

# THE ROCKFINDER

Michiana Gem & Mineral Society  
Tom Noe, Editor  
305 Napoleon Blvd.  
South Bend, IN 46617



# THE ROCKFINDER

MARCH, 2001

# MICHIANA GEM & MINERAL SOCIETY

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The purpose of the Michiana Gem & Mineral Society is to promote the study and enjoyment of the earth sciences and the lapidary arts, and to share lapidary knowledge and techniques.

General meetings are held the fourth Sunday of each month, 2:00 PM, EST, at Our Redeemer Lutheran Church, 805 S. 29th St., South Bend, IN. Regular exceptions include May (third Sunday), July (no meeting), August (club picnic) and the November/December meeting and Christmas party. Board meetings are held before the general meetings. The annual club show is Labor Day weekend.



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 Yearly Membership Dues (Payable by January 1)  
 \_\_\_\_\_ Individual \$10.00 per year  
 \_\_\_\_\_ Family \$15.00 per year  
 \_\_\_\_\_ Junior \$1.00 per year  
 \_\_\_\_\_ Subscriber \$7.50 per year

Please indicate areas of special interest.

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Please send your dues and this form to  
 Michiana Gem & Mineral Society  
 c/o Bob Heinek

7091 E. East Park Lane, New Carlisle, IN 46552

## HEADS OF COMMITTEES

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 Librarian Diane Gram 272-6885  
 Historian Ed Miller 498-6513  
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 Membership All Members

The Michiana Gem & Mineral Society, a not-for-profit organization, is affiliated with the Midwest Federation of Mineralogical Societies and with the American Federation of Mineralogical Societies.

*The Rockfinder* is published monthly except July and August. Editor, Tom Noe, 305 Napoleon Blvd., South Bend, IN 46617 (ph. 289-2028). Co-editor, Herb Luckert, 221 Marquette Ave., South Bend, IN 46617 (ph. 282-1354). Reporters, Bob Heinek, Herb Luckert, club members.

Permission is hereby granted to reprint any original *Rockfinder* articles, as long as recognition is given along with the reprint.

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Name \_\_\_\_\_  
 Birthday \_\_\_\_\_

Name \_\_\_\_\_  
 Birthday \_\_\_\_\_

Name \_\_\_\_\_  
 Birthday \_\_\_\_\_

Date of Wedding Anniversary \_\_\_\_\_

Phone \_\_\_\_\_

### PLEASE READ AND SIGN THIS SECTION:

With my signature I hereby release the Michiana Gem and Mineral Society, Inc., and its individual members and the owners of any premises upon which I enter under permit granted to the society, absolutely free of any liability whatsoever, to my person or my property, and further I will respect the equipment and property of the aforesaid owners.

Signed \_\_\_\_\_ Date \_\_\_\_\_

# THE ROCKFINDER

Newsletter of the Michiana Gem & Mineral Society

Volume 41, Number 3

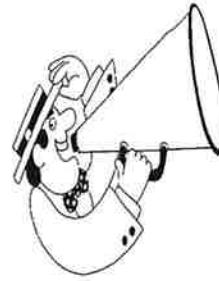
March, 2001

**Meeting:** Sunday, March 25  
Doors open 1:30 p.m.  
Meeting at 2:00 p.m.  
Guests are always welcome.

**Place:** Our Redeemer Lutheran Church  
805 S. 29<sup>th</sup> St. (29<sup>th</sup> & Wall)  
South Bend, IN

**Program:** Diane Gram will have a hands-on program continuing with the preparation of bags for the September show.

**Hosts:** Pat and Tom McLaughlin  
Heide Santarelli



## April Birthdays

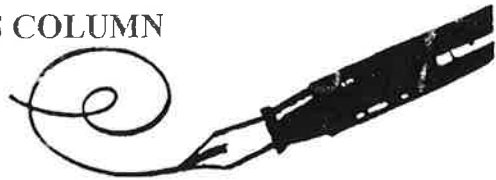
3 Ed Miller  
4 Sally Peltz  
16 Jim Russell  
17 Jim McHugh

## UP AND COMING

- Mar. 31- Apr. 1: Columbus Club and Licking County Club combined show, Newark, OH.  
Mar. 30-Apr. 1: MAPS Expo, Macomb, IL, fossils only.  
Apr. 5-7: Indian Mounds Rock & Mineral Club show, Breton Village Mall, Grand Rapids, MI.  
**Apr. 6-8: South Bend Gem Show, Century Center, South Bend.**  
Apr. 21-22: Blossomland Gem & Mineral Society show, Cook Nuclear Center, Bridgman, MI. Free admission.  
Apr. 27-29: Mt. Clemens Gem & Lapidary Society show, 300 N. Grosbeck, Mt. Clemens, MI.  
May 4-6: Kalamazoo Geological & Mineral Society show, Fairgrounds, Kalamazoo, MI.  
May 5-6: Greater Cincinnati Gem, Mineral & Fossil show, Cincinnati Convention Center, 5<sup>th</sup> & Elm.  
June 8-10: Rocky Mountain Federation show, New Mexico.  
June 11-17: AFMS/South Central Federation show, Texas.  
June 16-17: Michigan Geology & Gemcraft Society Rockhound Seminar, Carter Middle School, Clio, MI.  
June 22-24: California Federation show, California.  
June 22-24: Bloomington Rock Swap, Monroe County Fairgrounds, Bloomington, IN.  
Jul. 13-15: Eastern Federation show, New York.  
Aug. 17-20: Faceting Seminar 2001, Midwest Faceter's Guild, Mott College, Flint, MI.  
Aug. 20-Sep. 1: Northwest Federation show, Washington.  
**Aug. 31- Sep. 2: Michiana Gem & Mineral Society show, Century Center, South Bend.**  
Sep. 7 - 9: Midwest Federation show, Wisconsin.  
Sep. 7-9: Greater Indianapolis Gem, Mineral & Fossil Show, Hancock County Fairgrounds, Greenfield, IN.  
Nov. 2-4: Southeast Federation show, Mississippi.



## DON'S COLUMN



Well, it is March already, and I wonder where January and February went. I have to say "WOW" after the February meeting. How can we beat it? The meeting sure had a lot going for it; there was so much information and so many things going on. We had a good turnout, good food and good company. Those who couldn't come sure missed a good program (Thanks, Bob and Margaret). At our next meeting, Margaret says we could use some help making bags for handing out at the fall show. Please come and participate.

Hey, we have the April South Bend Gem and Mineral Show coming up and I know Bob and Margaret could use some help. Please show up and see if they need a hand. By the way, the club is running a silent auction at the show. If you have something to sell or to donate to the club for sale, talk to Tom Noe. He could also use some help with the auction during the show, so call him to volunteer.

**GEMSTONE OF THE MONTH—MARCH**

Aquamarine means "sea water." It is a semiprecious stone, but a fine aquamarine may be more valuable than a flawed precious emerald. Aquamarines are from the beryl family—the same as emerald and heliodor. Aquamarine is a silicate of beryllium and aluminum and is found in Brazil, Russia, Madagascar, Afghanistan and the United States. Most aquamarines come from pegmatites. They are found as long hexagonal crystals and are considered among nature's most beautiful. Brazil is the most important source. In the American Museum of Natural History in New York you can find a 20-pound aquamarine that was broken off a 273-pound crystal with a sledgehammer. Aquamarine often has a greenish tint, which can be eliminated by heat-treating the stone. A less than red-hot heat removes the yellow from the green (green is a combination of blue and yellow), leaving a purer blue color. Most of the aquamarines sold in the US are heat-treated and this is an acceptable practice.

**NEW BOOKS IN THE LIBRARY**

By Librarian Diane Gram

Members are welcome to check out these two books of local interest from the club library:

*Geology Underfoot in Illinois* by Raymond Wiggers

A guide for readers on geologic walking or driving tours of 37 sites in Illinois. Enjoy an unexpected exploration of Chicago's architectural geology. Embark on a fault-seeking expedition in Mark Twain's big-river country, or try moraine surfing on Interstates 55 and 74. With a touch of curiosity and this book in hand, you will wander the state with a new sense of wonder.

*Roadside Geology of Indiana* by Mark J. Camp

Hundreds of millions of years ago, warm, coral-rich seas deposited mud on the ocean floor, and in time it became limestone—the cornerstone of Indiana geology. From the fossil-studded rocks and twisting caverns of the southern hills to the coal seams of the Wabash Valley and the shifting sands of the glacial plains, this book provides a window to a vibrant and dynamic past. Tour Indiana's timeworn topography and discover fossilized reefs, mastodon skeletons, geodes, buried bedrock valleys, and the site of a meteorite impact.

**HAVE A TUMBLER FOR SALE?**

Sam Shapiro is looking for a tumbler to buy. If any club members have one to sell, please call Sam at 234-9648.

The Arizona Petrified Forest grew about 100 miles from where the trees are now found. They grew in an ancient forest of primitive Araucarian pine. They were washed by floods into lower-lying swamp land and were buried in the mud and silt so fast that trees 6 to 8 feet in diameter and up to 80 feet long were completely fossilized.

*The Rock Rattler* (May, 1997)

**MINUTES OF THE FEBRUARY 25 MEETING**

President Don Church called the meeting to order at 2 p.m. There were 19 adult members present, no juniors and no guests. Diane Gram, Pam Rubenstein and Phyllis Smallwood had charge of the hospitality table, wide a wide variety of scrumptious desserts to delight our palates.

Tom Noe made a motion that the minutes of the January meeting be accepted as printed in the *Rockfinder*. David Peltz seconded the motion and it carried easily with no dissenting votes.

Bob Heinek read the treasurer's report, which will be filed for audit.

Margaret Heinek gave a report on the upcoming April gem and mineral show. Unfortunately, three of the dealers have had to cancel due to unforeseen circumstances. Margaret said she is contacting other dealers to find replacements. She also noted that *Lapidary Journal* will set up a table at the show.

Science Alive was a success at the St. Joseph County Public Library. Representing the club were Bob and Margaret Heinek, Herb Luckert and Tom Noe, who showed displays, answered questions and handed out small samples of fossils and rocks.

The South Bend *Tribune* published a very nice, accurate article about the club and the educational activities we are involved in.

The YWCA, Center for the Homeless, St. Vincent De Paul Society and Our Redeemer Lutheran Church all sent thank-you letters for the donations the club made in December.

Field Trip Chair Kathy Miller announced some details of the trip scheduled for October 7, a Sunday. More information is coming and will be published in the *Rockfinder*. The trip will concentrate on fossils in the Mazon Creek area of Illinois. A sign-up sheet was passed around at the meeting, and those who are interested are encouraged to contact Kathy as soon as possible.

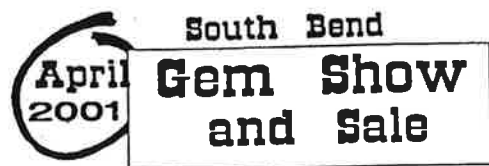
Tom Noe made a motion that we send our yearly dues to the American Lands Access Association. The motion carried and Bob Heinek will send the check for \$50.

Tom also mentioned that he will be able to run the silent auction at the April show, but not at the September show. Don said he would make arrangements for the September show, and several people volunteered to help at the April show.

New business: The proposal to contact the South Bend school system and arrange for busloads of students to attend the September show on Friday have not been progressing. Margaret said she is still waiting to hear from them, and it's necessary to contact the dealers well in advance to see whether they want to take on the additional expense of staying in town an extra day. That can't happen until the school system indicates whether the plan is possible. Diane Gram made a motion to table this proposal and work on it for next year. Margaret seconded the motion and it passed.

Refreshments followed the business part of the meeting. The program consisted of a short video of Canyonlands National Park and numerous displays of photos and samples from the club members who had visited that area during the American Federation show. Kent Hoffman, Diane Gram and Sally Peltz won door prizes.

Submitted by  
Gladys Pacholke, Secretary



South Bend  
**April 2001 Gem Show and Sale**

at the  
**Century Center**

120 S St Joseph St, South Bend, Ind

**April 6, 7, 8, 2001**

Friday - 2pm to 7pm / Saturday - 10am to 6pm  
Sunday - 10am to 4pm

Adults-\$2.50 daily

6 to 16-\$1 daily

Under 6-Free

Handicap Accessable

*Quality Dealers*

Bring this card for a discount of 50 cents for each adult in your party. No other discount applies.

**MAZON CREEK FIELD TRIP****Braidwood, Illinois**

A field trip has been arranged for October 7, 2001, for fossils. Fossils of the Mazon Creek Area are contained in round or oval smooth rock bodies known as concretions. They range in size from less than an inch to a foot or more in diameter and have a gray, brown or rusty color. When split open, they reveal a fossil, though some may be barren. Concretions may be split with a hammer and chisel or by immersing them in water and alternately freezing and thawing them.

Fossils of the Mazon Creek Area are especially unique in that the soft parts of plants and animals have been preserved. Paleontologists consider this area to be one of the world's most important fossil localities. Many types of fossils represent plant and animal forms never found anywhere else in the world.

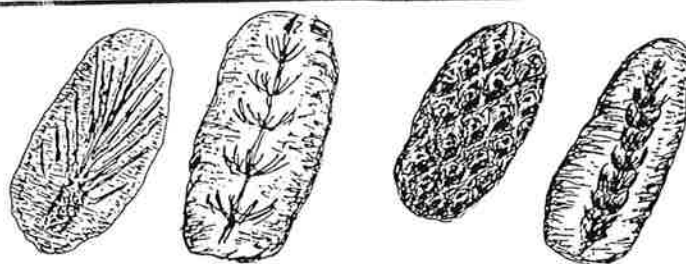
We are very fortunate to have as Field Trip Co-Chairmen Dennis and Jan Horral. They not only have been to the Mazon collecting area, but met a person that lives and collects in the Mazon area. They are going to see about arranging for him to take us to a new collecting site at Mazon Creek, and possibly to his home to see what he has collected there through the years.

Dennis and Jan have also said we should make a point to see the Mazon Creek Museum while we are there; they have seen it and said it is great.

We will board the Cardinal Bus on Sunday, October 7, at 7:45 a.m., departing promptly at 8:00 a.m., from the K-Mart parking lot at Ireland Road and 31 South. The bus is scheduled to return at 6:00 p.m. that same day.

**WHAT TO BRING:**

- A sack lunch, snacks and something to drink



- The usual rock hammer, a chisel, rake, etc.
- A collecting container (pail, sack, backpack, etc.)
- A box for under the bus to carry home your finds (hopefully everyone will be lucky)
- Ticks and mosquitoes may still be around, bring a repellent!
- An extra pair of shoes. One for collecting and one for the bus.

We have 23 folks signed up already, leaving 24 available seats left. Just let us know if you wish to go. Please do not make the commitment and cancel at the last minute (unless it is an emergency).

**We will have the sign up sheet at March, April and May meetings, "let's fill the bus!"**

Kathy Miller, Dennis & Jan Horral

**THE NEW DOLLAR COIN**

By Carolyn Weinberger

Have you seen the new "gold" dollar coin and wondered if it is real gold or not? By exploring the U.S. Mint website ([www.usmint.gov](http://www.usmint.gov)), I've learned that the new coin is made of an alloy called manganese brass which is bonded to a core of pure copper.

The manganese alloy is made up of 77% copper, 12% zinc, 7% manganese and 2% nickel. If you include the copper core, the composition of the new dollar is 88.5% copper, 6% zinc, 3.5% manganese and 2% nickel.

If you've not yet seen the coin, it features a likeness of the Indian guide Sacajawea. The obverse features a flying eagle. Of course, the coin is gold in color.

*Gem Cutter News* (May, 2000)

## EW BLM GUIDELINES ISSUED

Reported by Tom Noe

New federal guidelines for the collection of fossils and minerals became official April 1, 2001. The unexpected changes in regulations were part of a flurry of last-minute regulatory acts of the Clinton administration. Former federal regulations were quantitative. They stipulated, for example, that only a specific number of pounds of petrified wood could be collected for personal use in a single year, and that invertebrate fossils could be collected, but not vertebrate fossils.

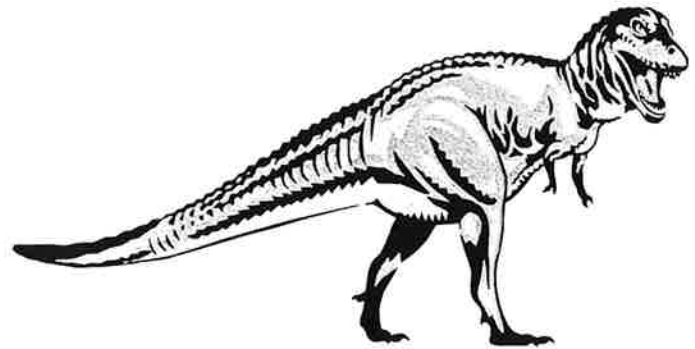
The new rules move to a different standard entirely, by which all minerals and fossils are considered part of the same collecting category. Weight will not be a factor in the future, nor the type of material collected. Instead, ALL materials of collector interest may be freely collected on public lands managed by the BLM, but only on a "catch and release" basis. Finders may locate and "collect" materials—that is, find them and pick them up—but must then replace them in the ground in exactly the same spot where they were found.

"The 'catch and release' method has been extremely successful with fishing enthusiasts, and we are confident that this relaxation of the rules—in response to public comment—will also give a tremendous impetus to the location and appreciation of our mineral and fossil heritage," said a spokesman for the BLM, who asked not to be identified. "In the comments we have received from collectors in public hearings, we were interested to note that the 'chase' was the most important aspect of enjoyment for a small percentage of respondents. It is with them in mind that we have enacted the new regulations. They indicated that their most enjoyable moments in life occurred precisely during the search for natural wonders and unique specimens. Under the new rules, collectors may search to their hearts' content on all BLM-managed lands, locating new fossils and splendid works of natural beauty, as long as they replace the materials immediately, so that others who come after them may experience the same enjoyment of discovery."

The BLM is also considering the placement of sign-up sheets for collectors at the sites of particularly

important fossils, similar to the rosters placed on mountaintops for those who would like to sign their names when they have successfully reached the summit. A collector could sign in after finding an especially beautiful specimen, preserving some record of the discovery until the sheet is recycled in an ecologically friendly way by Mother Nature herself.

As noted above, the new regulations take effect April 1, leaving plenty of time for collectors to adjust to them in time for the summer vacation season.



### TINKER, THE KID-REX

Jim Chaney, Big Jim's Fossils

Camp Wood, Texas. Bit by bit, details of one of the rarest of dinosaur discoveries are slowly unfolding from a Hill Country paleontology laboratory that looks suspiciously like a backyard storage shed. Inside, the metal walls are decorated with a bright mural of happy dinosaurs hunting in a Cretaceous-era field. Ron Frithiof and Kim Hollrah, two decidedly nonacademic fossil hunters, proudly show off their find: the remains of a 70 million-year-old baby *Tyrannosaurus rex*.

"There's Tinker," Mr. Hollrah said. He points to what appears to be a jumble of reddish-yellow rock encased in plaster. On another table lay Tinker's shattered jaw, complete with nasty-looking teeth.

In November, Mr. Frithiof, an Austin land developer, and Mr. Hollrah, a self-styled professional dinosaur hunter, shocked the paleontological world with the announcement that they had unearthed a nearly complete skeleton of a juvenile *Tyrannosaurus rex*. They moved him to a lab on Mr. Frithiof's ranch in Real County for further scientific study. Since noted fossil hunter Barnum Brown found the first *T.*

*rex* remains in 1904, only 24 specimens have been found. Only two were more than 50% complete, and all were adults. Mr. Frithiof, Mr. Hollrah and their crew of two assistants, without a college degree among them, had done what the academic world of dinosaur researchers never had.

The baby *T. rex*, nicknamed "Tinker," a childhood nickname of Mr. Frithiof, was found by their small expedition near Belle Fourche, S.D., in the summer of 1998. Dr. Robert Bakker, a Yale-trained paleontologist and senior scientist of the Wyoming Dinosaur Society, authenticated the fossil remains as a juvenile *T. rex* 75% to 90% complete. "Tinker is one of the most complete scientifically significant and most exciting *T. rex* skeletons ever found, and one of the most important dinosaur specimens from any age and any locale," said Dr. Bakker after his first visit to Mr. Frithiof's Hill County lab. "It really did knock my socks off."

"Tinker was about 5 or 6 years old when he died and would have been about 20 feet long and weighed maybe 1,200 pounds, about a quarter of his dad's size," Dr. Bakker said. "The baby's jaw is filled with rows of sharp teeth that could gobble 500 pounds of meat and bone in one bite."

Dr. Bakker, who revolutionized the paleontological world three decades ago with research that suggested dinosaurs were warm-blooded, fast-moving creatures, not sluggish lizards, was also a consultant to the movie *Jurassic Park*. (Note from Herb: he also has nutty ideas about 1,200-pound animals swallowing 500 pounds at one bite.)

Not all scientists were pleased that the discovery of a lifetime was made by people without academic standing. "I had the head of one paleontology center tell me it had no scientific value because it was found by amateurs," Mr. Frithiof said. "Well, we aren't amateurs. Our team knows more about what to look for in the field than most academics ever dreamed of knowing."

"Generally, there is a collegial spirit among the scientific community and experienced fossil hunters," said Karl Flessa, chief paleontologist at the University of Arizona and past president of the Paleontological Society. But rifts do occur. "There have been many important scientific finds made by amateur paleontologists, and we have a long and successful history working with them," Dr. Flessa

said. "There are some tensions between amateurs and the academics at times. Some professors get upset when important finds fall into the hands of the amateurs." Dr. Flessa said the discovery of a juvenile *T. rex* would constitute a very rare and very important addition to the scientific knowledge of the dinosaur. "It's very unusual. Off hand, I'm not aware of any other juvenile *T. rex*. It would help us learn how they grew and developed," he said. "The important consideration is what techniques they used to preserve the remains and how available they will make their discovery for scientific research," he said.

During their expedition to the Dakota Badlands, the discoverers came across Tinker's bones emerging from an outcropping of rock washed out by flash floods. To the untrained eye, it looked like nothing more than a jumble of yellow stone. But Mr. Hollrah, a veteran of dinosaur hunts, immediately recognized the shape of *T. rex* bones. "When I saw him, I knew this was the big hit. Tinker was buried in a pile of prehistoric leaves and ferns about 8 feet square. It looked like a murder scene," Mr. Hollrah said. "He was all torn up, the skull ripped apart. The late Cretaceous periods are not a pretty time for dinosaurs."

"The tedious work of removing Tinker's bones from the matrix of 66-million-year-old dirt and debris unveiled key aspects of his life", Mr. Hollrah said. "He was a young male, and he still lived with Mom and Dad. His teeth show that he was eating the same meals the adults did, which suggests Mom and Dad brought him food to the nest," he said. "At the time he died, it looks like he was out hunting, but not on his own. Something, another predator, got him near his nest."

Mr. Frithiof, 52, became interested in fossil collecting through his brother. "The more I saw, the more I became obsessed," he said. Six years ago, he teamed up with Mike Harrell, a Houston broker for prehistoric objects. Mr. Harrell introduced him to Mr. Hollrah, 40, a veteran fossil hunter. The three formed a partnership to hunt for *T. rex* fossils.

Not trained academically, Mr. Hollrah learned the fundamentals of the prehistoric life forms in 10 years of fieldwork finding and selling fossils to collectors and museums worldwide. His contacts in South Dakota led to the discovery of Tinker. It was Mr. Frithiof's first field dig.



The fossil's remains were moved to a lab the Bio had set up in Houston. After Mr. Harrell died of a heart attack last March, Mr. Frithiof moved the lab to his ranch in Real County, near Camp Wood. (Ed. note: More recently the fossil has been moved to Iowa City, IA where preparation continues.)

"With several hundred thousand dollars tied up in Tinker's restoration, the financial value of dinosaur fossils is never far from mind," Mr. Frithiof said. "A badly eroded *T. rex* tooth brings \$5,000 in the collector's market," he said. "Tinker's four-inch teeth, in almost pristine condition, could bring \$100,000 each."

Even in the realm of academic research, money is an undeniable factor. Sue, an adult and nearly complete *T. rex* discovery in South Dakota in August, 1990, was sold at auction to the Field Museum in Chicago for \$7.7 million. Although many collectors and institutions have shown great interest in Tinker, Mr. Frithiof said he turned down big financial offers. "Tinker is too significant to the science community and needs to be studied for years come. Ultimately, we hope to get our investment back. But we can't just sell Tinker," Mr. Frithiof said. "We decided early on this was something bigger, something we really need to share with not just the scientific community, but with kids and anyone else interested in dinosaurs."

Tinker has gone cyber, complete with his own web site, called Kid Rex (<http://www.KidRex.com>). It offers insights into the story of Tinker's life and death, his discovery and links to just about anything you want to know about *T. rex*.

In addition to their own research, the Tinker team will open the lab to members of the academic community. But the study will be on the Tinker team's terms. And in their Hill Country facilities. "We don't want Tinker to get lost in some university lab, the subject of somebody's stuffy academic paper," Mr. Frithiof said. "Tinker is something for everyone to enjoy."

Cantrill *GEMS* (Mar., 2000)

## HOW TO HAND POLISH A SOFT STONE

By Marie Zigler

Pick a nice pebble already partially smoothed by wave action at the beach. A good one is a Petoskey (fossil coral).

Materials needed:

—a stone

—bucket of water

—a pie pan

—2 circular pads cut to fit the bottom of the pan, with an extension as shown in the pattern. Naugahide works well, as will leather. The pads act as cushions. One is for sanding and the other is for the final polish.

—wet and dry sandpaper sheets of 220, 400, and 600 grits. (Start with 80 grit for a stone that is not smooth enough.)

—cerium oxide or other polishing compound such as tin oxide.

Directions:

Place circular pad in pie tin, then 220 grit sandpaper. Pour in approximately a tablespoon of water, and when working dip your stone into the water as necessary to keep wet. Sand the stone thoroughly, turning it systematically, rubbing long and hard in a circular motion. The sandpaper placed on the extension will help you polish the edges of the stone. Polish 15 to 30 minutes on each side, or more if needed. The first step is very important, so don't skimp on time or effort. Rinse in bucket thoroughly—the stone and the pie plate—and dry the stone with a paper towel.

Repeat the process with 400 grit, again rinsing well.

Repeat with 600 grit. When this step is finished the stone will almost gleam and it will be very smooth. It is important to wash the stone and pie tin to remove all traces of abrasive residue. Dump the water bucket outside, not in your sink. Rinse bucket well and fill with clean water.

For the final polish, use a new circular pad. Sprinkle on the polishing compound. You can use a small amount of water. Rub hard and fast. You can rinse and dry your stone off now and then to check it until you are satisfied with the results.

From *The Strata Data*

## ALASKA, THE FRAGMENTED FRONTIER

Alaska is not the usual solid chunk of continent. It may consist of at least fifty separate terrains or rock masses, many of which come from some other location. The only piece that may be an original part of the North American continent is a small area near the Canadian border, north of the Yukon River, but they are not sure even of that. David Stone of the university in Fairbanks says the state is a "garbage heap."

Alaska is an example of a relatively new concept in plate tectonics—that the edges of many continents are made up of blocks of foreign rocks that have been slapped against them by plate motions. With the acceptance of the theory of plate tectonics in the early '60s, they began to understand how, in the jostle and rearranging of continents, pieces could be broken off one land mass and attached to another that was nearby. Scientists who scoffed at even short-distance journeys by rock masses are now proposing an "exploding continent" in the ancient Pacific that scattered as pieces to every side.

Paleontologists have found fossilized remains of extinct single-celled organisms that are characteristic of Asia rather than North America. Paleomagnetic evidence in southwestern Alaska indicates that those rocks were formed farther south—within 15 degrees of the equator, about 2000 million years ago. The block would have had to travel as much as 9,000 kilometers to its present position in Alaska and British Columbia.

The 50 major terrains identified so far range in size from one mile to several hundred miles square, and each is bounded by major faults, believed to be the structures along which the terrains moved. Some are clearly from the edges of some unknown continent, while the others formed from ocean crust. Most believe that continents grow as soft sediments and are scraped off the top of a plate as it plunges beneath a continent, like butter on a piece of bread. But, in Alaska the blocks are stacked side-by-side like plates in a dish drainer. They do not understand how this occurred.

*Rock Rollers* (Nov., 1990)

## POLLUTION

The late Dr. William Pecora, Undersecretary of the Interior, calculated that all of man's air pollution during his thousands of years on earth does not equal the amount of particulates and noxious gases from just 3 volcanoes: Krakatoa, near Java (1883), Mt. Katmai, Alaska (1912) and Hekla, Iceland (1947). He points out that nature's pure water isn't so pure after all. A few examples:

The springs feeding the Arkansas and Red Rivers carry approximately 17 tons of salt per minute.

The Lemonade Springs in New Mexico carry approximately 900 pounds of sulfuric acid per million pounds of water. (This is more than 10 times the acid concentration in coal mine discharges.)

The Mississippi River carries over 2 million tons of natural sediment into the Gulf of Mexico each day. The Paria River of Arizona carries 500 times more natural sediment than the Mississippi River—yes, one billion tons of sediment per day.

*Lithnics* (Dec. 1976) original source unknown

## CONTINENTAL SPLIT

By Randolph E. Schmid, Associated Press

Volcanic rocks newly discovered in Brazil indicate that an eruption 200 million years ago produced the most widespread lava flow in Earth's history, splitting apart North America and South America, Europe and Africa.

A previously unrecognized area of lava flow covering about 965,000 square miles in the Amazon basin turns out to be related to lava flows on three other continents, researchers say in today's issue of the journal *Science*. The eruption occurred at the same time and had the same origin as lava flows found in North America, Africa and Europe, said Paul Renne of the University of California at Berkeley, who led the international team that conducted the research.

And, he added in an interview, an early mass extinction at the same time seems likely to have been connected to the huge magma flow.

(Summer, 1999)