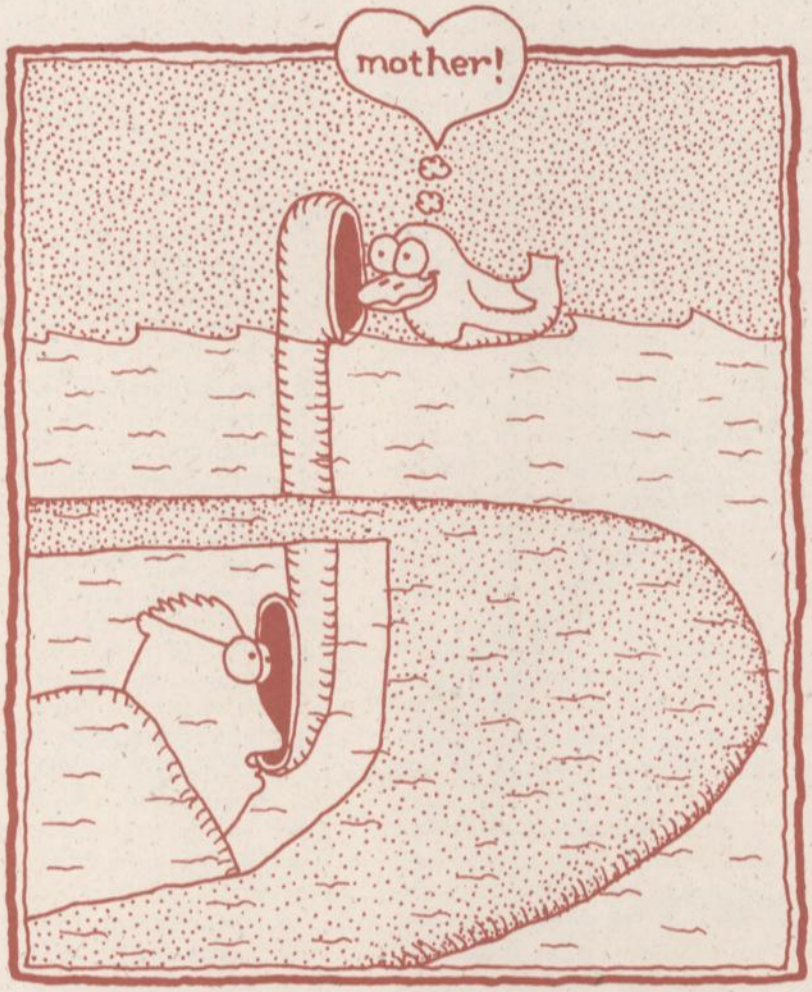
Fall 1994

LITE geology

A quarterly publication for educators and the public–contemporary geological topics, issues and events

New Mexico Bureau of Mines and Mineral Resources (NMBM&MR)



Giles began to worry. What would the captain say. . . the crew!?!

This Issue:

Earth Briefs

Bathtub Duckies Make Research Fun

On January 10, 1992, a dozen shipping containers washed overboard from their vessel during a storm in the North Pacific Ocean while the ship was en route from Hong Kong to Tacoma, Washington. One of the containers broke open, releasing 29,000 plastic duckies and other bathtub animals. Ten months after the spill, toys were discovered on the beaches near Sitka, Alaska. Beachcombers who found and reported the toys played a large role in the data collection for scientists tracking this mid-ocean spill to learn more about ocean current pathways.

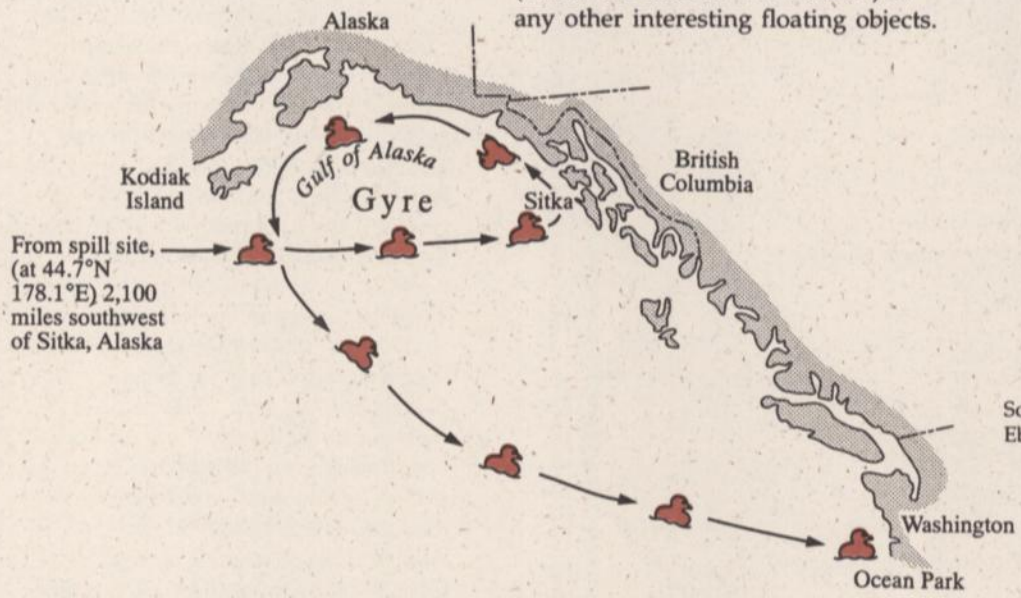
The first reported group of beached toys was found near Sitka on November 16, 1992. The second sighting of the fugitive toy animals occurred twelve days later. To enlist public beachgoers' assistance in the data gathering, scientists ran advertisements in area newspapers. Over the next ten months, about 400 toys, including yellow ducks, blue turtles, green frogs, and red beavers, were positively identified along 850 km of shoreline between Kodiak Island and Coronation Island.

Still the travelling tub toys pressed on. Some of them floated northward until they became entrapped in seasonal ice of the southeast Bering Sea. After the spring thaw of 1994, some of the ducks and their companions were presumed to have followed typical drift patterns northward through the Bering Strait, passing into the Arctic Ocean and travelling north of Siberia, eventually reaching the North Atlantic Ocean. Some may have continued west toward the Asian Continent.

Flocks of duckies and friends who did not enter the Bering Strait may have migrated south instead following the

Gulf of Alaska **gyre** (a surface current loop), eventually intersecting with their own spill site and heading for the Washington and Oregon shorelines. A lone toy found at Ocean Park, Washington on November 10, 1994 is believed to have followed this pathway.

Oceanographers Curtis Ebbesmeyer and W. James Ingraham are using a computer simulation model to estimate the trajectory of the drifting toys as they travel along the surface of the seas. The plastic toys float so high in the water that they have extra **windage** (they get extra push from the wind), which makes them good travellers. Both scientists anticipate that by the year 2000, some of the 29,000 floating tub toys will be sighted at many oceanic locations in the Northern Hemisphere. These researchers welcome any help in reporting subsequent finds of the toys (which are labeled "First Years") or any other interesting floating objects.



Contact:

Curtis Ebbesmeyer
Evans–Hamilton, Inc.
731 Northlake Way
Seattle WA, 98103

W. James Ingraham Jr.
Resource Ecology and Fisheries Management
Alaska Fisheries Science Center
National Marine Fisheries Service, NOAA
7600 Sand Point Way, NE
Seattle, WA 98115–0070

Source:
Ebbesmeyer, Curtis C., and Ingraham, W. J., Jr., 1994, Pacific toy spill fuels ocean current pathways research: Eos, Transactions, American Geophysical Union, v. 75, no. 37, pp. 425, 427, 430.

—story by S. Welch and T. Click; map by K. Campbell

Have you ever wondered...

... about gold?

Virginia T. McLemore
Senior Economic Geologist, *NMBM&MR*

The relentless pursuit of gold has shaped man's history and will continue to shape our future. Gold is certainly the most romantic of metals. Men have travelled thousands of miles and risked their lives for gold. The legend of Jason and his Argonants is centered around the search for the fleece of a golden ram. The Egyptians first used gold coins around 3400 B.C. Promises of new discoveries of gold finally enabled Columbus to finance his journey to the New World. Coronado and other Europeans travelled across oceans and continents searching for the **precious metal**. Throughout history, many people saw vast amounts of gold as a display of power. The discovery of gold in New Mexico in 1828, in California in 1848, and later in Alaska enticed people to seek their fortunes by traversing the North American continent. Many private fortunes can be traced to the successful mining of gold and silver. Even today, gold is the most sought after metal in the world.

What is gold? Gold is a metallic element with an atomic number of 79 and an atomic weight of 196.9665. A one inch cube of gold weighs 10 troy ounces or 311 grams. The **specific gravity** of gold is 19.3, which means that it is 19.3 times heavier than water. The average crustal abundance is 0.004 **parts per million (ppm)**. Gold is naturally obtainable in very high purity because its stable atomic structure resists easy bonding with other elements.

Gold is resistant to corrosion and oxidation and is a good electrical conductor. Gold is relatively soft, **malleable**, and **ductile**; it can be hammered into thin foil sheets or drawn into thin wires. However, it is probably gold's pleasing color, luster

(or shine), high density, and relative scarcity that make the metal so desirable. Indeed, the most common use of gold is for jewelry and other ornamental applications. Most nations use gold as a medium of exchange, for settling international debts, and as a standard for monetary transactions.

In the gold industry, the term Karat is used to indicate purity, measured in 24ths. 24-Karat or 24K gold is pure gold whereas 10K is 10/24 or 41.7% gold. **Fineness** also refers to purity measured in parts per thousand. 1000 fine gold is pure gold. The Troy weight system is used in the U.S. One **Troy ounce** = 1.097 ounces, avoirdupois = 480 grains = 20 pennyweight. One troy ounce is equivalent to 31.104 grams.

A large portion of the U.S. gold of is stored in a vault at the Fort Knox Bullion Depository near Louisville, KY, which is under the supervision of the U.S. Director of the Mint. The gold consists of brick-size bars (7 x 3 x 1 ¾ inches) that weigh 27.5 pounds each.

Gold is also used in the electronics industry, dentistry, the aircraft-aerospace industries, and in the medical and chemical fields. A thin film of gold electronically adhered to office windows insulates from the cold in winter and keeps out the sun's infrared radiation in summer. Gold-coated mirrors in infrared jammers are used by military aircraft to confuse enemy heat-seeking missiles. Miniature phone jacks are coated with gold to increase digital reliability. Compact discs can be coated with gold to provide ultimate sound quality.

U.S. gold production has increased dramatically in the past 15 years. In 1990, the 9.3 million ounces mined was worth over $3.6 billion. Production for 1993 is expected to exceed 9 million ounces. Nevada is the leading gold-producing state. Most of the recent production has come from large, open-pit mines (mostly in Nevada) developed in response to price increases of the early 1980s. These mines remained profitable through the price slump of the mid-1980s. As a result, the U.S. dependence on gold imports has dropped.

The first western gold rush in 1828 resulted from the discovery of gold in the arroyos draining the Ortiz Mountains in Santa Fe County. An estimated 450,000 ounces of gold have been produced from the Old Placers district in the Ortiz Mountains. Gold production in New Mexico from 1828 to 1990 was at least 3 million troy ounces, worth approximately $200 million. Some estimates put production at about 3.5 million ounces. Much of this was recovered as a by-product of other mining, especially from **copper porphyry** and lead-zinc deposits. Mines producing only gold are uncommon in the state.

Gold has been found in several different types of deposits in New Mexico. **Placer deposits** are generally the first to be discovered because prospectors first investigate stream beds in a given area using a gold pan. Placers are found in arroyos and streams where the gold is eroded from earlier accumulations and concentrated by sedimentary processes. Recently, research has indicated that bacteria also may be important in concentrating gold in placer deposits. Gold is typically found in nature as the free metal. However, in some deposits, gold occurs with tellurium to form tellurides. Gold also occurs in trace amounts in other minerals such as pyrite, chalcopyrite, and galena.

Several types of **lode deposits** are also found in New Mexico. Gold has been the most important product in several mining districts in New Mexico that lie on or near the boundary between the Great Plains and the Southern Rocky Mountains or Basin and Range physiographic provinces. These deposits have some similar characteristics that, when compared with their tectonic setting, define a class of ore deposits called the Great Plains margin deposits. These deposits contain both **base** and precious metals, but precious metals are generally high compared to other ore deposits in the state. One of the largest producing districts is the Elizabethtown–Baldy district near Raton, a Great Plains margin deposit. An estimated 471,400 ounces of gold were produced between 1866 and 1942. Gold has been important in a number of districts including the Mogollon, Steeple Rock, White Oaks, and Cochiti. The copper porphyry deposit at Santa Rita has produced over 500,000 ounces of gold as a by-product since the early 1900s.

GLOSSARY

Base metals—the common metals but not iron, copper, lead, and zinc.

Copper porphyry deposits—large, low-grade deposits of disseminated copper (~ 0.3–0.8% copper by weight) and veinlets of copper minerals found in or adjacent to igneous intrusions.

Ductile—capable of being drawn or stretched without breaking; opposite of brittle.

Lode deposits—mineral deposits consisting of veins, or disseminations within rocks; mineral deposits within consolidated rocks.

Malleable—capable of being plastically deformed under stress (such as hammering) without breaking.

Parts per million (ppm)—a unit used for expressing the concentrationby weight of an element in a material or solution; the number of parts of an element in one million parts of the material in which it is found.

Placer deposits—surficial mineral deposits formed by gravitational concentrations of mineral grains weathered from lode deposits and transported; unconsolidated deposits.

Precious metals—the less common metals including platinum, gold and silver.

Specific gravity—a ratio of the mass of a specific volume of a substance to the mass of an equal volume of water at 4°C; relative density. Mass/volume units are commonly expressed as grams/cubic centimeter.

Troy ounces—a special unit where 1 troy pound equals 12 troy ounces, 1 troy ounce = 1.097 standard ounces or 31.104 grams.

Sources:

Boyle, R. W., 1979, The geochemistry of gold and its deposits: Geological Survey of Canada Bulletin 280, 584 pp.

Boyle, R. W., 1987, Gold, history and genesis of deposits: Van Nostrand Reinhold Company, New York, 676 pp.

Barna, C., Brook, R., Fishman, S., Smith, S., and Tisdale, M., 1993, A golden opportunity for science: Science and Children, U.S. Bureau of Land Management, 8 pp.

Etris, S., 1993, 'Precious' metals have many uses beyond ornamentation: AMC Journal, v. 79, no. 12, pp. 13–14.

Greenwood, N. N., and Earnshaw, A., 1984, Chemistry of the elements: Pergamon Press, New York, 1542 pp.

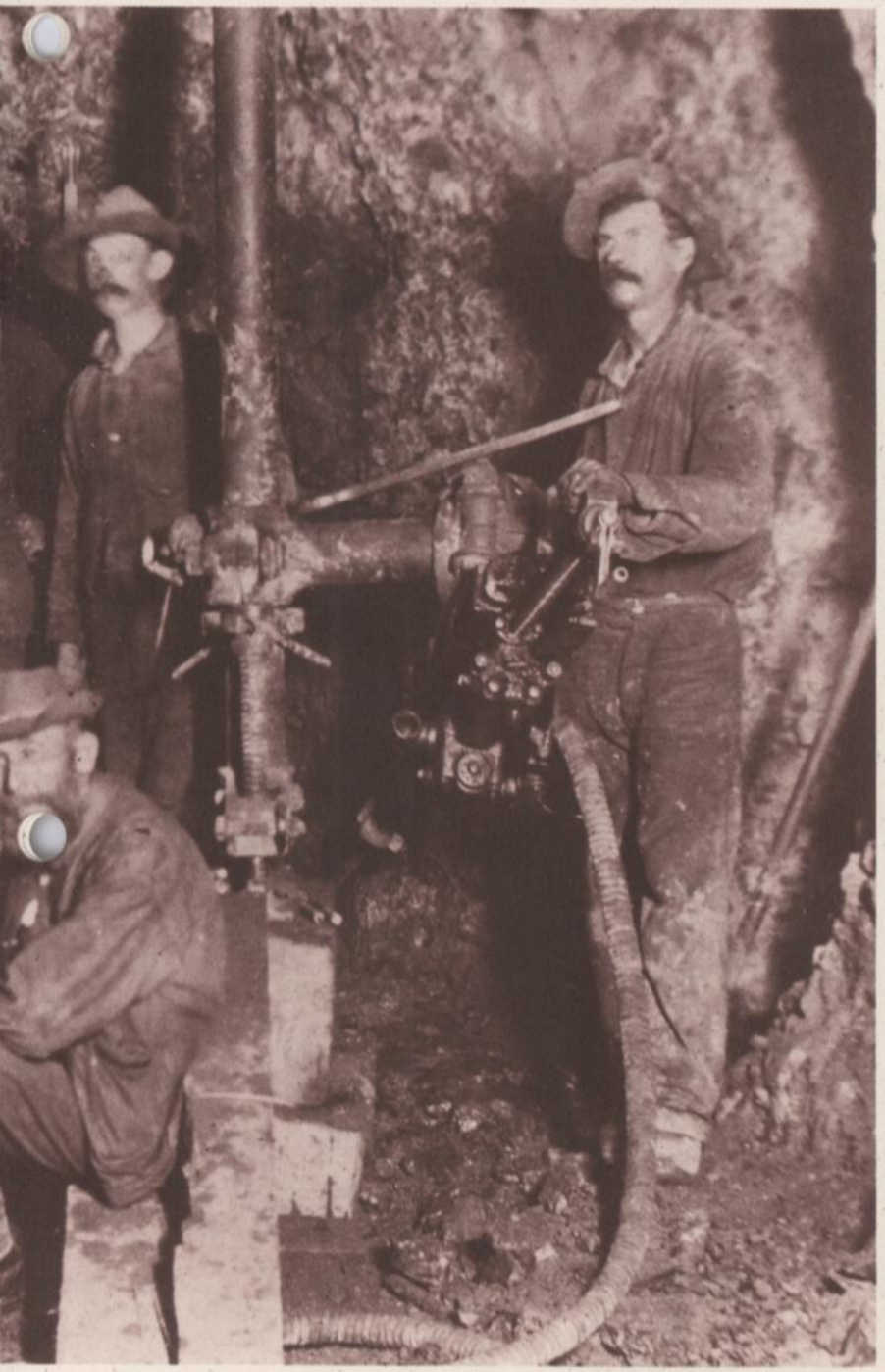
Johnson, M. G., 1972, Placer gold deposits of New Mexico: U.S. Geological Survey, Bulletin 1348, 46 pp.

Lucas, J. M., 1992, Gold: U. S. Bureau of Mines, 60 pp.

North, R. M., and McLemore, V. T., 1986, Silver and gold occurrences in New Mexico: New Mexico Bureau of Mines and Mineral Resources, Resource Map 15, 32 pp., scale 1:1,000,000.

North, R. M., and McLemore, V. T., 1988, A classification of the precious metal deposits of New Mexico; *in* Bulk minable precious metal deposits of the western United States: Symposium Volume, Geological Society of Nevada, pp. 625–660.

A group of miners and the mine co-owner pose at the 1000 ft. level shaft station in the Old Abe mine at White Oaks, Lincoln County, New Mexico, ca. 1893. If the miners seem a little "dazed" by the photographer's flash powder, it is because their only source of illumination is the feeble light given off by the flickering miner's candlesticks. The Old Abe was the biggest and richest gold producer in the district, credited with about $1 million prior to WWI. The Old Abe also had the distinction of being the deepest dry mine (1500 ft. deep without water) in the United States at the time, and produced some of the most unusual and attractive gold



specimens (native gold wires in the mineral selenite—a transparent variety of gypsum) from the "Fish Pond" stope on the 800 ft. level. Can you determine which of the men in the photograph is the co-owner?

NMBM&MR Photo Archives, #1664; courtesy of Frances Jahns in memory of Dr. Richard H. Jahns. Caption by Bob Eveleth, Senior Mining Engineer, NMBM&MR.

answer: John Y. Hewitt, co-owner of the famous Old Abe mine, is pictured sitting front and center and is the only man in the photo in coveralls, presumably to protect his "street" clothes.

topos for teachers...

New Mexico Bureau of Mines and Mineral Resources has accepted the remainder of the out-of-print USGS 15-minute topographic maps for the state of New Mexico. The Bureau is in the process of dividing this collection with other agencies in order to distribute them to teachers and the public. Several distribution points in New Mexico are:

1) Teachers in the Albuquerque area can receive maps by contacting Juan Abeyta at the Education Outreach Center of Sandia Labs, phone (505) 889–2306.

2) The New Mexico Department of Education in Santa Fe will be distributing their collection of maps during school visits throughout the state.

3) Teachers from other parts of New Mexico can contact Susie Welch to request maps. The Bureau will try to coordinate delivery of maps to a local point to serve area teachers. Call Susie Welch at (505) 835–5112 or 835–5420 for more information.

Teachers: watch for the New Mexico Bureau of Mines and Mineral Resources display tables at educational gatherings. We will be bringing stacks of maps to give away! Please contact Susie Welch if you know of a sizeable teachers' meeting in New Mexico where we might distribute these maps.

Nonstructural Earthquake Hazards in Schools

Robert J. Redden
Earthquake Program Manager

New Mexico has been designated as a "moderate risk" state for earthquakes by the Federal Emergency Management Agency (FEMA) and the U.S. Geological Survey (USGS). Most scientists in the state agree that large earthquakes have occurred in New Mexico in the past and that they could occur again. Even though large earthquakes are rare in New Mexico, there is a potential for moderate seismic events that could cause extensive damage to buildings in the state. Schools can be particularly vulnerable to the effects of an earthquake. Even if a school building suffers no serious structural damage during an earthquake, injuries can result from the movement of building contents and other nonstructural elements of the building.

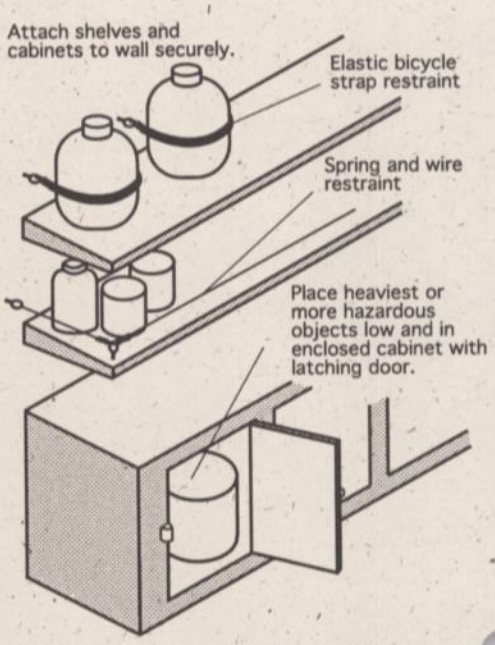
Nonstructural hazards can occur in every part of a building. Common nonstructural items in a school include ceilings, lights, windows, office equipment, furnishings, computers, files, air conditioners, electrical equipment, and anything stored on shelves or hung on walls. In an earthquake, nonstructural elements may be thrown about or tipped over, causing injury, damage, and a disruption of school operations.

An excellent example of nonstructural damage to a school facility comes from Stuart Northrop in his description of damage at the University of Albuquerque (Pius X High School) during the January 4, 1971 earthquake in Albuquerque (Northrop, 1982). He states, "Damage at the University of Albuquerque was estimated at $30,000 to $40,000, much of it due to leakage and spillage of chemicals. Hardest hit were the chemistry laboratories in St. Francis Hall. Chemicals valued at about $10,000 flowed from the shattered containers, dissolving floor tiles and molding. Steel shelving was bent and twisted. Assumption Hall, which houses the university library, also reported extensive damage. Bookracks were bent and twisted, dumping thousands of books to the floor." Fortunately, this fairly small earthquake occurred around midnight and there were no students in the library or chemistry labs.

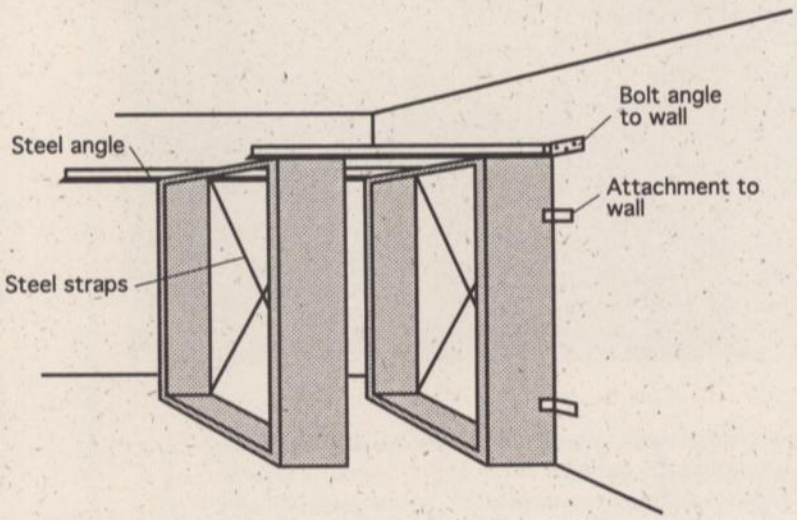
Publications from the New Mexico Earthquake Office can help to identify nonstructural hazards at a school site and show how those hazards can be reduced. Please contact Bob Redden at the New Mexico Earthquake Office in Santa Fe, phone (505) 827–9254. The following examples from FEMA Publication 241 show how to secure chemicals in a laboratory, and how to secure library shelves.

Source:
Northrop, S., 1982, Earthquakes of Albuquerque country: New Mexico Geological Society, Guidebook to 33rd Field Conference, pp. 171–79.

—illustrations by K. Campbell, modified from FEMA Publication 241.



Safety Restraints for Chemical Storage



Bracing of Library Shelving (Stacks)

Poetry Corner

Here are three geology-related poems. The first describes an unusual characteristic of some larger dinosaurs: because it took so long for nerve impulses to travel from their brains to their hind leg and tail regions, they developed a collection of nerves in their hip regions which served as a "second brain"! The next poem, *Step coyote quiet*, honors our Earth. The last poem, *A foolish riddle*, cautions that a rock that glitters is not always gold.

from *Man and the vertebrates*

Behold the mighty dinosaur
famous in prehistoric lore,
not only for his power and strength
but for his intellectual length.
You will observe by these remains
the creature had two sets of brains,
one in his head (the usual place),
the other at his spinal base.
Thus he could reason *a priori*
as well as *a posteriori*.
No problem bothered him a bit;
he made both head and tail of it.
If something slipped his forward mind,
'twas rescued by the one behind.
And if in error he was caught,
he had a saving afterthought.
Thus he could think without congestion
upon both sides of every question.
Oh, gaze upon this model beast
defunct ten million years at least.

—Alfred Sherwood Romer

Source:
Romer, A. S., 1933, Man and the vertebrates: University of Chicago Press, Chicago, IL, 427 pp.

Step coyote quiet

Step coyote quiet on my treasured land
Be its steward for this briefest day
Caress it gently with a mother's hand

Hear rabbit quick the raptor's wing and
Gather close the will to say
Step coyote quiet on my treasured land

Breathe mule deer long my timber stand
Live the perfumed grass alert as they
Caress it gently with a mother's hand

See falcon clear the rainbow's gold and
Feel her sighs along this haunting way
Step coyote quiet on my treasured land

Taste the gift of cloud, of ancient sand
While on your tongue its magic plays
Caressing gently with a mother's hand

And steward this place as wisely as you can
So it can nourish us tomorrow and today
Step coyote quiet on my treasured land
Caress it gently with a mother's hand.

—Jacques Renault
Senior Geologist,
NMBM&MR

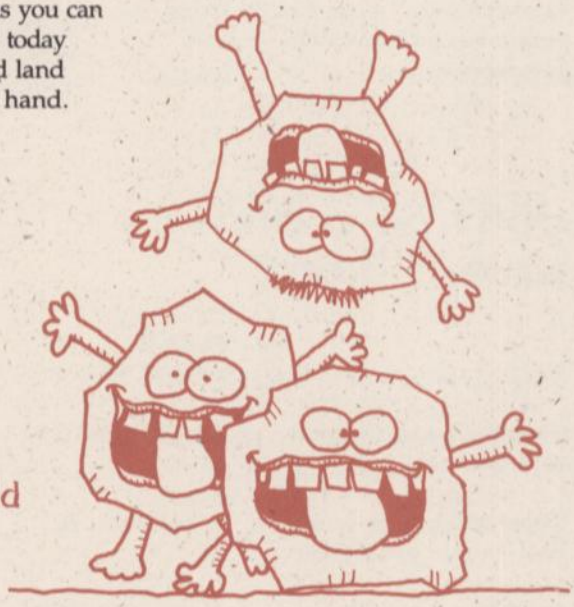
A foolish riddle

People think I'm pretty cool.
You may too, but now you're told;
Reason hard, be not a fool;
I'm not as smart as yellow gold
Though I can teach a golden rule
Even to the brassy bold.

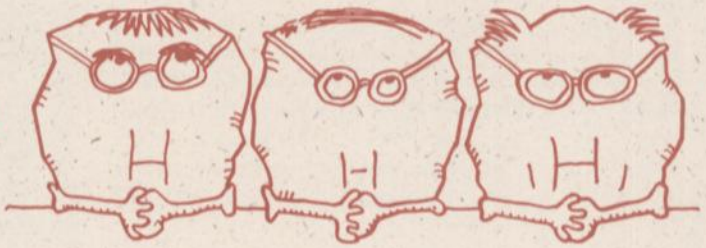
If you should see my sunny pluck
Shining from a vein,
Never trust in simple luck--
'**T**is wise to look again.

Gold is soft, but better test;
On tip of blade you'll show me.
Last to know are first to guess.
Don't fail to think, then know me.

—Jacques Renault



fool's gold



intellectual's gold

Safeguarding New Mexico's Ground-Water Supply...

A brief introduction to the Comprehensive Ground-Water Protection Program (CGWPP)

Ground water is a fundamental resource in New Mexico; it provides drinking water for about 88% of the State's population and also supports agriculture, commerce, and industry in the State. This resource is vital to the health and economic welfare of our citizens and requires careful protection. New Mexico's ground water is supervised by at least 13 State agencies and 16 federal agencies. Public participation is growing under a variety of organized activities.

The need for a comprehensive water quality program in which agencies and individuals can cooperate in protecting our ground water was addressed in 1992 by the Water Quality Control Commission (WQCC). Under the authority of the State, a subcommittee of the WQCC was formed to create and oversee a system that unites all voluntarily participating federal, state, local, and tribal agencies with ground water responsibilities along with the public to work cooperatively toward a common goal of safeguarding New Mexico's ground water. This system is called the **New Mexico Comprehensive Ground- Water Protection Program.**

The subcommittee created a guidance document that describes their envisioned activities. Strategic activities include establishing goals and priorities, identifying roles and responsibilities of agencies, implementing measures to accomplish the State's goal, coordinating the gathering and sharing of information, and **improving public education and participation**.

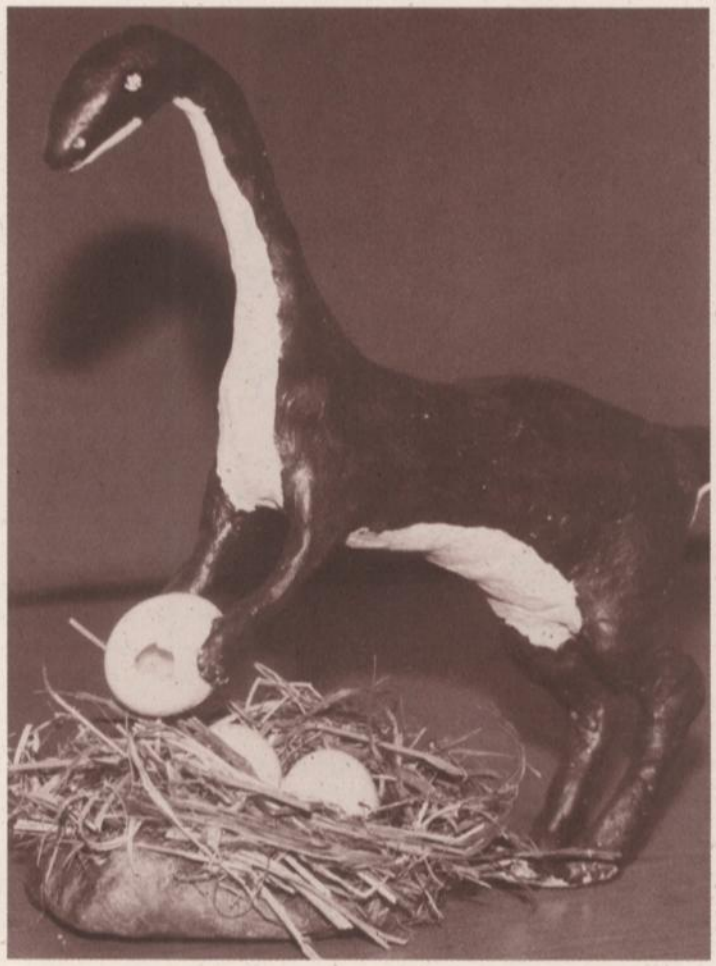
The Comprehensive Ground-Water Protection Program will consist of the WQCC (11 members; WQCC has final authority for the program); the Subcommittee, Technical Work Groups (technical staff from federal, state, local or tribal water agencies), a **Public Participation Group** (representatives from environmental groups, government natural resource agencies, industries, regional water planning groups, academia, and the public) **and the Public-at-large** (via public meetings). Anyone interested in obtaining the document or participating in this program to safeguard New Mexico's ground-water supply can contact Gary King at the Surface Water Quality Bureau in Santa Fe, (505) 827–2928.

Source:
Comprehensive Ground-Water Protection Program Guidance, 1994: New Mexico Environment Department, Evaluation and Surface Water Quality Bureau, 1190 St. Francis Drive, P.O. Box 26110, Santa Fe, NM 87502.

don't be a drip— save a drop...

Activity:	If each person saves:	New Mexico might save:
Shorten your shower to 5 minutes	25 gallons/day	37.5 million gallons/day
Turn off faucet when you brush your teeth	6 gallons/day	9 million gallons/day
Install a 1.6 gallon toilet	16 gallons/day	24 million gallons/day

Source:
Agua Action—A guide to water conservation in New Mexico: Water Conservation Program, State Engineer Office, Santa Fe, New Mexico. For more information on water conservation, call 1–800–WATER•NM, or call Alice Darilek directly at (505) 827–3879.



Sources for Earth Science Information

Teachers can receive free materials including curricula, student handouts, and reference materials for school resource media centers by contacting:

U.S. Bureau of Mines
Guy Johnson, Staff Engineer
Building 20
Denver Federal Center
Denver, CO 80225–0086

A free teacher's packet including a poster, lesson plans, activities, and a list of mineral resource information can be obtained by calling or writing to:

Mineral Information Institute
Jackie Evanger
475 17th Street, Suite 510
Denver, CO 80202
(303) 297–3226

The Environmental Protection Agency Provides a free information hotline for radon. Call:

1–(800) SOS-RADON

Information on Earth Science programs, projects, reports, products and their sources is available from:

U.S. Geological Survey
Earth Science Information Center
(USGS ESIC)
Call 1–(800) USA–MAPS

or in New Mexico, contact:

Amy Budge
Earth Science Information Center
Earth Data Analysis Center
University of New Mexico
Albuquerque, NM 87131
(505) 277–3622

Here are some more of the dinosaurs entered in our *Reconstruct the Dinosaur* contest. These were created by students at Taos Junior High School. (Space constraints have delayed our printing of these wonderful entries; there are more to come.—ed.)

high LITES

EARTH SCIENCE UPDATE

Update on Mineral Education Tools for 1994-1995

The following information on teachers' resources is supplied by the Education Program at the Denver Research Center of the U.S. Bureau of Mines. Most of these materials are available at no cost.

Videos

Available from:

The U.S. Bureau of Mines
(202) 501–9649
- *Copper*—27 min.
- *Gold*—28 min.
- *Recycling: Your Next Assignment*—19 min., for children
- *Call Me Can*—18 min., for young children
- *Out of the Rock*—30 min.

The Colorado Historical Society
(303) 866–3682
- *The Miners*—25 min.

The American Coal Foundation
(202) 466–8630
- *Balancing Needs: Coal and the Environment*—20 min.

More videos

BHP–Utah International
(505) 598–5861
- *Coal: Born in the USA*—13 min.

ASARCO (303) 296–5900
- *America's Buried Treasure*—20 min.

Caterpillar (309) 675–5046
- *Common Ground: Modern Mining and you*—26 min.

American Mining Congress
(202) 861–2800
- *Mining: Discoveries for Progress*—10 min.

Center for Energy and Economic Development (303) 694–4244
- *America's Fuel*—11 min.

Other Resources

Available from:

The National Energy Foundation
(801) 539–1406:
- *From Mountains to Metal* (poster)

The National Coal Association
(202) 463–2655:
- *Facts About Coal* (reference book)

The American Mining Congress
(202) 861–2800:
- *What Mining Means to Americans* (brochure)

The U.S. Department of Energy
(202) 586–6503:
- *Dinosaurs and Power Plants* (teachers' booklets and posters)

a rock for every classroom...

Wanted: *Rocks Digest* wants to hear from teachers who would like to obtain free rocks or minerals for the classroom. Teachers may run an ad at no charge to request free samples or specimens in the Trader Ads section of *Rocks Digest*. Please write your ad (be creative!) and send it to Celia Grohmann at *Rocks Digest*, P.O. Box 8186, Missoula, MT 59807–8186. Please mention *Lite Geology* when you write to Celia.

P.S. If any of our readers who are rockhounds or who work for a mineral industry can provide educators with classroom samples or specimens, please contact *Rocks Digest* so that Celia can match you with interested teachers.

what's on-line?

The U.S. Geological Survey is offering a new experimental on-line service called Ask-A-Geologist. Anyone with Internet access can send their questions about Earth science to the USGS via electronic mail, and the question will be answered within a day or two by a USGS geologist. The e-mail address is:

ask-a-geologist@octopus.wr.usgs.gov

For a few months, the USGS will be collecting questions and answers. From this, the USGS will compose a Frequently Asked Questions (FAQ) file available for anonymous FTP and World Wide Web (WWW).

If you have any questions about the service itself, but not directly related to geology, contact the system administrator, Rex Sanders. His e-mail address is:

rex@octopus.wr.usgs.gov

publication sources:

Standard Practice for the Use of the International System of Units (SI) is a guide to the increasingly popular metric system. The price is $23, and may cost as little as $9 for large orders. To order, contact:

ASTM
1916 Race Street
Philadelphia, PA 19103

Also available is a 35-page pamphlet written by Walter O. Wunderlich, called ***SI–International System of Units–Explanations and Applications***, which deals with some of the more complicated aspects of the metric system, such as customary-metric conversions, dimensional analysis, and the difference between weight and mass.

Learn a little about geologic time each day...

Gibson Consulting offers a 366-day *perpetual calendar* that never has to be changed because the days of the week are not listed on it. Each day of the calendar illustrates and describes a single point in the history of the Earth. The days are arranged in chronological order, beginning with the Earth's origin on January 1 and ending with the emergence of early man on December 31. The calendar costs $13.95 (plus $3.50 shipping); call for prices on bulk orders. Residents of Colorado and Golden please add appropriate sales tax. The calendars are available from:

Gibson Consulting
P.O. Box 523
Golden, CO 80402
(303) 278–0867

Rocks Digest, formerly known as the ***Big Rocks Trader***, is described as "required equipment for armchair rockhounds." To subscribe to this bimonthly publication, send a check or money order for $12.99 (+ $5 U.S. for Canadian subscriptions) to:

Rocks Digest
P.O. Box 8186
Missoula, MT 59807–8186

The U.S. Bureau of Mines is offering a Rock Video Catalog. These videos present information on various minerals, and range in length from less than 10 minutes to nearly half an hour. The videos are available for loan free of charge from the USBM. To get your own Rock Video Catalog, write to:

USBM Audiovisual Library
Cochrans Mill Road
P.O. Box 18070
Pittsburgh, PA 15238

***Lite Geology* evolved:**

Lite Geology began as a small Earth-science publication designed and scaled for New Mexico. Our subscription list has grown tremendously during the past two years, and now includes a large number of out-of-state readers. In order to keep up with the demand for this publication from outside of New Mexico, we will charge **$4.00 per year for out-of-state readers**, which covers the cost of printing and mailing *Lite Geology*. The subscription year begins with the Fall issue, and ends with the Summer issue to correspond with the academic year. **If you reside outside of New Mexico and wish to keep your subscription active, please return this form with a check for $4.00.** We thank all of our readers for their enthusiastic support and hope that all of you will continue to subscribe. If you have questions about your subscription, please call Theresa Lopez at (505) 835–5420. Thanks! —ed.

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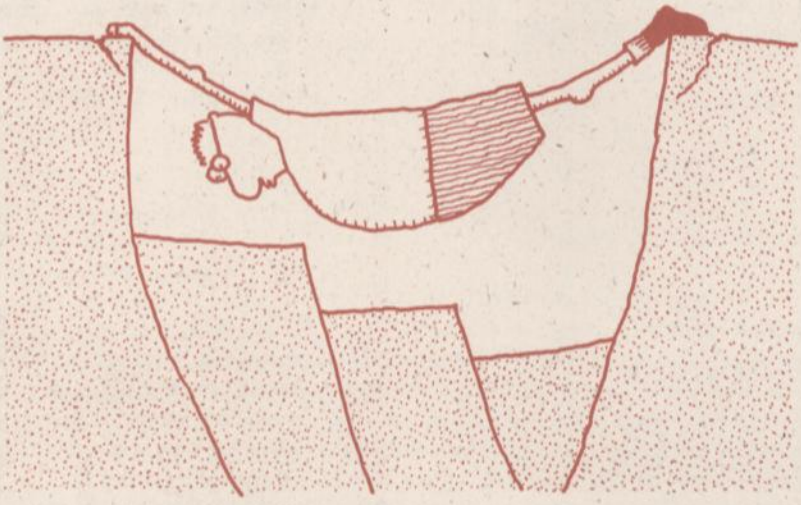

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