N° 14 December 2002

European Geologist

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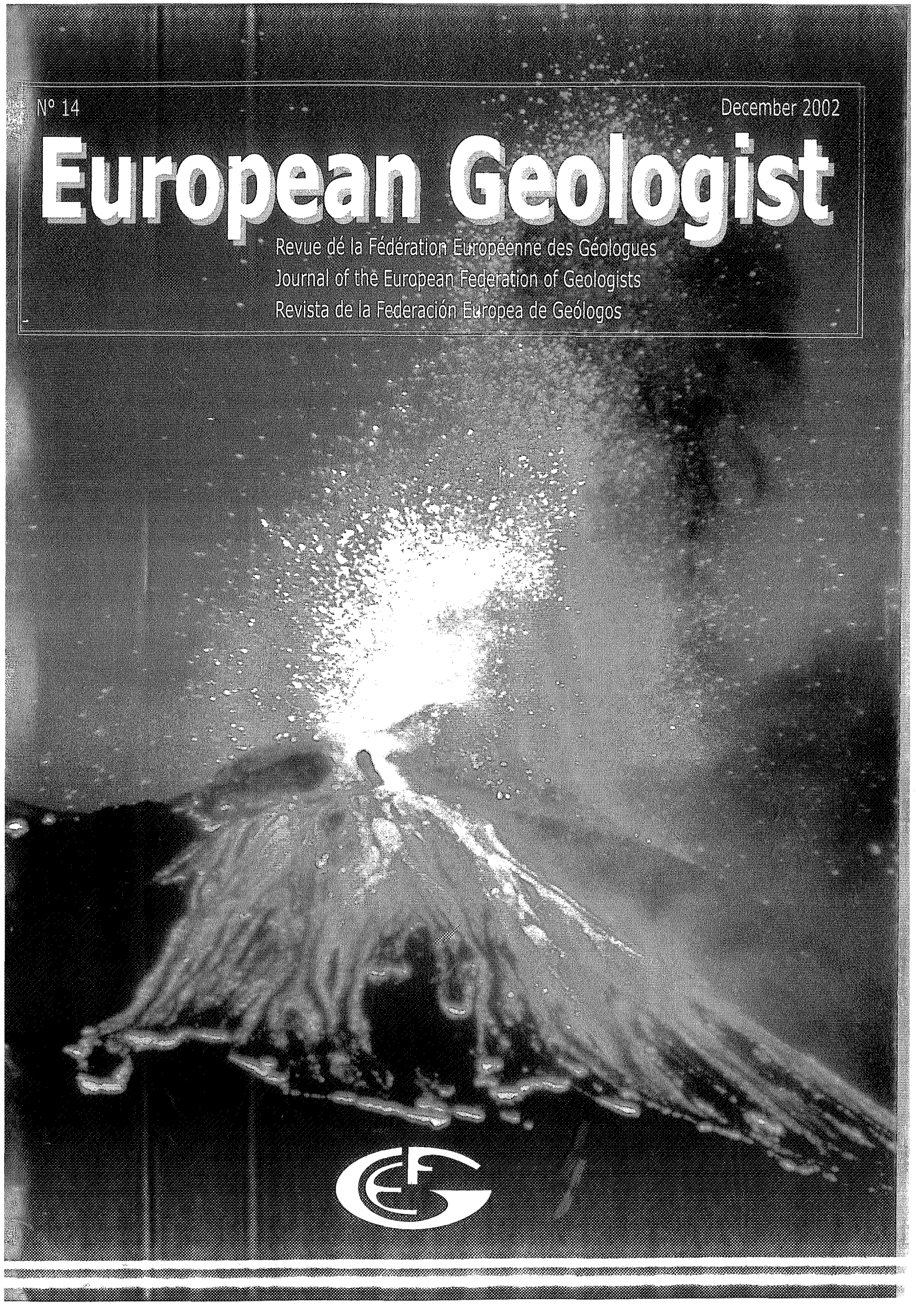

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Foreword

UNDERSTANDING THE LANGUAGE

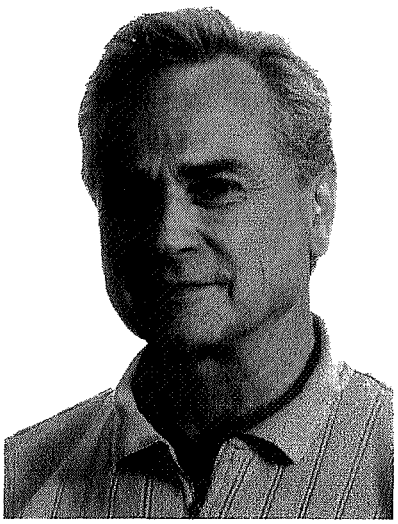
by Christer Åkerman, President

My first EFG Council Meeting occurred 500 years after Columbus discovered America, in Salamanca in 1992. I was there because of my interest in working with international professional matters and I spoke Spanish, which was not so common among Swedish geologists. I remember how curious I was about how such a meeting would be, how it was organised and how it would be carried through. It turned out that discussions on the different topics were long and animated and were characterized by a cacophony of languages. At that time and for several years afterwards regular translations were made into the three EFG official languages – English, French and Spanish. Also other, unofficial languages were heard frequently, not least Italian. I really enjoyed the atmosphere. I was amused by meeting all these interesting individuals from many countries in Europe as well as from the USA. I was hooked and stimulated to continue working within and for the EFG.

With time the English language has taken over the Council Meetings more and more. This is for the sake of efficiency and for moving as quickly as possible towards the important issues, and therefore delegates have not objected much.

Now, ten years later, I find myself as president of EFG, a Federation that has changed in many ways. It has grown continuously and now comprises 19 countries in Europe. Being elected president in Berne I picked up signals from delegates of several countries, that now with a president from a non-English speaking country there would be more time devoted to explanations and translations to other languages.

I have had reasons to think about this several times in the past. I am sure that delegates from non-English speaking countries sometimes vote without fully knowing or understanding the content of the proposition. Just missing the meaning of one single but vital word may mean a big difference. Yet, delegates have voted, not wanting to interrupt or cause delay and embarrassment.



I think this is an essential point and I will therefore try hard to combine these two opposite factors, the aim of moving forward and not losing time, together with the necessity of regular checking around the table that all delegates are able to follow and understand before voting etc.

I will finish there – although I am Swedish.....

EurGeol. Christer Åkerman
President
European Federation of Geologists

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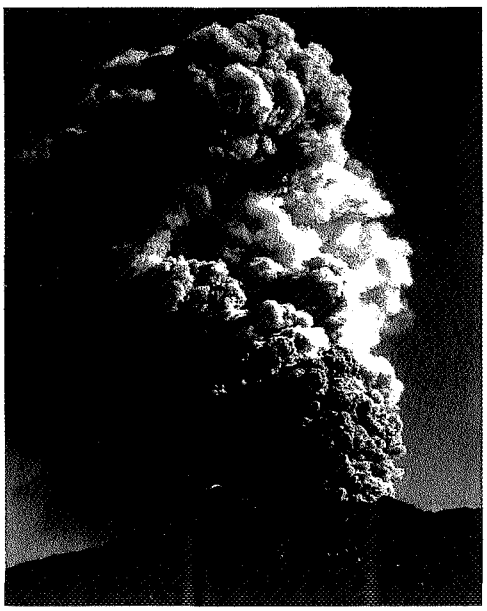

16th April 2000. The central cone of Etna (left) with the southeast crater (right) hidden by the fumes it is erupting. The small spatter cone below it is emitting lava flows. (Photo: Jean-Claude Tanguy).

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Cover photograph
A nocturnal eruption from the southeast crater of Etna, November 1998
(Photo: Jean-Claude Tanguy)

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EFG Council Meeting in Berne, June 2002

by EurGeol. Christer Åkerman

Berne, the capital of Switzerland, welcomed warmly 25 delegates from 15 European countries, one associated member from USA, one observer from Norway and two EFG Officials. The temperature was above 30° C and remained so throughout the three-day meeting. The Swiss Association, CHGEOL, must have worked hard to prepare for the meeting, because everything was so well organised: hotel locations, meals, excursions and transport. And yes, timing was like a good Swiss watch!

Switzerland is a beautiful country, and thanks to the organisers and sponsorship from the Federal Office for Water and Geology and from Holcim Ltd, we had some wonderful views over Berne and the surrounding Alps, a thrilling ride deep into one of the impressive railway tunnel projects of Switzerland, the Lötschberg base tunnel, and all sites were guided by enthusiastic and excellent geological expertise. It was indeed a very nice way to introduce some main features of the geology of Switzerland. One can hope that future EFG Council Meeting organisers saw this as a good example of how to present the geology of the country, and will do something similar, just like the Polish delegates suggested at the Council Meeting in Budapest 1999.

The Council Meeting in Berne also demonstrated in several ways the significant development of the Federation. Not so much because we are now able to keep to the agenda timetable but more importantly, we now spend a majority of the time discussing professional matters that should be the core of our business. EFG achieved a noticeable stability, even including the finances, during the presidency of Gareth Jones. Some of the issues and points from the Berne Meeting that I would like to mention in order to illustrate this are

- A Cooperation Agreement between the Canadian Council of Professional Geoscientists (CCPG) and the EFG was approved and signed, demonstrating a mutual recognition of common interests.
- A substantial increase in new European Geologists, in Berne reaching 412 holders of the EurGeol. title, demonstrating that the re-launching and promotion of the title influenced the recognition of the value of our professional quality standard. In Ireland 80% of the IGI eligible members have achieved or have applied for the title. In Spain, ICOG is striving to have all 2600 eligible members become EurGeols and is also planning to achieve ISO accreditation. In the United Kingdom, GS thinks it is possible that 30 % of eligible members will hold the title within a period of five years.
- The new regulations that were agreed upon required the establishment of five bodies or working groups. Members were appointed to these five bodies: 1) International Licensed Body (ILB), the EFG central body for approving applications for the EurGeol. title from associations that do not have their own national licensed body; 2) Registration Authority, the EFG function responsible for giving the license; 3) Ethics Committee; 4) Disciplinary Body and 5) CPD Working Party for the development of an EFG scheme for continuous professional development.
- The increasing amounts of notification of Draft Directives, Policy Communications and Initiatives with geological implications, generated by the European Commission, that have been brought to the attention of EFG delegates, demonstrating the great achievement made in establishing contacts with the Commission and MEPs, mainly through the EFG Brussels office and the EFG European Union Delegate.
- The increasingly good order of the Statement of Accounts and positive development of relations between Income and Expenses figures.

The size of the budget is of course

Delegates at the funicular station on the field excursion to Niesen summit

Presentation by Hans Guntlin, Holcim Ltd, main sponsor of the Berne Meeting, in front of interested EFG Board

essential for our participation in various situations as a recognised organisation for geological expertise. It is a main problem, which the Board has to deal with constantly, to get busy geologists to commit themselves to devote some of their free time to deliver accurate material so that EFG can provide timely professional advice on various topics to the European Commission.

To solve this problem, it was proposed by the Spanish delegates to increase the budget substantially so that people could be paid for their work. It should be noted that ICOG from Spain, with the help of skilful leadership, has become so wealthy that they can afford to allocate 0.7 % of their budget to NGO World Geologists and it was suggested that the EFG should also contribute with about 500 Euros.

How that increase in the budget can be achieved is not easy to say, considering that several national associations are poor and struggle to survive as full members of the Federation, and that there is no EU grant aid available for advisory activities of the EFG. As it was pointed out by a delegate from the UK we must ask ourselves: "What do members want from the EFG?" I do suspect though, that the answer to that question to a large extent would depend on how the question is presented, how well we can present a proposed measure and what the national association is considered to have achieved at home.

I will keep in mind what the experienced Associate Member Delegate from USA recommended, to concentrate on giving the EurGeol. title a concrete content, understandable to everybody.

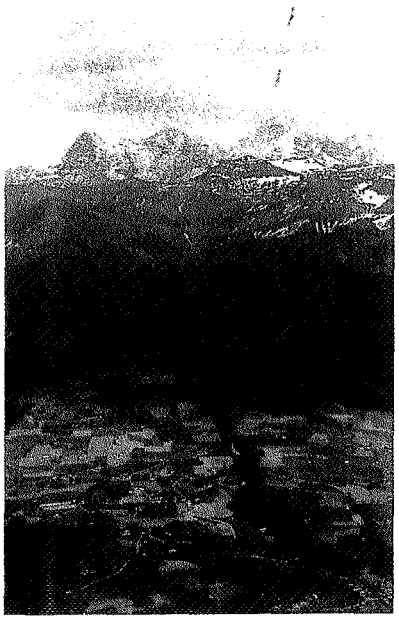
Finally, I would like to share with you the short moment of nostalgic happiness that I experienced on leaving on Monday the 17th of June from BELP, the airport at Berne. The airport terminal buildings were being reconstructed and now consisted of a tent containing a simple check-in desk, at which a kind lady gave me a free drink ticket, and also including a security control gate. Walking through the security control gate I heard a familiar noise from the metal detector. I stopped, raised my arms as a good citizen, and began saying that, surely it must be the clasp of my belt making the noise. Suddenly I realised that nobody was there at the gate to notice my activation of the detector. I hesitated a while before going on into the next room, thinking that I would soon have a hand on my shoulder, but nothing happened.

The next room was a combined departure terminal with lots of newspaper stands and bar with a few tax-free showcases. Behind the bar a middle-aged kind-looking woman was working. I gave her my free drink ticket and she asked me what I wanted to drink. It was hot in there so I ordered cold beer, which she served very quickly. We were alone at the bar and the passengers had boarded. I made my choice of tax-free liquor and Swiss chocolate and gave her my Visa card for paying. She looked worried and asked me: "Will you not have trouble with these?", looking at the bottles. I said no, its fine, which obviously made her relieved and she attempted to charge my card.

My card was not accepted despite considerable efforts and she made a phone call that convinced her of permanent error problems. She brought out an old overdrawing copy machine that produced a barely readable print, but we both agreed to the sum that I should pay. Everything was so peaceful and nice in an old-fashioned way, so far away from the modern, huge hectic airports around the world, and I was grateful for this reminder of the past.

My beer was finished. I decided to go and sit down to read a newspaper. A plastic bag with my tax-free liquor and Swiss chocolate was standing on the other side of the bar, but the woman was now busy serving two gentlemen who had free drink tickets. I leaned over the bar, reached for the plastic bag and left, smiling.

Happy participants at Niesen summit



View of Alpine peaks from Niesen summit 2362 masl

A retrospective of the last three years

by EurGeol. Gareth Ll. Jones BSc, MSc, PGeo

In Spring 1999, President Manuel Regueiro of Spain asked me whether I was interested in standing for the position of President for the new Board to be elected in June. However there were a number of issues to be addressed before saying yes, which included Personnel, Work Load, Personal Finances and Working Time Commitments.

On the Personnel side, in a rapidly expanding Federation, I had seen the Secretary-Treasurer's work load and responsibilities increase to become too great for one individual. Also the role of the EU Delegate had already begun to develop and she had begun to regularly attend Board Meetings. Consequently, the 1999 Council Meeting accepted proposals to increase the Board from three to five members.

I understood that the Work Load of the President would be significantly higher than that of Vice President, which was confirmed by preceding Presidents Manuel Regueiro, Gunnar Hultquist and Richard Fox. It became apparent that Presidential duties would involve significant travel time and expenses and I decided to budget at a day a week management time and a further ten days a year travel plus associated expenses. I knew that the EFG budget was very tight and could not supply the required cash. Previous Presidents had only managed by belonging to large organisations.

Clearly I could only undertake this position if I could secure financial backing for both my expenses and my working time. Thus I was most fortunate to secure initial backing from Enterprise Oil which was followed by a number of Irish companies (see box). Without this backing the Irish Presidency would not have been possibly and I am most grateful for it.

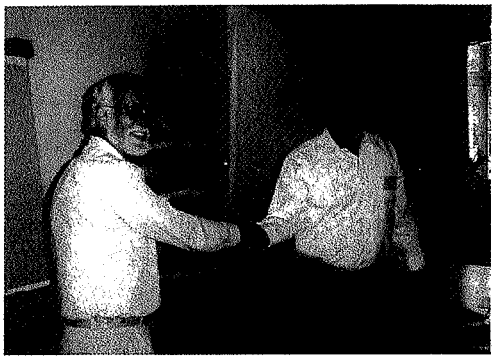
In practice, at least one day a week was spent on EFG business, rising to three days a week when a meeting was imminent. The travel commitment, including the basic Council and Board meetings, involved some eight or nine trips a year. Only the development of electronic Board meetings kept things under control and allowed the work to proceed.

So much for practical working consideration, but what about the actual work carried out? The first and most difficult task of the new Board was to sort out the Federation finances. We were fortunate that Treasurer Carlo Bravi made sense of these, paid off our debts and established transparent procedures.

The next thing was to transfer our base from Paris to Brussels so that we could have easy access to the European Commission. In Paris we had been extremely fortunate to be hosted in their office by the Union Française des Géologues. Now we found it very difficult to find a suitable serviced office in Brussels - at the right price! After much fruitless searching by the Board, Eric Groessens negotiated with the Union Belgo-Luxembourgeoise des Géologues who had an office in the Belgian Geological Survey. With the permission of the Director, Peter Laga, the EFG was able to use this office in exchange for UBLG's membership dues. So now we have a good office, in the heart of the geological community and within walking distance of the European Commission. We are particularly grateful to all our Belgian colleagues.

On the national membership front Austria and Denmark left for different reasons, whilst Greece faded away. The basic reason was that we were not making the professional case strongly enough. However the Czech Republic and Iceland were elected to full membership, whilst Norway has indicated that they will apply for membership in the near future.

Internationally, we continue to strengthen our ties with our Associate Member, the American Institute of Professional Geologists, whilst we have just signed a Co-operation Agreement with the Canadian Council of Professional Geoscientists. Together with these organisations the EFG co-organised the first International Professional Geology Conference in July 2000 which was hosted by the Ilustre Colegio Oficial de Geólogos de España in Alicante, Spain. This major step forward will be followed by the second IPGC to be hosted by the Geological Society of London in 2004.



Gareth Jones handing over the reins to newly elected President Christer Åkerman

A detailed review of our professional title of European Geologist (EurGeol.) took place and Council decided that it would be mandatory for all EurGeols to adopt Continuing Professional Development (CPD). This allows the title to keep pace with the requirements for professional development around the world and enables the mutual recognition of professional titles. The title was relaunched, under new Regulations, through the new Registration Authority and national members can apply to become Licensed Bodies to award the title themselves. The associations of Ireland, Spain and the United Kingdom have already been licensed and there has been a 155% increase in the number of titles issued, rising from 167 to 412 in the three year period.

The Federation continues to lend strong support to EurGeols that experi-

ence problems working in other countries. However the value of the title is becoming still greater. In Spain, the title is now enshrined in law and EurGeols will have the same rights and privileges to register with ICOG as Spanish-qualified geologists. In Canada, the Canadian Securities Administrators announced that they will accept someone who holds the EurGeol. title as a Competent Person for the purpose of signing off reports submitted to the Canadian stock exchanges. In Ireland, the Government's Exploration and Mining Division and the Environmental Protection Agency will also accept someone who holds the EurGeol. title, as a Competent Person.

Our flagship European Geologist magazine was started under the editorship of Manuel Regueiro of Spain who produced the first ten issues. When he went on to become involved in the World Geologists NGO, the baton passed to Denmark and Steen Laursen edited no. 11, assisted by Maureen McCorry. When Steen then moved on, Maureen took over and she has produced nos. 12, 13 and this issue. The Magazine is now established on the European scene producing from 2003 over 8,000 copies per issue. Articles are always welcomed!

On the electronic front the Federation's website has continued to develop under the management of Detlev Doherr of Germany (www.eurogeologists.de) and the maintainance of Peer Anderson, Denmark.

The Federation has always seen its position as one of a number of European geological bodies and has endeavoured to work with them when possible. Thus with EuroGeoSurveys we support each other when we have mutual goals and interests. We are co-operating with the International Association for Engineering Geologists to produce a new dossier on Geotechnical matters.

Similarly we are working with ProGeo on geological heritage. However we have let slip our contacts with the European Engineers and I hope that the new Board will be able to pick this up again. We have recently adopted a new Code for the Reporting of Mineral Exploration Results, Mineral Resources and Ore Reserves, which was built on the previous international JORC code.

But it is our work in Brussels which is very important for the future of the profession. We acknowledged this when we appointed Agency Chief Isabel Fernandez to be our lobbyist in Brussels. Already, through several European Commission Directorates, we are involved in the preparation of EC Directives such as Water, Sludge Disposal, Mine Waste, etc. Irish MEPs have asked questions in the European Parliament for us, whilst the European Commission has confirmed that it supports the EFG's work to facilitate the free movement of geologists within the Community.

So, with the progress of the last three years, I warmly welcome the election of the new Board and wish President Christer Åkerman (Sweden), Vice-President Uros Herlec (Slovenia), Secretary-General David Norbury (UK), Treasurer Carlo Enrico Bravi (Italy) and EU Delegate John Clifford (Ireland) all success for the next three years.

The Past President's Irish sponsors:

1999	Enterprise Oil
2000	Enterprise Energy Ireland
2001	CRH Group
	Castlemore Quarries
	CSA Group
	K T Cullen &Co.
2002	Conroy Diamonds & Gold

Obituary

by Andrzej Slaczka

Zbigniew Wilk
(1924-2002)

Zbigniew "Zbyszek" Wilk passed away during an excursion to the Carpathians, August 29, 2002. Zbyszek was born on October 23, 1924, in the town Stary Sącz, south-east of Kraków. In 1946-1950 he studied at the Academy of Mining and Metallurgy in Kraków's faculty of Prospecting Geology and received an MSc and Engineer in Geology degree. In 1959-1960 he completed postgraduate studies at the University of Kansas, Lawrence, USA to specialise in Hydrogeology.

After graduation Zbyszek started his professional career as a hydrogeologist in the mining region of Lower Silesia. However very quickly he became a member of the teaching staff of the Academy of Mining and Metallurgy. He progressed from assistant to full professor in hydrogeology. He was a dedicated teacher, educated hundreds of hydrogeologists and as a teacher, was held in high repute and was liked by students.

Zbyszek devoted his life to hydrogeological problems in mines and became a pioneer of mining hydrology in Poland. He was one of the best known experts, always well respected by his colleagues and to his last days was invited for consultations on hydrogeological problems. He was author or co-author of 135 scientific publications. For his achievements Zbyszek was elected a full member of the Polish Academy of Sciences & Arts and was awarded State Orders.

Zbyszek always found time to make meaningful contributions to geological societies. For years he was a member of the Council, was elected president for ten consecutive years and rendered a really great service to the Society. To the end he was the Editor in chief of the Annales Societatis Geologorum Poloniae. For his service he was elected as Honorary Member of the Society. He was also a member of the International Mine Water Association (IMVA), International Association of Hydrogeologists (IAH) and the International Association of Hydrogeological Sciences (IAHS).

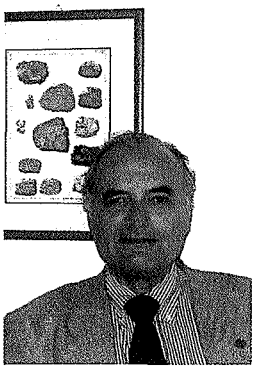
Zbyszek was a great supporter of collaboration between the Polish Geological Society and the Federation of European Geologists (EFG), founder of the Commission of Professional Geologists within Polish Geological Society and member of the Board of EFG. As recently as last June he attended the Board Meeting at Bern.

Zbyszek was sincere hardworking, honest and a true gentleman. He was greatly respected and will be truly missed by all who had the great fortune to know him.

News from the treasurer:

EFG financial progress report

by Carlo Enrico Bravi, EFG Treasurer



YEAR 2002 - THIRD STATEMENT OF ACCOUNTS
(01 January - 30 September 2002)

	Euro	Euro
INCOME (net received)		
1 - From year 2001		
. Fees paid by U.K. - Sweden - Holland	7.375,00	
. Other income (Magazine - EurGeol. fees, etc.)	1.851,74	
- Bank interest 3/12/2001 (paid Jan. 2002)	20,13	
Sub-total	9.246,87	
2 - Year 2002		
Fees from Nat. Ass.		
. (Belgium-Czeck Rep.-Finland-France-Germany-Iceland-Ireland-Italy-Poland-P - E - CH - Slovenia-Slovakia-Hungary)	22.743,87	
. Magazine extra copies (N°11 +N°12)	9.761,57	
. EurGeol. fees	864,16	
. Magazine advertisements (N°11+ N°12)	2.008,23	
- Bank interest at 30/6/2002	161,73	
Sub-total	35.539,56	
Total income	**44.786,43**	
EXPENSES (including bank transfer costs)		
1 - Related year 2001		
. Various (Magazine, Mailing, Transport, Editor, Board, etc.) paid Jan-Feb. 2002		-6.990,33
		-6.990,33
2 - Year 2002		
. Eur Geol Cards		-101,42
. Photocopies, stationery etc.		-101,03
. Secretarial work		-1.541,57
. Postage + telephone + fax+accounting		-466,75
. Bruxelles Office: I, II & III Term. staff wages		-7.500,00
. Bruxelles Office: running costs		-1.500,00
. Board expenses (meetings, travels, misc.)		-7.540,90
. EFG Leaflets		-535,55
. Magazine Editor (advance)		-3.013,42
. Magazine printing&mailing (N°13 advance)		-5.766,42
. Bank costs (different from transfer costs)		-22,85
Sub-total		-28.089,91
Total expenses		**-35.080,24**
EFG FINANCE 12/06/2002		
- Banca Pop. Bergamo-Credito Varesino (Banca Brignone) Milan	16.880,85	
- Credit Lyonnaise - Paris	71,57	
- Cash	500,00	

Two documents accompany this brief EFG financial progress report.

The first document is the year 2003 budget, as approved at the EFG Council Meeting in Bern in June 2002. For the first time, the budget includes all items which are related to our Magazine "European Geologist", which shall be published in two issues as for the year 2002. It will in future be much easier to compare the budget with the real expenses and income.

The second document is the Third Statement of Accounts, at the date 30 September, 2002.

The first statement (30 March, 2002), was sent by e-mail to all Delegates and the second (12 June, 2002) was presented and distributed to the council in Bern (14-16 June, 2002). Since then, there has been some increase in income (all Nat. Ass. have paid and Magazine extra copies costs are at a good stage of recovery).

The item "EurGeol. fees" is much greater than that expected in the budget, probably due to a necessary settlement after the introduction of the new system for the Title.

Expenses have also been updated and all items are within the amounts that were estimated in the budget.

Concerning the "European Geologist" Magazine (issue N°13), only costs are shown, as no income for advertisements and extra copies has yet been collected.

FINANCIAL BUDGET YEAR 2003
(approved at Council Meeting in Bern - June 2002)

ITEMS	INCOME	EXPENSES
INCOME		
. Bank + cash 31/12/2002	1.200,00	
. Fees from National Associations	32.000,00	
. Other contributions	500,00	
. Fees from EurGeol. Title	3.500,00	
. Eur Geol Magazine (2 issues)	16.500,00	
. Bank interest	35,00	
Total income	**53.735,00**	
EXPENSES		
**** Paris***		
. Legal seat administration costs		500,00
**** Bruxelles***		
. Office staff		10.000,00
. Activities connected with EU		800,00
. Other activities (EurGeol. Title, etc.)		1.200,00
. **Office costs:**		
Telecom		1.000,00
Stationery		500,00
Mailing		600,00
Web site maintenance		200,00
Contingencies		500,00
- Extra travelling expenses connected with EU (meetings, etc.)		2.000,00
*** Working groups activities**		
(Printing dossiers, etc.)		1.500,00
* Board expenses for meetings (n° 4)		12.000,00
* Board running expenses		500,00
* Administrative costs (accounting, etc.)		3.500,00
*** EG Magazine**		
. Editor 3.000,00		
. Printing + design + films		9.000,00
. Mailing + road transport		4.000,00
Bank charges		650,00
Incidental (2,5% of total costs)		1.250,00
Total expenses		**52.700,00**
EXPECTED RESULT FOR YEAR 2003	1.035,00	

EU Delegate and EFG Brussels Office report July – September 2002

by EurGeol. John Clifford [1] PGeo and EurGeol. Dr. Isabel Fernandez Fuentes [2]

Promotion of the EurGeol. title

Presentations on the nature and value of the title were given at

- The Geolognica Belgica International Meeting in Leuven, Belgium on September 12th
- The Cedefop organised conference on "Social Partners and the Development of Competences and Qualifications in Europe" which was held in Brussels on September 23rd and 24th. As a result of attendance at this conference contact was established with a number of other organisations active in promoting pan-European recognition of qualifications and titles, and who are dealing with similar problems and issues of mobility. These contacts will be followed up to establish if common strategies can be developed.

Freedom to Practise

A case has arisen in Spain of a German-educated geologist, and holder of the EurGeol. title, who has had his application to be registered as a geologist rejected by the Ministry. The application was supported by ICOG. A Dossier has been prepared and presented to the Internal Market Directorate-General who have agreed to take up the case. A second similar case has now been brought to our attention. Detailed information is being sought on this and will be raised with Internal Market when the documentation is received.

EU relationships

- Mine Waste Directive

A submission was made to the EC Directorate responsible for the draft emphasising the importance of the "competent person" concept and suggesting that it be spelt out in greater detail in the Directive. Opinion was also expressed on the importance of risk assessment in the classification of waste.

- Geotechnical Standards

Application has been made for the EFG to be represented as a non-voting participant on the CEN (European Committee for Standardisation) in CEN/TC 250 (Sub-Committee Eurocode 7) and CEN/TC 341 (Sub-Committee Geotechnical Investigation and Testing). A decision on the application is pending.

- Sludge Directive – Biosolids Working Group

At the request of Edmund Nickless, Mr Peter Thorn of The Geological Society, has agreed to act as an Observer and will report on relevant issues.

Assistance to EFG Working Groups

- Life long learning pilot project application

At Bern it was agreed that a pre-proposal application would be prepared and reviewed by the Board in October 2002, prior to submission to the European Commission in November 2002.

The level of response from delegates did not provide a sufficient depth of either expertise or commitment to be confident that a strong Pan-European Pilot Project could be proposed. In view of the low level of interest, it was recommended to the Board not to proceed with the preparation of the application. However, an alternative proposal on developing a pan-European life-long learning standard for geology was suggested and approved.

- European Geological Heritage

The EFG was invited to attend a working group meeting in Strasbourg on September 13th. As agreed at Bern, the EFG was represented by Dr. Helgi Torfason (Iceland).

It was a conclusion of the meeting that there was consensus in reporting the results of discussions to the Bureau of the CO-DBP and the CO-DBP itself, in view of the preparation of a draft Recommendation on "Conservation of the geological heritage and areas of special geological interest", for possible adoption by the Committee of Ministers of the Council of Europe.

Such a task could be a co-operation exercise with UNESCO and relevant NGOs and scientific bodies, such as ProGeo, Geosites, the International Union of Geological Sciences, the European Federation of Geologists and the European Palaeontological Association. A partnership of the Council of Europe with UNESCO and the organisations mentioned above might be able to develop a framework of common activities at the European level aimed at the protection, management and enhancement of mobile geological heritage and of areas of special geological interest in Europe.

The Brussels Office will lend whatever administrative support is required. However, it is considered that the development of a policy on the issue is a matter to be developed through the EFG European Geological Heritage Working Group.

Relationships with other bodies

- Belgian Geological Survey and UBLG

Attendance at the Leuven Conference provided the opportunity to express our appreciation to the Belgian Geological Survey for providing office facilities for the Federation.

- European Commission Registration

The EFG is now registered on the CONECCS internet database. This is maintained by the Commission. The purpose of the database is to list those European organisations that make policy recommendations and submissions to the Commission.

EFG is also registered on the Yearbook of International Organizations – Guide to Global Civil Society Networks Website: http://www.uia.org.

[1] EU Delegate
[2] Agency Chief, Brussels Office, EFG

The ICOG's Continual Professional Development scheme: investing in our geologists' professional future

by Manuel Regueiro, Cristina Sapalski and Mª Isabel Gómez

The Spanish Official Association of Professional Geologists (ICOG) has been giving special attention to the *Continual Professional Education* of Spanish geologists, and has designed a scheme of training courses, conferences and short courses to keep them in tune with the quick development of certain disciplines or to update them in whatever new techniques or knowledge our science brings up.

Such a scheme has to be measured, controlled and adapted to the local needs of our associated members, but also to the national needs of our evolving western society. It has to be of quality and easy to evaluate, so just as professional geology needs regulated quality control, a professional development plan must be also subjected to a quality control process to change, and or eliminate, that which does not fulfil the current needs of our members or their professional niches.

One of the keys for the success of many of the companies where our professionals develop their activity, lies in gathering together a team of competent and well formed technicians. More and more companies value a good post-graduate professional training, efficiency and compromise with the company objectives in each post. Today companies view training not as an expenditure but as an investment, since better trained professionals provide better capabilities which leads to improved job performance. This in turn enhances self-respect and confidence in the professional, opens wider professional horizons and induces a better working environment and individual satisfaction.

In order to cope with the new challenges of our profession in a more competitive and specialised society and to enable our professionals to reach higher posts in their companies through a permanent and actualised system of training and recycling personnel, the ICOG has established different levels of training and different training sectors, both in traditional geological fields and in the new fields that are continuously developing around us.

We, at the ICOG, understand that the efficiency of a Continuing Professional Development scheme lies in the personal reaction to the system by each individual member of the Association, but it is our job to stimulate our members and promote the social aspect so that geology is socially recognised and the job of a geologist is viewed as invaluable and qualified.

Training courses

Successful courses of quality and at competitive prices in Spain have increased exponentially in the last few years. The cost of ICOG courses are considerably lower than the market cost for our associated members, although non-associated members can also attend at nominal costs. Such prices do not mean lower quality; on the contrary, the training courses are conducted and organised by some of our best professionals in their fields of expertise. This of course has a cost, as in most cases lecturers are compensated at standard market prices on an hourly basis. In some cases, though, such highly skilled professional are providing the ICOG with their expertise and no compensation is requested, depending on the type of course and the final attendance. The ICOG usually covers the expenses of the lecturer and stipulates fixed fees per class.

All associated members with over 10 years certified experience are entitled to participate as lecturers in our courses. Prior to the organisation of any training course, the organiser sends via ICOG a request for lecturers to all its members, in this way giving all members the opportunity to actively participate in the ICOG's CPD system.

The main professional specialities in which our course can be grouped are:

Engineering geology
Environment
Mineral Resources
Hydrogeology
Geological software

Most courses are organised yearly and are planned and listed beforehand so associated members can plan ahead. All courses include profuse documentation which after some time can be sold to those members interested. The documentation can also be consulted in the ICOG's premises.

The future

The ICOG is committed to a *Continuing Professional Development Plan* which includes a series of promotional and training activities whose main objective is maintaining a benchmark of professional standards and thereby increasing the quality and quantity of employment for geologists in Spain.

The CPD plan also includes, besides training activities, the organisation of other types of cultural activities and services which are addressing not only our members, but society in general, on aspects of everyday life such as geological infrastructures, environment, hydrogeology, mining and earth sciences in general. Training the society in the benefits of the use of geological knowledge is another way of promoting the geologists' access to jobs.

The ICOG frequently monitors the demand for geological posts in order to structure training course to the needs of the companies offering geological vacancies.

One of the most important challenges that the ICOG's CPD Scheme faces in the coming future is *on-line training*.

Ilustre Colegio Oficial de Geólogos de España (ICOG)
Spanish Official Association of Professional Geologists

Manuel Regueiro and course participants

Today professionals lack the necessary time to carry out lengthy training courses, particularly when they are organised away from the city where they work. The Internet will very soon allow the ICOG to produce courses adapted to the personal needs of the professional, including the duration, specificity, level, and, of course, the fact that one can take it whenever one wants. This we think will multiply the penetration of our training courses to all places in Spain and will grant all our members, whatever their experience or situation, access to the CPD scheme.

Professional titles

The launch of professional titles within the ICOG will undoubtedly be a major turning point in the CPD scheme, as it will be the main test for the system.

Professional titles involve an evaluation according to certain pre-established benchmarks. Training is incomplete if no evaluation is carried out. All ICOG training courses include a final evaluation with individual marks for the attendants. They also evaluate the performance of the lecturers who may be replaced for future courses if they fail to reach the expected standard.

In Spain there is no tradition of professional titles since academic titles are recognised as the passport for professional practice. In fact most legislation recognises that once obtained, the academic title empowers the bearer to sign any type of professional document. The only other major requisite to practise professional geology in Spain is membership of the ICOG.

But most employers know that the academic title alone is not enough. Such a title only quarantees that the graduated has a minimum level of scientific knowledge covering certain aspects of geology. Most companies understand that a recent graduate must be subsequently trained in the practical aspects of professional geology. Those with post-graduate training, masters or specialised training now have better possibilities of finding a suitable job.

An official professional centre which certifies the fulfilment of professional training on a permanent basis will be of invaluable help to the human resources departments of employers.

The ICOG has already received recognition for such a certification system via its recently approved statutes, which in its article nº 63 establishes that among the scope of the National Professional Titles Vetting Committee (CNET) it has the capacity to certify the professional capabilities of its members. The CNET had its new regulations approved by the last General Assembly of the ICOG in march 2002.

Today the certification system is being reviewed by an external consulting firm with the objective of obtaining from the Spanish Certification Institution (AENOR) the ISO 9002 standard of quality certification. This external certification will enhance the titles awarded and encourage members to obtain the new professional titles.

The new titles which can be obtained through the ICOG professional certification system will be:

Title of Specialist Professional Geologists

Title of Professional geological expert witness

Title of European Geologist (EFG)

All titles will have different and clearly defined requisites and involve the need of an individual CPD system follow-up with periodical reviews which will be carried out by the CNET.

The ICOG believes that benchmarking professionalism together with a strong CPD scheme represent the only way forward to improve the quality of professional geologists in Spain.

The main courses organised by the ICOG in the last few years can be categorised as follows:

Engineering geology

- Geotechnics and foundations course.
- Course on Geological Engineering
- Engineering geology and geotechnics of tunnels
- Engineering geology and geotechnics of linear infrastructures
- Quality Control of Works
- Drilling and borehole logging
- Technical sessions of slopes and banks
- Technical sessions on foundations and ground improvement
- Geotechnical drilling and "in situ" testing

Environment

- Course on introduction to the EIA methodology
- Environmental evaluation
- Course on Environmental Impact Assessment

Hydrogeology

- Quality and pollution of underground waters
- Advanced methods in the treatment of hydrogeological data
- Protection of underground water resources
- Hydrogeology and drilling course
- Urban water supply management

Mineral resources

- Evaluation of mineral resources and mining properties
- Quality control of ballast
- Specialist course on Industrial Minerals and Rocks
- Environmental auditing and management in mining companies
- Specialist course on legalisation and management of quarries and gravel pits

Geological software

- Rockware training course
- Idrisi GIS training course
- Erdas Imagine training course

Singing together

Ruth Allington [1] talks to Ted Nield from Geoscientist

Ruth Allington, Chartered Geologist, Chartered Engineer, works as an Equity Partner in the Geoffrey Walton Practice (GWP), in Charlbury, Oxfordshire, which consults in the design of mineral operations, geotechnical engineering, surveying, resource investigation and evaluation, advice relating to blasting and blast vibrations, and in as expert advisors and witnesses. Ruth is also a qualified commercial mediator – all in all, no stranger to hard work.

Since the mid 1980s she has also been deeply committed to Geological Society business, initially as a committee member, then secretary and later Chair of the Engineering Group – the Society's oldest and largest Specialist Group. There she implemented a far-reaching corporate plan after extensive consultation – an achievement she looks back on with considerable pride. Since 2000 she has been on the Society's Council, as a Vice President in 2001 (with special responsibility for the Regional Groups), and now as Secretary, Professional Matters.

After all that and her family, any time left finds Ruth singing – as a solo or ensemble singer as a regular member of several choirs, including her favourite, the North Cotswold Chamber Choir. Indeed, it was singing that took her to King's College London - and it was King's that took her to GWP.

Ruth graduated from King's (BSc, Geology and Geomorphology) in 1980 and in 1981 from Durham (MSc, Engineering Geology). "The way it went was - I did a lot of singing. I was in the King's College Chapel Choir and one day I was riding my bike to choir practice when I suddenly thought: "I'm a fool not to do an independent project". I went haring off to Denys Brunsden my tutor (and a huge formative influence). He put me on to Geoffrey Walton because, he said, "I know he has an ideal project for you"".

"So Geoff introduced me to my study area in South Wales, where I looked at the relationship between huge fissures in the hillside above Aberfan and mining subsidence. At the time, Geoffrey Walton and Alan Cobb were working on the Taff Vale trunk road through Rendel Palmer & Tritton – contributing mining geology and also working (with John Hutchinson particularly) on the geology and stability of the Taren Landslip. On the way back from a visit to the project area, Geoff offered me a job. I said "yes please".

After graduating from King's, with Geoff's encouragement, I went to Durham to do my MSc in engineering geology under the late Roy Taylor - a consultant to the Practice at the time. I was so lucky to find a job that suited me right from the very start, to have been given the chance to develop in directions that interested me and for which I had aptitude throughout my career, and now to be a Partner with a stake in the business."

The Practice's publicity material makes a point of emphasising its originality of approach. *"A truly independent (and often highly original) view is assured"* it says. It's at the heart of Ruth's people-centred approach to things. "Originality doesn't happen by accident – it happens by picking the right people, by letting them develop and find their strengths, and by anticipating what the market will want in the future – and what we can deliver. Most of our recruitment has been opportunistic (including mine and Alan Cobb's) – Geoff, particularly, has a brilliant instinct for who will fit and how the Practice should develop to keep its competitive edge. Alan and I are fortunate indeed to have learned our professional and business skills from him".

Her well-known commitment to Continuing Professional Development (CPD) stems not only from this personal and corporate commitment to excellence, but also to effective communication. "The way we like to run our business is to strive to be the best in our specialisms, to stick to what we know, and to develop our skills base into related areas. We feel it is terribly important for our people to continue to develop; we are not a big firm so our structure is very flat. In terms of seniority therefore, people develop by developing their skills and finding their 'niche'. We do a lot of in-service training. Several staff members have been sent on MSc courses on salary, GWP paying the fees."

"When we employ people, we are hoping that they will stay with us long term. It's perhaps old fashioned, but it makes sense to us. Some companies would prefer to have their workforce ready trained, but that's becoming more and more difficult because of the terrible skills shortage in geotechnics and related areas, especially following NERC and EPSRC reviews of many geoscience MSc courses. They also fear that investing in in-service training will be better for their competitors than for them!"

"That's always a risk but having an inadequately trained, poorly motivated workforce that makes errors is a bigger one. Take insurance. Premiums for professional indemnity insurance have risen dramatically this year for a number of reasons, including the poor claims record of engineering and environmental consulting overall. Insurers are looking for evidence of ways in which companies are managing risk and are penalising poor risk management and poor claims records with high premiums and high excesses.

[1] Chair of Professional Committee, Partner at the Geoffrey Walton Practice - and singer -

In-service training brings direct business benefit by reducing the risk of errors leading to claims of professional negligence."

The "SME" perspective pervades Ruth's attitude to CPD. "We are expecting staff to come to us and say "I want to do this course or go to this meeting, because I will benefit, and so too will Practice." We want them to get out there, develop existing skills, extend their skills base and, of course, promote the Practice and get work. But CPD is not all about courses and meetings outside – in fact most CPD happens within our organisation. As for me all those years ago, individuals are encouraged to identify a direction that interests them and work to develop that area. In this way, CPD benefits both individual and organisation – it should be a culture, not an activity."

But are busy people ever going to want "another damned thing to do", especially if CPD becomes compulsory for CGeols (as it is for those who have signed up as EurGeol)?

"No, of course they're not if CPD means ticking boxes as part of a mechanistic process designed just to clear hurdles set by the Geological Society, or any other institution. However, if professional status, and recognition, are dependent on demonstrating not only that we have met a certain standard (like chartered status) but also that we have actively maintained it, then companies will come to see the benefit - and so will their employees."

"I don't think it's easy these days for younger people to experience a sense of community in geology in many specialist areas. Everyone is under such pressure – younger geologists are not given time off work for conferences or meetings unless there is some immediate business benefit that the employer can see. My aim is to propagate the idea that professional development of staff (including attendance at conferences or meetings) brings direct business benefit. I want to find ways for the Geological Society to do more to help companies and employees to obtain the training and CPD opportunities they need. Involvement of universities seems to me to be crucial – for example, run by or in cooperation with universities, CPD courses help academics understand the needs of young graduates working their way up in industry."

"The people I most want to draw in and enthuse are the young geologists in the regions working towards CGeol. They are the ones who are going to carry this forward, they are the ones who will be carrying the Geological Society forward. They are the geological community of the future. I want their bosses involved by being encouraging to them, by passing on their experience, and investing in their development. In that way CPD will play a part in linking the community up again – universities with industry, employers with employees, geologists with each other. This is surely what the Society is all about – *serving science and profession*. Without science the profession gets nowhere and without professionalism, the practitioners get nowhere. We all need each other."

All working together, all 'singing from the same hymn sheet' and all communicating. Not far removed from singing in a choir, in fact. So what would she put into Room 101?

"Professional pessimists. The ones who say "We tried that 20 years ago and it didn't work – you're wasting your time". Well, perhaps circumstances have changed. Perhaps they tried it the wrong way. Of course experience is valuable, but only if it says, "We tried it this way, and it failed. So let's try another way."

Article reprinted from Geoscientist

Developing professionalism

by Ted Nield [1]

Surveys by the Geological Society of London show that there is no more important issue for our Fellows than Continuing Professional Development (CPD). This demand is particularly strong among younger Fellows, many of whom are professionals in smaller commercial firms.

As well as satisfying the needs of this group, CPD also goes towards filling gaps in training, while improving and broadening knowledge and skills, and developing the personal qualities and other transferable skills needed in business today. As part of this initiative, the Society is delivering a series of development courses in several regional centres as well as at Burlington House, our London headquarters.

The first series of courses, held during autumn 2002, proved extremely popular. The series included: Technical report writing solutions (Dr Louise Baron, 16 September); A practical guide to avoiding professional negligence claims and managing risk (Steve Dixon, 30 September) and An introduction to acting as an expert witness (Ruth Allington, 14 October)

With further courses around the UK scheduled for early 2003, the Society is maintaining a portfolio of training and development as well as endorsed courses delivered by others. Details of all of these courses are to be found on www.geolsoc.org.uk - enter "CPD" in the search box.

[1] Sub-Editor of Geoscientist

The European Geologist professional title

by EurGeol. John A Clifford PGeo, FIMM, FAusIMM, CEng

The European Federation of Geologists has adopted a system of multilateral recognition between the affiliated national associations, which is incorporated in the European Geologist (EurGeol.) professional title. The title is open to all geologists who are involved with every aspect of geology whether they work in government, academia or industry. A candidate for the title must have satisfactorily completed a third level educational programme and have obtained appropriate professional experience
over a combined minimum total of eight years. In addition, holders of the title must comply with the EFG's Code of Ethics and maintain their professional standards through lifelong learning activities.
The European Commission has recognised the value of the title in facilitating the free movement of geologists within the Community. To guarantee wider international recognition the EFG has entered into reciprocal recognition agreements with kindred professional associations in North America.

La Fédération Européenne des Géologues (FEG) a adopté un système de reconnaissnce multi-latérale entre les associations affiliées, qui se traduit par le titre professionnel de "Géologue Européen". Ce titre est ouvert à tous les géologues qui sont impliqués dans les différents aspects de la géologie, qu'ils travaillent dans la fonction publique, y compris dans l'enseignement et la recherche, ou dans le domaine privé.
Un candidat pour le titre doit avoir satisfait au minimum à un programme de trois années d'études supérieures et doit avoir obtenu une expérience professionnelle d'au moins huit ans. De plus, les titulaires du titre doivent se conformer au code d'éthique de la FEG et maintenir ses connaissances professionnelles tout au long de sa carrière par la formation continue.
La Commission Européenne a reconnu la valeur du titre en facilitant le libre déplacement des géologues au sein de la Communauté. Pour garantir une reconaissance internationale plus large la FEG a developpé des accords de reconnaissance reciproques avec des associations professionnelles analogues d'Amérique du Nord

La Federación Europea de Geólogos ha adoptado un sistema de reconocimiento multi-lateral entre sus asociaciones nacionales que se ha incorporado al título profesional de Geólogo Europeo (EurGeol). El título está abierto a todos los geólogos que están relacionados con cualquier aspecto de la geología tanto si trabajan en la administración, la docencia o en la industria.
Los candidatos al título deben haber completado con éxito un programa educativo de grado superior y haber obtenido una adecuada experiencia profesional durante un período de al menos ocho años en total. Además aquellos que obtengan el título deben cumplir el Códio Deontológico de la FEG y mantener su cualificación profesional por medio de actividades formativas complementarias durante toda su vida profesional.
La Comisión Europea ha reconocido la importancia del título para facilitar la libre circulación de geólogos en la Unión Europea. Para garantizar un más amplio reconocimiento internacional, la FEG ha firmado un acuerdo de reconocimiento recíproco con organizaciones profesionales de su mismo tenor en América del Norte.

The European Federation of Geologists (EFG) is a federation of national geological associations. It was established, in 1980, by representatives from Belgium, France, Italy, Portugal, Spain and the United Kingdom.

The nations currently represented within the Federation as Full Members are: Belgium, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Luxembourg, The Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. In addition to these Full Members, Bulgaria, Norway, Romania, Turkey and Canada are present as Observer Members, while the United States is an Associate Member.

Throughout Europe the members of the EFG represent the profession of geology to national governments, and to the European Union. It works to promote the necessity and value of geological advice to guide the development of policy with regard to the responsible use of the Earth's natural resources, the avoidance of environmental pollution, land-use planning and environmental protection.

Particular emphasis has been given to the free movement of geologists in Europe, and with the mutual recognition of their academic and professional qualifications by the adoption of the title of European Geologist (EurGeol.).

The EFG, in conjunction with its member associations and others, is to the forefront internationally in developing codes and guidelines. For example,

The Code for the Reporting of Mineral Exploration Results, Mineral Resources and Minerals Reserves, which was adopted by the EFG in 2001, is now being proposed as the template for an international code on the subject.

The professional profile of a geologist

Much of today's geological practice affects the health, safety and welfare of the public, the environment, and the economy and feasibility of engineered works.

The roles and expertise of the geologist are many and varied. Geologists are the experts in discovering the raw materials that underpin and sustain modern life, such as oil and gas, base and precious metal ores and construction materials. Engineering geologists evaluate the natural conditions necessary for the safe construction and operation of roads, railways, high-rise buildings, industrial complexes and dams. Hydrogeologists and environmental geologists are responsible for finding and advising on the protection of water supplies, for locating sites for the safe containment of hazardous wastes, and mitigating the impact of floods such as those which affected much of central Europe in recent months. Geophysicists work at understanding and developing models to predict volcanic eruption and earthquakes. Bedrock geologists educated in structural geology and tectonics work on locating sites for the disposal of radioactive waste, both regionally and locally.

Because of their training geologists observe problems of the present environment in the light of the historic developments of global environments in the past. Thus, they are the specialists who are best prepared to forecast environmental processes and changes by human impact at present and in the future. Mining, quarrying, construction, geotechnics, development of water resources, waste disposal and flood avoidance measures are just a few examples of activities that may significantly change the landscape and the quality of life of local inhabitants. It is essential in fulfilling these roles that the professional work of the geologist is always of the highest possible technical standard.

International professional passport

During the 19th and 20th centuries much of the world was explored, mapped, surveyed and its resources identified by geologists who qualified in European universities. This trend continues today in a number of ways.

- The European Union provides financial and technical assistance to develop the resource industries of the developing world, and to minimise the environmental impact of that development
- European geological surveys assist third world countries in mapping and surveying the geology of those countries
- European academic institutions provide training and research facilities both in Europe and elsewhere in the world
- European-based resource development companies operate internationally to provide society with the raw materials essential for continued economic growth and sustainable development
- European-based financial institutions are major providers of the risk capital for resource development
- European-based geological consultants provide technical advice to all of the above and, in addition, to a multiplicity of clients throughout the world.

In addition, today many modern infrastructure projects traverse national boundaries, e.g. Channel Tunnel, Storbelt Link, Rhinebraun Coal and its dewatering effects.

This globalisation requires professionals of equal training, experience and status to meet and deal with the technical and professional issues on an equal footing. Thus, it is essential that some form of international technical passport is recognised, that will allow practice in a range of jurisdictions.

Qualified person concept

Recent international developments within the natural resource and finance sector increasingly require that technical reports, particularly those reporting on a company's mineral resource assets, must be signed off by a "qualified person". The Canadian Securities Administrators specify, for example in NI 43-101, that a qualified person:

- Must be a geologist or engineer
- Must be an individual, not a firm
- Must have at least five years of experience relevant to the particular project
- Must belong to a self-regulatory organisation with disciplinary powers that is recognised by statute (a "professional association")

Similar requirements are insisted upon by the Australian Stock Exchange and by various government bodies responsible for the licensing and regulation of mineral exploration and development.

These institutions have published lists of professional titles that they recognise. In many jurisdictions the EurGeol. title is so recognised, subject to the individual having relevant experience.

The European Geologist (EurGeol.) title

Background and regulations

In accordance with Directive 89/48/EEC (OJ L 9.24.1.1989, p.16) and Directive 92/51/EEC (OJ L 209.24.7.1992, p.25), the EFG has adopted a system of multilateral recognition between the affiliated national geological associations in 20 countries. All of these associations have agreed to accept each other's accredited degree courses, and have agreed a formula, which defines a professional geologist. This formula embraces education, training and experience.

Holders of the title of European Geologists must comply with the EFG's Code of Professional Conduct and maintain their professional standards by participating in Life-long Learning Programmes.

The title is open to all professional geologists who are involved with every aspect of geology including geophysics, mineralogy, hydrogeology, sedimentology, petroleum geology, geotechnics, mineral surveying, biostratigraphy, igneous and seismic geology, and so on, whether they work in government, academia or industry.

A candidate for the title of European Geologist must have satisfactorily completed a third level educational program and have obtained satisfactory professional experience over a combined minimum total of eight years.

To guarantee wider international links the EFG has entered into reciprocity agreements with other professional geological associations including the American Institute of Professional Geologists (AIPG) and the Canadian Council of Professional Geoscientists (CCPG).

Life-long learning policy and procedures

As part of its drive to ensure high standards in the profession and practice of geol-

ogy, the EFG requires all holders of the EurGeol. title to maintain and develop their abilities as practitioners by a commitment to continuing professional development.

Each national association may develop life-long learning programmes within the context of the EFG policy. In that policy the EFG recognises that life-long learning programmes may include the following:

- On-the-job training where specific learning outcomes have been identified and planned
- Attending formal courses and conferences
- Writing papers, giving presentations
- Normal study for a recognised award
- Private study, including correspondence courses, and other forms of distance learning
- Managerial or organisational work with a scientific society or professional body
- Professional activities supporting teaching or mentoring
- Private reading, including keeping abreast of current publications

As an example of that policy in action, the Institute of Geologists of Ireland have developed a scheme which is based on the concept of the CPD Cycle (Schaffalitzky, 2001). This demonstrates that CPD is an ongoing process, developing in parallel with the member's career.

The concept is simple:

- First, define yourself professionally
- Second, identify areas where you would like to improve your capabilities
- Third, draw up a Personal Development Plan (over a 3 year period)
- Fourth, implement the Plan by attendance at courses and lectures, and developing skills within the workplace
- Fifth, record this activity on an annual basis, and report
- Sixth, review your progress and reassess the Personal Development Plan for the next year

Mobility within the European Union

European policy and legislation

Access to employment in another Member State is a fundamental aspect of the free movement of persons within the European Union. The European Union's policy encourages mobility for workers between the Member States. The strategic objectives of that policy, as enunciated by the European Parliament, are:

"Increasing the Community's workers' chances of finding work and adding to their professional experience;

Encouraging the mobility of workers, as a way of stimulating the human resource response to the requirements of the employment market;

Developing contacts between workers throughout the Member States as a way of promoting mutual understanding, creating a Community social fabric and hence an ever closer union among the peoples of Europe".

Regrettably, this policy is still largely an aspiration. This was recognised by the Commission in the 1996 Veil Report, which concluded that (European Commission, 1997):

".. *Free movement is not yet a daily reality for Europe's citizens".*

And noted that, in the case of the non-regulated professions:

" *The reality and size of the problem of the recognition of qualifications have been underestimated.*"

National regulation

The profession of geology is regulated in only two countries within the European Union. These are Italy and Spain. In the United Kingdom the title "Chartered Geologist" is regulated by The Geological Society of London, a learned society, and professional body, incorporated by royal charter. Where Member States do regulate, each one does so by reference to the diplomas and other qualifications obtained in its national system of education and training. The Community has addressed this problem in a number of different ways by adopting, in successive waves, various directives facilitating the recognition of professional qualifications. The most important of these is Directive 89/48/EEC of 21 December 1988, completed as Directive 92/51/EEC of 18 June 1992.

In Italy each region has its own Order of Geologists who administer the system. A geologist must be a member of the Order to legally practise. However, in Italy foreign academic qualifications do not have legal validity; their holders are not automatically entitled to pursue academic studies for which a specific Italian title is prescribed or to practise professionally. Therefore it is currently virtually impossible for qualified professional geologists from other EU States to practise their profession in Italy.

In Spain, there are two system in which EU citizens can legally practise their profession. One is to obtain recognition of their academic title by the Ministry of Education, Culture and Sports. The other is governed by the terms of the free movement directive and operated by the Ministry of Science and Technology as the designated authority to authorise professional practice. After official authorisation or recognition, the Ilustre Colegio Oficial de Geologos (ICOG), the Official Association of Spanish Geologists, is the legal body that registers all geologists practising in Spain. ICOG's statutes, which are recognised in Spanish Law, state that in other to practise geology in Spain, a graduate in geology must register with the association and that persons holding the EurGeol title are recognised by the ICOG as national geologists.

In the United Kingdom the regulated title "Chartered Geologist" is conferred by The Geological Society of London. Application for this title can be made at any time by a migrant who is a national of a Member State. The application and appeal procedures are the same for UK national and non-national applicants.

In Ireland, where the profession is not regulated, reports submitted to government under the requirements of the Mining Act will only be accepted if signed off by a suitably "qualified person". A "qualified person" is defined as a person with a recognised geoscience degree, to have at least 5 years experience in the relevant field, and to be a member of a relevant recognised "professional association". Such an association is defined as a "self-regulatory organisation of geoscientists that admits members primarily on the basis of their academic qualifications and experience, requires compliance with professional standards of competence and ethics, and has disciplinary powers". A similar policy has been adopted by the Irish Environmental Protection Agency in respect of technical reports submitted to it.

In general however, in countries where the profession is not regulated, market forces govern the situation. Anybody can call himself a geologist and practise as such without professional qualifications. Where qualified employment is involved however, non-nationals may come up against the problem of the *de facto* recognition of their qualifications and diplo-

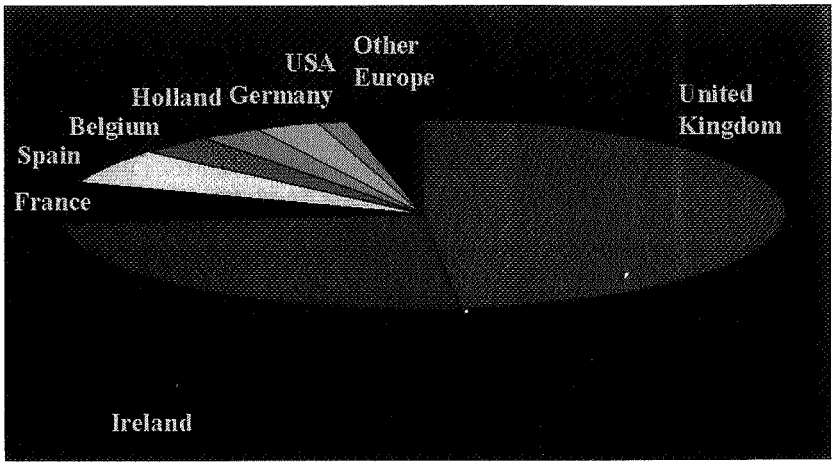


Figure 1. Distribution of the EurGeol. Title

mas. Problems have arisen, for example, in Belgium when Dutch qualified geologists sought employment in Flanders, and in Denmark where a UK qualification was not recognised. In Germany a Greek-qualified geologist, with 12 years professional experience, had his application to practise classified by the German Employment Office (Arbeitsamt) as "unskilled assistant" (Oberverwaltungsgericht, 1995). On appeal the decision was confirmed on the basis that the Greek diploma was not equivalent to a German diploma, since the German diploma is dependent on the submission of a thesis. No allowance was made for the applicant's professional experience.

In Greece these problems do not arise, as geological reports are only accepted by the statutory authorities when engineers sign them.

In an attempt to overcome, or at least to minimise, these problems the European Commission has encouraged national professional organisations to co-operate at the European level. For example, the Commission, referring to the EurGeol. title, in a reply to a question asked at the European Parliament by Mr. Niall Andrews MEP in December 1998 (P-0152/99) on the subject of Free Movement of Professionals throughout Europe, welcomed:

"Common platforms and initiatives taken by the private sector"

In the reply it also noted that

"Such initiatives might be particularly valuable in the field of non-regulated professions".

More recently in a written reply to Mr. Gerard Collins MEP in March 2001 (P-0505/01) the Commission stated that it:

"Supports this move by the EFG, since it is likely to facilitate free movement of geologists within the Community."

EurGeol. title in practice

To-date the EurGeol. title has gained acceptance amongst geologists particularly in the United Kingdom and Ireland (Fig. 1). This is partly as a result of the fact that both the UK and Irish national associations are licensed to award the title. The Spanish association is also licensed and has begun the process of awarding the title to suitably qualified geologists registered through them.

Geologists from the United Kingdom and Ireland have a tradition of working internationally. The distribution of the title awards suggests that these geologists see the EurGeol. title as an additional passport to assist the recognition of their professional status. Thus they consider that this additional title will prove useful, if not essential, in years to come in demonstrating to potential employers (government agencies, consultants, commerce and business) that the holder represents a very high standard of professionalism.

When an analysis of the title awards is completed, in the context of geological disciplines and/or geological practice, it also tends to support this interpretation (Fig. 2). This analysis demonstrates the dominance of title awards in the engineering geology, mineral exploration / mine geology and hydrogeology sectors. These are the sectors where signing off on reports is a common requirement and where the "competent person" concept has gained widest international acceptance.

The title of EurGeol. currently has no legal status and confers no rights to work in any European country. However, it is increasingly clear that possession of the title will speed the geologist's application to work in the country. All the national geological associations within the EFG have agreed that any professional holding the title will be automatically given the same rights and privileges as a national geologist, up to the legal and competency limits that each National Association might have. In those cases where the National Association is the office in charge of the recognition of foreign titles, the recognition will be automatic. In those where its role is assisting a statutory registration authority, its recommendation will be favourable to the recognition, mentioning explicitly that the applicant bears the title of EurGeol.

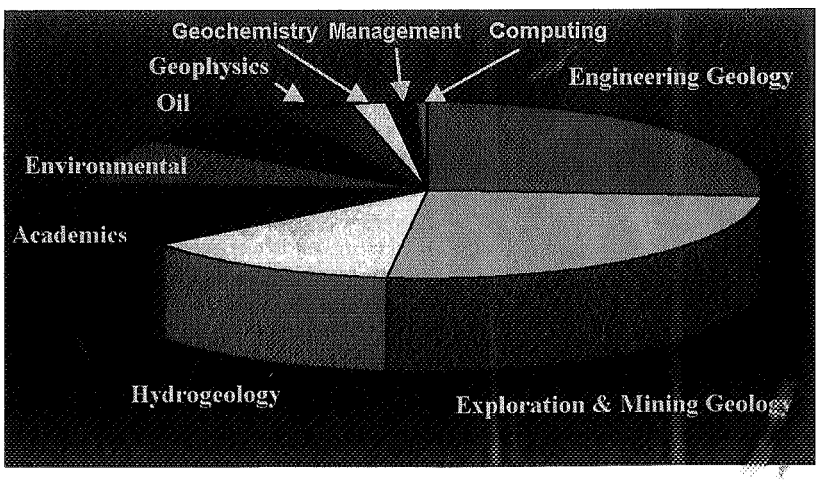
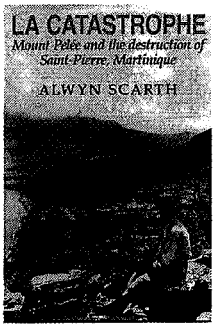


Figure 2. Distribution of EurGeol. Title awards by specialisation



Terra Publishing, Harpenden (UK). 2002, hardback 246 + 10 pages. 19.95 £ (~ 30 €)

La catastrophe. Mount Pelée and the destruction of Saint-Pierre, Martinique

Alwyn Scarth.

One hundred years after the major eruption of Mount Pelée, on Martinique, Alwyn Scarth tells us the day-to-day story of the greatest volcanic catastrophe of the twentieth century. One century ago, 27,000 people lost their lives during this tragic event.

Our historic record of Mount Pelée starts about the year 1300, the estimated date of a more violent explosion than the one of May 8, 1902, and probably at the origin of the crater named "l'étang sec". During the French colonization, from 1635 and during the 18th century, the number of reports about volcanic activity increase. The eruption of 1792 is recorded in a paper from Dupuget dated "Ventose of the year IV of the Republic" (February 1796) at the same time as the previous observations on the "Soufrière de la Martinique". A new and stronger eruption occurs during the year 1851. A report written by a committee composed of two pharmacists and a physician is published by the "Journal Officiel" of December 24, 1851. It purports that the volcanic risks are slight whereas hurricanes (700 deaths in 1891), earthquakes (January 21, 1839, 400 deaths in Fort-de-France) or the tsunamis (September 8, 1900 in Galveston, Texas 5000 deaths) are a lot more important risks.

This book is not a scientific analysis of the catastrophe in terms of volcanology. The author tells us the day-to-day history of the catastrophe from the first signs recognized by visitors from the 4th of june 1900 to 1903. The eruptions of Mount Pelée are of the type "nuées ardentes" and the last lava flow dates to 14000 years ago. The next eruption will take place in 1929, but this is another story.

The author attempts to analyze the progress of the catastrophe while showing us how and for what reasons so many people died during Ascension Day 1902. The place of Cartesian reasoning and the difficulty of the evaluation of the risk and hazards are especially described. Alwyn Scarth creates a work of enlightenment at the same time; he proceeds in opposition to a certain number of received ideas and he allows us to understand the progress of events.

Some simple maps are sufficient to locate the places discussed in the text; photographs from the time are mainly extracted from the archives of Alfred Lacroix (Museum National d'Histoire Naturelle in Paris) and, as with the other documents, are chosen well to illustrate the text and to allow the reader to visualise the situations and landscapes better.

Some boxes provide a particular insight on the geological phenomenon, the victims of the landslide, the sudden variations in the White River flow, the rumors and the mistakes (p89) circulating in Saint-Pierre, the portrait of Governor Louis-Guillaume Mouttet or Alfred Lacroix. These boxes are very informative.

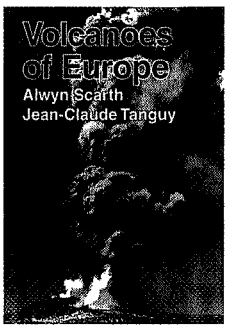
The summary is detailed and it is completed by an index and a complete bibliography but the geological maps are not mentioned.

The more recent eruptions in the Caribbean or on the American continents (eruption of Soufrière of Guadeloupe in 1976 or Mount St. Helens in 1980, for example) showed us that determination of the imminence and the size of eruption, even the type of volcanic eruption, is a very delicate exercise for volcanologists. It is even more delicate for a non-specialist and real experience in this domain is often very limited or even non-existent.

Consequently, the decision to evacuate the population must remain with the civil authority. This decision depends on the consideration of various sources of information - scientific, technical, economic, social etc. - and on the evaluation of the hazards and risks incurred by people. The role of luck (luck or misfortune) cannot be evaluated and yet its role is not negligible where natural hazards occur.

In conclusion, this book is pleasant to read. It doesn't require detailed scientific knowledge. I shall recommend it therefore, while underlining for our geological colleagues that the global vision broached in this work makes its reading very instructive.

EurGeol. Dr Jean-Michel Quenardel



Terra Publishing 2001
256pp. ISBN 1-903544-03-3 PB
£19.95 (30 €)

Volcanoes of Europe

Alwyn Scarth and Jean-Claude Tanguy,

Alwyn Scarth and Jean-Claude Tanguy take us on a fascinating journey to almost all European volcanoes most of which are intimately tied to the history of humanity. They begin with the Mediterranean region, volcanic provinces of Italy and Greece, travel to the Atlantic, the Canary Islands, the Azores, Iceland and Jan Mayen, and finish with the dormant volcanic regions in France and Germany. The history of each volcano is meticulously researched, and accompanied by an excellent bibliography. Special attention is given to the impact on the people who live on or around them. The authors outline the causes, initiation, and growth of the continent's volcanic province to provide background to their environmental aspects and contemporary activity. The volcanoes and volcanic activity are described in clear prose with a minimum of technical jargon. The writing is ably done, and well organized.

The book is well illustrated, regional maps need simplification but they are still very useful. Most photos are black and white, carefully chosen to demonstrate phenomena mentioned in the chapter. They include an eight-page colour photo plates insert, but primarily the illustrations are informative rather than spectacular.

A glossary and vocabulary of volcanic terms and a list of eruptions in Europe in historical times is included. The index divided into "places, features and personal names" and "topic and themes" is particularly helpful. At the end of each chapter is a remarkably comprehensive and up-to-date scientific bibliography.

I would highly recommend this book to anyone interested in volcanoes, regional geographers and geologists, and others who enjoy the study of our Earth and its processes. The book provides a very useful overview of volcanic features and processes for amateurs, students and professional Earth scientists. This book fills a large gap between textbooks on vulcanology and local trade books on volcanoes of a specific area.

Volcanoes of Europe will give you an informed look at some of the most sublime and interesting features of the natural world of Europe and inspire you to go and see them. This is a book needed by anyone who would like to explore the volcanic landscapes of Italy, Greece, Spain, Portugal, Iceland, France or Germany.

Uroš Herlec (lecturer, Department of Geology, University of Ljubljana, Slovenia)

Tackling the problem of excessive seepage in the Hallandsås railway tunnel

by N.K.Mandwal [1] & Satish Chandra [2]

The Hallandsås Railway tunnel is under construction near Båstad in the south of Sweden. The project involves construction of twin tunnels through the late Cretaceous Hallandsås ridge. Due to tectonic movement the rocks in the fault zone were crushed and pulverized. Subsequently the fault breccia has been deeply weathered and eroded. There was a problem of excessive seepage through these sheared and water charged zones. Efforts were made to check the inflow using different sealing materials including Rhoca Gil, which resulted in water pollution. However, the level of chemicals in the water reduced considerably when the use of Rhoca Gil was stopped.
In the case of the Hallandsås tunnel, the ground water table appears to be much above the tunnel grade. Due to heavy precipitation, recharging the aquifiers through the discontinuities is taking place at a much faster rate, which is creating problems in tunneling, in some of the critical reaches. The geotechnical problems and the remedial measures are discussed.

Un tunnel ferroviaire est sous construction dans la region de Halland en Suède. Le projet s'agit de double tunnels qui traverseront la colline de Hallandsåsen. A cause des movements tectoniques, la roche dans le zone s'est pulvrisée et le « fault breccia » a été profondement erodé, ce qui a produit de fortes fuites d'eau. Pour empêcher une inondation des tunnels, différents mesures de bouchage ont été prises, parmi d'autres avec Rhoca Gil, qui ont occasionné une pollution de l'eau. La teneur de produits chimiques a notablement baissée lorsque l'utilisation de Rhoca Gil a cessé. Dans le cas de tunnel de Halland la nappe phréatique se trouve au dessus du niveau du tunnel. A cause de la forte précipitation, la nappe aquifère s'est rechargé très vite ce qui cause des problèmes de construction dans les passages les plus critiques. Les difficultés de caractère géotechnique et les mesures rémediantes sont discutés.

Cerca de la ciudad de Båstad, al sur de Suecia, se está construyendo el túnel Hallansås para el tránsito de trenes. El proyecto envuelve la construción de dos túneles idénticos a través de la cadena montañosa de Hallandsås. Debido a los movimientos tectónicos, las rocas en la zona fault han sido trituradas y pulverizadas. Posteriormente la fault breccia ha sido profundamente afectada por las erosions del clima. Esto ha procido un problema excesivo de seepage en estas rocas y la zona cargada de agua, se ha tratado de usar diferentes materiales incluyendo la Rhoca Gil el cual, como resultado ha producido una polusión en el agua. El nivel quimico del agua se ha reducido considerablemente despues de detener el uso de la Rhoca Gil En el caso del túnel de Hallandsås ha mostrado un alto del agua. Debido a la gran cantidad de sedimento se ha producido uno discontinuidad. Esto ha hecho que sé llenen estos aquifiers mucho mas rapido de lo que se debená, el cual ha creado dificultades en la construcción del túnel, especialmente en las áreas criticas. El problema geotecnico y los diferentes metodos e instrumentos de apoyo están en discusión.

The Hallandsås railway tunnel is under construction in the south of Sweden near Båstad (Fig. 1). The project involves construction of 8.6 km long twin tunnels, each measuring 9 m high and 7.6 m wide, through the Hallandsås ridge, comprising Archean gneisses, granites, amphibolites and diabase. Hallandsås is a 40 km long stretch of high ground with a highest point of 226m. It is a horst structure, which has been formed during the late Cretaceous period. Due to tectonic movement the rocks in the fault zone have been crushed and pulverized. Subsequently the fault breccia has been deeply weathered and eroded. The Hallandsås ridge contains three such sections: The northern edge zone, the Molleback zone and the southern zone. Tunnelling through these sheared and water-charged zones is a difficult task because they form very poor tunnelling media. The longitudinal section of the railway tunnels is shown in Figure 2, and the sketch section of Hallandsås ridge showing the layout of the tunnels is shown in Figure 3.

In the first instance, efforts were made to lower the water table in the Hallandsås

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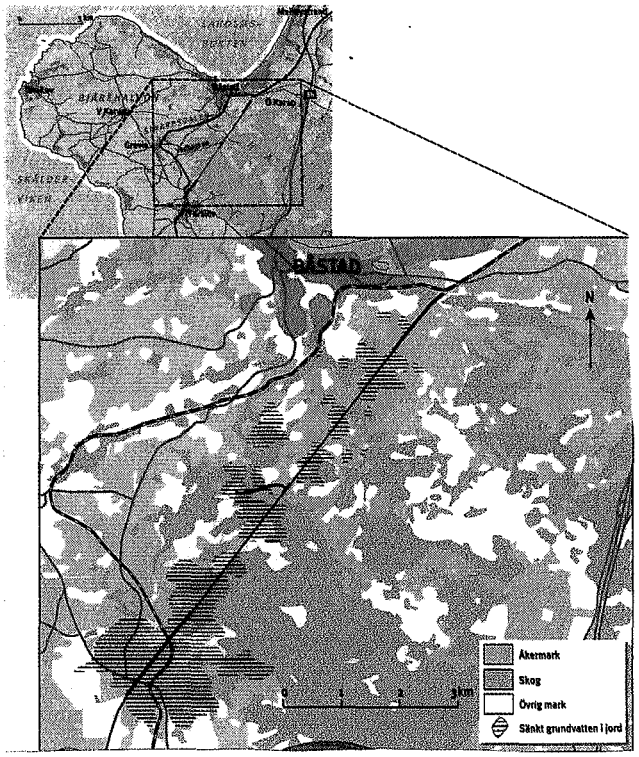

Figure 1. Location map of project area (Peter Lönegård, Nyhetsbrev, Västkustbanan.)

ridge. The maximum permitted amount of water to run into the tunnels was of the order of 33 l/sec. However, during actual tests the inflow was several times higher than that envisaged, particularly near the northern tunnel openings. The water table sank more than 100m in some areas above the tunnel. This resulted in drying up of many private wells. A number of springs, wetlands and small streams were adversely affected. The Environmental Inquiry Committee has calculated that it may take 1 to 5 years to restore the water table, once the tunnel is sealed.

Besides the two tunnels, which are 25m apart, an access tunnel 890m long, 7.5 m high, 6m wide and inclined at 14% (slope 1:7) has been constructed on top of the ridge down to the railway tunnel centre. This tunnel was completed in August 1997. Thus, additional headings became available for the early completion of the railway tunnel.

For safe and easy tunneling, a continuous pre-injection technique in the shape of a fan was adopted before blasting at the headings. Great efforts were made with conventional sealing to check the water inflow. More than 80 different cement combinations were tested. Efforts were also made to discover alternative injection methods. Potassium / sodium silicates were tested and they effectively sealed the discontinuities. However their durability was uncertain. A chemical produced in France under the commercial name Rhoca Gil was recommended as the best sealant. The preliminary tests also gave encouraging results.

In March 1997, the first injection of Rhoca Gil was made in the tunnels. The results were positive and inflow water showed no trace of chemicals. This was followed by full scale Rhoca Gil injection along a 200m length at the southern openings of the tunnels. Nearly 1400 tons of Rhoca Gil was injected into the rocks around the tunnel periphery. The chemical analysis of inflowing water showed high levels of acrylamide and N-methyl acrylamide (harmful substances) in the northern tunnels and at the head of the access tunnel; hence further injection was terminated.

The toxic chemicals dissolved in the water flowing out of the Hallandsås ridge caused paralysis to some cows as well as fish kills in a nearby fish farm. Immediate steps were taken to reduce the adverse environmental affects. The levels of the chemicals in the water reduced considerably after the use of Rhoca Gil was stopped. The decontamination process of polluted water was begun in april 1998. It took about a year (end of 1997 to the begining of 1999) to reach levels within 0.005 mg/l . By the end of June 2000 nearly 8.6 km of tunnelling had been completed including 1.7 km from the southern end, 1.2 km from the northern end and 40 m from the access tunnel headings. Lining the inside is also being done simultaneously.

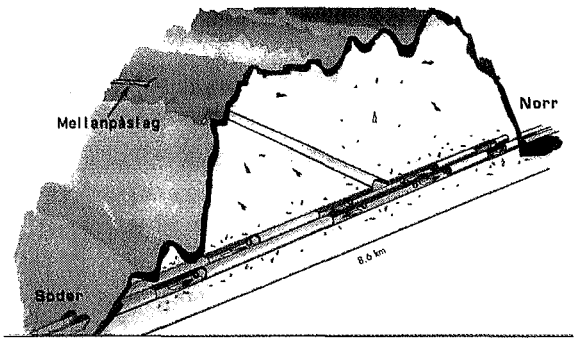

Figure 2. Longitudinal section of the railway tunnels (Peter Lönegård, Nyhetsbrev, Västkustbanan.)

Geology of the project area

In sweden there are three major geological units:

- The Precambrian Crystalline basement (older than 570 million years)
- The Caledonian (between 510 and 400 million years)
- The sedimentary rocks outside the Caledonian (Cambrian-Tertiary)

The geology of south west Sweden has been described in detail by Lundqvist (1979). The Geological map of the southwestern part of sweden as published in the National Atlas of Sweden (1994) is illustrated in Figure 4. Geologically the project area is represented by the first unit, i.e., Precambrian Crystalline (basement) rocks. It is a part of the Baltic Shield, which came into existance through several mountain-building processes when sedimentary and volcanic rocks were folded and affected by metamorphism at different depths in the earth's crust. During the orogenies, large amounts of granitic magma were added to the bedrock. The predominant rock types in the area are gneisses, granites, granodiorites, amphibolites and diabase. The Hallandsås ridge is a horst structure. The faults generally strike in a NW-SE direction. The rocks are highly sheared and brecciated along the fault zones.

Geotechnical problems and remedial measures

The predominant crystalline rock i.e gneisses, granites, granodiorites, amphi-

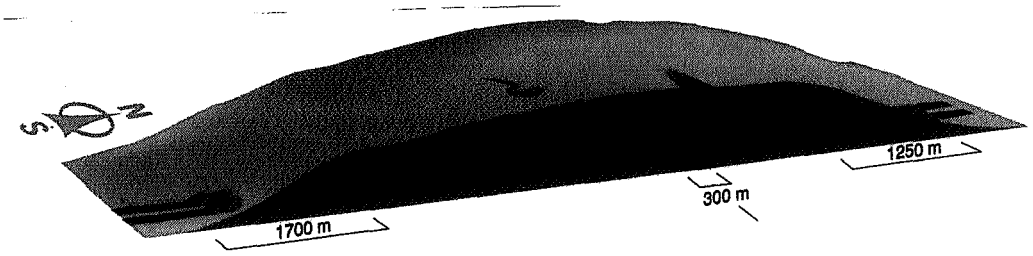

Figure 3. Sketch section of Hollandsås ridge (Skanska AB. Railway Tunnel through Hallandsås)

bolites etc are supposed to be very competent, hard and impermeable having good geometrical properties. They are considered as very good tunnelling media. However large-scale crustal movements during the orogeny have caused folding and faulting in the rocks, resulting in the development of tension and compression joints along the fold axis, as well as fracturing and crushing of rock mass along fault planes.

The bedrock permeability of massive crystalline rocks is supposed to be very low, but the existence of joints and fractures/fault planes totally changes the bed rock permeability because they provide concentrated paths of percolation and water flow. The area receives heavy precipitation from rain as well as snowfall. The annual average rainfall is around 1000mm. Most of the water goes into the streams as surface run-off, but a part of it percolates down to the aquifiers through pores, crevices and fracture planes. This process continues till the aquifiers are saturated and form a ground water table. The fractures link up more and more aquifiers and at last connect the ground water with the surface water. When an opening in the form of a tunnel or well is made into the saturated zone, it provides an easy path for water flow. The rate of flow depends upon the level of saturation, water head at the tunnel grade and recharging capacity of the aquifiers. If the rate of water discharge into the tunnel is higher than the recharging capacity, then the rate of inflow decreases with the passage of time and finally, when the ground water table drops further below the tunnel grade, the water inflow is totally stopped. This is an important factor.

The 14.295 km long Da-Yao-Shan double track railway tunnel in China also had large-scale and long-term water gush, due to karstic features and it was successfully tackled by surface and subsurface treatments.

In the case of the Hallandsås tunnel the groundwater table appears to be much above the tunnel grade. Due to heavy precipitation, recharging of aquifiers through the discontinuities is taking place at a much faster rate, which is posing many problems in tunnelling in some of the critical reaches. Prevention is better than cure. To achieve this goal, the problem needs a three-pronged approach during the construction period:

a. *Increasing the surface runoff and channelling the water flow through hard and massive rocks:*

This can be achieved by smoothing the slopes and removing the obstructions to free flow of water. Usually the gullies are formed in the comparatively softer rocks because they are eroded much more quickly than hard and massive rocks. The shear zones and fault zones are thus prone to gully formation. It is desirable that in such specific reaches of the tunnel allignment, the water is diverted and the surface flow is channelled through massive rock till the tunnel is completed.

b. *Clay blanketing of fracture and fault zones:*

Water finds an easy path of percolation and leakage through the fracture and fault zones. It would be advantageous to provide an inpervious clay blanket in these zones. The clay blanket would check the entry of water through them and consequently the recharg-

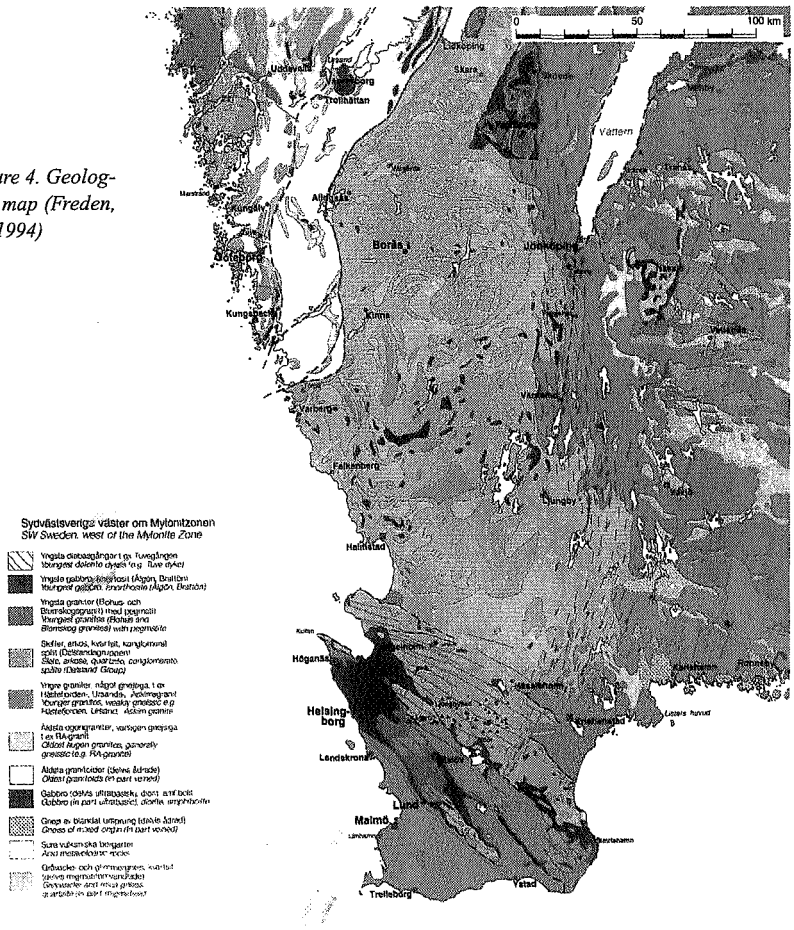

Figure 4. Geological map (Freden, C., 1994)

ing capacity of the aquifier would be reduced. The clay blanket will be environmentally friendly and not have any adverse effect on flora and fauna.

c. *Advance probing and grouting of rock mass:*
Advance probe holes may be drilled at the tunnel head to ascertain groundwater conditions. This should be followed by continuous pre-injection of non-toxic, eco-friendly, quick-setting cement/polymer material under high pressure, in the shape of a fan to ensure water tightness.

In fact, higher water tightness and cavitational resistance is necessary while ensuring strength and durability. One of the polymers, which has been successfully used on some projects is styrene-butadiene latex. It has a simple application technique, is non-toxic and has excellent physical and mechanical properties. It has higher tensile strength, water tightness, frost resistance, corrosion resistance and is durable.

Acknowledgements
The authors express their gratitude to Dr. Gunnar Gustafson, Prof. and Dean, School of Civil Engineering, Chalmers University of Technology, Gothenburg, Sweden for valuable discussion on the Hallandsås railway tunnel project. They are indebted to Jessica Eke, public relations officer, Hallandsås project, Banverket, for explaining the project details, the problems encountered during tunnelling and arranging for the site visit. Thanks are also due to Mr. Lars Boman, who made the effort to accompany the authors from Gothenburg to the project site for inspection and to Mr. Kjell Flodberg for scanning the geological map. The information and the figures are freely drawn from the references cited and we thankfully acknowledge the authors and the institutions.

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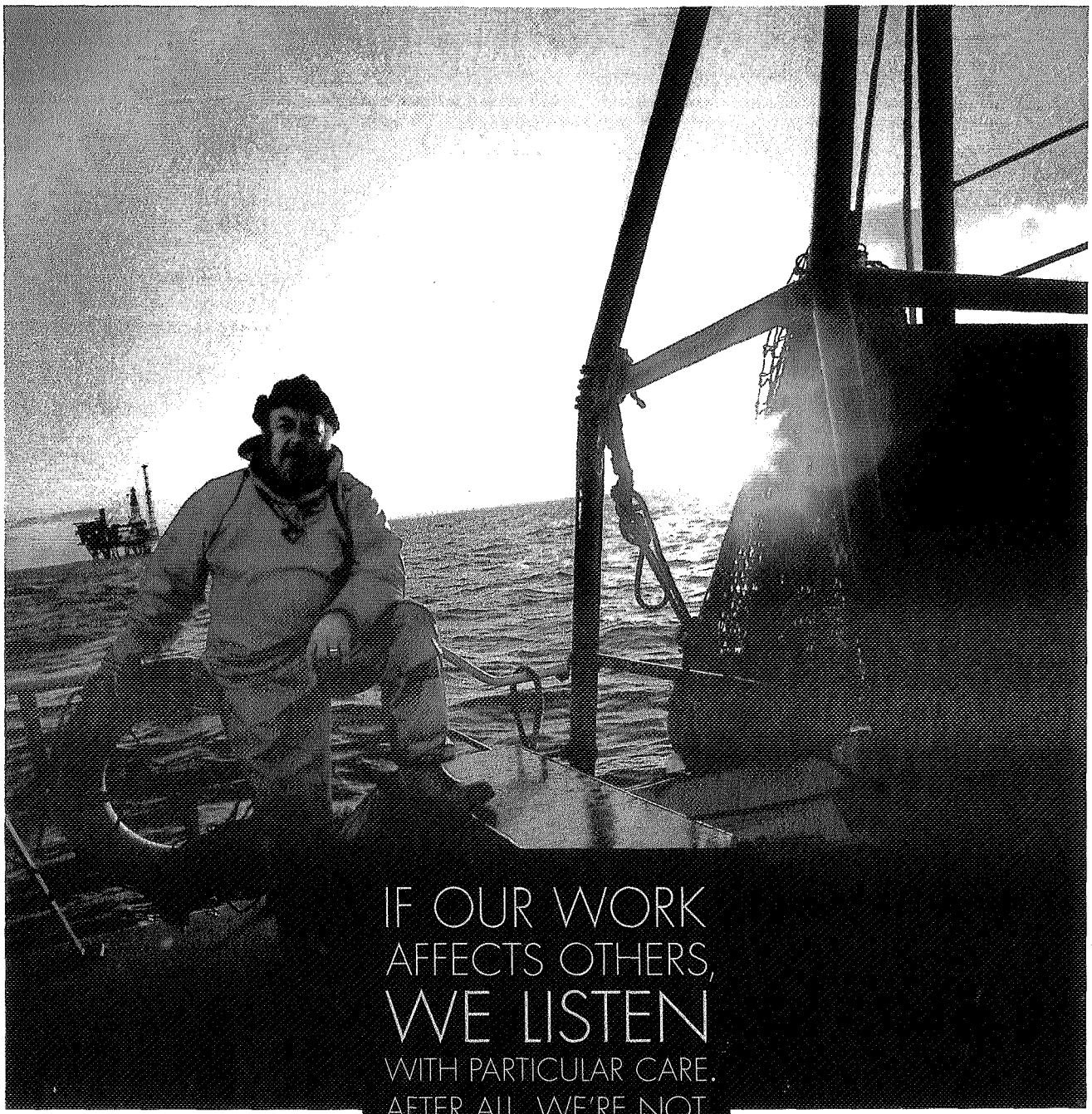

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A survey of contaminated sites in Switzerland

by Peter Haldimann [1] and Ulrike Walter [1]

In the past, investigation and monitoring of contaminated sites was carried out on a regional level or applied case by case at specific sites. At present, based on a new directive a countrywide survey of contaminated sites is being carried out. The number of contaminated sites is actually estimated to about 40'000 to 50'000. Despite the generally modest pollutive concentrations, the quality of groundwater, surface water or air is threatened or affected by some few percent of the contaminated sites. The survey will systematically check all potentially contaminated sites, and will identify those most at risk. Within the next one or two generations, possibly dangerous sites must be investigated and, if necessary, remediated.

Dans le passé, l'investigation et la surveillance systematique des sites contaminés était effectué sur base régionale ou selon la nécessité au cas spécifique. Aujourdhui, suivant une nouvelle directive, dans tout le pays un cataloque des sites contaminés est établi. Le nombre des sites contaminés est actuellement estimé à 40'000 -50'000. Malgré les concentrations des polluants en general assez basses, dans quelques pourcents des sites la qualité de l'eau souterraine, de l'eau superficielle ou de l'air est menacée ou affectée. Avec le catalogue, tous les sites contaminés seront jugés, et les sites les plus dangereuses seront identifiés. La recherche et, si necessaire, la remediation des sites contaminés sera réalise dans les prochaines une ou deux generations.

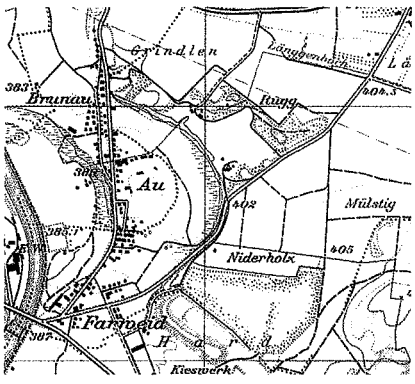
En el pasado, la investigación y el control de sitios contaminados se realizaba a nivel regional o se aplicaba según el caso específico. Hoy en día, sobre la base de una nueva directiva, se está llevando a cabo un estudio de sitios contaminados en todo el país. El número de sitios contaminados actualmente se estima en aprox. 40.000 a 50.000. A pesar de que las concentraciones de contaminantes generalmente son bajas, la calidad del agua subterránea, del agua superficial o del aire está amenazada o afectada en un porcentaje reducido de sitios contaminados. En el estudio, se examinarán sistemáticamente todos los sitios potenciales contaminados y se identificarán aquellos que presenten el mayor riesgo. Los sitios potencialmente peligrosos se investigarán y, si fuera necesario, se remediarán durante la próxima generación o en las próximas dos generaciones

Switzerland generally reminds us of strait-laced bankers, snow covered mountains, clear blue lakes, cattle grazing on green pastures. In this context, contaminated sites appear as a sharp contrast.

However, the Swiss midland area is densely populated. During the last two hundred years, industrial activities developed in the cities as well as in mountain valleys, and during the last fifty years rising amounts of industrial, civil and construction waste have been dumped in numerous landfills. The Swiss Agency for Environment, Forests and Landscape (SAEFL) estimates that about 40,000 to 50,000 contaminated sites exist in Switzerland

[1] Consulting geologists at Dr. Heinrich Jäckli AG, Zürich, Switzerland.

Figure 1. Clipping of a geographical map, dated to 1960s, with several gravel pits. Ancient gravel pits are possible landfill sites, wich might contain waste material. The careful examination of old maps and aerial photographs can pinpoint ancient pits.



At present, a countrywide survey of contaminated sites is being carried out, and all contaminated sites are being assessed. Those judged as potentially dangerous will later be investigated. Sites with harmful or inconvenient effects or with the risk of such effects must be remediated. This may be the case for some few percent of all contaminated sites.

The Industrial Situation in Switzerland

Since natural resources, such as ore or coal, are rare, most manufacturing industries import raw materials and convert them into tecnological products. The amount of imported raw materials is small in comparison to the manufactured products, as is generally the amount of waste and pollution. Even in many industrial sites, the pollutive concentrations are only moderately elevated above the limit values for uncontaminated soil. Many old

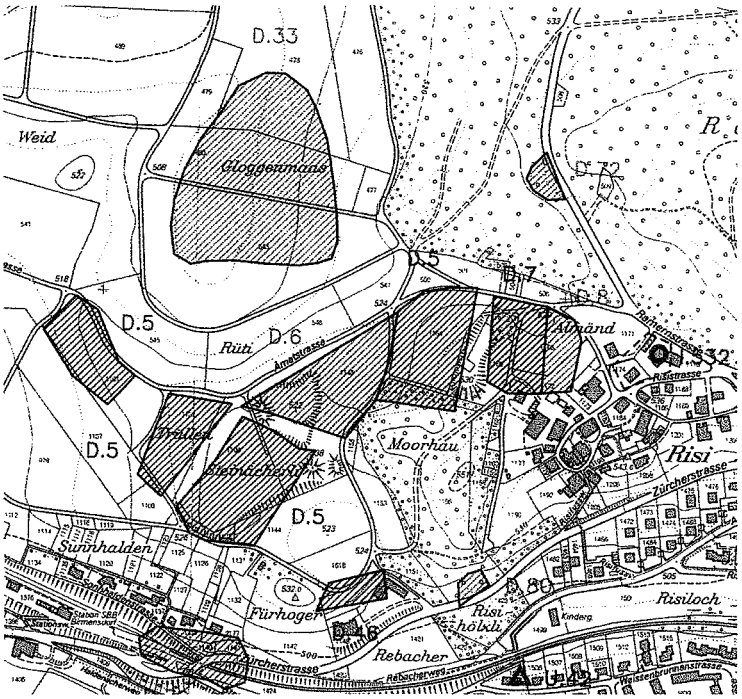


Figure 2. Clipping of a survey of possible contaminated sites, established in 1980s on cantonal level showing several ancient gravel pits, possibly landfill sites (shaded areas), a possible industrial site (annulus, right side), and an accident site (triangle, bottom of the picture).

Drinking Water in Switzerland

In Switzerland, the consumption of drinking water is about 1 billion m^3 per year (year 2000). As much as 80% of the drinking water is produced from groundwater, half captured from natural springs, half pumped from wells in mostly gravelly aquifers. Twenty percent of the drinking water is taken from lakes. (Homepage SAEFL: www.BUWAL.ch; Neue Zürcher Zeitung 29.8.2002).

About 40% of the produced water can be used as drinking water without any treatment. Treatment is in most cases only necessary to cure occasional bacteriological contamination. The treatment is quite simple and not expensive.

The quality of the groundwater pumped as drinking water is monitored carefully. Traces of chemical contamination due to human activity are detectable in most wells, but concentrations are generally far below standard values allowed for food and drinking water. Public drinking water is not only impeccable, but generally also tastes good .

The protection of ground water and the maintenance of its good quality is a main target of the environment protection law and of the directive for remediation of contaminated sites.

waste disposal sites mainly contain material with a low pollutant content.

Despite the generally modest pollutive concentrations, in some cases groundwater or air quality is threatened or already affected. Many industrial sites are to be found in river valleys with gravel aquifers, or in karstic regions with highly permeable limestone aquifers. The same is the case for some older dumping sites. In those highly permeable groundwater-bearing environments, retention of certain pollutants is low, and the risk that even modest contamination affecting drinking water quality is high.

Handling of Contaminated Sites in the Past

In the past, the legal base for the handling of contaminated sites was the Water Protection Law. There is a long experience in handling contaminated sites, before the actual Directive for Remediation of Contaminated Sites was enacted in 1998.

before 1970: No systematic investigation or monitoring. Contamination caused by accidents with fuel and other hydrocarbons was, if discovered by chance, remediated by excavation.

after 1970: Facilities containing fuel and other possibly harmful fluids were surveyed and monitored, as well as waste disposal sites. The monitoring was accomplished on cantonal level, based on the water protection law of 1971.

after 1970: In some groundwater areas, pollutive emissions from landfills and waste deposal sites were detected and monitored. Possibilities for remediation were studied, but action was rarely taken.

1983: Enactment of the Environment Protection Law. Duty to investigate, assess and, if necessary, remediate contaminated sites. Building activities on contaminated sites are allowed only if harmlessness has been proved.

after 1985: Due to progress in analysing technologies, pollution of volatile chlorinated hydrocarbons was detected in some drinking water wells. A few wells were temporarily out of service until the pollution was remediated.

1985-1995: First surveys of possibly contaminated sites, accomplished by cantonal authorities, based on the Environment Protection Law.

1990: Enactment of the Technical Directive for Waste Material. In cantons with high building activity, problems with unexpected contamination on construction sites occurred more and more frequently. Subsequently, construction and excavation waste from possibly contaminated sites was explored carefully. Contaminated material had to be dumped in waste disposal sites complying with the directive. This gave a strong impulse to investigate the contamination in areas designed for redevelopment.

after 1990: In several cases, remediation of pollutive emissions was carried out, mostly by cantonal authorities, some by private companies.

after 1990: Some investigations were carried out to obtain certifications, for example ISO 14000, requiring knowledge about contamination.

after 1994: Real estate investors claim information about contaminated sites on investment objects.

after 1998: Nationwide survey of contaminated sites, based on the new Directive for Remediation of Contaminated Sites

Historic review

about 1860 First law designed for the protection of groundwater used as drinking water, on cantonal level in the city of Basle.

since 1951 Successive development of the Water Protection Law, 1951, 1971 and 1991. Directive edited 1997. Law and directive ban pollution from surface water as well as from groundwater. Waste water must be cleaned before being introduced into rivers and lakes. Measures to protect water quality (groundwater as well as surface water). Standard values for clean water.

1983 Environment Protection Law; Duty to investigate, assess and, if necessary, remediate contaminated sites. Construction on contaminated sites is allowed only if harmlessness is proved, or if a sanification has been carried out.

1990 Technical Directive for Waste Materials. Duty to avoid or recycle waste. Unrecycable waste must be treated or conditioned, to reach an preferably harmless state. Directive for construction and supervision of waste disposal sites.

1994 On cantonal level: technical guidelines for use of demolition and excavation materials, with limit values for pollutants.

1998 Directive for Remediation of Contaminated Sites. Duty to investigate, assess and, if necessary, remediate contaminated sites. Criteria for assessment. Construction on contaminated sites is allowed only after proof of harmlessness or after successful sanification. Definition of sanification objectives.

1997/99 SAEFL directive for recycling and re-utilisation of demolition material (1997) and excavation material (1999). Limit values imposed for pollutants in those materials.

1999-2002 SAEFL guidelines on how to investigate and assess contaminated site. The edition of technical instructions and guidelines by SAEFL is relatively new. Previously, general laboratory and engineering guidelines as well as scientific guidelines were applied to investigate and assess contaminated sites. The SAEFL guidelines facilitate the investigations and the assessments.

Systematic Survey of Contaminated Sites on a Nationwide Level

In Switzerland, the following sites are denominated as contaminated sites:

- waste disposal sites: any site that contains a fill other than unaltered natural material
- industrial sites: sites with pollutive concentrations exeeding the limit values for uncontaminated material
- accident sites: sites with pollutive concentrations exeeding the standard values for uncontaminated material

It is important to notice that the term «contaminated site» is applied regardless of the degree of contamination (see below).

The systematic survey of contaminated sites, i.e systematic searching and the first short-assessment of all contaminated sites will be carried out by the cantonal authorities within the next few years. It is done according to both the Directive for Remediation of Contaminated Sites (1998) and the guidelines from SAEFL. The search is based on the following documents and information:

- review of older surveys, if existing
- careful examination of old maps and in other documents concerning landfills
- review of aerial photographs
- review of commercial registers of manufactory sites of branches dealing usually with pollutive substances
- interviews with owners
- in case of suspected landfill, a short investigation by digging and visual assessment of the filling material may be carried out.

Open information policy and involvement of the owner

The result of the survey can have severe consequences for the land owner. To avoid opposition, it has proven useful to inform every concerned land-owner in advance. The owners of possibly contaminated sites are invited to a public information meeting where the target of the survey and the applied methods are explained. When communicated at a public meeting, the targets and the aspects of environment protection, especially of groundwater-protection, are more easily understood.

It has also proven useful to interview each concerned owner. The assessor gathers additional information about the site, and the owner may ask further questions about procedure and targets of the survey. In many cases, the owner provides additional documents useful to the assessment. In case of intended digging work, the agreement of the owner is essential, and his presence during the digging is often useful.

Classification of contaminated sites

According to the Directive of Remediation for Contaminated Sites, the authorities have to classify all sites by their actual or future pollution potential:

- contaminated sites without effects on the environment,
- contaminated sites where the potential effects on the environment must be investigated,
- the priority of such investigations is judged according to the vulnerability of groundwater, air and soil.

SAEFL has given guidelines for the short-assessment leading to the classification. For accident sites and industrial sites, the branch is the main criterion, since it indicates the possibility of dangerous substances being used or produced. Waste disposal sites are classified by the degree of contaminated material (proven or suspected) and by the amount of material in the fill. The owner of the sites has an

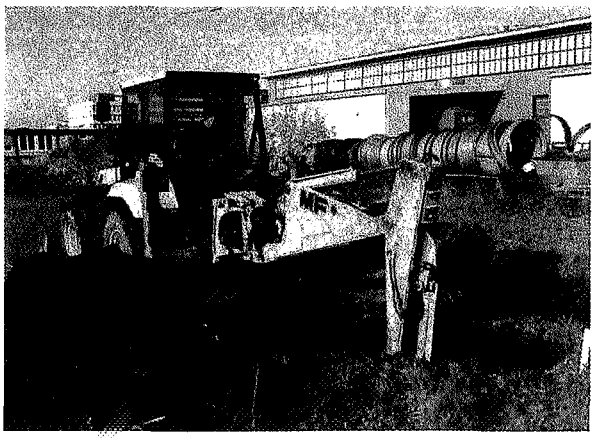


Figure 3. Dredger at digging work. On some old landfills, the grass hardly covers the waste material, in this case cinder, mixed with sand and gravel.
(Photo: Ulrike Walter)

opportunity to see and comment on the results of the assessment, before the site is registered. In some case, he might decide to immediately investigate the site, to prove its harmlessness.

Investigation and Assessment of Contaminated Sites

The investigation of a contaminated site, i.e. the historical and technical investigation, has to be carried out by the land owner. The authority may require the land owner to carry out the investigation if a site is judged harmful or dangerous to the environment. If a site is judged dangerous, investigation will be demanded immediately. Based on the results of this investigation, the authorities assess the site according to the criteria defined in the Directive for Remediation of Contaminated Sites.

For all kinds of contaminated sites, this investigation and assessment is an essential obligation before any new use or construction can start. In Switzerland, space is rare, and it is very important that ancient industrial areas are investigated in order to be re-developed, to save space and to protect the remaining agricultural land and untouched landscape for future generations.

The future

Within approximately the next five years, the survey will systematically check all possibly contaminated sites, and will identify those most at risk. Investigation and remediation can then be concentrated on the most dangerous cases. According to estimations by SAEFL, the investigation and remediation costs in Switzerland may reach about 3.5 billion Euro (SAEFL 2001), within the next one or two generations, to remediate the negligence of our antecedents.

Figure 1 reproduced by permission of the Swiss Federal Office of Topography (BA024727)

Classic Geology in Europe.

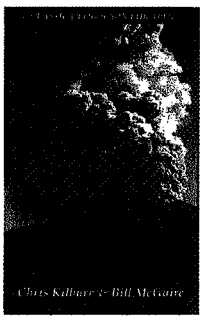
1. Italian volcanoes by Chris Kilburn and Bill McGuire 2001. ISBN 1-903544-04-1 Paperback. 166 pp. 11.95 Stg.
2. Auvergne by Peter Cattermole 2001. ISBN 1-903544-05-X Paperback. 168 pp. 11.95 Stg.
Terra Publishing, Hertfordshire, England

Europe has arguably the most diverse geological history of all our continental landmasses. In addition the continent has provided the source for many geological concepts and landmark discoveries through over 400 years of investigations. Classic Geology in Europe is a new series of guides to the geology of this fascinating mosaic of plates with Italian Volcanoes and Auvergne the first of many planned excursions into the crust of a diverse continent.

Italian volcanoes is a journey around the Tyrrhenian rim of the country, visiting the vents and products of the Roman and Campanian provinces together with the Aeolian islands off the coast of Sicily. These volcanoes played a pivotal role in the development of European civilization and have an unrivalled record of investigations, in some places dating back to the second century BC.

The complex setting of volcanicity and these volcanoes is first discussed in terms of modern plate tectonic models for the Afro-Eurasian collision zone. The geochemistry of their volcanic products together with the various styles of eruption form the core of the introductory chapter with some spectacular period impressions of the Somma-Vesuvius eruption of 1779 supplemented by actual photographs of some more recent eruptions. A safety guide for survival on active volcanoes completes the chapter and links into the subsequent field guides. Detailed intineraries around Somma-Vesuvius, the Phlegraean Fields, the Aeolian Islands and, of course, Mount Etna are provided in detail. The history of eruptions, evolution and key characteristics of each volcanic centre precedes information on routes, excursion durations and notes on the degrees of difficulty of each trip. Useful lists of literature and relevant webpages conclude each of thematic chapters. The book contains a useful glossary and index and is well illustrated; although many of the black and white photographs lack contrast, the majority of the simple grey tone figures work well. Errors are few; the repetition of the foot of page 9 on the start of page 13 is a minor aberration.

The second book in the series targets the Auvergne and adopts a slightly more formal structure although the three introductory chapters together with the ultimate chapter cover a range of useful topics additional to the core of geological material. The introduction leads the reader into chapters on the setting of the Auvergne, practical considerations and a cameo of the geology of the region together with an introduction to the itineraries themselves. The Auvergne boasts some spectacular scenery and some magnificent extinct volcanoes. The excursions take potential travellers into the classic terrains of the Puy-de-Dôme Massif, the Massif du Sancy, the Monts du Cantal and finally Haute-Loire. Each section is introduced with a geological overview and some key geological concepts. The excursions are clearly described, many with detailed maps (some unfortunately lack scales) and photographs although many suffer from a lack of clarity. Finally key literature and websites are collected together at the end of the book with a glossary and comprehensive index.



Both guides succeed well in providing sufficient geological and logistic background together with a range of data sources as a complement to the excursion guides themselves. Moreover the guides can clearly function at a range of knowledge levels from the focussed family holiday to the specialist student field trip. Both are recommended and provide a fine start to the series.

Professor David Harper
University of Copenhagen

Sustainable development at the Sola Refinery, Norway.

by Inger Strass [1]

Norske Shell's Refinery at Sola outside Stavanger, Norway was closed down in 2000. At present, all the equipment has been removed, almost 99 % of the assets have been sold for recommissioning or recycled and the whole area of the 1000 m² site is being vetted and cleaned. The vision for the decommissioning project has been that the project shall create the basis for new and sustainable industryial development of the area. The cleansing process of the soil is planned to be finished by July 2003 and the planned energy park on the site will hopefully result in the development and commercialisation of future-oriented energy and environment technologies.

La raffinerie norvégienne de Shell à Sola, à la périphérie de tavanger, a été fermée en 2000. A présent, tout l'équipement a été enlevé, rès de 99% des biens ont été vendus pour d'autres usages ou recyclés, et les 1000 m² de surface totale du site sont en train d'être examinés et nettoyés. L'idée de ce projet de démantelement est qu'il doit servir de base pour un développement industriel nouveau et durable de la zone. La décontamination du sol doit se terminer en juillet 2003 et le parc de l'énergie prévu sur le site devrait permettre le développement et la commercialisation de technologies d'énergie du futur et d'environnement.

La refinería de Shell Norske situada en Sola a las afueras de Stavanger, en Noruega, se cerró en el año 2000. En la actualidad todos los equipos han sido retirados, casi el 99% de bienes se han vendido su reutilización o reciclado y toda la zona de la planta de 1000 m² está siendo revisada y limpiada. La visión del proyecto de reutilización era que el proyecto debería crear las bases para el nuevo y sostenible desarrollo de la zona. El proceso de descontaminación del suelo está previsto que termine en julio del 2003 y el parque energético, que tiene previsto ubicarse en ese lugar, se espera dará como resultado el desarrollo y la comercialización de tecnologías energéticas y medioambientales futuristas.

Norske Shell's Sola Refinery (Fig. 1) was closed down in 2000. As this is written, all the equipment, buildings, pipeways and roads have already been removed, and almost 99% of the assets have been sold for recommissioning or recycled (Fig. 2). Everywhere on the 250 acre site the ground is being vetted and cleaned, and in just a few years the site will be a spawning ground for businesses offering forward-looking industrial jobs. Taken as a whole, the remediation process - involving demolition, cleaning and rebuilding - represents Europe's perhaps most sustainable project.

For Norske Shell it is very important to strike a sure balance between economic viability, social demands, and a sound environmental program for the released acreage, consistent with a forward-looking energy policy, besides generating new businesses and new jobs for the region. Shell has opted for a level of remediation that will permit all types of commercial and industrial activity to settle down and colonise the plot.

"This is a standard far more stringent than the Norwegian authorities require us to meet, but at the same time it gives the new owners much greater flexibility," explains project manager Sigbjørn Egeland.

The Shell Refinery in its day was sited in Sola on account of the fine natural harbour. The painstaking dismantling of the above-ground facilities has now been completed - without any accidents or injuries of any kind.

The almost 250 acre Refinery site is reckoned by many people to be the most attractive commercial plot in the region. In a span of 10-20 years, the space can be developed to accomodate 500,000m² of commercial and industrial buildings, which together can provide as many as 8000 jobs. At the time of its closure, the Refinery provided work for 188 technicians and staff.

The Refinery land can become the region's leading commercial centre for enterprises engaging in logistics, harbour services, oil, energy, foodstuffs, and environment. The regeneration process will assure that the space freed up, the site qualities, and the general location of the land, are all exploited for the maximum benefit.

Comprehensive

One of Norway's most comprehensive environmental operations is now being undertaken in Risavika. Altogether, some 350,000m³ of soil and rock are being monitored and vetted in the area where the Refinery once stood. Experts reckon that about 130,000 tonnes of earth will need to be cleansed. In terms of big trucks and trailers, the volume is close to 5000 full loads.

Oil product residues constitute the key source of pollution on the plot. Measured in volume, the oil recovered from the soil will probably be enough to fill about 20 road tankers.

"In other words the volumes of oil are not particularly large. The level of pollution is by no means dramatic, and good technologies have been developed to remove the oil residues. Oil products are not foreign materials in nature. Shell

[1] Senior Geologist, Norske Shell

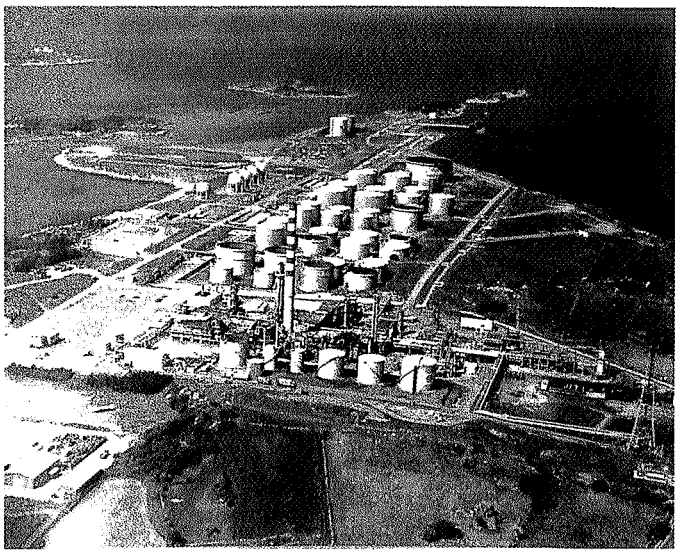


Figure 1. Before clearance

has imposed strict standards for soil quality before the site is reopened for new purposes, and the standards have been approved by the authorities. Remediation of the site must meet the standards for its proposed use, which is as industrial and harbour acreage. In order that the area shall be open and accessible, and at the same time pose no threat to health or safety, Shell is also conducting a cleansing operation to ensure that the entire site meets the standards for recreational land use," says environmental consultant Sverre Nergaard.

"The goal is to eliminate any risk to health and the environment from the pollutants in the ground (soil, rock, ground water), and leave the area free from unpleasant odours, as well as to eliminate any risk of pollutant seepage into the sea," he adds.

The work of cleaning the earth and rocks on the Refinery site is a process that requires careful logistics and considerable precision. The specific area where the pollution is concentrated - almost 50 acres where the storage tanks once stood and where the refining process took place - has been divided into grid squares of 200m x 200m. Within each square, technicians are vetting the soil and subsoil at a half meter at a time. Piles of soil have been excavated, analysed, and sorted for further processing, based on the level of contamination found.

Cleansing methods

Soil and rocks to be vetted are divided into four categories: Soil that is unpolluted, or so slightly polluted that there is no need for remediation; soil that can be washed clean; soil suitable for biological composting; and soil that needs to be put through a thermal cleansing process.

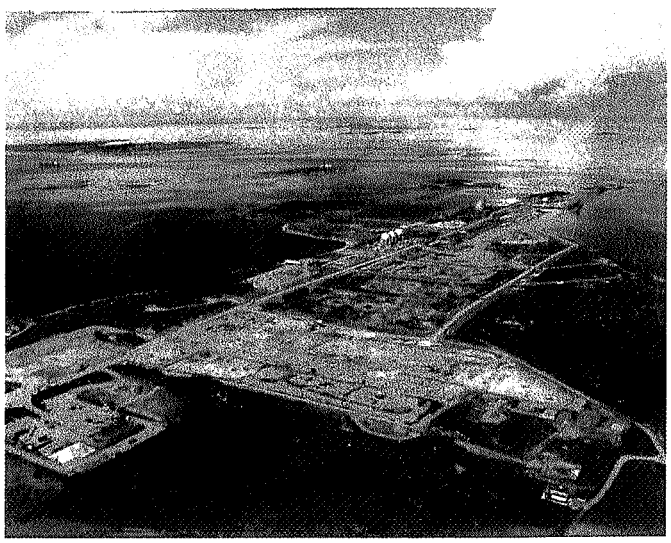


Figure 2. After clearance

The washing operation occurs in an advanced plant operated by the Belgian experts Watco, who have established a temporary unit in Risavika. Here every tonne is put through a multistage process where the soil is sorted and the pollutants are literally washed out. If the level of pollution in the product after the washing operation is greater than Shell's stringent standards, then the soil is designated for the next stage.

Biological composting is a process where the soil's normal bacterial culture is stimulated by the addition of traditional mulch and supplementary nutrients, like nitrogen and phosphorus. Remediation is achieved using the natural biological cleansing processes, where microorganisms "digest" the oil. Conditioning of this type is expected to take something over three months.

The final method involves applying heat, so-called thermal processing, where the contaminated soil is warmed to a high enough temperature to incinerate the remaining oil residues.

Sustainable recommissioning

Lyse has chosen Risavika as the landing point for gas to the southern part of Norway, and a future-oriented Energy Park is planned on the vacant site. The Refinery site will become a centre where users enjoy efficient infrastructure and benefit from solutions that are at once both low-cost and rational.

Energiparken AS will bring together a range of energy producers and energy users. The goal is to exploit synergies and connect up different economic sectors. In this way it is hoped to spawn a value-generating industry and technology-oriented cluster, whose key focus areas will be energy and environment. The vision is an Energy Park that will spark international interest for the development and commercialisation of future-oriented energy and environment technologies.

The work of sorting and remediating the soil on the former Refinery site will continue until the end of July 2003.

Norske Shell has signed a contract under which Energiparken AS will purchase about 65 acres of the former refinery site in Risavika. Energiparken AS is already in the process of drawing up a development plan for the area. The goal is for the initial phase of development to commence as early as autumn 2003.

Natural mineral waters: the boast of Italian industry

by Dott. Giuseppe Bonsignore [1], EurGeol. Dott. Carlo Enrico Bravi [2]
and Dott. Umberto Ragni [1]

The richness of Italian Natural Mineral Waters resources is highlighted by the authors in this article, which considers the country's thermalism in relation to the special geological, structural and hydrogeological characteristics of the peninsula.
Natural Mineral Waters are then described, as well as their distribution, with comments on the Directives and Laws (Italian and EU disciplines) that regulate the exploitation of these resources. The so called "spring waters" (well known in France as "eaux de source") are also mentioned, with regard to the great development in their utilization. Italy is recognized as one of the principal producers of bottled natural mineral waters, while it holds the world record for yearly per capita consumption, ahead of France and Germany. Principal Commercial Groups and Trade Marks and their export to other countries are mentioned.

L'auteur souligne la richesse de l'Italie en eaux minérales naturelles et présente pour commencer le thermalisme très particulier du pays, lié à la situation géologique, structurale et hydrogéologique qui caractérise la péninsule.Les eaux minérales naturelles sont ensuite décrites ainsi que leur distribution sur le territoire et les directives et lois (italiennes et européennes) qui régissent leur exploitation sont analysées. Les eaux dites « de source » (déjà bien connues en France) sont mentionnées étant donné le grand développement de leur consommation. L'Italie est l'un des principaux producteurs d'eaux minérales naturelles en bouteilles, tout en détenant le record mondial de consommation par tête d'habitant, suivie par la France et l'Allemagne. Les principaux groupes commerciaux et marques commerciales sont mentionnées ainsi que l'aspect exportation.

En este articulo se pone de manifiesto las buenas condiciones en recursos de agua mineral natural existentes en Italia, considerando las condiciones de termalismo del país, relacionadas con la geología de la península, características estructurales e hidrogeológicas. Se han descrito los recursos de agua mineral, así como su distribución territorial, siendo analizadas las directivas y leyes (europeas e italianas) que regulan la explotación de estos recursos.También se menciona el llamado "spring waters" (conocido en Francia bajo el nombre de "eaux de source") que en la actualidad presenta un gran desarrollo de su utilización. Italia es conocida como uno de los principales productores de agua mineral embotellada , teniendo el record de consumo anual per cápita seguido de Francia y Alemania.
En este articulo se mencionan los principales grupos comerciales y marcas, refiriéndose también a la exportación a otros países.

Various statistical studies show that during the last twenty years Italy has enjoyed a prime place in the production of natural mineral waters, being a major producer at a European level.

The reasons for this success are various and can be related to the peculiar hydrogeological conditions of the country, good technology, a good enterprise feeling as well as the strict regulations that are applied in this commercial sector.

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Thermalism

The use and exploitation of thermal waters is known from the Roman Period, when these started to be employed for medical purposes. This tradition was also favoured by the fact that hydrothermal and hydromineral inheritance is largely and equally distributed on the National Territory (Fig. 1).

Italy has in fact a great number of "hyperthermal spings" (over 50° C), "thermal or hot waters" (30 ° - 50° C) and "ipothermal spings" (20° - 30° C).

These are normally related to different Italian volcanic districts (Campi Flegrei, Colli Euganei, Ischia Island, Vulcano Island, Sicily, Roman volcanic district) and to the deep circulation of aquifers, which takes into consideration the geothermal gradient.

Figure 1 gives an idea of the typology, quantity and distribution of thermomineral occurences on the National Territory. These resources are considered of some importance for the local economy of several Italian Municipalities, both from a therapeutic and a tourist perspective. (Acqui Terme – Abano – Bormio – Sirmione – Montecatini – Chianciano – Pozzuoli – Lacco Ameno – Ischia – Sciacca).

Natural mineral waters

The waters mainly exploited for bottling purposes are the so called "cold mineral waters" that are also largely distributed on the Italian peninsula, due to peculiar

hydrogeological conditions and to favourable climatic factors, which give way to different qualitative and quantitative typologies, with special chemical and physical properties.

According to the National Law n.° 105/1992 and the 1999 modifications in accordance with European Community Directives n.° 80/777 and 96/70 , "*natural mineral waters*" are " *....those waters that originated from an aquifer, give way to one or more natural or artificial springs and have special hygenic peculiarities and properties, which are generally favourable to health. Natural mineral waters differ from ordinary drinking waters in their original pureness and preservation, their dissolved mineral salts and/or oligoelements and their particular effects".*

The real difference between normal drinking water and a "natural mineral water" is mainly due to the chemical composition. In accordance with European Community Directives, the Italian Classification of natural mineral waters is based on the total quantity of dissolved salts, calculated as the "salt residue" in mg/liter at a temperature of 180° C .

Formerly (1934 - 1985) the "Marotta and Sica Classification" was in use. Now (since 1985) a new European Community Classification is in use . The two classifications are shown and compared in Table 1.Generally depending upon the presence and concentration of salt, other types of classification are also in use; the most commonly used is that shown in Table 2

Typology and distribution of exploited and bottled hydromineral resources

According to an updated inventory, there are in Italy 253 different trade marks (labels) of natural mineral waters, which are collected through the same number of springs. They are distributed on National Territory in the different Regions as illustrated in Table 3.

It can be noted that both the distribution in the different areas of the Italian peninsula and the peculiarity of the mineralization and concentration of typical salts, is a direct consequence of the different geological conditions and the local presence of peculiar lithologic types .

European Community rules and Italian restrictions on the exploitation of hydrominerals

In complete accordance with European Community rules, the Italian Directive regarding the exploitation of natural mineral waters is very strict and several safety procedures must be observed.

Table 1. Mineral water classification

Old classification 'Marotta e Sica'

Oligomineral

200

'Medium-mineral'

1000

Mineral

New E.C. classification

Minimally mineralized

50

Oligomineral

500

Mineralized

1500

Rich in mineral salts

(Residual deposit expressed in mg/l)

The National Category Association has in addition worked out typologies of studies, periodical analysis and special precautions that have to be realised in order to grant purity and pollution protection, which are mostly required by the consumer. Besides that, those waters which are known for their special health purposes, must conform to strict controls regarding their chemical composition, which must be kept constant.

Table 2. Mineral water definition

Bicarbonate: Bicarbonate content	>600mg/l
Sulphate: Sulphate content	>200mg/l
Chlorate: Chlorate content	>200mg/l
Calcic: Calcium content	>150mg/l
Magnesic: Magnesium content	>50mg/l
Fluorate: Fluorine content	>0.1mg/l
Ferruginous: Bivalent iron content	>0.1mg/l
Acidules: Free carbon dioxide content	>250mg/l
Sodic: Sodium content	>200mg/l

(Suggestion for sodium-free diets sodium content <20mg/l)

All the different rules that must be followed by the user of a natural mineral water spring, are very clearly explained in the National Laws n.° 105/92 and n.° 339/99. The addition of any substance that might modify the original chemical, physical and bacterial conditions of the water, in order to enhance its drinkability or remove bacteria, is strictly forbidden.

However, the following operations are allowed: water transport (pumping and storage) – elimination or addition of carbon dioxide – filtration and decantation and, eventually, oxygenation. All the above treatments must at the same time guarantee a non-modification of the mineral water's natural conditions.

Methods to evaluate the original conditions of natural mineral waters are expressly regulated in some National Laws (n.° 542/92 – n.° 13/93 – n.°339/99). These Laws require in-depth, accurate hydrogeological studies and a series of analytical determinations of chemical, physical and bacteriological parameters, that have to be repeated during the four different seasons.

For clinical and pharmacological use of natural mineral waters, special studies must be carried out using standard methods in state laboratories (hospitals, universities, etc.). Studies vary of course according to the particular salt concentrations of the waters and their effect on the human organism.

Detailed studies and research are specially required for the hydrogeological aspect of natural mineral water resources. In fact in order to be recognized as "natural mineral water" from the Ministry of Sanitation, it is necessary that a complete series of inspections and studies be carried out on the whole aquifer from which the spring water originates. Exploratory drilling and geophysical prospecting accurately identify the hydrogeological recharge basin.

Detailed mapping and cross sections have to be carried out in order to determine all geological, geomorphological, lithological and structural parameters, together with the permeability conditions of those soils included in the recharge area. Also temperature and pluviometric data have to be collected over a sufficient period of time, in order to achieve a hydrogeological balance. Once these studies have been completed, the underground circulation of the aquifer will be reconstructed, with an

Figure 1. Principal thermomineral water-springs in Italy

analysis of hydraulic peculiarities, mineralization processes and the seasonal variation of possible water quantity of the spring(s).

All information must be completed with an accurate description of the water collection system, together with special investigations, which are aimed at determining any possible connection of the mineralized aquifer with areas in which pollution might occur.

"Spring waters"

The European Community Directive 80/777- which is followed by Italian Laws regarding the matter of natural mineral waters – has lately been substantially modified, due to the European Parliament Directive 96/70 and the Directive of the European Council of 28 October 1996.

All modifications concerning the management of natural mineral waters have been included in the recent Italian Law n.° 339/1999.

The most important innovation is related to the introduction and recognition of the new category of "spring waters", that for several years has already been produced and distributed on the French market ("eau de source") .

In Italy the denomination of "spring water" is reserved only for those waters which are intended for human consumption in their natural condition and directly bottled at the spring. A "spring water" must of course have all necessary chemical and bacteriological properties to be recognized as a drinking water. "Spring waters" may therefore be different from natural mineral waters, whose chemical and physical composition does not necessarily have to comply with drinking regulations.

Nevertheless, for their recognition and for market purposes, spring waters must undertake all hydrogeological and prevention procedures as already described for natural mineral waters.

Hydromineral resource protection

Italian regulations are very accurate on this specific aspect, as special attention is required in the determination of the potential vulnerability of recharge areas and along preferable directions of the aquifer, in order to define all possible prevention and protection measures.

Three different areas must be determined, in order to ensure that the aquifer be uncontaminated to the point where the water is collected; *absolute defence area, respect area and protection area*

Special bounds are foreseen for these areas and severe limits are required for land use .

The *absolute defence area* corresponds to the area very close to the water collection point, around which a space of at least 10 meters radius must be absolutely free and fenced, with an efficient drainage system for surface waters. In this space only operations related to water collection and general maintenance are allowed.

The *respect area* is generally identified hydrogeologically, taking into consideration the possible vulnerability depending on local geological conditions; it can also be defined with a "chronological principle", taking into consideration the period of time that water might require to cover, through saturated soil, the space from a possible pollution point to the water collection point.

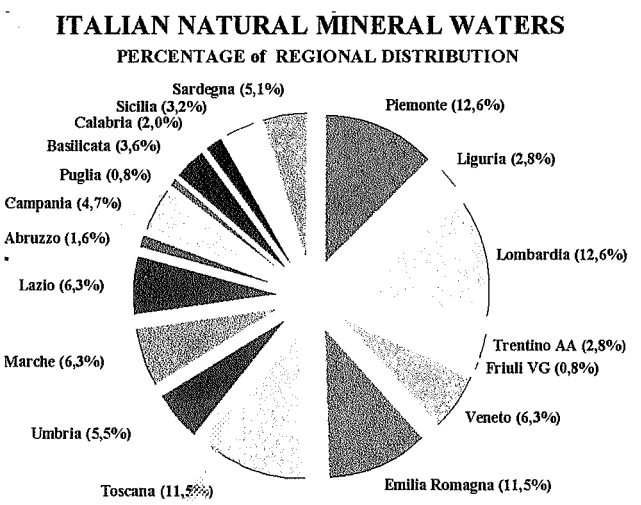
In case of lack of specific procedures that might define the above, it is generally assumed that the respect area has a space of not less than 200 meters radius around the water collection point (geometric principle). However, in the respect area of a mineralized water spring, all activities and interventions on the territory that might directly or indirectly be responsible for undesired interactions with the underground aquifer are either forbidden or strictly regulated.

The *protection area* includes the two already mentioned and corresponds more or less to the recharge areas and to the basins where the mineralized aquifer originates . Land use here is regulated so that the aquifer might be well protected, even if regulations are not so strict as in the previous cases.

Increase in consumption

Due to the development of industrial bottling systems and the parallel progressive

Figure 2. Regional distribution - trade marks



quality decrease of the waters distributed by aqueducts, during the 1980s the former Italian habit of considering mineral waters only as an occasional drink, has gradually been converted into normal daily domestic use. In fact our country is the world leader for the per capita consumption of mineral waters, followed by France and Germany.

During the last five years, the following consumption has been recorded :

. Italy : 145 liters per capitea / year
. France : 118 liters per capita / year
. Germany: 103 liters per capita /year

The strong consumption increase is also connected to new bottling techniques (traditional glass bottles have been replaced by PVC and PET water containers), which have simplified production, storage and distibution, reducing costs, including transport, and eliminating the problem of bottle returns.

According to figures from Canadean Ltd., the total volume of mineral water which is used annually in Italy is nearly 8,000 million liters and represents 0.2 % of the total amount of waters distributed by national aqueducts. However, if reference is made only to the water used as drinking water (which is estimated at 1% of total domestic use), the ratio is nearly one sixth of the total consumption.

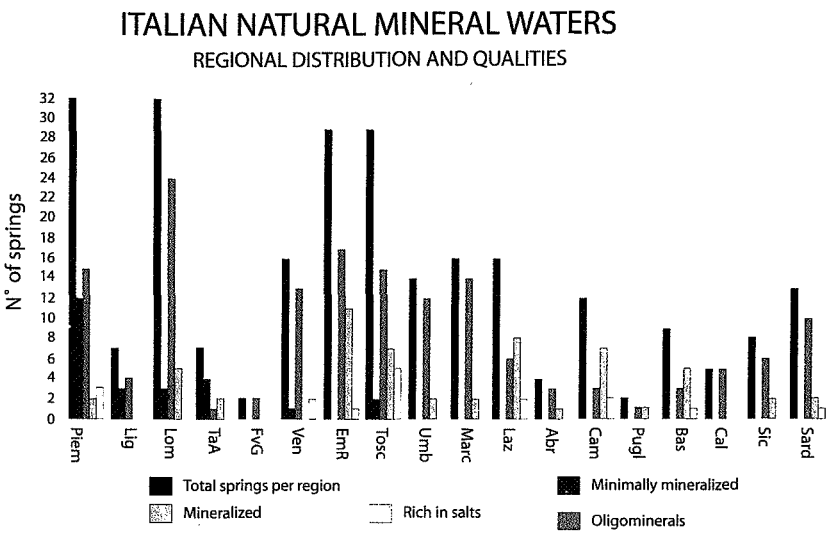


Figure 3. Regional distribution - typology

This fact, together with a good commercial atmosphere, a strong hygiene and sanitary guarantee because of the very modern systems of obtaining water, the strict protection of the aquifer recharge areas and reliable control systems all along the way from the water collection point to the final product ready for the market, has resulted in great vitality in the production sector.

Industrial production

Until the early 80s, the distribution in Italy of bottled mineral waters was mainly organized on a regional basis, with the few exceptions of a small number of trade marks, which were already diffused on a National scale.

From then on, mainly due to the facts previously described, a quick development of the sector industry took place, with the concentration of many trade marks in a few commercial groups.

At the end of the last century, nearly 80% of total national production was ruled by six major commercial groups, while the remaining 20% was distributed among over 150 firms, with a total of over 200 trade marks .

The most important groups are:

San Pellegrino (Levissima, Recoaro, Panna, Pejo)
San Benedetto (Guizza)
Nestlè (Vera, San Bernardo)
Danone (Ferrarelle, Boario)
Spumador (San Antonio, San Francesco, Neve, Valverde, Serena, Gioiosa, Nocera Umbra)
Terme San Andrea (Lidia, Goccia di Carnia)
Uliveto Rocchetta)

Other important Firms are:

Sangemini (Fabia)
Norda (Daggio, Alisea, Dolomiti, Pasubio)
Val Menaggio (Chiarella, Fonte Laura, Paraviso)
Traficante (Lilia, Toka)
Campari Crodo (Lisiel, Valle d'Oro, Nova).

The export is about 3% of total National production and it is in rapid increase, at present ten times that of the '85 –'90 period.

Major buyers are : Germany, Switzerland, France, USA, Canada, Russia and Arab Countries .

Table 3. National resource distribution

Region	Springs	Minimally mineralized	Oligo-mineral	Rich in salt	Mineralised
Piemont	32	12	15	2	3
Liguria	7	3	4	0	0
Lombardia	32	3	24	5	0
Trentino Alto Adige	7	4	1	2	0
Friuli Venezia Giulia	2	0	2	0	0
Veneto	16	1	13	0	2
Emilia Romagna	29	0	17	11	1
Toscana	29	2	15	7	5
Umbria	14	0	12	2	0
Marche	16	0	14	2	0
Lazio	16	0	6	8	2
Abruzzo	4	0	3	1	0
Campania	12	0	3	7	2
Puglia	2	0	1	1	0
Basilicata	9	0	3	5	1
Calabria	5	0	5	0	0
Sicilia	8	0	6	2	0
Sardegna	13	0	10	2	1
TOTAL	253	25	154	57	17
PERCENTAGE	100	9.9	60.9	22.5	6.7

A perspective on volcanic catastrophes

by Alwyn Scarth

Volcanic eruptions have claimed 220,000 victims since 1783, but 67% of the deaths occurred in only four outbursts. Increasingly sophisticated techniques now enable the progress of eruptions to be forecast much more accurately, but problems of communication still remain between scientists and those under threat. These problems are illustrated with reference to three famous eruptions: the unavoidable tragedy caused by Mount Pelée in 1902; the catastrophe that could have been avoided when Nevado del Ruiz erupted in 1985 ; and the great catastrophe that was avoided around Pinatubo in 1991.

Les éruptions volcaniques ont fait 220,000 victimes depuis 1783, dont les deux tiers dans seulement quatre cataclysmes. De nos jours, des techniques de plus en plus sophistiquées permettent une prévision beaucoup plus précise du déroulement des éruptions, mais des problèmes de communication persistent entre les scientifiques et les populations menacées. Ces problèmes sont mis en évidence dans trois éruptions célèbres: l'inévitable tragédie de la Montagne Pelée en 1902; la catastrophe de 1985 au Nevado del Ruiz, qui aurait pu être évitée; et celle de 1991 de Pinatubo, où la collaboration entre les scientifiques et les pouvoirs publics a très sensiblement limité le nombre de victimes.

Las erupciones volcánicas han matado a 220,000 personas desde el año 1783, de las cuales victimas dos terceros murieron en solemente cuatro cataclismos. Tecnicas cada mas eficaces os permiten una mas precisa prevision de los acontecemientos volcánicos - sino que problemas de communicacion siempre hay entre scientificos y poblaciones en peligro. Estos problemas los han puesto en evidencia tres erupciones: la inevitable tragedia del Monte Pelée en el año 1902; la catástrofe del año 1985 en Nevado del Ruiz, la cual hubiera podido ser evitado; per fin la del año 1991 en Pinatubo - en ese año no fue tan alzado el numero de victimas porque trabajaron juntos scientificas y autoridades publica

Volcanic eruptions cause some of the most spectacular disasters on Earth and they have claimed about 220,000 victims since 1783 (Tanguy *et al.* 1998). But their bad reputation is somewhat undeserved, for they are much less lethal than earthquakes, which have matched that figure in the past 25 years alone (Scarth 1997). Volcanoes pose neither a constant, nor ubiquitous, threat; nor are major catastrophes directly linked to powerful outbursts. Since 1783, 67% of the volcanic fatalities occurred after only four eruptions: Tambora, Indonesia, in 1815; Krakatau, Indonesia, in 1883; Mount Pelée, French West Indies, in 1902; and Nevado del Ruiz, Colombia, in 1985. Tambora and Krakatau erupted with much greater violence than Mount Pelée and Ruiz. Famine resulted in most of the deaths around Tambora, but the other disasters were caused by volcanic phenomena travelling swiftly over the surface: tsunamis surged from Krakatau, a nuée ardente blasted from Mount Pelée; and a mudflow rushed down from Nevado del Ruiz. Less than 5% of the deaths came from falling ash or lava-flows, which are the features most commonly associated with eruptions.

The great advances in research during recent decades have enabled volcanologists to use an array of increasingly sophisticated techniques to monitor the world's apparently more dangerous volcanoes, so that the smallest warning signs of activity can be analyzed. Nevertheless, there are still probably more active volcanoes than experts trained to investigate them – especially in the developing world. The chief signs warning of an ascent of magma and a possible eruption include: an increased frequency and intensity of volcanic earthquakes; a swelling of the cone; expansion of hydrothermal activity, especially when magmatic gases, such as sulphur dioxide and hydrogen sulphide, are expelled; a growth in the heat given off by the volcano; and a development of hydro-volcanic (or phreato-magmatic) activity. None of these signs develop with clock-work regularity, and they can be spread over days, weeks, or months. Neither do these signs necessarily prove that an eruption will take place – and still less when it will happen, or what form it will take.

If an eruption occurs, a catastrophe happens when human beings remain in the wrong, vulnerable, place at the wrong time, and do not retreat to safer havens –either because they are ignorant, or because they are unconvinced of the danger. Until the last few decades, ignorance predominated: very few Earth scientists could forecast the development of a large eruption. The vast progress in volcanic research has now reduced much of this ignorance, but scientific facts have

still not always convinced potential victims of their vulnerability. This is perhaps primarily a problem of communication. In principle, the experts convince the authorities and the media, who then explain the threat to the people and evacuate them if necessary. Problems arise at every link in this chain of communication. The various groups involved have strongly divergent points of view, attitudes, and different social and even psychological needs. The Earth scientists thrive on discussions replete with hypotheses, caveats and provisos, but it must be said that they often express themselves in an in-house technical jargon that the uninitiated cannot understand. Politicians, administrators, and media commentators want simple, direct answers to complicated scientific questions: *When will the eruption take place? What will happen? Which areas should be evacuated?* And they often expect a short answer that could fit conveniently into a newspaper headline. They are also often hamstrung by industrial, commercial or political interests. It is important to remember, too, that the welfare of their people is rarely - and scarcely ever has been - a prime concern of many governments. Many authorities realize that an evacuation would probably cause social unrest, which would entail much more trouble *for them* than the eruption. The threatened populations themselves usually have no idea what to do, or what advice to follow, and they thus turn to local pundits, whose ignorance never stops them from expressing their views. Any evacuated people will inevitably be housed in poor conditions, and their abandoned homes might well be looted. Many threatened people are so poor that they have virtually no transferable assets. Thus, they tend to prefer advice that favours inertia, and stay at home and take their chance with the volcano rather than move to undefined faraway refuges. Moreover, if the forecast of the Earth scientists proves incorrect, the evacuated people will blame the authorities rather than the experts – and certainly not the volcano. Few administrations seem prepared to follow the example of the Japanese and Philippine Governments, for instance, who train people how to act in such emergencies (e.g. Scarth 1999). Thus a volcanic catastrophe would now spring almost as much from human psychology as from the eruption itself. Three famous eruptions illustrate the practical extent of these problems.

Figure 1. The ruins of Saint-Pierre, May 1902

An avoidable catastrophe: Nevado del Ruiz, November 1985.

Most of the 23,000 victims of the eruption of Nevado del Ruiz could have been saved (Voight 1990,1996). The responsibility lies with a panoply of administrators and politicians, who seemed incapable of accepting that high and distant Ruiz could possibly damage the towns of the plains below. But people living to the northeast of the volcano were obviously in grave danger, for the active crater was situated near the northeastern edge of the summit ice-cap. After giving off abundant warning signs for over ten months, this crater expelled its first, rather modest, quantities of magma on 13 November 1985. It formed a mudflow that destroyed the town of Armero, 60km away on the plains to the northeast. It had happened before, and it had been documented (Acosta 1846). Armero had been built on the solidified remnants of a mudflow that Ruiz had dispatched in 1845. The person who sets up house on the remains of one eruption is likely to see it destroyed by the next. In 1985, all the ingredients of a similar catastrophe were assembled, and thus Armero fell victim to Ruiz. They are *still* there. The only difference now is that the established warning systems might prove adequate.

When Ruiz started to erupt, Colombia had many volcanoes but no experts trained to monitor any possible eruptions. For months the local Provincial administrations lacked guidance and knowledge because the national government failed to give any lead (Voight 1990, 1996). The administration and the local

Figure 2. The ruin of the centre of Saint-Pierre, mid-May 1902, with Mount Pelée erupting in the background

scientists were slow to act, and even seemed unwilling to accept that a problem existed at all. In March 1985, for instance, a visiting UN scientist recommended that a map of the likely volcanic hazards should be drawn up. Work did not even start on this map until 20 September. When UNESCO officials wrote offering help, their letter was lost in the Colombian bureaucracy for two months. An eruption on 11 September sent a mudflow rushing some 27km down a northeastern valley, but a Colombian geophysicist still declared that Ruiz posed no threat. When the mayor of Armero voiced his fears for his town, he was for long largely ignored. Indeed, local personalities, including church leaders, claimed that the press was spreading "volcanic terrorism" and asserted that a map of volcanic risks would lower property prices. It was only on 8 October, after months of scepticism, that the Colombian Geological Institute finally acknowledged that mudflows might threaten Armero. An Italian team of experts told the government on 31 October that a larger eruption could soon occur. Some towns began to improve their evacuation plans, but still failed to designate any refuge areas with suitable lodgings. Four months after the Colombians had first asked for technical help, the US Geological Survey finally agreed to send two experts to Ruiz, but they delayed their departure when an insurrection broke out in Bogotà in early November. When Ruiz erupted magma for the first time on 13 November, Armero was doomed. It melted about 10% of the ice-cap and formed a mudflow that sped at 36km an hour down to the town.

A few lives could still have been saved before the mudflow swept most of Armero and its citizens away. Some firemen and policemen, on their own initiative, tried to warn people of the danger, but the inertia factor was strong. The priest had said that there was no reason for alarm; it was raining; and there was a soccer match on TV. The local radio, which might have issued the most effective warnings, was playing cheery music when the mudflow arrived. The damage cost the Colombian economy one fifth of its gross national product – clearly more than the cost of training a few experts in volcanic eruptions and organizing adequate refuges.

A catastrophe avoided: Pinatubo, June 1991.

Pinatubo produced one of the largest volcanic outbursts of the twentieth century, and it also coincided with a typhoon. But what might have been the greatest volcanic catastrophe of the century was avoided because much greater scientific and technical skills were brought to bear than in Colombia, because the authorities took an active part in mitigating the effects of the eruption, and, to some degree also, because lessons had been learnt from the events in Armero (Newhall and Punongbayan 1996, Scarth 1999). Over a million people lived within striking distance of Pinatubo – including those in the Clark American Air Force base, some 25km from the crater. The Philippines already had the administrative and scientific infrastructures to deal with the crisis, and this eruption became the first to be monitored from start to finish – by the Philippine Institute of Volcanology and Seismology and their American colleagues. Soon after the volcano started hydrothermal activity on 2 April 1991, a danger zone of 10km around the crater was designated and 5,000 people living within it were evacuated to refugee camps. A rapid survey of the hitherto little-known geology of Pinatubo was made; and five Alert-Levels were established in relation to the expected growth in activity. The first hazard map was issued on 23 May, published in the media, and sent to the whole administrative hierarchy from the President to village leaders. The threatened people were told what to expect – not least with the aid of a graphic film on volcanic hazards. As the magma approached the surface, danger zones were extended, and more people were taken into refugee camps. In all some 74,000 people were evacuated. The volcano played its part in the crisis by behaving with visible logic that analysts could follow, progressing with increasing ferocity from April towards its climax in mid-June. The obviously growing threats meant that most opinion-formers could readily be convinced about the dangers they faced. At the climax of the eruption on 12-15 June 1991, Pinatubo erupted 1,500 times as much volcanic material as Nevadio del Ruiz, but the well-organized response to the crisis meant that the eruption cost only 200-300 lives, although a further 900 died in refugee camps from diseases to which they had never before been exposed in their old mountain fastness. The volume documenting the eruption has become a most useful manual for dealing with a volcanic emergency (Newhall and Punongbayan 1996).

An unavoidable catastrophe: Mount Pelée. May 1902.

The eruption of Mount Pelée in Martinique, and the loss of some 27,000 lives when Saint-Pierre was destroyed, caused the greatest volcanic catastrophe of the twentieth century (Lacroix 1904, Chrétien and Brousse 1988, Scarth 2002). The events illustrate how eruptions could turn into tragedy in an age when they had hardly ever been studied.

The eruption came to its climax with unusual speed. Although weak hydrothermal activity had been observed for at least two years at the summit, the first hydrovolcanic eruption did not take place until 23 April 1902. The first ash fell on Saint-Pierre on 3 May, and a nuée ardente annihilated the city on 8 May (Figs 1 and 2). The many violent chapters in Mount Pelée's volcanic history were then totally unknown. The two eruptions that had taken place since the French settlement in 1635, which might have offered warning precedents, had been so feeble that they merely convinced the citizens that the volcano was moribund and harmless.

The volcano-tectonic earthquakes during the two weeks of the eruption were weak and infrequent and no buildings were damaged. Earthquakes, or associated turbidity currents, cut submarine cables four times, but such breakages were not unusual. Little ash was expelled and the Trade Winds directed most of it westwards over the coastal village of Le Prêcheur. Only about 3cm of ash accumulated in Saint-Pierre from 3 May. The eruptive column was small and rarely exceeded a height of 2-3km. A lake formed in the summit crater, but, on 5 May, the lowest part of the rim collapsed and formed a notch facing south towards Saint-Pierre. The collapse generated a mudflow that destroyed a factory on the coast, killed 25 people, and sent small tidal waves flooding into Saint-Pierre across the bay. Magma reached the summit on 6 May. The great nuée ardente blasted straight to Saint-Pierre from the notch on the southern rim of the crater at 08.02 on 8 May, leaving only between 64 and 111 survivors in the area that it devastated.

No-one could offer any valid guidance to the citizens because no experts on eruptions were available. The citizens were bewildered by a succession of apparently unrelated calamities which seemed to indicate that nature had gone mad, but they perceived Saint-Pierre as a safe haven. They feared a bigger eruption less than other disasters that they knew had happened elsewhere, such as destructive earthquakes or huge sea-waves. They could not identify their real enemy and therefore could take no effective action to avoid it.

Contrary to common belief, the authorities did what they could in response to what they knew. The mayor of Saint-Pierre issued an explanatory poster on 6 May; the Governor set up a Scientific Commission on 7 May, which issued a report that very evening. The Governor twice came to spend the night in the city, and visited the apparently most endangered village of Le Prêcheur three times. He did not surround Saint-Pierre with troops to prevent people leaving the city so that they could vote in the election.

It has often been asked why the city was never evacuated. This is completely to misunderstand the situation. There was little time to develop a policy and still less to apply it. There were no guidelines and known precedents at the time. No refuges were available for over 26,000 people. Roads were so poor that evacuation would have had to be undertaken by sea. It would have been very slow, because the local vessels were too small and requisitioning transatlantic liners would have taken far too long. Moreover, the volcanic symptoms displayed did not merit an evacuation (Scarth 2002). And, as Lacroix (1904) pointed out, "none of the events that might logically have been forecast in fact occurred". The nuée ardente could not have been forecast, because nobody had then studied, and few had even observed, what is now acknowledged to be the most devastating feature of the volcanic repertoire. Moreover, it blasted out to Saint-Pierre in a narrow zone covering about 15 degrees of arc. If it had taken any other direction, the city would have been saved and the death-toll would have been much reduced. Thus it was a tragic irony that those who assessed the situation logically lost their lives, while those left the city in panic survived.

On average, a powerful eruption occurs in the world about once every ten years. Since the latest major eruption took place at Pinatubo in 1991, a large explosive eruption could soon be due. Will all those affected in the stricken country have learnt enough to avoid another catastrophe? Lurking behind all forecasts of volcanic catastrophes in Europe itself is the prospect of another eruption of Vesuvius, which promises to be the most violent since 1631. Contingency plans have been made to evacuate 600,000 people who would be in grave danger. (Civetta 1998). It is to be hoped that the warnings from Vesuvius will be heeded.

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World Geologists (Geólogos del Mundo) Update

by Juan Luis García [1], Ángel Carbayo [2], Manuel Regueiro [3], and Yolanda González [4]

World Geologists continues with its activity on humanitarian geology. In the current year the organisation has accomplished three projects, two related to geological hazards, one financed by the EU, the other by the Catalonian Government and a third related to water supply, financed by the Nando Peretti Foundation. WG has also organised courses and conferences and participated in several seminars. In the immediate future two new projects related to water supply in Western Africa will start and another two projects combining geological hazards and hydrogeology in El Salvador are envisaged. There are also four water supply projects, depending on financial support, planned for Ecuador and El Salvador.

Géologues du Monde continue à développer l'activité de géologie humanitaire. L'organisation a finis trois projets pendant cette anneé, deux projets en rapport aux risques géologiques, financiés par l'Union Europeénne et par le Gouvernement de Catalonia, et un autre projet en rapport à l'approvisionnement de l'eau, financié par la Fondation Nando Pereti. GM a aussi organisé de cours et de conférences et a participé en plusiers séminaires. Au future proche quatre projets vont comencer, deux projets sur l'approvisionnement de l'eau en Afrique Occidental et deux projets sur la thématique combiné de caractérisation de risques et hydrologie à El Salvador. Il y a aussi quatres projets d'approvisionnement de l'eau, un à Ecuador et trois à El Salvador, qui sont en attente d'un support financier.

Geólogos del Mundo continua con su labor sobre geología humanitaria. En el año actual ha terminado tres proyectos, dos relacionados con riesgos geológicos, financiados, uno por la Unión Europea y otro por la Generalitat de Cataluña y un tercero sobre abastecimiento de agua, financiado por la Fundación Peretti. Asimismo ha realizado cursos y conferencias y participado en seminarios. En fechas próximas se iniciarán dos proyectos sobre abastecimiento de agua en Africa Occidental y otros dos proyectos combinados sobre caracterización de riesgos geológicos e hidrogeología en El Salvador. Existen cuatro proyectos futuros pendientes de financiación correspondientes también a abastecimientos de agua, uno en Ecuador y tres en El Salvador.

Handling of hazards and vulnerability in the San Miguel volcano. El Salvador

Financed by ECHO (European Commission Humanity Organisation). Finished by May 2002.

All the proposed objectives to reduce significantly the geological hazards in the area have been fulfilled by:

- Construction of engineering works for rehabilitation and mitigation.
- Installation of an early alert system for heavy rainfall.
- Preparing local people to manage hazards in an emergency situation (self-protection)

[1] President of the NGO
[2] Financial Manager
[3] Secretary
[4] Co-ordinator

Diagnosis and inventory of areas with geological hazards in the municipality of Usulutan. El Salvador.

Financed by the Catalonian Government. Completed by June 2002.

Several maps of hazards and risk assessment have been drafted to pinpoint the areas with high landslide risk, designing the corresponding civil works needed to eliminate and/or reduce the risk as well as the new location of housing located in hazards zones in the communities.

Underground water supply to the villages of Rompición and Barracones. Gulf of Fonseca. La Unión. El Salvador.

Financed by the Nando Peretti Foundation. Developed from march to June 2002.

The project has solved the water supply problem of these communities by means of two wells. The flow of good quality water obtained will allow the supply to 2500 people of 100 l per person.

Next November the second phase of this project will allow the distribution of water to the final users.

Meetings, Workshops, Seminars, Conferences and Training Courses

- Workshop on Geological Hazards in land use management. Nejapa. El Salvador. Financed by UNESCO. 19-23 march 2002.
- Participation of WG in a seminar on low cost housing in seismic hazardous zones. Organised by the NGO Inter-Acción. 26-28 September 2002.
- Annual ECHO meeting. Brussels.
- 2nd Course on General Geology. University of San Salvador.

World Geologists has organised this course for the third consecutive time in co-operation with the University of Catatonia, the University of Madrid (UCM) and the University of El Salvador. The course has included the

following modules: general geology, mapping, vulcanology, seismics, hydrogeology, geological engineering and environmental geology. 40 students with different careers attended. The course if of great importance in a country where the academic career of geologist does not exist in spite of the number of geological hazards present in the country.

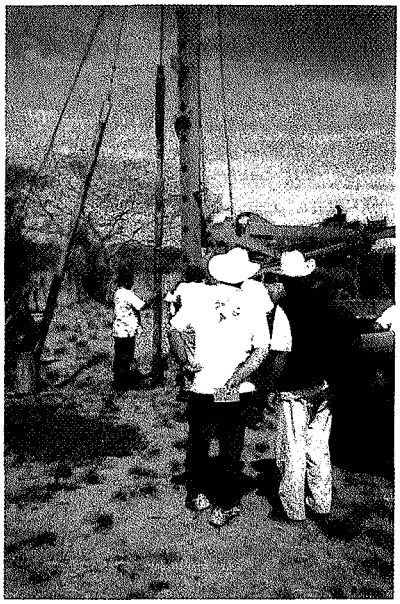
- Conference in the Geological Survey of Spain on the role of World Geologist in international co-operation.
- Conference on the Press Club in Oviedo (Asturias) on the above subject.

Current projects

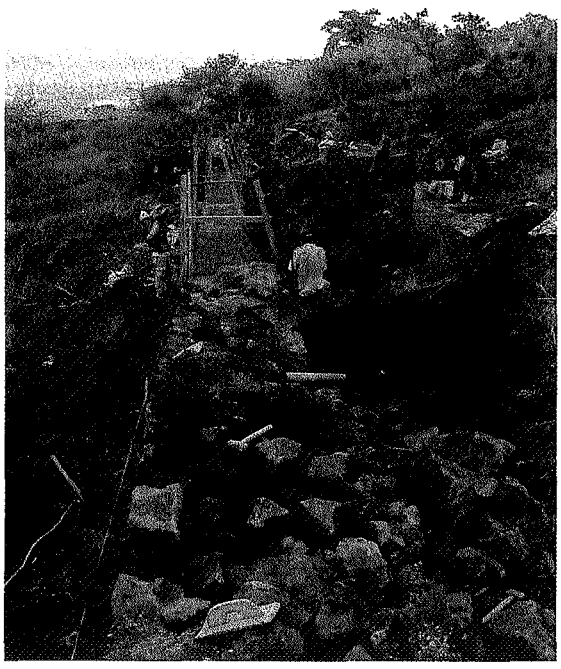
- Co-operation with Architects Without Frontiers in the supply of underground water to several villages in Burkina Faso. Started in august 2002.
- Water supply to 3 villages (Eolo, Beo and Bwa) of the Prefecture of San Mali. To start in November 2002. Will try to solve the water supply problems of 1500 people in an area of extreme poverty and drought.
- Characterisation of geological hazards and sizing of the hydrogeological resources in Nejapa, El Salvador. Financed by the County of Barcelona. To start in November 2002.
- Geological, hydrogeological and environmental analysis for the communitary development of primary health assistance (PHA) in the municipality of Jucuarán, San Salvador. Financed by the Catalonian Government. Will be carried out together with Medicos Mundi. To start in November 2002.

Future projects, pending financial support

- Chumbai project. Construction of two wells for underground water supply and irrigation of rural communities on the slopes of the Cotacachi volcano. Imababura. Ecuador.
- Underground water supply for the inhabitants of the Meanguera Island Fonseca Gulf. La Unión Dpt. El Salvador.
- Underground water supply for the inhabitants of the Zacatillo Island Fonseca Gulf. La Unión Dpto. El Salvador.
- Underground water supply for the villages of Peñas Blancas, El Chagüite, Agua Caliente and San Felipe. Municipality of Pasaquina. La Unión Dpt. El Salvador.



Hydrogeologists Bravi and Contreras in a trial drilling project, Rompición, 2002



Building of retention wall, southern San Miguel volcano slope, El Salvador, 2002

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News and events 2002-2003

Czech Republic

Conferences 2003

25 – 28 Aug: ECSMGE XIII[th] European Conference on Soil Mechanics and Geotechnical Engineering: Geotechnical problems with man-made and man-influenced grounds. Prague, Czech Republic. Contact: Prof. Ivan Vaníček.e-mail: csmge@fsv.cvut.cz www.ECSMGE2003.CZ

15 – 19 Sept: International Association of Hydrologists International Conference on Groundwater in Fractured Rocks. Prague, Czech Republic Call for abstracts. www.natur.cuni.cz/gwfr2003

Germany

Conferences 2003

8 – 14 Sept: Association of European Geological Societies – MAEGS13 Running Water – Geoscience and the European Water Directive (provisional title) Bundesantalt fur Geowissenschaften und Rohstoffe. Contact: Dr Jens Wiegand. e-mail: jens.wiegand@uni-essen.de

News

The floods in Germany, August 2002 by EurGeol. Detlev Doherr

'Dresden and it's famous Semper Opera house below water', 'dozens of villages exacuated' - pictures of the floods in Germany have been broadcast by news stations all over the world. Now that water levels have receeded, local authorities, businesses and private householders have begun to assess the damage done. A call for the support of the armed forces by the Association of German Geoscientists (BDG) and member companies affected by the floods received a clearly positive response. Help for the soldiers already at work trying to counteract the damage of the floods has come not just from state branches of the BDG but also from companies and private individuals. This help has been in the form of free primary advice for those involved. As a result, questions relating not just to the general consequences of the floods but also to specific questions concerning the degree of the damage and remedial action could be answered in a quick and clear manner. The BDG provides a list of those companies involved that can be obtained from the BDG main offices in Bonn. e mail: BDGBonn@t-online.de

Ireland

Conferences 2003

26 Feb: IGI, Conference on land use and spatial planning. Dublin Castle. General enquiries: Susan Pyne. e-mail: admin@igi.ie

27 Aug – 3 Sept: 21[st] International Geochemical Exploration Symposium IGES 2003. University College Dublin. General enquiries: Eibhlin Doyle (GSI). e-mail: eibhlindoyle@gsi.ie

31 Aug – 3 Sept: 3[rd] North Atlantic Minerals Symposium NAMS 2003. University College Dublin. General enquries: Nicola Meenan, Conference. Partners Ltd., 96 Haddington Road, Dublin 4.
e-mail: nmeenan@conferencepartners.ie

Italy

Conferences

17 – 20 June: European Congress on Regional Geoscientific Cartography and Information Systems Bologna, Italy. Call for papers. www.regione.emilia-romagna.it/geologia

Spring 2003: ANGI Convention on Environmental Protection Milan
Contact: Largo Richini 8, 1-20122- Milan

Autumn 2003: ANGI Convention on Hydrogeological Risk (in cooperation with LIONS). Milan

Courses

Summer 2003: ANGI Training course for environment technicians (in cooperation with UNITEL). Bergamo and Brescia

Netherlands

Conferences

20 - 21 Feb: EMSAGG Conference in Delft, the Netherlands. European Marine Sand and Gravel - Shaping the Future. Organisation: Jacqueline Kalkman, TU Delft Congress Office, P.O. Box 5020, 2600 GA Delft. Tel: +31-15-2788022, Fax: +31-15-2786755 e-mail: J.Kalkman-Baijens@FD.TUDelft.nl

12 - 17 May: Geofluids IV – 4[th] International Conference on Fluid Evolution, Migration and Interaction in Sedimentary Basins and Orogenic Belts Utrecht, the Netherlands. More information: www.nitg.tno.nl

10 - 16 Aug: XV[th] international congress on Carboniferous and Permian Stratigraphy. Utrecht, the Netherlands. More information: www.nitg.tno.nl

Slovenia

Conferences

26 – 29 May: 3[rd] International Conference on GIS for Earth Science Applications Organised by Geological Survey of Slovenia. Ljubljana, Slovenia. Details: www.geo.si/i-ggg/konferenca_icgesa/konferenca_icgesa.htm

Meetings

13 - 14 June: Annual Council Meeting E F G. Ljubljana, Slovenia

USA

Conferences

27 March – 2 April: International Association of Hydrologists/United States Geological Survey/National Ground Water Association. 2[nd] Conference on Salt Water Intrusion in Coastal Aquifers: Monitoring, Modelling and Management (SWICA II) Merida, Yucatan. Contact: Patricia Beddows. e-mail: Patricia.Beddows@bristol.ac.uk

4 – 9 Oct: 40[th] Anniversary Annual Meeting of the American Institute of Professional Geologists (AIPG). Glenwood Springs, Colorado, USA. Details: www.aipg.org.

Courses

Robert Font has 2 courses available on-line
1) Petroleum G&G Course
2) Geohazards
First module, free of charge.
www.geosciencedm.com

UK

Conferences

7 – 9 Oct: 6th Petroleum Geology Conference: North West Europe and Global Perspectives. Queen Elizabeth II Conference Centre, London. Deadline for abstract submittal 31 December 2002. Contact: www.geolsoc.org.uk or www.pesgb.org.uk or www.petroleum.co.uk

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:

Maureen Mc Corry
Kaplevej 7
2830 Virum, Denmark
e-mail: Harper-mccorry@mail.tele.dk

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.