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AIPG needs quality articles for future issues of The Professional Geologist. Members are encouraged to submit articles or call Headquarters and recommend individuals who should be asked to submit articles. Submissions should be 800 to 1600 words in length. Articles submitted on diskette along with a hard copy are appreciated. Headquarters uses DOS, WordPerfect 5.1, and can utilize 3 1/2 or 5 1/4 diskettes. Photographs, figures, tables, etc. are welcome. Photographs enhance articles and make great TPG covers. Be sure to send photographs when possible with your articles OR send your favorite photograph for consideration as the cover for a future TPG issue. Submission deadline is six weeks preceding month of issue.

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TECHNICAL TOPICS
Mining Geology
Petroleum Geology
Hydrogeology
Environmental Geology
Geophysics/Engineering

ISSUE
January
March
July
September
November

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Some Perspectives On
The Future Of Geology In Mining
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David M. Abbott, Jr., CPG-4570

COVER - Picture taken in 1971, is of an old gold stamp mill located in the Comstock Mining District in Nevada; the structure is no longer standing. — photo by Edward E. Bohn, CPC-7862

DEPARTMENTS

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AIPG, 7828 Vance Drive, Suite 103, Avada, Colorado 80003-2124.
Russell G. Slayback, CPG-2305

At the beginning of any endeavor one should consider goals or objectives to strive toward. Goals should be reasonably attainable - a stretch but not unattainable objectives; our reach should never exceed our grasp. Having never served as president of a national geologic organization, my first goal is not to embarrass myself and to be a worthy successor to Bill Fisher and an outstanding line of previous AIPG leaders. However, we should have a few more specific goals to measure 1994 against.

So as I begin a term as AIPG’s 30th President, let’s strive toward these objectives:

• **5,000 AIPG Members By The End Of 1994**

This elusive membership total has been within reach for many years but keeps eluding us, as different sectors of our profession suffer economic hardship from time to time. For 1994, it can be attained if we do a good job of keeping present members and maintain the recent rate of growth of new CPGs. Each of you must know a good geologist or a few who should become AIPG certified; seek them out and urge them to apply in 1994.

• **A Stronger Governmental Affairs Program**

I am pleased to report that 1992-93 AIPG Secretary Bob Merrill has agreed to head our 1994 National and International Affairs Committee. Bob and his committee will be working to develop position papers on key issues affecting geologists, especially in areas known to be subject to 1994 action by the U.S. Congress. These position papers will be reviewed and modified as necessary by the Executive Committee, and will be published to support AIPG positions before legislative bodies. The overall committee charge has been expanded this year to include international affairs, reflecting the growing market, opportunities and necessity for geologists to be involved in the international market. AIPG will also financially support a stronger AGI Governmental Affairs Program in 1994.

• **Continued Improvement Of AIPG Publications**

If any AIPG service deserves credit for ongoing improvement in recent years, it is *The Professional Geologist* and the other AIPG publications including the remarkable full-length book *The Citizen’s Guide to Geologic Hazards*. In 1994, Editor Charles Wm. Dimmick plans on revision and re-publication of several items in the Guides to Professional Practice series, and possible a start on another book-length publication.

• **Improvement In National - State Section Communications**

AIPG’s strength is the strength and local involvement of its state and regional sections. Too often, these sections feel isolated from national AIPG activities and then fail to participate in the Advisory Board and other national AIPG opportunities. Vice President Steve Testa has agreed to help in this area by developing more regular communication with state section officers. We will try to keep informed about local meeting schedules so that national officers and Executive Committee members can try to augment Bill Knight’s periodic section visits.

• **Quicker Processing Of Applications**

Processing of applications for certification has been a periodic problem. We thought we had it solved in 1991-92 when average processing time got down to 6 months but we just got swamped in 1993 by the number of new applications. For 1994, we plan to add members to the National Screening Committee and modify some of the committee procedures to get back to the 6-month schedule. Any shorter time does not allow for the proper verification and evaluation of qualifications for certification.

• **Clarification Of AIPG’s Position On State Registration**

For some time, AIPG’s position on state registration or licensing of geologists has been supportive of local efforts to achieve such legal status, but there remains a lingering perception that AIPG opposes registration. AIPG policy statements on this issue and two related registration/certification issues appear on pages 41, 42 and 44 of the 1993 Directory. The Executive Committee will strive to clarify these policies into one coherent policy during 1994.

• **Distinguished Essayists**

Discussions during the informal part of the Annual Business Meeting in Springfield last October indicated that AIPG was not doing enough to inculcate professionalism and ethics in our newer members. We have a marvelous talent pool in our past presidents and other officers, and national award winners. We will try to tap these talents with a Distinguished Essayist series in *The Professional Geologist*.

How about it? Do you have any pet programs that you think AIPG should focus on? Let me know and I will bring it before the Executive Committee.
SPECIAL REPORT

Mining Geology

Part 1

Round Mountain Gold Mine in Nye County, Nevada -Jonathan G. Price, CPG-7814
Some Perspectives On The Future Of Geology In Mining

Jonathan G. Price, CPG-7814

Geology has a bright future in mining. I base this prognostication on three assumptions: (1) demand for mined products will grow, (2) there are still major ore bodies to be found, and (3) environmental concerns will make the business more challenging.

Long-term demand for mined products can be linked to population. All indications are that world population will continue to rise, more people will demand a higher standard of living, and there will be more demand for water, food, energy, and mineral resources. As more people move to urban areas, physical infrastructure will be stressed, and the demand for industrial minerals will increase. Conservation and changing lifestyles in the affluent countries will help to lessen the increasing demand for resources; nonetheless, demand will grow.

Demand for certain low-value resources, such as aggregate and raw materials for cement, will increase as population grows and physical infrastructure is repaired and improved. A major problem facing the miners of raw materials is access to land. Ironically, although everyone wants inexpensive aggregate (which, given the cost of truck and rail transportation, generally means that the material should come from a local source), few people want a quarry near their homes. Zoning rarely takes into account the need for aggregate resources for either development or maintaining infrastructure. Furthermore, consideration of the increased truck traffic and resultant air pollution that is a consequence of locating quarries farther from towns generally is lacking.

NIMBY (not in my backyard) and NIMTOO (not in my term of office) attitudes will continue to hamper the mining industry. This is occurring for essentially all activities (from industrial mineral quarries and metal mines to smelters and waste disposal facilities) and at all levels (from local to international). For example, at the local level, it is difficult to locate an aggregate quarry near New York City. At the national level in the U.S., opposition arises to nearly every new mining operation. Even the Indonesian government does not permit exploration for metals on Java, its most populous island.

Mining is clearly an international business. The distribution of ore deposits is uneven geographically, in size, and in grade. High grade, large size, and superior technology generally can overcome most obstacles, such as disproportionate taxes and royalties, inhospitable conditions, competing land values, and environmental concerns. Some places likely will remain inaccessible for the foreseeable future (U.S. National Parks, Wilderness Areas, the continent of Antarctica, inner cities, the Moon), and more lands likely will be withdrawn from mining.

If the recent past can be used to predict the future, then geologists will continue to find major ore bodies. Take the U.S. gold industry as an example. (For details, please refer to Nevada Bureau of Mines and Geology Special Publications 14 and MI-1992, which discuss the U.S. gold and Nevada mining industries, respectively.) Prompted by relatively high prices, mining companies increased gold exploration in the late 1970s and into the 1980s. The result has been a dramatic rise in U.S. gold production (an increase from 1980 by a factor of almost ten), such that the U.S. is now second only to South Africa in annual gold production. Gold production in the U.S. today is at an all-time high, approximately three times that during the peak year following 49ers' gold rush to California.

Exploration successes in the 1980s and 1990s have assured vitality for the mining industry in the U.S. for the foreseeable future, unless government restrictions severely limit the ability to mine what has already been found. Nevada leads the nation in gold production, accounting for 6.5 million troy ounces (valued at approximately $2.25 billion) and approximately 60% of the U.S. total in 1992. At the end of that year, announced reserves and resources in Nevada totaled approximately 138 million troy ounces, enough to keep the industry afloat for 20 years or so.

Although exploration in the U.S. appears to have peaked in about 1988 (according to such measures as the numbers of claims filed on federal lands), major finds continue to be made. Many of these new finds have been made in established mining districts, and several significant finds have been totally blind deposits, discovered beneath hundreds of feet of alluvial overburden.
Most of the major finds in recent years in Nevada have been sediment-hosted (Carlin-type) deposits. The Goldstrike mine in the Carlin Trend, which is now operated jointly by American Barrick Resources Corporation and Newmont Gold Company, had a 1992 year-end reserve of 21 million ounces of gold. Although the deep ore bodies in this mine will be removed from an open pit, other sediment-hosted deposits are and will continue to be mined by underground methods.

Gold fever is still among us. Two years ago a mine geologist at the Round Mountain mine in Nevada hand picked approximately 100 pounds (not ounces) of gold in an afternoon. An exceptionally high-grade, low-angle structure was intersected during mining of the ash-flow tuff host rock. Over 40,000 tons of material with a recoverable grade in excess of one ounce per ton was mined from this structure. Typical average grades at this mine, which in recent years has produced on the order of 300,000 to 400,000 ounces of gold per year, are between 0.03 and 0.04 ounces per ton.

Pressure will build on all fronts (from negotiations of trade agreements to loans for international development) to level the environmental and human-health playing fields, but poorly developed countries striving to better their own overall standards of living will continue to make shortcuts. Miners (often minors) in Africa, South America, and in the Pacific islands continue to extract gold with amalgamation, to expose themselves to what we would consider unacceptable concentrations of mercury vapors, and to pollute their rivers with mercury.

Environmental concerns offer a challenge for geologists. Most major environmental questions that concern a mining operation are either strictly geological or are in part geological. For example, one of the challenges facing the Nevada gold mining industry is hydrogeologic - how much water will be pumped to dewater the mines, what are the water-quality issues, how will the water be disposed, and what will be the long-term impacts on regional ground-water resources from dewatering and from evaporation from lakes in open pits that later fill with water. Even such issues as mapping the distribution of biological species and ecosystems, which is a major mission of the new National Biological Survey in the U.S. Department of Interior, should have a geological component. Geology, which affects soil types, topography, and drainage, is an underlying control on ecosystems.

Geological and geochemical expertise is needed in environmental concerns about pollution from mining. In many metal mining districts, natural pollutants, such as arsenic, are associated with ore deposits. As a consequence, natural surface and ground waters may exceed the government-stipulated levels for safe drinking water. Although mining can in some cases compound the natural pollution, it is imperative that we understand the natural conditions before we try to clean up water around an abandoned mine or establish post-mining standards for water in the mine area.

Geologists have a responsibility to speak from their knowledge about the environment and the impacts of mining. People tend to marvel at an attractive new building but rarely realize that holes needed to be dug in the ground to provide the material used in the building. When giving talks on the mineral resources of Nevada I generally show a picture of the Round Mountain mine, one with a well-tiered high wall that resembles the Great Pyramid. Why don’t we view mines as engineering achievements rather than as eyesores on the landscape? Most stories written about modern gold mining practices, which involve the safe use of cyanide solutions to extract gold from the ores, inflame the arguments by describing "cyanide-laced" solutions, with the implications of intentional poisoning rather than the practicality of controlling and detoxifying cyanide.

In summary, geologists have a bright future in mining. With continued pressures to restrict access to land for mining, there will be many challenges for individual geologists - to better educate the public about the need for mineral resources, to speak out about the mineral potential on lands proposed for withdrawal from mining, to compete in an increasingly global minerals business, and to resolve environmental concerns.

Dr. Jonathan G. Price is Staff Director of the Board on Earth Sciences and Resources, National Academy of Sciences-National Research Council. He is on loan to the National Research Council from the Nevada Bureau of Mines and Geology, University of Nevada, Reno, where he is the Director and State Geologist.

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JANUARY 1994 • The Professional Geologist 7
I. S. Parrish, CPG-4612, with assistance from
David A. Rhoades, CPG-7630

The mining geologist is the grunt of his profession. In football terms he is the offensive lineman, whereas, the exploration geologist reflects the glamour of the wide receiver or running back.

The mining geologist has two principal responsibilities: Grade Control and Reserves. To accomplish these he must understand the geology and genesis of the ore deposit being mined. This understanding is developed through mapping, sampling, and drilling. Too many geologists assigned to mines become so wrapped up in the detail of mapping, sampling, and drilling that they fail to convert this data into grade control and reserves. Too many mines confine their geologists to mapping, sampling, and drilling, assigning responsibility for grade control and reserves to the engineers.

For an effective grade control program the mining geologist must not only understand the ore body, but he must convey that understanding to the rest of the mining team. Communication by memos, by graphs, by maps, and by example is essential.

The greatest shortcoming in most young mining geologists is their failure to communicate.

As a longtime mine geologist I have tried various methods to get my message across. I've hung graphs in the engineering office, the shifters office, and by my grade control officers' lockers. The graphs showed daily, weekly, monthly, and annual production as budgeted and as realized. I've badgered people whenever there was a deviation. Why? How? and sometimes, Who?
On a monthly basis I provided the mine office with bench maps showing outlines of ore to be mined. These were made before the area was drilled by blast holes and helped in mine planning. The outlines were derived from working cross sections which incorporated information from drill holes, blast holes, test holes, pit sampling, and geological mapping. The Mine Superintendent and Pit Bosses could see whether my estimates (ore outlines on bench maps) were accurate and soon made their own effort to contribute to a more accurate estimate through such means as addi-
tional test holes, etc. The result was better communications among the geology department, engineering department, and production crew; a greater trust for each other; and a better prediction of ore zones resulting in a better mining plan.

Shifters and pit bosses were given periodic courses in grade control, much in the fashion of the safety courses they had to attend and also on a periodic basis. I would have crates of rocks lying about. The shifters were asked to assign a grade to each crate. Whoever made the closest estimates received a 12-pack of beer at the end of the shift.

A similar program kept my geologists sharp. Each geologist logged so much core. He had to estimate copper grade of each sample sent for assay. A daily record of estimates and assays was posted in the geology office. Each Friday the geologist with the best weekly score drank at the expense of the rest of the crew.

I carried a Polaroid camera around the mine taking pictures of poor grade control practices. The pictures were produced at weekly or monthly production meetings. After a short while there was no need to even load the camera. Its presence in my truck was enough to assure proper mark-up, drilling, and clean-up.

Daily grade control, separating waste from ore and ore from waste, may not have the pizzazz of finding a new ore body, but is essential if a mining company is to remain in business. The mining geologist directing an effective grade control program pays his wages most every day of the year. A precious few exploration geologists find ore bodies. The vast majority, although working long and diligently, never pay their way. For the mining geologist there is a deep satisfaction in the knowledge that his work is worthwhile, and through his efforts a
natural resource was recovered and not wasted.

Reserves are the inventory of the mineable portion of the resource. To maximize the reserves one must have a thorough understanding of the geology of the ore body and the nature and controls of the mineralization. This knowledge enables the mining geologist not only to assist in mine planning, but also to direct local exploration to extend reserves.

Again, the ability to communicate his knowledge is paramount so that both long and short range planning are orchestrated to maximize recovery of reserves and for prioritization of exploration targets.*

AGU Introduces Earth and Space Index (EASI) Version 1.0

AGU's first electronic index on disk is now available. The Earth and space Index (EASI) Version 1.0 (1991-1992) comes with search and retrieval software, has nearly 10,000 references, and is the only database of all AGU publications. Users can find full bibliographic references including journal article, book title, individual articles within books, translation articles, maps, and articles from EOS. EASI sells for $24.00 list and $16.00 for AGU members. The package includes two 3-1/2" diskettes for either IBM-PC (MS-DOS) or Macintosh computers.

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Saving Geoscience Data

Preliminary results from AGI's survey of more than 800 organizations indicate broad support and interest in the geoscience community for developing a process for capturing and retaining geoscience data in jeopardy of being lost. Large international oil and gas companies that are reducing operations in the United States would be major data contributors to a repository system. The geoscience community and independent oil and gas producers would be the primary users of data in the system. The steering committee for the National Geoscience Data Repository System met July 14 in Dallas to review preliminary results of the survey. Contact: AGI Executive Director Marcus E. Milling for more information.*
TOMMY KNOCKERS

Tom Steven

I once worked in mines, but I was not a miner,
I found the ore that others mined,
And studied empty holes to find out
Why the ore once there, was there,
But I did not mine it

But as I prowled and probed and looked,
I tested for a life within the rocks,
I sought the spirit of the earth that
Transcends the mud and broken rock
That form a mine's externals

The working mines, with all their bustle,
Noise, and distractions, were hopeless
For my purpose, for what I sought
Was shy and timid, lying hidden in the walls,
In patient wait for man to cease his tumult

When ore was gone, and miners long departed,
The empty holes again became the realm
Of Tommy Knockers, whose taps and creaks
And ravelling runs of broken rock
Gave warning that the earth again belonged
To them, and that those like me, who trespassed,
Best beware, for fate at last was theirs to deal

As I intruded where ghosts alone remained,
And crawled the edges of then-crumbling stope,
Littered with the gob that came from far above,
At times I doused my light to listen,
To hear the voices in the blackness,
A blackness that would close and hold me,
Softly, yes, but firmly, firmly,
As those voices spoke

There, a creak, a whispered cry of pain
From a rotting stall that was taking weight;
It was doomed, of course, but so was I,
And would we break together?
A splash as a drip of acid water
Found its target in the darkness,
A clatter as an isolated rock came
Tumbling from above, dislodged by what,
Or whom, I did not know. A distant tap,
An obscure rattle, the clamor of deep silence,
Those were the voices heard

Or in the illusory haven of a low-backed drift,
Where I stretched my tape and cut my samples,
There as well I'd listen as the Tommy Knockers talked,
There I'd listen for the warning that would say
GET OUT, GET OUT OF HERE, OUT NOW!
And I would go, down the drift and up the raise,
Scrambling with my tools and pack and samples
Along the haulage toward the portal till
At last the daylight bend, and LIGHT
Robert H. Paschal, CPG-0118

I'm talking about mining geology from the perspective of having appraised mines over the past 27 years in ten states from Alaska southeast to North Carolina, mines that produce zinc and copper and iron and tungsten and borates and clay and coal and limestone and, most prosaic but perhaps most necessary of all, construction rocks, namely crushed rock and sand & gravel.

Now, appraising mines isn't exactly mining geology, but it's a good way to learn about mining economics, which is what influences employment of geologists. A word about jobs: Exploration for metals is probably the most fascinating side of mining geology, while production geology -- that done in the course of continued mining -- is probably the dullest. That was very likely the reason for the item that hung above the door to the geologists' office at Kennecott's longtime operation at Ruth, Nevada. It was not mistletoe, but a sign that read: "Abandon hope, all ye that enter here."

One thing that's all too obvious about mining in the United States is that it's getting harder every year to do it. The main reason is not geological, but rather social and political, and so much has been written on it that I won't belabor it here.

Suffice it to say that NIMBY -- not in my back yard -- now prevails. Sometimes it's justified, but more often not. In most cases, NIMBY is based on simple ignorance of the general use of minerals, since most people are unaware how much they use. And I mean ignorance which, unlike stupidity, can be cured. The role that geologists can play in curing this form of ignorance is substantial.

Ironically, it's still not too tough to open a new gold mine in Nevada or Alaska. I say "ironically" because society could probably get along more easily without gold than any other mineral you could name.

One example of the peculiar directions that ignorance about minerals can take: The main market for aggregate deposits that lie in one small-population California county is an adjacent metropolitan county, some people in the small county asked: "Why should we have to provide sand and gravel for another county?" This, of course, is provincialism in the extreme. The proper retort would be: Why should Kansas provide wheat for your bread? or Michigan your automobiles? or Florida your grapefruit? Etc.

Geologists can and should do a job here by testifying at public hearings, writing letters to newspapers, et al. They should be factual letters, based where possible on such sources as the bulletins published by the U.S. Bureau of Mines.

Back to rock and gravel: 1.97 billion tons were produced in the U.S. in 1992. Put another way, that is 3.94 trillion pounds, which makes copper's three billion pounds small potatoes. What's more, it amounts to 7.72 tons per person per year, for every man, woman, and child.

Someone may say: "Who, me? I didn't use any 7.72 tons last year, and I don't know anyone who did." But
buildings and streets and freeways and other odds and ends made up the difference. For example, a 1,500-square-foot home with a slab floor and a double garage, plus driveway and sidewalk, will eat up about 74 tons of aggregate plus 13 tons of portland cement. The people who built my larger home with four-car garage used up 144 tons of aggregate, enough to take care of 18.65 average people for a year.

One little-known, or at least little-appreciated, geologic wonder: The hundreds of millions of tons of Pleistocene gravels at the base of the mountains north of Los Angeles, that stretch for 58 miles from San Fernando east to San Bernardino. Without that remarkable resource, no L.A. freeways, no swimming pools dotting the landscape. Or would that really be so bad?

California’s legislature did a remarkably intelligent thing some years ago when it enacted a law that requires local governments to recognize useful aggregate deposits, and to restrict to the extent possible their being condemned or covered up by urban expansion. The main defect in the law is that decisions are indeed left in the hands of local governments, which may be more subject to political pressures from developers than they can withstand.

In any event, the role of geologists in this legislation is paramount. The State Division of Mines and Geology has the responsibility for delineating aggregate deposits. It has met this responsibility by publishing a highly professional series of reports on aggregate deposits near metropolitan areas. It’s hard to imagine any more useful job for society that American geologists might perform.

I last did an honest day’s work as a geologist thirty-one years ago, yet my letterhead read “Consulting Valuation Geologist.” What do I do to merit that fairly proud title? It’s a job that’s done by very few people who are competent to do it, and I won’t be around much longer, so I’m going to tell you. My work consists primarily of making estimates of the fair market value of mines and quarries. It’s interesting work, and it’s profitable, so one might wonder why more people haven’t gone into it.

Since appraisement requires an understanding of three-dimensional depleting mineral properties, a background in geology or mining or petroleum engineering is indispensable to full understanding and rational conclusions. That’s why I used the word “competent” above. Some flatland real estate appraisers attempt to appraise mineral properties, and even write appraisal reports, always with disastrous results.

When I was actively appraising oil and gas properties as well as mines, a real estate appraiser once said to me: "If you will just give me an oil property’s reserves, its current rate of production, its production decline rate, the price of the oil, the operating expenses, and the discount rate, I can appraise it." The correct answer to that statement, which I made, is: "Ray, if all that information is available, a clerk can appraise it.”

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The above laundry list for appraising an oil property is much like one for a mine or quarry. Except in the case of construction rocks, and often even then, the appraiser may accept the operator's estimate of reserves, because this estimation, especially in the case of vein or disseminated deposits of metallic minerals, is a very large and costly chore.

But, given adequate historical data, the appraiser must make his own judgements on everything else. It's evident that most of these judgements lie in the area of finance and economics, not of geology. In fact, any geologist not interested in financial analysis is ill-advised to become a mineral-properties appraiser, because it's always in the area of finance, not geology, where the arguments lie.

This means that a geologist shouldn't just say some day: "Hey, I think I'll start appraising mines for a living." Before-hand, that geologist should learn appraisegment, using a standard textbook on the subject plus D.L. Gentry's and T.J. O'Neill's "Mine Investment Analysis," published by the Society of Mining Engineers.

A bit of serendipity here is that work as an appraiser inevitably makes one more acute about one's own financial affairs. And who's to argue with that?

It is an oddity that there are few "older" mining geologists. With maturity many mining geologists gravitate towards production work as pit foremen, or mine superintendents. Others make the conversion into exploration geologists. The attention to detail and the appreciation of cost factors provide a background useful in exploration. Exploration geologists, or the other hand, seldom make good mine geologists. They, by the very nature of their job, must be optimists. The young professional who goes into mining geology soon learns to be a pessimist. He learns that no matter how fine an ore lense he has delineated, the miners will trash it unless he stays on their case. And, like the offensive lineman, he can only hope that his efforts will provide the means for yet another score.

Title of European Geologist

The following appeared in the September/October, 1993, Geoscientist, publication of The Geological Society of London. By special agreement between AIPG and the Geological Society, the way is open for AIPG Members to attain the title of European Geologist via the title of "Chartered Geologist."

The Geological Society is a member of The European Federation of Geologists, and the Federation Council ratified the procedure for the award of the title of 'European Geologist' at its meeting in Brussels in November 1992.

Chartered geologists with earth science degrees can now apply for the title without further validation, and application forms are currently available from Jackie Maggs, the Society's Membership Manager.

The cost of registration and subscription for the first three years from the EFG has been set at 150 ECUs, with subscriptions thereafter at 25 ECUs per annum. (£1 = 1.270 ECU as at June 1993.) The Geological Society Vetting Committee has agreed the additional figure of £30 for the first three years, and thereafter a charge of £10 per annum. The advantages of receiving the award of 'European Geologist' will be the recognition of a high standard of education and experience endorsed by the Member Associations of the Federation and the European Community.

Following the finalization of the Single Market in January 1993, the free movement of professionals will begin to become a reality, and with respect to insurance matters, there are a wide variety of legislations and attitudes to legislation that will need to be appreciated by geologists throughout the EC. The title of 'European Geologist' will be a common standard of practice which will be accepted as a mark of quality, which will enable preferential rates of professional indemnity insurance to be made available to those members given the title. Furthermore, if a significant number of Chartered Geologists become European Geologists, the political credibility of the Society and the European Federation of Geologists will be enhanced in future dealings with Brussels and Strasbourg.

There is a great difference between working as a professional in the UK compared to one who is working throughout Europe, where recognition by the authorities and the public can be the difference between employment and unemployment. The award of the title of 'European Geologist' is the way forward for professional geology in an expanding Europe.

Those interested should contact AIPG Headquarters for information on becoming a "Chartered Geologist."
STATE NET

UNITED STATES S 1622
AUTHOR: Braeux
INTRODUCED: 11/6/93
SUMMARY: Amends the Internal Rev. Code 1986 to treat geological, geophysical, and surface casing costs like intangible drilling and development costs.
STATUS: 11/04/93 INTRODUCED.

UNITED STATES S 1679
AUTHOR: Laurenberg
INTRODUCED: 11/19/93
SUMMARY: Establishes a program to develop and demonstrate innovative technologies to combat shoreline erosion.
STATUS: 11/18/93 INTRODUCED.

UNITED STATES HCR 188
AUTHOR: Sharp
INTRODUCED: 11/22/93
SUMMARY: Expresses the sense of the Congress that a dramatic new direction in Federal Government energy research, development, demonstration, and commercialization funding priorities should be adopted to improve environmental protection, create new jobs, enhance U.S. competitiveness, and reduce the trade deficit.
STATUS: 11/22/93 INTRODUCED.

UNITED STATES S 1670
AUTHOR: Hanin
INTRODUCED: 11/19/93
ENACTED: 12/03/93
SUMMARY: Improves hazard mitigation and relocation assistance in connection with flooding.
STATUS: 12/03/93 SIGNED

UNITED STATES S 29291
AGENCY: Dept. of the Interior/Off. of Surf. Mining Reclam. & Enforcement
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION—18
SUMMARY: Requires all underground coal mining operations conducted after 10/2/92, to promptly repair or compensate for material damage to non-commercial buildings and occupied residential dwellings and related structures as a result of subsidence due to underground coal mining operations.
CITATION: 30 CFR 701, 784, and 817
PROPOSAL DATE: 09/24/93
COMMENT DEADLINE: 11/23/93
HEARING DATE: 11/08/93, 11/09/93, 11/19/93, 11/22/93

UNITED STATES S 29317
AGENCY: Department of the Interior/Bureau of Land Management
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION—18
SUMMARY: Amends the NCRs regulations governing the disposal of uranium mill tailings. The amendments are intended to clarify existing regulations by ensuring timely replacement of the final radon barrier by requiring appropriate verification of the radon flux through that barrier.
CITATION: 43 CFR 27/20
PROPOSAL DATE: 09/28/93
COMMENT DEADLINE: 11/2/93

UNITED STATES S 478
AUTHOR: Ortis
INTRODUCED: 11/22/93
SUMMARY: Authorizes the Secretary of the Interior to negotiate agreements for the use of Outer Continental Shelf sand, gravel and shell resources.
STATUS: 11/22/93 INTRODUCED.

UNITED STATES S 29464
AGENCY: Dept. of the Interior/Off. of Surf. Mining Reclam. & Enforcement
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION—18
SUMMARY: Revises existing definitions of "arsenical" and "coal"; to add definitions of "bituminous/subbituminous" and "lignite"; bituminous and subbituminous coal and "lignite coal."
CITATION: 30 CFR 700, 701, 705, 706, 715, 716, 785, 825, and 870
PROPOSAL DATE: 10/07/93
COMMENT DEADLINE: 01/07/94
HEARING DATE: 11/2/93, 12/06/93

UNITED STATES 29500
AGENCY: Dept. of the Interior/Minerals Management Service
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION—18
SUMMARY: Amends the regulatory programs of the minerals Management Service (MMS) to state specifically the authority of MMS to require lessees or operators to conduct archaeological resources surveys and submit reports prior to exploration, development and production, or installation of lease term or right-of-way pipelines.
AGENCY CONTACT: Kumkum Ray, Engineering and Standards Branch, Minerals Management Service, 391 Elden Street, Herndon, VA 20220-4817; (703) 787-1600.
CITATION: 30 CFR 250, 256, 280, 281
PROPOSAL DATE: 10/12/93
COMMENT DEADLINE: 12/13/93

UNITED STATES 29622
AGENCY: Environmental Protection Agency
TOPIC: ENVIRON. PROTECTION AND POLLUTION CONTROL—8
SUMMARY: Sets forth requirements for cleanup levels for sites contaminated with radionuclides. These regulations will be designed to protect human health and the environment from exposure to ionizing radiation, and is applicable to sites contaminated with radioactive material subject to the Atomic Energy Act and to Superfund sites, including but not limited to federal facilities.
CITATION: 40 CFR 195
PROPOSAL DATE: 10/21/93
COMMENT DEADLINE: 12/20/93

UNITED STATES 29635
AGENCY: Environmental Protection Agency
TOPIC: ENVIRON. PROTECTION AND POLLUTION CONTROL—8
SUMMARY: Revises the National Oil and Hazardous Substances Pollution Contingency Plan.
CITATION: 40 CFR 300
PROPOSAL DATE: 10/22/93
COMMENT DEADLINE: 12/20/93

UNITED STATES 29751
AGENCY: Department of Energy/Nuclear Regulatory Commission
TOPIC: ENERGY—7
SUMMARY: Amends the NCRs regulations governing the disposal of uranium mill tailings. The amendments are intended to clarify existing regulations by ensuring timely replacement of the final radon barrier by requiring appropriate verification of the radon flux through that barrier.
AGENCY CONTACT: Catherine Matisen, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555; (301) 492-3638.
CITATION: 10 CFR 40
PROPOSAL DATE: 11/03/93
COMMENT DEADLINE: 12/17/93

UNITED STATES 27982
AGENCY: Department of the Interior/Bureau of Indian Affairs
TOPIC: POLITICS AND GOVERNMENT—15
SUMMARY: Amends the regulations concerning the leasing of Osage reservation lands for oil and gas mining to eliminate premium, bonus, or other like payments from consideration in the calculation of the royalty price for crude oil in Osage County, Oklahoma.
AGENCY CONTACT: Gordon Jackson, Superintendent, Osage Agency, Bureau of Indian Affairs, Pawhuska, Oklahoma 74056; (518) 287-1032
CITATION: 25 CFR 226
PROPOSAL DATE: 11/05/93
COMMENT DEADLINE: 01/04/94

UNITED STATES 28899
AGENCY: Department of the Interior/Minerals management Service
TOPIC: ENERGY—7

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SUMMARY: Governs the establishment of financial responsibility for offshore oil facilities and gas facilities with concurrent gas condensate production, and requests comments from interested parties.
AGENCY CONTACT: 30 CFR 253
PROPOSAL DATE: 08/25/93
COMMENT DEADLINE: 12/24/93
HEARING DATE: 11/30/93

UNITED STATES 28999
AGENCY: Department of the Interior/Minerals Management Service
TOPIC: ENERGY—7
SUMMARY: Governs the establishment of financial responsibility for offshore oil facilities and gas facilities with concurrent gas condensate production, and requests comments from interested parties.
AGENCY CONTACT: William S. Cook, Chief, Inspection and Enforcement Branch, 703-767-1610
CITATION: 30 CFR 253
PROPOSAL DATE: 08/25/93
COMMENT DEADLINE: 12/24/93
HEARING DATE: 11/02/93, 11/04/93

FLORIDA H 215 AND S 28
AUTHOR: Ogles, AND BROWN-VAITE
INTRODUCED: 11/17/93, 11/09/93
SUMMARY: Prohibits using an injection well for the disposal of hazardous waste. Allows an injection well already permitted to be used until 12/30/95.
STATUS: 11/17/93, 11/09/93 PREFILED.

FLORIDA S 142
AUTHOR: Committee on Natural Resources
INTRODUCED: 11/09/93
SUMMARY: Places the Department of Environmental Protection in charge of coastal management; authorizes compilation of program; deletes certain duties of the Coastal Resources Interagency Management Committee; requires the Department to conduct a study relating to coastal zone management.
STATUS: 11/09/93 PREFILED.

IDAHO 1401
AGENCY: Department of Water Resources
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION—18
SUMMARY: Relates to development of "negotiated rule-making" on conjunctive water management, joint management of ground and surface water, in the Snake River Plain area; develops procedures for the "negotiated rule-making" which contemplates development of the rule language through public involvement, since it has never done one before; results from legal action involving Department of Water Resources and associated with the Snake River Basin Adjudication.
AGENCY CONTACT: Dick Larsen, Department of Water Resources, Boise, ID 83701, (208) 327-7900
CITATION: (TO BE CODIFIED) Docket No. 37-0312-5001 Conjunctive Water Management
PROPOSAL DATE: 06/19/93
COMMENT DEADLINE: 11/05/93
HEARING DATE: 11/15/93

IDaho 1405
AGENCY: Board of Professional Engineers and Land Surveyors
TOPIC: BUSINESS AND CORPORATIONS—2
SUMMARY: Changes practice and procedure rules; makes minor, technical changes.
AGENCY CONTACT: Dave Curtis, Board of Professional Engineers and Land Surveyors, Boise, ID 83701, (208) 334-3860
CITATION: (TO BE CODIFIED) housekeeping
PROPOSAL DATE: 08/30/93
COMMENT DEADLINE: 01/01/94

illinois 5745
AGENCY: Environmental Protection Agency
TOPIC: ENVIR. PROTECTION AND POLLUTION CONTROL—8
SUMMARY: Concerns a minimal hazard certification procedure for above ground tanks, containers and waste piles that are potential sources of groundwater contamination and are within the setback zones or any regulated recharge area of any potable water supply well in Illinois; establishes procedures for the application, review, certification and decertification processes for minimal hazard determination and provides criteria for the use and management of these potential sources of groundwater contamination.
AGENCY CONTACT: Richard Cobb, Manager Groundwater Section, Division of Public Water Supplies, Illinois Environmental Protection Agency.
CITATION: 2 CCR 404-1 Docket 10-1
PROPOSAL DATE: 09/10/93
COMMENT DEADLINE: 10/12/93
HEARING DATE: 10/18/93
MAINE 4361
AGENCY: Dept. of Human Services/Bureau of Health/Div. of Health Eng.
TOPIC: BUSINESS AND CORPORATIONS--2
SUMMARY: Requires each well driller and initial pump installer to be registered with the state before January 1, 1994; sets forth the application procedures, work experience, reciprocity, examinations, and procedures for the handling of complaints.
AGENCY CONTACT: Francis Drake, Division of Health Engineering, State House Station 10, Augusta, ME 04333 (207) 287-5667
CITATION: [UNCODIFIED] Wall Drillers and Pump Installers' Rules
PROPOSAL DATE: 09/22/93
COMMENT DEADLINE: 10/29/93

MARYLAND 4475
AGENCY: Dept. of Licensing and Regulation/Board for Prof. Engineers
TOPIC: BUSINESS AND CORPORATIONS--2
SUMMARY: Sets revised application fees for initial examination and reexamination of the Fundamentals of Engineering Examination.
AGENCY CONTACT: Mary Myers, Executive Director, Board for Professional Engineers, 501 St. Paul Place Suite 902, Baltimore, MD 21202-2272 (410) 533-6292
CITATION: COMAR 09.23.04 .01 Fees
PROPOSAL DATE: 10/15/93
COMMENT DEADLINE: 12/01/93
HEARING DATE: 12/15/93

MICHIGAN H 5206
AUTHOR: Willard
INTRODUCED: 11/16/93
SUMMARY: Requires landfill reporting.
STATUS: 11/16/93 INTRODUCED.

MICHIGAN H 5143
AUTHOR: Huteson
INTRODUCED: 10/19/93
SUMMARY: Prohibits disposal of hazardous waste in underground mines, caves, or salt formations.
STATUS: 10/19/93 INTRODUCED.

NORTH CAROLINA 2573
AGENCY: Department of Environment, Health, and Natural Resources
TOPIC: RESOURCE MANAGEMENT AND PRESERVATION--18
SUMMARY: Makes exceptions to the new Erosion Rates for development that has been planned on existing lots; incorporates the updated 1992 rates of shoreline change into CAMA for use in delineating the Ocean Hazard Area of environmental concern and for determining setbacks for ocean front development; includes recent trends into the long term average rate of change.
AGENCY CONTACT: Dedra Blackwell, Division of Coastal Management, P.O. Box 27687, Raleigh, NC 27601-7687, (919) 733-2393
CITATION: 15A NCAC 7H .0104, .0304 Coastal Management
PROPOSAL DATE: 11/10/93
COMMENT DEADLINE: 12/01/93
HEARING DATE: 12/08/93

TEXAS H 2043
AUTHOR: Saunders
INTRODUCED: 03/11/93
ENACTED: 08/20/93
SUMMARY: Requires a person making an application to the Water Commission for a disposal well permit to submit with the application a letter from the Railroad Commission concluding that drilling or using the disposal well and injecting industrial and municipal waste into the subsurface stratum will not endanger or injure any known oil or gas reservoir. Requires the Water Commission to hold a public meeting on a new municipal solid waste facility in the county in which the facility is to be located.
STATUS: 06/20/93 SIGNED.

WISCONSIN A 907
AUTHOR: Large
INTRODUCED: 11/17/93
SUMMARY: Requires the abandonment of certain private wells.
STATUS: 11/17/93 INTRODUCED.

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Happy New Year To You All!!

According to the December 7 edition of the Wall Street Journal, the Department of Energy is expected to announce an initiative to stimulate domestic energy production. The gas and oil initiative will begin studies to find ways to increase offshore drilling in the Gulf of Mexico, reduce regulatory restraints on oil and gas production. The administration is also considering whether to charge major California oil producers $422 million for alleged unpaid royalties going back to 1960. It seems to me that the reason for stimulating the oil and gas industry is to enable the Fed to collect more taxes. It's a sign of the times--The gummint gives and the gummint taketh away. At least we'll all have a health program.

So now to the business of the day--THE FEDERAL REGISTER--

Vol. 58, No. 210, 11-2-93
Part IV, page 58630 - Department of Interior. BLM, 43 CFR Part 3180. Final Rule--Onshore Oil and Gas Unit Agreements: Unproven Areas. This rule amends the regs so the government will not lose revenue under unit opns.

Vol. 58, No. 214, 11-8-93
Part III, page 59334 - DOI. DOI - Office of Surface Mining and Enforcement. 30 CFR Parts 870, 886, 887, and 888. Abandoned Mined Land Grant Procedures. Proposed Rule. Proposed regulatory changes to amend grant procedures to ensure consistency with changes Congress has made to Title IV of SMCRA. Should be read by those doing SMCRA associated work. For further information contact: Norman J. Hess, OSM, DOI, 1951 Constitution Ave., N.W., Washington, D.C. 20240; (202) 208-2949.

Here's The Biggie
Vol. 58, No. 222, 11-19-93
Part II, page 61147 to 61596. EPA - Water Pollution Control, NPDES General Permits and Fact Sheets: Storm Water Discharges From Industrial Activity: Notice. You name it, this document covers it.

Vol. 58, No. 223, 11-22-93

Vol. 58, No 229, 12-1-93
DOI - National Biological Survey: Establishment of Organization Notification of establishment of the National Biological Survey. This announcement gives the purpose and proposed organization of the new biological bureaucracy.

Vol. No. 231, 12-3-93

And Finally---
Here's a schedule I wish I had for the same pay they get--
Congress reconvenes on January 25, 1994
they are off 2/12-2/21
they are off 3/28-4/10
Passover 4/27
Easter 4/3
District work period 5/27-6/7
Memorial Day 5/30
District work period 7/1-7/10
District work period 8/15-9/5
Labor Day 9/5
Rosh Hashana 9/6
Yom Kippur 9/15
Target for adjournment 10/7
You figure how many days they work - and remember, you elected them.
Changing Regulatory Climate Constricts AIPG Comprehensive HealthCare Plan

Changes in state regulations are having an impact on the AIPG Group Insurance Program. A fifth state, New Jersey, has joined the list of states where new business can not be accepted. Earlier this year restrictions had been placed on new business in New Hampshire, New Jersey, New York, and Vermont. Coverage remains in effect for individuals previously insured in these five states, but no new applications for coverage are being accepted. The AIPG Group Insurance Program is administered by Seabury & Smith and the Comprehensive HealthCare coverage is underwritten by New York Life.

Although efforts are being made to again serve the health care needs of AIPG members in these five states, there is not yet a solution. Seabury & Smith is monitoring the situation, working with New York Life, and keeping AIPG members informed.

For information about the insurance plans available through the AIPG Group Insurance Program contact the Office of the Administrator at 800-424-9883 or in the Washington, DC area call 202-457-6813.

Pennsylvania Professional Geologist Licensing Applications Now Available

The State of Pennsylvania Board of Professional Engineers, Land Surveyors and Geologists has decided to circulate registration applications for geologists. Geologists wishing to receive an application for registration in Pennsylvania should do so by requesting the "Professional Geologist Registration Application" in writing to:

The State Board of Professional Engineers, Land Surveyors and Geologists
613 Transportation and Safety Buildings
Harrisburg, PA 17120-0029.

Kinross Copper Corporation Receives A Major Permit Required For Its Proposed Underground Copper Mine

Kinross Copper Corporation (formerly Plexus, Inc.) of Salt Lake City, Utah, was issued an operating permit in September, 1993 by the Oregon Department of Geology and Mineral industries (DOGAMI) for a proposed underground copper mine to be located approximately 50 miles east of Salem in the Detroit Ranger District of the Willamette National Forest.

The operating permit from DOGAMI is one of several permits needed by Kinross. It also needs to obtain water rights and approval of the design of a proposed tailings dam from the Oregon Department of Water Resources, water-quality permits from the Oregon Department of Environmental Quality, and an approval of its plan of operations from the USDA Forest Service. Before mining can begin, the company must also file a bond with the USDA Forest Service and/or DOGAMI that will guarantee completion of reclamation of the mine site after mining is completed.

Short-Course Series

Principles and Applications of MODFLOW

March 22 - 25, 1994

Instructors:
Peter F. Andersen and Robert M. Greenwald
(Env Trans, Inc.)

This course focuses on the use of the U.S.G.S. Three-Dimensional Finite-Difference Ground-water Flow Model MODFLOW and its accompanying programs. Lectures on the principles of ground-water flow modeling and the use of MODFLOW will be complemented by hands-on computer sessions during which participants will work through a series of real-world problems.

For more information contact the IGWMC.

igwmc  international ground water modeling center

Institute for Ground-Water Research and Education
Colorado School of Mines
Golden, Colorado 80401-1887
Phone: (303) 273-3103 FAX: (303) 273-3278
Dear Bill:

I wish to call the attention of AIPG members to your October, 1993 column entitled: Next Year's Legislatures. Your evaluation is right on the money. The Colorado Section has worked extensively with the legislative process over the past four years. Our legislators are, for the most part, ignorant of the role geology plays in their state's economy. Our members have been giving legislators and bureaucrats copies of The Citizens' Guide to Geologic Hazards in an effort to educate them as to the role geology plays in the state of Colorado. We have also lobbied extensively in the legislature over the Colorado Geologic Survey, surface owner vs. mineral owner issues, oil and gas issues, and land use issues.

The AIPG, Colorado Section, has gained a lot of political clout in the process. We now have legislators and bureaucrats coming to us about issues. We have a well-developed phone network within the state to alert members to issues of importance so that they can contact their legislators about those issues. Legislators are hearing from our members.

It is now time for AIPG members to become involved in their respective states' geologic issues and in national affairs. This population is ignorant of geology and the role it continues to play in their lives. We, as geologists, must get involved in public affairs. We have a professional responsibility to do so. Responsibility goes along with professional competence, integrity and ethics.

The past four years has been highly productive in building consensus and moving forward. Participation is up in our section as a result of owning our responsibility as geologists to participate in the political process.

Bill, thanks for your well-written article. Your observations are accurate.

Peter R. Clute, CPGE-6038
President, AIPG Colorado Section

Dear Editor:

As a geologist and professional engineer actively involved in mineral appraisals since 1977, I am interested in AIPG's efforts to include geologists in the process. However, my experience indicates that the typical geologist does not understand the appraisal process or even the basic concepts very well, and this has resulted in a considerable amount of poor work. Real Estate appraisers are, therefore, understandably reluctant to share the work, even when they know they should. Of course, most real estate appraisers can make only the most superficial comparisons when faced with a mineral interest.

The solution, in my opinion, lies not with legislating or adopting regulations stipulating who will do what, but with education on both sides of the fence. To this end, I have participated in the Society of Farm Manager and Rural Appraisers Natural Resources Committee which oversees education of real estate appraisers on this topic. As mineral appraisals are rarely sought except when the financial stakes are high and the assets substantial, the geologist involved should be aware of the limits of his/her expertise and also understand the appraisal process sufficiently to provide input that is meaningful.

I suggest that AIPG consider educating its members about the appraisal process. Many qualified appraisers are available who would be pleased to give a lecture or lecture series on the subject and highlight the basic principles.

Central to any appraisal is the concept of highest and best use. For a given piece of real estate that contains minerals, there are also a number of other potential uses that do not involve minerals for which the property might be suited. A geologist not strongly trained in real estate appraisal can have no business determining the highest and best use of the property and therefore, the ultimate appraised value, unless minerals becomes moot. In every case in which my firm has been involved where minerals are a factor, ignorant geologists have proposed fabulous valuations for the minerals and completely ignored other potential uses. If other uses are considered, most geologists presume that the mineral value is then added on to the value for the highest and best use. This is incorrect and only makes a fool of the geologist and his client. Thus, the geologist must realize that participation in any formal mineral appraisal is only a part of a team effort, where other rights are concerned, and a qualified real estate appraiser will be captain of the team.

In addition, we have found that uninformed geologists also tend to rely exclusively on versions of the income approach to value and ignore the most important indicator, the market for mineral properties. In the rare case where an untrained geologist does attempt to incorporate market data, it is usually given little weight in the final valuation. This is due to the misguided idea that the market value of the mineral potential of a property can never be known without extensive exploration and evaluation work. As raw prospects change hands in the market place all the time, it is not necessary to have a proven reserve inventory to appraise the mineral right. However, proven reserves are an absolutely necessary prerequisite for proper application of the income approach.

I call on AIPG to take a more professional approach and seek to act less like a bouncer in a corner bar. Educate the membership regarding the responsibilities of the geologist with regards to the subject of mineral appraisal. Encourage education and training of those members who would wish to enter or remain in this area of practice. In fact, I would strongly recommend that AIPG make some minimal education mandatory prior to practice in this area. The major appraisal organizations stand ready to train anyone who is interested, and AIPG should stand ready to make referrals to interested members.

AIPG's interest and actions in this area are also critical to sharing our expertise with uninformed real estate appraisers who may think themselves capable of evaluating a mineral estate with no formal training as a geologist and/or mining or petroleum engineer. As we all know, the
devil is in the details. The Institute might consider approaching the Appraisers with an offer of mutual education and cooperation.

Thank you for the opportunity to share my opinions with you.

Ellen F. Hodos, P.E., CPG-6966

EARTH SCIENCES RESOURCE CENTER
We recently received the following letter, asking for input. It seems to me that it would be in the best interests of the profession to help out. -The Editor

Dear Editor:

The Department of Geosciences at the University of Houston is developing an "Earth Sciences Resource Center" for the Houston area. This resource center will provide educational materials for K-12 science teachers in the region. This center will contain, among other things, books and curriculum material, videos and slide sets, rock, mineral, and map sets, as well as listings of people and places which can serve as resources in specific areas of interest. In addition, it will serve as a clearing house for bringing teachers and earth scientists in the community together. This center will eventually have on-line capabilities allowing teachers (and their students) to have access to a wide array of educational experiences both in and outside the classroom.

Two of our initial efforts are in the areas of Energy and in Global Systems (e.g. the Ocean/Atmosphere system). We would greatly appreciate any information you might send us about the availability of resource materials you might have on these or any other earth science topics of potential interest to K-12 students and their teachers.

We also would welcome any comments, questions, or suggestions you might have regarding the development of our resource center.

William R. Dupre'
University of Houston
Department of Geosience
4800 Calhoun Road
Houston, TX 77204-5503.

Dear Editor:

In 1861 this great nation was deeply divided by a disastrous Civil War. Some 132 years later, that division of North and South is still noticeable in some areas of the country. It still affects the way some very nice people think about other very nice people.

Today our great nation is once again being divided...but, this time it is an East and West division! I believe that a large majority on both sides of this division do not desire such a catastrophe and don't realize that we are approaching the point of no return. All over the world countries are dividing into smaller countries. This tends to eliminate "BIG BROTHER". Perhaps it is time to think about this? California will vote to become two or three states...Australia is thinking about dividing into two countries. Canada has been thinking about dividing for years, etc.

It is completely unbelievable that one part of the country wishes to impose, BY FORCE, their ideas, beliefs, standards, etc. on another part of the country, destroying thousands upon thousands of jobs, destroying our way of living, dislocating thousands of families and creating havoc to society in general without any thought whatsoever of compensation. As in 1861, we are again approaching a time when a continuation of present policies will lead to a lot of bloodshed. Will we again start a hatred that will last for generations? Some people in the West already have acquired an active hatred that may last beyond their lifetime...a hatred that could lead to bloodshed at any time.

The attack is comprehensive, all-encompassing, invading every facet of our lives. The ultimate goal is the destruction of private property rights and the loss of personal freedom. Many of the attackers behind the leaders do not know what the real objectives are and, if they did, would be very shocked. Since the number of people in the East outnumber those in the West, they can use "government", or more correctly "government regulation" to impose their will at their convenience. They are using scores of avenues, all at the same time, to reach their objective. Some of the avenues are: wolves, grazing, endangered species, clean air, clean water, wilderness, wild and scenic rivers, eco-systems, eco-regions, non-point source pollution, DEQ, BLM, grizzly bear, spotted owls, no timber cutting, save the coyotes, tree spikers, animal rights terrorists, requirements to plant sagebrush, rare and uncommon designations, wetlands designation...the list goes on and on. It's totally impossible to combat all these avenues of attack on the West. Once again our nation is being torn apart, and for what reason??? Think about it!

Roy H. Guess, CPG-2894
**POSITION AVAILABLE**

**DIRECTOR, MINNESOTA GEOLOGICAL SURVEY**

The University of Minnesota seeks to fill the position of Director of the Minnesota Geological Survey. The Survey is a unit of the School of Earth Sciences, and the Director is eligible for a tenured faculty position in the Department of Geology and Geophysics, in the Institute of Technology, the second largest college in the University.

The Minnesota Geological Survey carries out an active program of basic and applied geological research and provides service and education in geological matters to the people of Minnesota. These activities have been lately expanded by the establishment of special programs in geophysics and hydrogeology, in order to meet the State’s need for geological information for use in water resources, land-use planning, waste disposal, mineral discovery and minerals resource development. The close connection with the Department of Geology and Geophysics provides significant opportunities for collaborative projects of research, instruction and service. The Survey is funded by a special appropriation from the State Legislature and in addition receives significant funding for special projects and research from various governmental agencies.

The Director will be responsible for maintaining and augmenting the present programs of research and service to the State, maintaining records of the State’s mineral and water resources data and for providing geological information and evaluation to various governmental agencies and the public as needed. The Director is expected to provide leadership in the programmatic and budgetary planning of the Survey and to work closely with the University administration in presenting the proposals to the State Legislature. The Director is responsible for establishing and maintaining close working relationship with local, State and Federal agencies involved in geological research and the use of geological information in public policy and resource development.

Candidates for the position should hold a Ph.D. in geology or related fields and have at least ten years professional experience, equivalent to that expected for a senior faculty appointment in the Department of Geology and Geophysics. The appointment as Director is full time, for an initial period of 3 years, and is renewable.

Interested persons should send a resume and the names, addresses and telephone numbers of three references to Professor V. Rama Murthy, Chair, MGS Director Search Committee, Department of Geology and Geophysics, 108 Pillsbury Hall, University of Minnesota, Minneapolis, MN 55455. The position is available September 1, 1994, and the **closing date for applications is January 31, 1994.**

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

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**AWG Foundation To Offer Chrysalis Scholarship**

The AWG Foundation is pleased to announce that at least 2 Chrysalis Scholarships will be awarded on March 31, 1994. The $750 awards will be given to geoscience Masters or PhD candidates to cover expenses associated with finishing their theses. The Chrysalis Scholarship is for candidates who have returned to school after an interruption in their education of one year or longer. The support can be used for anything necessary to assist the candidate in completing her thesis, such as typing, drafting expenses, field work, or child care.

Applications should be made by March 1, 1994. The applicant should write a letter stating her background, career goals and objectives, her involvement in both the geosciences and her community, how she will use the money, and explain the length and nature of the interruption to her education.

The applicant should also submit two letters of reference. The reference letters should include a statement of the applicant’s prospects for future contributions to both the geosciences and her community. Her thesis advisor should also include when the candidate will finish her degree and what requirements are as yet to be completed.

For information on obtaining an application or for additional information please contact:

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Macalester College Geology Dept.
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St. Paul, MN 55105-1899.
(612) 696-6448
Fax (612) 696-6183.
Consultants supply a service for a fee. Our product usually is in the form of a report. The ultimate report, in my opinion, contains one word: Yes (or no). Yes, you may do that, or No, You may not. That usually is what the client needs to know. However, clients usually expect something for their money.

The ideal report tells the client what he needs to know (yes or no). The rest is mulch. To be sure, some of the filler has real value. Some expands on the conclusion and genuinely helps the client. Much of it, however, tends to try to show how smart we are and tries to justify our fee. Of late, filler has expanded to meet the perceived need of covering one’s buns in the event of legal action. Too many reports are written in this vein. They’re a product of our litigious society combined with the scientific writing that most consultants were brought up on. Which brings us to jargones.

We’re all familiar with jargones. It’s beaten on us to the point where we don’t see it for what it is. Still, it grates enough so that some of us continue to fight back. If we don’t, there’s the danger of imminent breakdown of communication in its entirety. Of course, there are those who believe that there’s not much worth communicating anyway and besides, government will take care of us when we’re finally overcome by information overload.

Come to think of it, it’s government that promulgates an awful lot of jargones (examples are all around you). In fact, jargones is a popular offshoot of the mother tongue-bureaucratese-invented by Agencies of the State and developed to a fine art by the Beltway Establishment. As government has grown and agencies proliferate, the mother tongue has been modulated to suit the tone of the faithful. It’s not as bad as it’s going to get, though, because most government agencies still can communicate with one another (even if many of them don’t).

But to be fair, government doesn’t have a lock on jargones. Many scientific disciplines (my own among them) are guilty of promoting their own peculiar lan-

GUAGES. It’s gotten so that even other branches of major scientific disciplines have trouble communicating with one another. Find me a paleontologist, for example, who can define caecolith (more challenging: find me someone who cares).

While it hasn’t gone as far as it can go, it might be about time to think about cutting the problem off at the pass before we are all drowned in an incoherent morass of verbiage (or worse, forced acronyms).

We can start cleaning our own house by writing clearly and directly, demanding clarity in writing, and not relying entirely on spellcheckers and Grammatik. Why should geologese only be interpretable by geologists? If we really want to get the word out that what we do has public import, why not make it so that it can be read by interested others without a ten-pound glossary? Oh sure, there are some times when scientific terms can’t be helped, and sure, there are lots of times when new words are needed. But why not make them conform to proper English rather than just let them proliferate helter-skelter? There’s no reason to hide good thoughts in a swamp, and there’s never an excuse for poor writing.

While I’m on this subject, has anybody else ever been stopped cold by the interminable parenthetic references (and acronyms) that lock your eyeballs in a stranglehold in almost every scientific paper? I realize that I’m on thin ice (and hallowed ground) here, but sometimes it’s really difficult to get the gist of a paper when your attention is being bracketed at a rate of once or twice per sentence. It’s really not necessary to justify every statement. It’s gotten so that even abstracts are being contaminated by parentheses, and most abstracts are bad enough without them.

I am aghast at the recent spate of resumes that slide off the end of my desk. I might tolerate ungood English from someone whose name I can’t pronounce, but when a poorly-written letter from Rocky Stone, M.S. (unsigned and dateless) accompanies a misspelled three-page resume reporting on more experience than could have been acquired in half a lifetime and punctuated with the fashionable words (like implemented and its siblings), I have a tough time with it. I used to reply, pointing out errors and things that might turn off the next person on the mailing list, but I’ve given up. There’s just too much bad work around.

I think that it comes down to taking responsibility for one’s own actions, and stopping expecting that others will overlook, or cover for, sloppy work. An awful lot of reports are included in this sloppy work, and it starts with poor resumes and jargon. Any ideas? As always, I’ll acknowledge any replies. Feel free.
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The Productivity Paradox In Mineral Exploration

The authors applying automated techniques for exploration at the Kawalita Mine, Fairbanks Mine District, Alaska.

Curtis J. Freeman, CGP-6901, President, Avalon Development Corp.
Daniel M. Wietchy, Senior GIS Analyst, Terra Modeling

Introduction

Ask anyone employed in the mineral exploration industry if they believe computer technology has increased their productivity and the answer is invariably "yes". It is logical to assume that the astounding rate of advancement of computer technology during the last 5 years has helped increase the productivity of the mineral industry. But has it?

The mineral industry, like all other basic industries, is struggling to become more productive in order to compete in what is now a global economy. Searching for ways to modify business practices to accomplish gains in productivity and measuring those gains is a science in itself. Productivity is most often measured in monetary terms. It also can be expressed in non-monetary terms. In the mineral exploration industry, for example, a monetary productivity gain could mean collecting a greater number of rock samples for a given cost than was previously possible. From a non-monetary standpoint, this activity can be viewed as collecting more rock samples in a specified time period than was previously possible. However, in the final analysis, productivity gains are being sought to increase or maintain profitability. Advancements in computer technology promise just such gains in productivity, although a growing body of evidence suggests these potential gains are not being realized.

Several years ago MIT economist Robert Solow pointed out that, contrary to popular belief, utilization of computer
technology by American businesses has not increased worker productivity (Rothschild, 1993). Although immediately taken to task for his heretical thinking, now referred to as the “productivity paradox”, numerous studies aimed at disproving Mr. Solow’s beliefs have failed to do so. As consultants to the mineral industry, the authors have committed significant time and effort to streamlining mineral exploration techniques through computer automation. Our efforts have increased worker productivity and have provided our clients with significantly more usable information for their exploration dollars. Our experiences prove that productivity can be increased dramatically with the assistance of computer technology. Unfortunately, it is equally clear that productivity gains in the mineral industry as a result of computer technology are the exception rather than the rule. Why? We believe the mineral industry is experiencing a late 20th century equivalent of the “Edison effect”.

The Edison effect is described best by Paul David, a professor of economic history at Stanford University. Professor David points out that although Thomas Edison invented the incandescent light in 1879 and the central power generating facility in 1881, it took nearly forty years before measurable increases in productivity could be quantified as a result of electrification. The reason was simple and complex at the same time: employee work habits needed to be changed along with the entire work place organizational philosophy in order to reap the tremendous benefits of electrification. Factories had to be rebuilt, personnel requirements had to be modified, management techniques had to be changed. People had to be forced to “think electric”. This educational process took time, but by the 1920’s worker productivity was increasing at a rate of 5% per year as opposed to 1% per year for the first two decades of the 20th century. In short, it took 40 years for the true benefits of electrification to be realized in the work place.

The authors have experienced a similar kind of productivity paradox regarding computerization of the mineral industry. With the advent of the computer age, great leaps in productivity were expected. However, surges in productivity didn’t materialize, due in part to lack of computer education and a latent fear of technology shared by all of us to varying degrees. This technophobia can best be described as the tendency to continue using manual methods of data collection, analysis and presentation despite the fact that computer technology has given us infinitely faster, more efficient ways of completing these tasks. The example presented below is conclusive proof that computer-aided exploration programs can increase worker productivity significantly.

In the spring of 1992 the authors were assigned the task of designing an exploration program for the Golden Summit project, a 31,000 acre precious metal property located 20 miles north of Fairbanks, Alaska (Freeman, 1991). Management of the property recently had been assumed by Freegold Recovery Inc., an aggressive Vancouver-based mineral exploration firm. When presented with our proposal to automate their exploration efforts, Freegold management quickly realized the potential for increased productivity and approved our proposal.

After review of the voluminous information on the 80-plus gold occurrences in the project area, a comprehensive field exploration program was designed. The program included environmental base-line monitoring, air photo reconnaissance, soil sampling, geophysical surveys, geologic mapping, dozer trenching and reclamations, trench mapping, rock sampling, reverse circulation drilling and EDM/GPS surveying. Based on time and budgetary limitations that were not variable, the authors incorporated automated computer techniques which enabled the above exploration program to be conducted in less than 6 months. Similar sized Alaskan programs often require two to three years to complete. The compression of work assignments into a six month window required that the decision-making process be proportionately streamlined. Freegold’s flat management profile provided the ideal format for achieving compression in the decision-making process.

As a first step, the 90-year history of the Golden Summit project was summarized and transferred to a word proc-

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essing format for rapid information search and retrieval. Scanning and editing the topographic base map covering the project was the next task. The third task consisted of writing an automated data retrieval program which allowed unattended retrieval of geochemical analyses via modem, followed by data reliability checks, filtering and transfer of final geochemical results into the database. Information in the database had the ability to be transferred to geostatistical programs, spreadsheet programs and word processing programs. When appropriate, geological, geochemical and geophysical data could be imported to computer-aided design (CAD) programs. A geographic information system (GIS) program could then be used to merge these data with land status records, survey data and remote sensing imagery to facilitate map generation at any size and scale for field or presentation purposes. The cost of the entire process was tracked with a customized computer accounting program.

Implementation of the above automated techniques introduced speed and flexibility to the program. Daily review and analysis of geological and geochemical results took place almost immediately. Go-no go decisions were made in a matter of hours. Where necessary, follow-up field work was implemented. At the conclusion of the field season an analysis of the costs of the 1992 Golden Summit program was completed. A comparison was made between the costs of the automated program completed in 1992 and the costs of a "manual" mineral exploration program previously conducted by the authors in the same region (Wietch, 1993). "Manual" in this context includes limited computer-aided word processing, spreadsheet use and geostatistical analysis, most of which took place after field work had been completed. The 1992 program reduced expenditures by 18% over the same level of work conducted with standard manual techniques. Since the programming and computerized map files are reusable, if the initial costs of these tasks are amortized over the expected life of the project, cost reductions of 25% to 30% are realized.

What about productivity in terms of results per unit time? Automated methods helped achieve significant savings in this category as well. Over a 4-month period, the above described automated package saved approximately 2,500 worker-hours for the exploration staff of the Golden Summit project. As a result, the exploration staff spent approximately 2,500 worker-hours on other geologic tasks that normally would have been conducted at a later date or not at all. This productivity increase can be viewed in another way. The extra time made available because of the computer-aided nature of the program was the equivalent of two additional persons working ten hours per day, seven days a week for the entire four month program, at zero cost.

If the productivity benefits of computerization are so significant, why does the productivity paradox in the mineral exploration industry still exist? The answer may be the same as that revealed by professor David's analysis of the Edison effect. Although computer-aided technology is clearly cost-effective, abundantly available, flexible, and diverse enough to benefit any exploration program, most mineral companies retain management philosophies, work force structures and employee work habits which were formulated during the now obsolescent Paper Age. Since the authors manage small consulting firms, changes in management style and philosophy do not have to overcome any significant management inertia which opposes such changes. Certain departments in some larger corporations can boast of this ability to change quickly and efficiently when necessary. Unfortunately, most mineral companies still suffer from a large management inertia. Despite the acknowledged benefits of computer technology, these firms resist computerization or continue to employ computer technology at only a fraction of its capabilities.

It was once thought that simple exposure to computer technology would solve the productivity paradox given enough time. However, research conducted by psychologists interested in technophobia indicate that, regardless of their level of experience with computers, most people suffer from the same fears and dislikes when dealing with computers (Balance and Balance, 1992 and 1993). The research conclusions suggest that simple exposure to computers does nothing to reduce or eliminate technophobia.

Tests conducted by psychologists Larry Rosen of California State University at Dominguez Hills and Michelle Weil of Chapman University agree that technophobia will not just "go away". Their studies indicate differences in age and gender are not important criteria affecting the level of technophobia a person may feel (DeLoughry, 1993). Their group sessions have shown a remarkable ability to reduce or eliminate technophobia, particularly what they refer to as the two most severe forms: anxious technophobia and cognitive technophobia. The former technophobia, identified by sweaty palms, heart palpitations and headaches is less common and much easier to identify. The latter phobia, cognitive technophobia, is more difficult to diagnose. Their calm, relaxed exterior
Reserve Definitions As A Fishing Story

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**Prospective ore:** ore which cannot be included in the [other] classes, nor definitely known or stated in any terms of tonnage.

**PROBABLE**

**Probable ore:** ore where there is some risk, yet warrantable justification for assumption of continuity.

**PROVEN**

**Proven ore:** ore where there is practically no risk of failure of continuity.

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Feb. 9-12. New Developments Regarding the K/T Event and Other Catastrophes in Earth History. Houston, TX. Contact: K/T Event, Lunar and Planetary Institute, 3600 Bay Area Blvd., Houston, TX 77058. Ph.: (713) 486-2149.


Apr. 25-30. Fifth International Symposium on The Observation of the Continental Crust Through Drilling, Santa Fe, NM. Contact: Earl Hoskins, DOSREC, College of Geosciences and Maritime Studies, Texas A&M University, College Station, TX 77843-3148.

May 4-6. 1994 Rocky Mountain Section Meeting of the Geological Society of America, Durango, CO. Contact: Jack A. Ellington, Technical Program Chair., Geology Dept., Fort Lewis College, Durango, CO 81301. Ph.: (303) 247-7244.


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