the restructuring of university degrees is in progress in several EU and EEA countries.

Tandis que progresse le processus de l'intégration européenne, le cadre de l'enseignement supérieur a besoin d'être réformé. Les ministres européens de l'Enseignement se sont mis d'accord sur la Déclaration de Bologne en juin 1999. Cette Déclaration prône la mise au point à l'horizon 2010 d'une aire européenne de l'enseignement supérieur, cohérente, compatible et compétitive. Les grandes lignes de l'Agrément de la réunion de Bologne ont été étendues lors de la réunion de Prague en 2001. A l'heure actuelle, la refonte des diplômes universitaires est en cours dans plusieurs pays de l'Union et de la Communauté économique européennes.

A medida que continua su curso la integración europea, la estructura de la educación superior se enfrenta a la necesidad de una reforma. Los ministros de educación europeos anunciaron la Declaración de Bolonia en junio de 1999. Esta declaración pide el establecimiento, para el año 2010, de una Zona Europea de Educación Superior coherente, compatible y competitiva. Los principios que se aceptaron en la reunión de Bolonia fueron posteriormente ampliados en Praga en mayo de 2001. Actualmente se está realizando la reestructuración de los títulos universitarios en varios países de la Unión Europea y del Área Económica Europea.

The Bologna and Prague process aims to create an educational system that is composed of an easily comparable degree structure. The structure will be based on two degrees, where all students would first acquire a three-year bachelor-level degree and subsequently, a master-level degree if they so wish. The bachelor degree would consist of 180 credits to be obtained during three years of study. The proposed master degree would require 120 credits from two years of study. A European credit transfer system (ECTS) will replace the prevailing systems and the universities and institutions providing the higher education will be committed to restructure their curricula for this new system. The workload for the particular courses and degrees is to be estimated according to the ECTS.

The advantages of the two-tier degree structure will be the promotion of mobility, the promotion of European cooperation in quality assurance and the predictable improvement of the competi-

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tive position of European Higher Education in a global environment. For students in several European countries the process will provide an opportunity to obtain their degrees in a shorter time and in wider perspective, if they wish. Life-long learning is also one of the essential targets in the process.

The process aims to be up and running by the year 2010, but it is the national governments that are responsible for the educational system in their own countries. Many universities have already started to prepare the Bologna reforms in their institutions. In Finland, the Ministry of Education has already proposed that Finnish universities move toward the two-tier degree structure so that all institutions will have to adopt the new degree structure in all study fields from 1 August 2005.

Consequences for Geology

The process has been acknowledged and greeted with satisfaction. The advantages it contains have been widely recognized. However, the reform is not without its critics. As the process will mean a thorough change in higher education, it is understandable that there are doubts and conjectures.

Geology (Earth Sciences) has a distinctive character among the sciences. It utilizes a vast amount of concepts, theories and methodologies not only of its own but also from, among others, physics, chemistry, biology, mathematics and computing. Its specific character has to be taken into account in planning the new curricula. Achievements in education, of course, are always highly dependent on the comprehensiveness of all the particular subjects of which a degree is composed.

Due to the diversity in bedrock and surficial conditions (litho-, hydro-, bio- and atmosphere) of the Earth and its environment, even on a European scale, the institutions in different countries have evolved diverging educational practices in Geology. The effect of a university's structure (combination of disciplines), local culture as well as quality in high school learning, vary form country to country.

The common target for all the geological institutions in the new structure should be to construct well-designed programmes for an up-to-date geoscientific education. At the same time these programmes should give confidence to students to carry out a part of their studies in other countries in order to widen their selection of competences and enable them to develop their academic and general skills. Within the European Higher Education Area, their study attainments in other countries will be approved as part of their degree progamme. An important skill for any geologist is the ability to undertake fieldwork, to employ and draw together the data gathered from the field and to integrate field and laboratory evidence with theory. There remains an open question of what, at least in geoscientific education, the basic competences to be acquired by every student should be.

In aiming to achieve the targets of Bologna and Prague (to promote quality, to increase mobility, to reduce the length of courses, to improve the motivation for studying etc.), the participating departments should carefully consider the contents of the vast bulk of knowledge and methodology that they have to offer. The length of the first tier degree is only three years, and it has been intended that a pathway should be available for at least some of the students to enter the labour market after passing the first cycle.

An important point that is repeatedly mentioned in the context of improving educational conditions within Europe is *harmonization*. There is no doubt that geologists all over the world are conscious of the particular characteristics of the Earth System We are aware that the conditions and character of nature may differ markedly from area to area and that the demand for geological knowledge varies accordingly. Given this fact alone, the overall harmonization of education in geology may prove disastrous and should be rejected if it aims to educate geologists through parallel courses throughout Europe.

Then there is the often-mentioned question of the relevance of the new graduate structure to the current labour markets. The relationship of the university degree structure with the non-university education structures has also been raised. The proposal that the first university degree should enable direct entry into the working life brings these two educational paths into conflict. In a number of countries, the polytechnic courses are even longer than three years.

The intention to channel at least some of the students straight into the work force raises the question whether these B.Sc. graduates would be competent enough for the authorization tasks for licensing authorities or civil agents etc. that they would be expected to do.

The consequences of the shortened education might lead to reduced qualification requirements, which again may lead to reduced salary levels. However, employers need specialists, geologists that have passed higher degrees. There is no doubt that an increasing number of geologists in the near future will have only the first degrees. What their ultimate professional position will be, remains to be seen. Certainly, the EurGeol. title, which authentically quarantees the higher educational and professional competence of the person, will be found to have great value.

At the bridgehead

There are more than a few ongoing projects and networks exploring the issue of a European Higher Education Area. The author is most familiar with the Tuning Project, which has collected together ca. 100 institutions from the EU and EEA countries. The project was launched in 2000 and it has been working by using grant support from the European Commission. The second phase of the project (2003-2004) will be launched in May. The project is coordinated by the University of Deusto in Spain and the University of Groningen in The Netherlands. The subject areas in the first phase consisted of Geology, Business Administration, Education Sciences, History, Mathematics, Physics and Chemistry. Prof. Paul D.Ryan of the National University of Ireland in Galway is the member of the Management Committee responsible for coordinating the Geology Group in the Tuning Project. A significant level of work has already been done; e.g. the project has examined the opinions of students and academics (7125 people) on questions of subject related and generic competences. The objectives and outcome of the pilot project, its initial recommendations and conclusion for the process, as well as much more information concerning current issues, can be found on the project's website: http://odur.let.rug.nl/TuningProject/index.htm.

Acknowledgements:
The author wishes to thank Dr Ashley Selby for revising the language of this article

So you want to be a Professor in a research university

by George D. Klein [1]

Since leaving academe and becoming a consultant in the petroleum field, petroleum geologists facing layoffs and mergers have asked me whether they should explore the possibility of becoming a university professor. This paper summarizes what I tell them, but the reader is advised that some of my commentary (1) may appear a bit jaded, (2) may be out of date because I left a faculty position in 1993, and an executive directorship of an academic marine consortium in 1996, and (3) is based on a career in research universities because I never taught in a small liberal arts college. Nonetheless, I maintain contact with people in academe and such conversations update my perceptions.

All candidates for university faculty positions must have earned a PhD. I then remind industry geologists that academic life and responsibilities also should have changed considerably from their idyllic views as a student. The principle reasons for these changes are funding issues in higher education and how faculty, programmes, and colleges within a university are evaluated by administrators, particularly when funds are tight.

Bottomline fact

The principle guideline often used for evaluating individual faculty performance, departments, and colleges is represented by the following formula:

$$E = ((CNF)X + Og)/A \quad (1)$$

Where E = Effectiveness of either individual faculty, department, or college

C = Credit hours per course

N = Number of students enrolled in a course

F = Tuition fee rate (in dollars) per credit hour for each course

X = Number of courses taught in an academic year

Og = Overhead (in dollars) for University Campus generated from research grants a professor wins for personal research, or aggregate overhead of all faculty in department or college.

A = Annual Salary, or Annual Department appropriation (both in dollars) from university budget.

Administrators in research-oriented universities view faculty, departments, and colleges as highly effective if E is greater than 80% of the annual state (or endowment) budget appropriated for salary or programme costs; acceptable if E ranges from 70 to 80 (but don't get complacent because things can go wrong quickly); and concerned or oversized if E ranges from 60 to 70. A faculty member or a department faces strong pressure of termination or closure if E falls below 60%.

So, the message is clear. Faculty members will survive as a professor if they are awarded lots of grants with lots of overhead for the university coffers, or teach a lot of classes with large student enrollments. In reality, faculty are required to undertake and publish research, so they must develop a constant multi-tasking, juggling act. A professor is viewed as a profit center by university administrators, no different from a petroleum geologist in industry. As one friend put it, deans expect "money in and publications out".

Consequently, professors are under pressure to secure external funding and keep E respectable. Thus the collegial comfortable life of college campuses in the 1970s and early 1980s has evaporated. Faculty have less time for students and for casual conversations than in the past. Moreover, because of lack of time to talk with students, career counselling and mentoring has declined, and in some instances, has fallen out of favour due to work load and campus-wide political climate.

Accountability standards have increased also, partly in response to federal funding mandates after the "overhead scandals" of the late 1980s. Thus faculty time also is devoted to completing more forms, accounting for more of one's time, and responding to countless memoranda. Ignoring accountability requests is fraught with risk.

Independant contractor

A university faculty member works and functions as an independent contractor. Thus job descriptions, such as used in industry, do not exist; the department head staffs courses; and one pursues whatever research one wishes to conduct (as long as it brings in grant funds). It also means that whenever the university asks a faculty member to do something "extra" or new, it provides a negotiating opportunity to request things from one's department head so one can keep one's research program functional, and be successful within the framework of the new assignment.

The interview

If a prospective faculty member is invited for an interview, it is absolutely critical to determine institutional criteria for success, including tenure and promotion. Be sure to ask everyone you meet during a campus visit to see if the response is consistent, because transparency in university dealings is a worthy goal that is sometimes difficult to attain.

During interviews, it is critical to ask about teaching loads, availability of office and lab space, starter funds for research equipment, internal grants, sabbatical leave policies, local schools (if one has children), local cost-of-living index, housing, and housing financial assistance (if the campus is located in an expensive area like the New York City area or California). All are legitimate questions. Also know what is needed in costs and space to

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develop your proposed programme and be sure to ask if and how the university can provide it as part of your appointment.

Advancement to tenure and promotion

When ready for advancement to tenure (usually at the Associate Professor rank) or a full professorship, university administrators and tenure review panels at all campus levels want to be assured that a candidate really has demonstrated a commitment to research, quality teaching, and is developing intellectual stature. At one time, to be promoted to tenure, one had to show promise, and to be promoted to a full professorship, one had to demonstrate that one's work was considered to be of national distinction. Now, to advance to tenure, one must demonstrate one's work ranks as being a scholar/scientist of international distinction. The tenure decision guarantees a faculty member a lifetime salary and benefits exceeding $2.0 million per faculty member. This is a large commitment for any university. Hence the scrutiny.

How does one attain such an international research reputation, and how does the university know? Individual faculty must attend and present papers at international meetings and develop a network of people overseas who follow their work. When one is a candidate for promotion, one is expected to provide names of senior experts in one's field who will be solicited to write evaluation letters as part of the tenure or promotion package. A candidate must be sure to include on that list some of the international contacts he/she has made who are of tenured and professorial rank, so that they can be solicited for letters. Such letters validate an international reputation and standing in the minds of campus tenure and promotion committees.

Faculty governance

Perhaps the biggest change in the university work environment that a person with industry experience faces is the issue of governance. In industry, governance is in the hands of management and defined by a job description. In universities, particularly in one's home department, a shared governance system exists. Each faculty member is expected to do his/her share of and participate in department governance duties, whether chairing or serving on committees, representing the department at certain campus meetings, serving on the faculty senate, and generally making sure the enterprise functions well. This is where one's collegial and team skills are needed to elicit cooperation from colleagues, to develop a plan of action, to persuade colleagues regarding a cause one champions, to meet deadlines, and complete tasks in a timely manner. For many of these tasks, deadlines are set in advance to meet certain goals (such as graduate admission offers). Pay attention to them, and then get back to writing, research, and grant-getting.

Teaching

One should never neglect teaching. Teaching evaluations are used in promotion reviews, and in state universities are considered in tenure reviews mostly because too many parents complain about poor teaching or uninterested teaching to their legislators who vote the annual appropriation. In addition, letters from current and former students are solicited and included. Aim for competent teaching and then get back to writing, research, and grant getting. Post office hours and stick to them to create adequate time to get research completed and published.

Never be intimidated by lengthy student evaluation forms and output. Only a handful of the questions asked are ever used in promotion reviews. New faculty should find out from their department head which questions are considered important.

Students

Students today are different compared to those of the past and come to campus with a new set of cultural and motivational values. During the years I taught, an incremental but obvious change in student skills and attitudes appeared every six years. Be ready for it. If you have children, you know what is involved. In my experience, the students on a state university campus that share a work ethic to succeed and a desire to excel, enroll in engineering schools because of limited places and strong competition to gain admission. If a geology department is located in a college of arts and sciences, the student pool likely may be less motivated. The best bet for attracting good students and being insulated from some of the campus folderol occurs when a geology department is located in a school or college of earth sciences. These are likely to be the geology programmes that have national and international standing and will be the hardest to eliminate if resources are cut campus-wide.

Faculty colleaques

Faculty colleagues represent the full range of society that one meets in the working world. Some are brilliant, some are backsliders, and some are unethical (in a surprising way compared to what one encounters in industry). Their work does not necessarily require social skills nor the practice of common courtesy that exists in the working world. As harsh as this sounds, be aware of it. Your success on campus may depend on that awareness.

Campus climate

Other factors have influenced the campus environment. The so-called "politically correct" movement dominates many institutions, particularly where faculty in humanities and social sciences rule the roost. If one raises research funds from the oil industry, be quiet about it, but do try to obtain industry consortium funding to achieve your goals. If a campus newsletter writes up your work and lists your industry funding, expect a few nasty phone calls from the irrational disgruntled campus environmental types or faculty in other departments who feel your research is tainted (i.e. not "pure"). The "politically correct" crowd sustains their actions, but don't be intimidated. Many geology departments have moved more into environmentally-related research to maintain campus "political" credibility, and in one case known to me, was required to do so by the administration or face elimination of their PhD programme.

Local community

Before applying for faculty positions, pay attention to fact sheets about the community in which a campus is located. If a candidate is married to a working spouse, check spousal career possibilities before considering a job where no spousal opportunities exist. This has become an issue of major concern on many campuses located in remote areas or in smaller towns (i.e. <100,000 people). One may be able to negotiate something for a spouse, but it is difficult. Such communities also lack adequate medical services. If one expects spousal opportunities, focus on universities located in communities larger than 250,000 or within a 50-mile radius of such a community. Likely, there will be

better schools available for one's children in such larger communities.

Space does not permit me to discuss life in college towns. The idyllic myth perpetrated by Hollywood does not exist. Don't expect to find it.

Closing comment

These are some of the points I share with industry geologists who inquire about a professorial career. If most of these facts are kept in mind, a petroleum geologist can make the transition successfully, and many have done so. However, because of the demands on faculty for grants and publications, one can expect to work as hard, if not harder, than one did in industry.

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So you want to be a College Instructor

by Gail G. Gibson [1]

As a former Dean for Academic Affairs at one of the two-year, regional campuses of a state university system, and as Department Chair and Center Director at four-year liberal arts or teaching institutions, I received telephone calls, unsolicited credentials packages, and more recently e-mails from geoscientists inquiring about possibilities of employment as college instructors. Some were seeking full-time employment. Others were seeking appointments as adjunct faculty, teaching one or two courses an academic term to augment existing income or as an opportunity to relax from their full-time jobs. Others were somewhere in between, perhaps thinking about making a move to other employment by getting at least one toe wet in academe. In a recent article, George Klein addressed many of the same questions relative to employment at research-intensive universities that are addressed below. However, as he indicated, there is another realm, actually two realms, of post-secondary education where teaching and working with students is the primary mission of the institution. I say two realms, in that one comprises the four-year liberal arts and teaching institutions, and the other is made up of two-year institutions. I have been employed in both realms after beginning my professional career in the petroleum industry.

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The Two-Year Institutions

The two-year institutions include technical-vocational schools, many of which have curricula that are transferable to four-year baccalaureate degree programs; community colleges that offer both a vocational-technical or certificate track and an academic or associates degree track that provides the first two years of a baccalaureate degree program; and junior colleges that provide the initial two years of coursework toward the four-year degree. In order to be a member of the faculty at a two-year institution, the minimum academic requirements are a Master's Degree with 18 semester hours in the discipline.

As a full-time geoscientist in these settings, you may be employed on a year-to-year contract or be on a tenure track. Depending on whether you are working at a regional campus of a university system or a technical college, some level of scholarly activity (research) may be required. You will in all likelihood be alone academically. You will probably have no other geoscientists to converse with and will commonly hear the question, "Oh, can I bring my arrowhead collection to you to identify?" Or, "Have you been on any digs lately?" You will teach multiple sections of the same subject. This can be boring or a can be a blast, because you are presenting material that most of the students have never considered, especially when you can utilize examples from the local area. You may have to convince the administration that labs are an essential part of the courses (particularly for transfer to baccalaureate programs) and that Physical Geology and Environmental Geology make a better pair of course offerings than the traditional Physical and Historical geology sequence. Be prepared to support this statement with a list of other institutions that offer such courses, institutions in the state, and in the system. Examples from out of state are not looked upon favorably, because "...they are different."

Teaching is the primary goal of these

institutions, which can, and should, take lots of your time, not only in the classroom, but in class preparation, and in review and tutoring sessions, as well as by the extra-classroom activities like attending student-sponsored functions. The students truly appreciate their faculty taking an active interest in their activities, and yes, the rewards are well worth that extra effort.

Many two-year campuses are structured around formal "student-centred learning" programmes to help the academically under-prepared students learn what they are really capable of accomplishing. Be prepared to embrace this approach, because it may be very different from what you remember of your undergraduate educational experience. You will cajole, threaten, and plead with many of your students to stop by your office for extra help, or you will personally take them to the student services help centre and introduce them to the tutors, mentors, and advisors or you will visit with your students in the student lounge, in their environment, to help them reach goals that you know they are capable of achieving.

You will frequently have to share teaching accommodations with other faculty, probably will have to use your personal mineral and rock samples to start with and carve out some storage space in already tight quarters, for the minerals, rocks, and maps you remember from your days sitting in an introductory geology class. As George Klein noted, the students may not be as academically and emotionally prepared or motivated as you may remember you and your classmates being. However, many students are just waiting for the door to their intellectual capabilities to be unlocked, and you can be the key! This is one of the major challenges you will face, a challenge that will require enormous amounts of your time, working with these students, agonizing over grades, and modifying the course syllabus as you change the material you present in class and how you present that material. On the upside of the equation is the warm and fuzzy feeling you get when the light finally goes on in a student's eyes or well written, coherent and correct answers begin to consistently show up on exams, or you watch a student receive his/her degree and then bring Mom and Dad over to meet you and say that "...this is my geology instructor, who helped me see what I needed to do in order to succeed." And field trips!!! Not every student wants to go, until the first, usually small, group shows their peers the minerals, rocks, and fossils that they collected. Then, the question is "When is the next field trip?"

Prepare yourself for meetings that are definitely not the "power meetings" you may have been accustomed to in industry. In many cases, such meetings dissolve into rehashing of old news, or carefully skirting the real issues, or discussions of who is related to whom. As you are well aware, committee meetings fill all of the time allocated, just like a gas filling all of an open area. Colleges and universities employ the shared governance approach to running the academic aspects of the institutions. You will note also that accomplishing routine and non-routine tasks (especially the latter) is attenuated because of time requirements of class registration days (plus the getting ready for and cleaning up after), midterm exams, autumn or spring breaks, end of calendar year holidays, final exam week, and the fact that faculty are on a nine- or ten-month contract. And, at the smaller two-year institutions with few administrative staff, when an administrative staff member takes annual or sick leave, or attends an off-campus meeting, a number of functions and decisions are delayed until that individual returns.

Do not be too professional, as this tends to unnerve your colleagues, many of whom have not undertaken professional development activities in years, or do not belong to professional organizations in their disciplines, or have not published in refereed journals. There is usually little financial support to attend professional meetings, but make the effort because you are setting an example for your students. Also, do not allow your professional licenses, registrations, and certifications to lapse. Such professional registration provides students with examples of non-academic professional goals useful to or necessary in their future professional lives.

Not all two-year colleges are located in major metropolitan areas. Many of the two-year commuting campuses are located in rural settings, drawing their students from sparsely populated, politically proscribed service areas where students may commute 30 - 40 miles to class. The commuting students may be "traditional" students in terms of age, academic preparation, worldly experience, and frequently lack of motivation and vision. Other students are "non-traditional," in terms of age, experience, and/or outside responsibilities. So, you will have two or three audiences in your classes -- from the highly motivated student who is wisely attending the two-year campus that is close to home to save money, to the student who is both academically and emotionally unprepared for the post-secondary experience, and the students whose external responsibilities (work, family, etc.) may adversely impact their academic efforts. All of these students require and deserve that extra effort from you, part of which effort is academic and part is the sharing of life skills with your class.

The campus climate can be an interesting beast. Cohesion among students and faculty may be low, especially on the commuting campus or at the institutions with multiple campuses, where both faculty and students spend time on different campuses. In my most recent position, I was a 10-minute walk from home to my office on one campus and a 50-mile drive from the other campus. In this situation, faculty members are not present every day on a particular campus, do not interact professionally with their colleagues on a regular basis, and frequently do not participate in campus or community activities because of their teaching schedule or residence locations. Accomplishing campus business (committee meetings, recruiting committees, faculty meetings) becomes more drawn out since it takes longer to get committee members together. This can be particularly bothersome on campuses with older faculty who are no longer proactive in their disciplines and profession.

As I noted above, two-year colleges are located in urban, suburban, and rural areas; areas that maybe very cosmopolitan or very provincial. As George Klein pointed out, opportunities for spousal employment or activities in suburban and rural areas can be severely limited. Likewise, interaction with the community may be difficult, because you are the 'outsider.' On the other hand, you may be readily accepted because of the cosmopolitan nature of the community.

The Four-Year Teaching or liberal arts Institution

This is the third realm in higher education and is markedly different from the realm of the two-year institutions and that of the research-intensive institutions. The student body sizes of these institutions range from a few hundred students to a few thousand. The four-year teaching institu-

tion will normally have a significant residential (dormitory and apartment dwellers) traditional student population. So, you will be able to see your students mature academically and emotionally over that four-year period of time, hopefully having a positive impact on that academic and emotional maturation.

In these institutions, the terminal degree in one's discipline is normally required for full-time employment. Promotion is through the tenure and promotion process, which is based on excellence in teaching, and an acceptable level of research and service. Most institutions now have their Faculty Manual on the web page. Reviewing this document will provide you with insight into many of the job requirements and procedures. You will undoubtedly note that shared governance is stressed in that document.

The four-year teaching institution may already have a Department of Geology or Earth Sciences, so that you would be joining a small faculty with similar backgrounds. Or, geology courses and perhaps a minor in geology may be offered as part of a Department of Physical Sciences. In addition to teaching, you are expected to conduct research and publish, but not to the extent of the research institutions. There will probably not be adequate space or equipment available, but one learns to make do. This research can be practical / applied, that is, directly applicable in the classroom, and should involve your student majors, as part of the institution's curriculum may be a senior thesis. Student research (especially in the areas of environmental geology or environmental science), you may remember, is one of the graduation requirements that helps pull not only what you learned together, but to apply that knowledge, and be able to demonstrate a level of competence to a potential employer.

Applying for and receiving grants is obviously a plus in this setting, just as it is at the two-year institution. As many departments are stressing the environmental aspects of geology or integrating geology, chemistry, and biology curricula into an environmental science major, collaborative grant applications and project work provide the opportunity to work with other faculty members on mutually interesting projects. The overhead generated from grant money (the politically correct "soft money") is important in funding your travel to professional meetings as well as in supporting other department activities.

Four-year institutions are more often located in at least moderately sized towns and cities. However, spousal employment may still be limited, particularly if the institution is viewed as the prime employer of the area and many of the faculty and staff have been employed there for several years. Like the two-year institutions, "new" ideas may not always be welcome.

In closing

The transition from geologic professional to geologic academician can be made. The rewards in the academic setting are very different from those of industry, but ever more satisfying. Being a great teacher means putting your whole being into the effort, but when a former student comes up to you and says something like "Do you remember me from the first geology class that you taught here, six years ago? Well, I learned more in that course than just geology. You taught me how to study and apply myself." This is the reward for all of the effort you expend and all of the frustration you will probably endure as a college instructor. Do not give up on the students!

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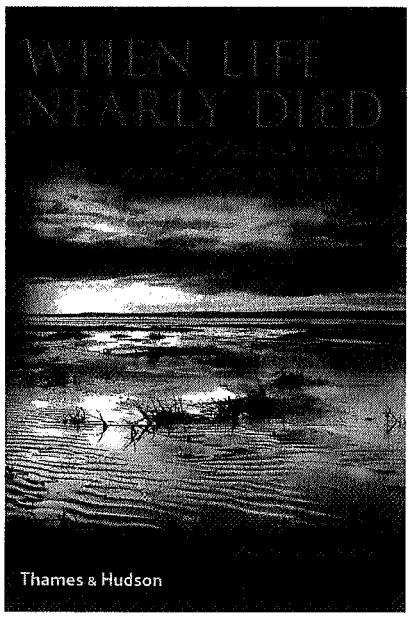

Apocalypse Then

Book review by David Harper [1]

WHEN LIFE NEARLY DIED. THE GREATEST MASS EXTINCTION OF ALL TIME. by Michael J. Benton. Thames & Hudson Ltd, 181A High Holborn, London WC1V 7QX; e-mail: sales@thameshudson.co.uk
ISBN 050005116X. Hardback £16.95.

[1] David Harper is Professor of Palaeontology and Deputy Director of the Geological Museum, University of Copenhagen.

There is now no doubt that some 250 million years ago great evil stalked the planet. Unimaginable catastrophies wiped out at least 90% of life on earth. The planet's biosphere jumped from a world of incredible animal and plant diversity to a desolate, grey, post-holocaust vacuum populated by a few hardy beasts eking out miserable existence. These events had a pivotal role in the history of the biosphere, reducing biodiversity to near unsustainable levels, but life recovered and some 10 million years later a new and very different global ecosystem dominated the planet.

Michael Benton presents the facts and the fiction surrounding this remarkable time in the history of life, together with current thinking on the causes and consequences of this great event, which essentially reset evolutionary agenda both on land and in the sea. While the clear focus of this well-illustrated book is the effects and consequences of the largest of the big five extinction events, Mike Benton has weaved together several related subplots. Significant is the marked swing in the 1980s from a uniformitarian view of geological processes, established in the mid-1800s by Charles Lyell in his influential 'Principles of Geology,' back to the catastrophist models promoted by George Cuvier in the latter part of the 1700s. Important, too, is the fact that science, unlike mathematics, rarely provides the correct answer. Rather, hypotheses can be developed that may be tested or falsified with new data and new methodologies; models for the shape of the history of life are a case in point. Finally, of course, the study of past extinction events is of considerable importance in predicting the path of the current '6th extinction event' that we may be currently experiencing.

In an opening chapter the scene is set with an historical review of some of the key reptiles that existed on either side of the Permian – Triassic boundary. Here also some of giants of 19th century palaeontology are introduced, ambitious and talented scientists that had clear agendas and trenchant views. The formidable Richard Owen, the 'British Cuvier,' had already much data at hand, developing viable reconstructions of a range of bones from the Permian and Triassic; clear was the use of similar types of fossil to correlate strata of the same age. Remarkable is the transition from the complex terrestrial landscapes of the Late Permian dominated by a range of mammal-like reptiles to a world dominated by the lumbering, pig-like *Lystrosaurus*, the most unlikely of survivors, but this clear picture had yet to emerge. A clear structure for geological time would be necessary to provide a framework for these fossil finds discussed by Benton in chapter two. Roderick Murchison named the Permian System based on exposures of rock near the city of Perm in Russia. The data was published in some haste, providing Murchison with the satisfaction of naming the system and establishing a type section for the interval of geological time for this system, the Permian Period. The rise and fall of the catastrophists are charted in the third chapter, particularly emphasising the roles of Cuvier and Lyell in the development of their respective catastrophist and uniformitarian models. Evocative is Henry de La Beche's satirical cartoon of Professor *Ichthyosaurus* addressing his class of reptiles on the remains of ancient humans, lampooning Lyell's cyclic model and his prediction that these giant marine reptiles could again populate our seas and oceans.

Although many of Lyell's principles dominated geological models throughout much of the 19th and 20th centuries, there were other schools of thought, albeit marginalized from mainstream science. In the fourth chapter we are exposed to a range of notable scientists including the eccentric and multilingual Baron Nopsca, one time freebooter and Albanian spy, who developed a number of theories for the end Cretaceous extinction of the dinosaurs. The neocatastrophist school of the 1950s and 1960s was headed by Otto Schindewolf; not only did he highlight extinction events, but he also developed ideas concerning possible extra-terrestrial causes. His focus on the end Permian event provided much ammunition for the catastrophist lobby, but sadly such heretical ideas remained far from the core of contemporary palaeontological research.

Chapters five and six focus on the origins and evolution of the bolide impact theory and the description of patterns and trends in the history of life. These have been the subject of many books and papers but these lucidly written chapters are an essential buildup to the main event. In short, the fossil record is good enough to describe many aspects of the history of life and clearly there have been at least five major extinction events, of which the end Permian was the largest.

Some of the key elements of the event (definition of the bases of the Permian and Triassic systems, isotope excursions and the Signor-Lipps effect) together with some critical localities (Meischan, South China; Greenland; Pakistan) are described in chapter 7. The next chapter is a vivid picture of the dramatic change in the marine ecosystem through the event. The lifestyles and living communities of the main players are described in graphic detail. Sadly, it is true that amongst the brachiopods, the coral-like richthofeniids, the excessively spinose waagenoconchiids together with the near-naked lyttoniids disappeared forever; the widespread appearance of the disaster taxon *Lingula* during the earliest Triassic was no substitute for the attractive and elegant assemblages of the late Permian. Chapters nine and ten dissect in detail events on land, describing the dramatic changes in vertebrate fauns across the boundary based on classic sections in Russia and South Africa. Here, John Sibbick's illustrations of both individual animals and their collective communities are especially informative. Mike Benton's own fieldwork on the River Sakmara is narrated through the eyes of a visiting scientist to a Russia that itself was in a state of change. The taste of flavoured 'casha' is mixed with details of critical sections across the Permian – Triassic boundary, where faunal changes are accompanied by dramatic fluctuations in patterns of sedimentation.

Chapter eleven brings us to the climax of the book. The end Permian extinction was real and substantial, but what were the causes? Many factors were clearly involved including the near proximity of many continents, the massive eruption of flood basalts and the exhalation of methane hydrates. But this is science. New data and new techniques will undoubtedly continue to develop our understanding of this exciting and critical turning point in the history of life. The final chapter draws our attention to the current biodiversity crisis on our planet. Clearly there are lessons to be learnt from past extinction events, but how little we actually know about the diversity of life, past and present, its origins and its resilience to crisis.

Michael Benton has provided a highly readable, entertaining, yet serious account of one of the key aspects of the history of our planet, life and its extinction. Over the last 20 years data has escalated and, over a century, styles of interpretation have changed. Nevertheless, palaeontology remains a core element of the understanding of the workings of our planet and predictive tool for the modelling of future crises.

Latest news from World Geologists

by Angel Carbayo [1] and Yolanda González [2]

NGO World Geologists continues towards its goal of developing international co-operation projects, as described below. It is worth mentioning the elections held last January where Angel Carbayo was elected as President of a new Board for this new period. This paper includes detailed references to the last projects completed such as one in the villages of Rompiciones and Barrancones (El Salvador) and another in Burkina-Fasso. The former provided enough drinking water to satisfy the needs of 2,500 people. As for those projects now in progress, two hazards characterization projects started in February in El Salvador. Likewise, a water project has started in Mali, where good results have already been obtained after a preliminary survey and exploratory mission. At the moment, four hydrogeological projects are under preparation and seeking funding.

L'ONG "Geólogos del Mundo" (Géologues du Monde) progresse dans son objectif de coopération internationale comme nous l'expliquons ci-dessous. Cette fois-ci, il faut mettre en valeur la célébration d'élections le 25 janvier pour élire un nouveau Conseil de Direction, qui commence une nouvelle étape avec Ángel Carbayo comme Président. Parmi les projets terminés on fait référence à celui de Rompición et Barrancones et à celui de Burkina-Faso. Dans le premier cas l'utilisation directe des usagers d'un débit d'eau potable qui couvre tous les besoins de 2.500 personnes a été pratiquement accomplie. Quant aux projets commencés, pendant le mois de février deux projets de caractérisation de risques au Salvador ont été mis en route. De même, on a mis en marche un projet d'eau au Mali où, une fois établie la ligne d'investigation à suivre par une Mission Exploratrice, puis réalisée, de bons résultats ont été obtenus. D'un autre côté, quatre autres projets d'hydrogéologie déjà élaborés sont en attente de financement.

La ONG Geólogos del Mundo continúa avanzando en su objetivo de realizar proyectos de cooperación internacional según se expone a continuación. En esta ocasión hay que destacar la celebración de elecciones el día 25 de enero para elegir una nueva Junta Directiva, que acomete una nueva etapa con Ángel Carbayo como Presidente. Entre los proyectos terminados se hace referencia al de Rompicón y Barrancones y al de Burkina-Fasso, en el primero de los cuales se ha conseguido prácticamente la utilización directa de los usuarios con un caudal de agua potable que cubre todas las necesidades de 2.500 personas. En cuanto a los proyectos iniciados, han comenzado durante el mes de febrero dos proyectos de caracterización de riesgos a realizar en El Salvador. Asimismo, se inició un proyecto de agua en Mali donde, una vez marcada la línea de investigación a seguir por una misión exploratoria y realizada aquella, se han obtenido buenos resultados. Por otro lado, hay otros cuatro proyectos de hidrogeología elaborados pendientes de obtener financiación.

Elections were held during the course of the Extraordinary General Assembly on January 24. As a result, Angel Carbayo was appointed President of the new constituted Board of Directors.

Completed projects

By the end of March, the successful completion is expected of the distribution of fresh water from the well built by World Geologists in La Rompición and Barrancones, in El Salvador. The water volume of 1.5 l/sg (100 litres per day per person) obtained from the well will be conducted by PV pipes to a high level tank now under construction. Gravity will permit distribution of the water to the population. In this way, the problem of fresh water will be solved for 2,500 people. Funding for hydrogeological research, execution of the mechanical drilling and preparation of the well was provided by The Nando Peretti Foundation, while piping installation was possible thanks to the Danish Cooperation contribution. Finally, the well was built because of the contribution by the Mayor's Office of Pasaquina (Department of La Union).

News of the successful outcome of the drilling of this well was widely spread amongst the population of the region of Fonseca Gulf, in El Salvador. For that reason, WG has received requests to solve many more problems; this involves the NGO having to work very hard to get new funding.

WG also completed its involvement in a project carried out by Arquitectos sin Fronteras in Burkina-Fasso, consisting of nine drills in search of water, each producing good results.

Projects in progress

A project called "Characterization of Geological Risks and Measuring of Hydrogeological Resources. Lineament for Country Planning of Nejapa Municipality, El Salvador" began on February 1 and will last for seven months. This project will be managed by an experienced geologist from Madrid, Diana Ponce de León, who is also Co-ordinator of the project, with the support of the geologist José A. de San Antonio from Asturias, Catalonian hydrogeologist Roser Mañé and a young voluntary geologist from Madrid, Julia Seisdedos, joining the team in March, for training.

1 President
2 Coordinator

The project "Geological-Environmental Analysis for the Community Development of APS (Primary Health Care) in Juacarán Municipality, El Salvador", began on February 15 and will be completed in ten months. The team will be coordinator, Catalonian geologist Carolina Torrecilla, and a support geologist from Madrid, Jesús Barrio. Two voluntary geologists from Asturias and Catalonia will join them soon. Every selected geologist for these projects is an active member of the NGO.

An Exploratory Mission of WG went to Mali on December 5 to begin preparations for the project "Fresh Water Supply for Three Localities at the Touba Parish, Mali Republic". The mission included Ángel Carbayo, President of the NGO, Luis Dichtl, an expert hydrogeologist in African countries, and Vicente Fabregat who transferred from IGME to this project. The objective of this trip was to study the geology and the hydrogeology of the area as well as to become familiar with the logistics and other features of the country. This was in order to discover the best way to obtain fresh water for three villages suffering a two-month period of drought every year and whose inhabitants are forced to walk several kilometres to provide themselves with live-saving fresh water.

As a result of the Exploratory Mission, the provision of vertical electric profiles was planned at Beo, Madoulo and Ealo villages in Touba Parish, located SE of the Mali capital city, Bamako. Using geophysical information, a favourable point was selected at Beo village as the first objective of the project, in order to carry out a mechanical drilling, which luckily gave a positive result. The depot is formed by weathered sandstones, providing a volume of 1l/s, in which a large-diameter well will be made. Such a volume largely fulfils the fresh water needs of the 125 inhabitants –including farming and cattle-rearing. Hydreogeologist Vicente Fabregat was in Mali for a month supervising the geophysics.

New projects

WG is currently taking part in a water project with the NGO MON-3. The first stage entails assessing the problems caused by the overexploitation of the underground water at the Figüig oasis, in a city located in Morocco, on the Algerian border. Such collaboration will allow a joint preparation for the second stage of the project in the near future, based on the results of the present research. It will allow the regulation of the aquifer and will soon be presented for funding.

The "Chumabi Project – Building of a drill for the obtaining of undergroud water, for supply and possible irrigation intended for rural communities of Cotacachi Volcano slopes (Imbabura Province, Ecuador)" has been presented to obtain funding. We hope to be successful.

In addition, the following three projects will be presented for funding:

- Underground water supply for the villages of Peñas Blancas, El Chagüite, Agua Caliente and San Felipe, Pasaquina Municipality, Department of la Unión, El Salvador.
- Underground water supply for the inhabitants of Isla Meanguera, Fonseca Gulf, Department of La Unión, El Salvador.
- Underground water supply for the inhabitants of Isla Zacatillo, Fonseca Gulf, Department of La Unión, El Salvador.

Pumping test in Mali

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News and events 2003

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Conferences

10-16 August 2003
XVth International Congress on Carboniferous and Permian Stratigraphy (XV ICC-P) and 55th Meeting of the International Committee for Coal and Organic Petrology (55 ICCP). For more information see site:
http://www.nitg.tno.nl

3-6 September 2003
Second Symposium on Mesozoic and Cainozoic decapod crustaceans, Oertijdmuseum de Groene Poort, Boxtel/ Natuurhistorisch Museum Maastricht, the Netherlands.
Info: Dr René H.B. Fraaije,
e-mail: info@oertijdmuseum.nl, *or*
dr. John W.M. Jagt,
e-mail: john.jagt@maastricht.nl

5-7 November 2003
1st International Conference Sustainable Development & Management of the Subsurface; Delft, the Netherlands, organization Delft Cluster,
e-mail: info@delftcluster.nl;
www.delftcluster.nl

Italy

News

Milan, Italy, April 2003
On the 15th April the following statement was given to the Press, at the Press Circle Milan (Circolo della Stampa),
" The newly formed "ASSOCIAZIONE ARDITO DESIO" named in memory of Prof.Ardito Desio (died aged 104 in Rome last year), leading geologist and explorer, who guided the Italian Expedition of K2 - Himalaya Group -" in 1954. The Association's aim is to promote Geology, Scientific Research and Environmental Protection. Some 350 people took part in the meeting, including academic and political authorities. The conqueror of K2, Achille Compagnoni, was also present and gave a short speech.

Also in April, a conference took place in Milan, organized by ANGI and Lions International. The title was 'I Beni culturali e Ambientali e il rischio geonaturale' (Geonatural Hazards affecting historic buildings and the physical landscape). Around 150 attended.

USA

Courses

R. J. Font has two courses on-line now at:
www.geosciencedm.com
One is a petroleum course (very comprehensive G&G in E&P) The second is the geohazards course.

Submission of articles to European Geologist Magazine

The EFG calls for quality articles for future issues of European Geologist. Submissions should be in English and between 1000 and 3000 words, although longer articles may be considered. An abstract of between 100 and 150 words should be included in English, French and Spanish. Articles should be sent via e-mail to the Editor at Harper-mccorry@mail.tele.dk or on disc to Kaplevej 7, 2830 Virum, Denmark. Photographs or graphics are very welcome and should be sent to the Editor as tif or jpg files.

Deadline for submission 30 March and 30 September.

Advertisements

Prices for advertisements

	One Insertion	Two Insertions
Full page (colour)	820 Euro	1320 Euro
Half page (colour)	420 Euro	670 Euro
Quarter page (colour)	220 Euro	350 Euro
Full page (black and white)	420 Euro	670 Euro
Half page (black and white)	220 Euro	350 Euro
Quarter page (black and white)	120 Euro	200 Euro
Business card size	90 Euro	150 Euro
Preferential location	25% plus	
Price for special pages:		
Outside back cover (colour)	1200 Euro	1900 Euro
Second page (colour)	1000 Euro	1600 Euro
Second last page (colour)	1000 Euro	1600 Euro

Data for European Geologist Magazine	
Number of issues printed:	6000
Periodicity:	2 times a year
Print mode:	Offset
Size:	A4 (210 mm x 297 mm)
Deadline:	30 March, 30 September.
Published:	30 May, 30 November
Advertisement delivered as computer file:	EPS, TIFF
For graphics remember to include fonts.	

6000 issues of European Geologist are distributed among professional geologists all over Europe. They are sent to the European countries National Federations of Geologists, and these national organisations distribute them to their members. These include geologists working in companies as well as at universities.

Layout of the magazine is made in Adobe Indesign for PC.

Method of payment:

Invoice after publication

Subscription Rates: Annual subscription to the Magazine: 13 Euro

Contact:

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European Federation of Geologists (EFG)

The European Federation of Geologists was established in Paris in 1980 during the 26th International Congress of Geology. In the same year the Statutes were presented to the European Economic Community in Brussels.

The Council of the EFG is composed of the representatives of the national associations of geologists of Belgium-Luxembourg (UBLG), Czech Republic (CAEG), Finland (YKL), France (UFG), Germany (BDG), Hungary (MFT), Iceland (GSI), Ireland (IGI), Italy (ANGI), Netherlands (KNGMG), Poland (PTG), Portugal (APG), Slovakia (SGS), Slovenia (SGD), Spain (ICOG/AGE), Sweden (SN), Switzerland (CHGEOL), United Kingdom (GS), whilst the American institute is an Associate Member. There are observer associations from Austria, Bulgaria, Greece, Norway, Romania, Turkey and Canada. The EFG currently represents about 75,000 geologists across Europe.

Mission

To promote the profession and practice of geology and its relevance.

Objectives

1. To promote and facilitate the establishment and implementation of national arrangements for recognising geologists who, through academic training and appropriate periods of relevant experience in the profession and practice of geology, are qualified to be designated as EurGeol.
2. To organise meetings and conferences to discuss issues related to the profession and practice of geology.
3. To co-ordinate the activities of member national organisations in preparing briefing papers on geological issues and presenting these to European bodies, national governments and other relevant organisations.
4. To maintain contact with the European Commission and respond in timely manner to requests for information.
5. To communicate, through meetings and other means, the relevance of geology to the resolution of issues of concern to society.
6. To promote the establishment of best practice for training of geologists.
7. To safeguard and promote the present and future interests of the geological profession in Europe, including:

- to guarantee the free movement of geologists in Europe, with the mutual recognition of their academic and professional qualifications by the adoption of the title of European Geologist (EurGeol.).
- to promote the harmonisation of education and training.
- to define and protect the title of geologist and related professional titles.
- to promote the code of professional ethics of the EFG.
- to provide advice and assistance to constituent member National Associations.