THE ROCKFINDER

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






# THE ROCKFINDER

**APRIL, 1997**

# MICHIANA GEM & MINERAL SOCIETY

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| Publicity | ..... | Tom Noe | 305 Napoleon Blvd., South Bend, IN 46617 |
| Membership | ..... | All Members | |
| Field Trips | ..... | Kathy Miller | 1106 Clayton Drive, South Bend, IN 46554 |

THE PURPOSE of the Michiana Gem & Mineral Society is to promote interest in and study of the earth sciences and the lapidary arts, and the sharing of 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. Exceptions include field trip meetings, June (field trip), July (no meeting), August (club picnic) and December (Christmas Party).

Board meetings are held the second Wednesday of each month, 7:00 pm, St. Joseph County Public Library, basement level.

The annual club show is Labor Day Weekend.

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.

*Rockfinder* staff:
Editor, Tom Noe, 305 Napoleon Blvd., South Bend, IN 46617
Co-Editor, Herb Luckert, 221 Marquette Ave, South Bend, IN 46617
Reporters, Bob Heinek, Herb Luckert, club members
All contributions for publication should be in the hands of t editor by the 10th of each month. Call (219) 289-2028 or (219) 282-1354. Permission is hereby granted to reprint any original *Rockfinder* articles, as long as due recognition is given along with the reprint.

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Yearly Membership Dues (Payable before January 1)

| | |
|---|---|
| _____Individual | $ 6.50 per year |
| _____Family | $10.00 per year |
| _____Junior | $ 2.00 per year |

Please send your dues and this form to
Michiana Gem & Mineral Society
c/o Margaret Heinek
7091 E. East Park Lane, New Carlisle, IN 46552-9400

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|---|---|
| General Geology____ | Beads_____ |
| Gems & Minerals____ | Silversmithing___ |
| Fossils_____ | Artifacts_____ |
| Cabochons___ | Rockhound____ |
| Faceting_____ | Crystals_____ |
| Carving_____ | Micromounts____ |
| Other_____ | |

Name_____ Birth Mo/Date_____
will attend meetings, yes___no__
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Address_____
Phone_____ Anniversary Mo/Date____

# THE ROCKFINDER

Volume 37
Number 4

The Newsletter of the
Michiana Gem & Mineral Society

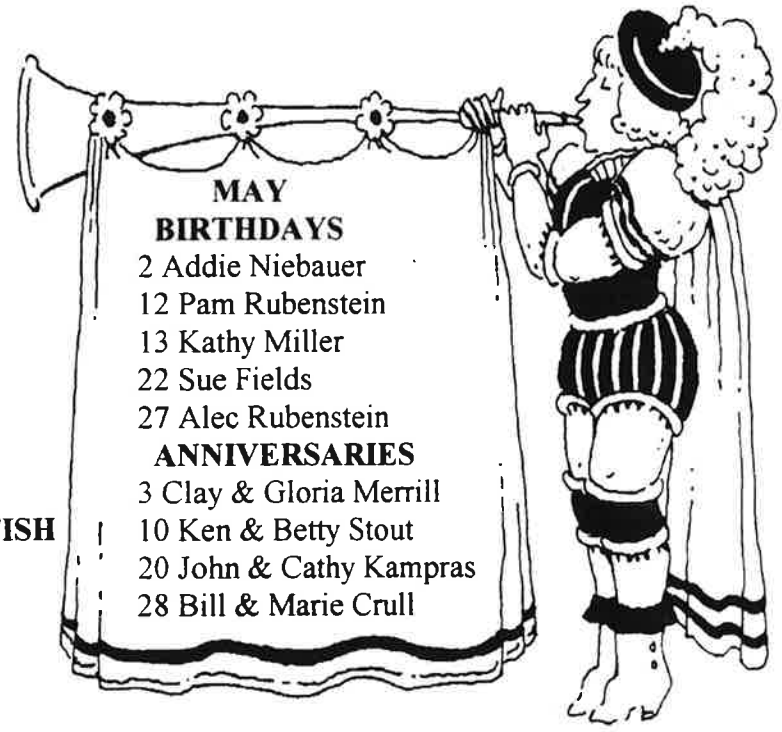
APRIL, 1997

**Meeting:** Sunday, April 27, 1997
Doors open at 1:30 p.m.
Meeting at 2:00 p.m.
Guests are welcome.

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

**Hosts:** Phyllis Smallwood
Pam Rubenstein

**Program:** Videotape program
**CAMEOS, INTAGLIOS & SCOTTISH JEWELRY**



**MAY**
**BIRTHDAYS**
2 Addie Niebauer
12 Pam Rubenstein
13 Kathy Miller
22 Sue Fields
27 Alec Rubenstein

**ANNIVERSARIES**
3 Clay & Gloria Merrill
10 Ken & Betty Stout
20 John & Cathy Kampras
28 Bill & Marie Crull

**UP AND COMING**

April 26-27--Blackhawk Rock Club Gem & Mineral Show, 7711 N. Main, Rockford, IL.
April 26-27--Summit Lapidary and Akron Mineral Show, Emidio Expo Center, Cuyahoga Falls, OH.
May 2-4--Central Illinois Gem and Mineral Club Show, Macon County Fairgrounds, Decatur, IL.
May 2-4--Kalamazoo Geological and Mineralogical Society Show.
May 3-4--"Those Super Sulfates" show, 2250 Seymour Ave., Cincinnati, OH.
May 3-4--Wabash Valley Gem and Mineral Show, Tippecanoe Valley Fairgrounds, Lafayette, IN.
May 4--Club field trip to Cheney Quarry. Details and directions are in this issue.
May 9-11--31st Annual Gem Jewelry & Mineral Show. 3501 Lapeer Rd., Flint, MI.
May 16-18--Midwest Mineralogical and Lapidary Society of Dearborn Show and auction (17), Civic Center, Dearborn, MI.
May 24-26--Chicagoland Gems & Minerals Association, DuPage County Fairgrounds, 2015 Manchester Rd., Wheaton, IL.
June 27-29--32nd Annual Gem, Mineral-Fossil Show & Swap. Monroe County 4-H Fairgrounds, Bloomington, IN.
June 28-29--23rd Annual Rockhound Seminar, Washtenaw Community College, Ann Arbor, MI.
September 19-21--Club field trip to Corydon, IN, area.
October 24-26--Midwest Federation Show and Convention, Davenport, IA.

## MARGARET'S COLUMN

Will we ever have Spring???? It certainly doesn't look like it; probably we will go into Summer with a bang!!! Oh well, guess we will have to trust the Indiana weather to change at any time.

The April show is over, Tom Noe was the chairman of the club's Silent Auction, and he did a very good job, along with his committee. I am not sure who all worked, but I know Herb and Phyllis Luckert went to the storage shed for items for the booth, and Herb returned the left overs back to New Carlisle for the shed. The committee did a very good job. They deserve "Thanks." Bob and I also helped pick up the items, and met Herb when he returned them to the shed.

We picked up several new members, which you can add to your roster:

Martha Couture, 523 W. Lowell Ave, Mishawaka, IN 46545.

Hollis Erickson, PO Box 11332, South Bend, IN 46634.

Greg Korte, 601½ W. Pike St, Goshen, IN 46526-2334.

John H. & Cathy Kampars, 280 Bachelor Rd, Niles, MI 49120.

Diana Quandt, 17680 Hansom Ct., South Bend, IN 46635.

Kate Johnston, 57987 CR 100, Elkhart, IN 46517.

Marion & Rosita Klodinski, 741 S. 23rd St, South Bend, IN 46615.

WELCOME!!!!!

Our program will be on Cameos this month, with a slide program from the Midwest Federati Slide Library. It is an interesting program. If you have cameos, bring them for display. We would all like to see yours.

Bob and I were in Georgia at our son's last month, and had a call from son Rob (a club member), that his wife, Judy, had had a heart attack and was having a by-pass on Easter Sunday. She is doing real well. Also, Pat McLaughlin underwent some shoulder repair on Wednesday April 9th. We are glad to hear that Sister Georgia Costin has returned to her residence, after being in the hospital lo these last few months. Glad to hear all are improving. Hope everyone else is well!!!

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## To the Fossil

by Pat Rutkowski

*You lay buried deep in stone –*
*No matter, shell or bone*
*Side by side or all alone.*
*Then one day, exposed and bare,*
*There you were; I stopped to stare.*
*I bent down to pick you up*
*By your beauty I was struck.*
*I took you home for another look*
*And there you were in my fossil book,*
*Clearly pictured on page four.*

*In my collection now you're stored*
*For me to view forevermore.*

---

Pat Rutkowski is a member . MMLSD and an avid fossil collector. Her favorite fossil is the ammonite.

## MINUTES OF THE MARCH MEETING

The March 23rd meeting of the Michiana Gem and Mineral Society was called to order at 2:15. Emily Johnson, vice-president, presided in the absence of Margaret Heinek. Fourteen members and one guest were present. A motion to approve the February minutes as printed in the *Rockfinder* was made by Kathy Miller and seconded by Margaret Schultz. There was no treasurer's report due to Pam's absence. Host and hostess were Gordon Dobecki and Jessica Zeiger. They decorated the refreshment table with an Easter basket, Easter eggs and cookies.

Kathy Miller reported on three field trips. The trip to the Cleveland Museum to see the Faberge jewelry exhibit was canceled due to lack of response. The May 4 drive-up trip to the Cheney Quarry at Bellvue, Michigan, was discussed. Details and directions will be found in the April *Rockfinder*. The fall excursion will be a trip to the Corydon Quarry and surrounding area on September 19, 20, 21. Sign-up sheets for motel rooms were passed around. Prices for Budgetel are:
2 people - 2 double beds, $51.95 each night
2 people - king-size bed, $51.95 each night
1 person - large single bed, $44.95 each night
This will be a two-night trip. Reservations must be in to Pam by August 1.

Librarian Bob Miller is updating our library. A few older books will be withdrawn. Members will review catalogs for future purchases. **MEMBERS, PLEASE RETURN ALL LIBRARY BOOKS TO BOB** so he can make an accurate account of the library.

Tom Noe reported that he is still looking for things to auction at the April 11-12-13 show at Century Center. Please bring your contributions to Tom at the show or before the show at his home. Volunteers to work this show were Emily Johnson, Sr. Jeanne Finske, Gladys Pacholke and David Peltz.

Displays consisted of a sampling of labradorite brought in by Tom Noe and a variety of stones from Crater of Diamonds brought in by Bob Miller.

Door prizes went to Jessie Zeiger, Fred Kunde and Sally Peltz.

Members: Please add to your roster the name of Alice Garwood, who is a returned member.

Gordon Dobecki is selling his equipment. A list of available equipment and materials will be printed in the April *Rockfinder*.

A motion to close the meeting was made by David Peltz and seconded by Bob Miller. Meeting closed at 2:45. Refreshments followed. In lieu of a program, members worked on prizes for the youth booth at next September's show at Century Center.

Gladys Pacholke
Sec.-Pro-Tem

## SIGN UP FOR SEPTEMBER TRIP

Club members, be sure to contact Kathy Miller pretty soon if you want to reserve a spot on the bus for the September 19 to 21 collecting trip to southern Indiana. You also need to get information about the motel spaces. Once we are sure that all interested club members have signed up, we will open any remaining bus seats to nonmembers. If you haven't decided for sure whether you are going, let Kathy know that, too. Her number is 291-0332.

## EQUIPMENT FOR SALE

The following machines for lapidary work are for sale by Gordon Dobecki. You can reach him at 259-7005.

1) Slab saw, 12", with extra new blade.
2) Trim saw, 8", with like new blade.
3) Tumbler, 1/3hp motor and 2 10 lb. barrels.
4) Grinding unit, (2) 6"x1-1/2" diamond wheels and pump.
5) Sanding unit, (2) 6"x3" expandable drums and pump.
6) Sanding unit, (1) 6"x3" expandable drum and pump.
7) Polishing unit arbor for 2 buffs. No pump.
8) 1,500 pounds of rock for cabbing and tumbling.

## THE NATIONAL COAL MUSEUM

By Herb Luckert

Phyllis and I recently visited this museum which was described in the January *Rockfinder*. We entered a building which housed the miners' washhouse. Instead of lockers, the miners had baskets which held their work clothes, boots and personal items to air out. The baskets hung from the ceiling and chains led down to ground level.

Before going down the shaft we got an orientation that covered equipment, maintenance, the miners' daily routine and other things that gave us an idea what to expect when we got down there. The orientation was provided by a miner who worked at the mine before it closed. Everyone working at the museum is a former coal mine employee. There was also a video orientation which we skipped.

We were led down the mine shaft by a man who formerly did maintenance in the mine and was also an "examiner," meaning he inspected the mine structure and equipment for safety. He was very proud of the fact that it is the only deep shaft coal mine that never had a fatal accident. Looking around in the mine gave a pretty good indication of why that was a record to be proud of. Wherever you looked you could see what an effort is involved in keeping the 600 feet of planet Earth above you from collapsing and crushing you into a fossil.

Our guide started up various pieces of equipment and demonstrated how they were used. Mind-boggling. The "full wall" machine is 12' wide at the business end, armed with carbide teeth set in a large rotating drum. The drum is slowly raised and lowered while rotating the teeth into the coal and rock. It gathers the loose material in toward the center of the machine with paddles. The material is pushed onto a belt which transports it back to another machine, somewhat similar to a front-end loader, which then transports the load to the material shaft where it is taken to the surface.

Toward the end of our tour we were told that we could take any material from the mine that we pleased--anything we could carry. In addition to coal there were large nodules which were very heavy. Not being prepared with anything to haul stuff in, we had to forgo a great collecting opportunity. If you visit this place, don't go down the shaft unprepared for collecting large and heavy materials!

## ON BOARD FOR CHENEY QUARRY

By Kathy Miller, Field Trip Chair

On Sunday, May 4, our club will celebrate spring with a field trip to Cheney Quarry in Michigan. This is a spot noted for iridescent pyrite, and everyone should be able to find some good examples. Other minerals are also present in the limestone, so you have a chance of finding quite a variety of specimens.

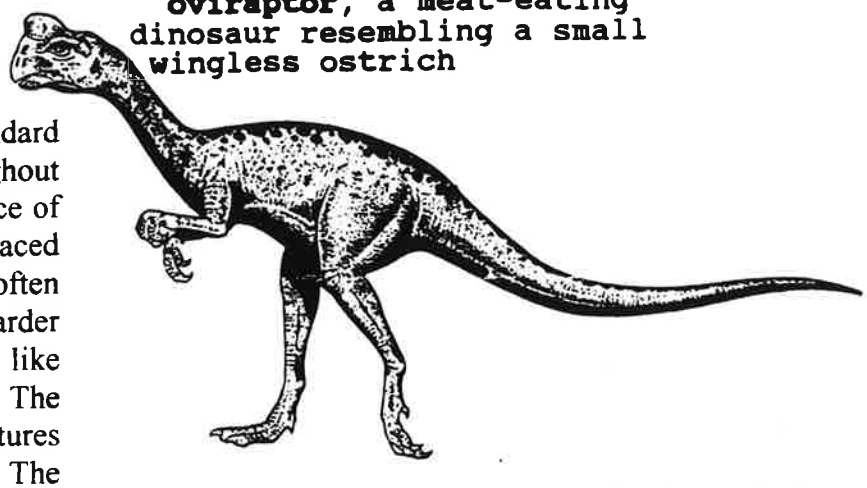
The simplest directions are these: take the Indiana Toll Road east toward Ohio. Just before Angola, take Interstate 69 north into Michigan. Continue north until you reach the Bellevue/Olivet exit (#48). Take this exit west into Bellevue. (At this point you are northeast of Battle Creek. If you prefer not to take the toll road, you could use M-60 or I-94 to get this far.)

At Bellevue, turn left to get to the stop light in the center of town, which is the junction with M-78. Turn left on M-78 and go approximately six blocks. You'll see a bridge over the river, where you take a hard right and go up the hill. There you'll see a sign for Cheney Quarry.

Arrive whenever you want, find a place and start digging. Other members of the club will be busy at work. Wear sturdy shoes and clothing appropriate for the weather, with adequate eye protection in case of flying chips. If you get lost (unlikely), just ask someone in Bellevue for directions. You can bring your own lunch or zip back into town for fast-whatever. Bring water with you, along with your rock hammer and regular digging tools. Youngsters should have adult supervision. There is plenty of rock for them to look through on the floor of the quarry, without climbing the walls (which aren't that high anyhow). Y'all come!

## DINOSAUR BONES OFFER CLUES TO FOSSILIZATION

By Tom Noe



oviraptor, a meat-eating dinosaur resembling a small wingless ostrich

How do bones fossilize? The standard explanation is that minerals percolate throughout the buried bones and deposit themselves in place of the original material. The bony stuff is replaced molecule by molecule by minerals, most often quartz (silica). Since the new minerals are harder than bone, and heavier, the new material looks like the original bone but is chemically different. The color has usually changed; the fossil fractures differently than ordinary bone does, etc. The internal structure of the bone is preserved in sometimes astonishing detail, but the bone itself has been replaced by minerals.

Recent tests, however, suggest that this simple picture may not often be the case, particularly for dinosaur bones. In his book *Seismosaurus: The Earth Shaker* (1994), David Gillette describes what happened when he studied the chemical analysis of a fossil dinosaur bone. As it turned out, a series of major elements in the fossil was a near perfect match with the elements present in modern bones. The fossil bone did have a lot of extra silica, of course, but otherwise they were chemically almost the same.

Now, if the fossil had been created through molecule-by-molecule replacement, then the chemicals in the bone should have altered significantly. After all, the minerals leaching down through the surrounding earth would be unlikely to carry the precise same mix of chemicals as already existed in the bone. Why didn't the bone have the same chemical analysis as the surrounding rock?

Further testing of more samples from the seismosaurus compared bone fragments with the surrounding rock to see how they compared in chemical analysis. The results led Gillette to the conclusion that the seismosaurus bone was not replaced at all. All the empty spaces within the bone--down to the cellular level--had been filled by silica, but silica had replaced very little actual bone. The bone was still there, intact. It had, in effect, been frozen solid with silica which had filled all the cavities where marrow had been and fats had been and fluids had been and tissues had been, but the bone itself had not been substantially altered in the process. Gillette suggests that many other bone fossils may also preserve original bone material, since this area has not been studied very well, and most people are content to think that fossilization is a replacement process.

The book is fascinating as an account of a remarkable dig and a new discovery, and the technical aspects of the science are very informative. Gillette suggests also that the addition of fluorine from percolating groundwater is all-important in the process of fossilization, perhaps because it may retard bacterial decay of the bones, until the silica begins to come in. If the bone is preserved long enough for silica to fill in the pores and cavities--voila, a fossil!

Fossilization is only one chapter in the book, but the rest of it is just as interesting. It's available at the South Bend library.

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## VOLCANOES & CHLORINE

**Did you know that volcanoes are a natural source of chlorine ? One of the big surprises from the studies of the eruption of El Chicon volcano in Mexico is that volcanoes are tremendous chlorine factories. Scientists at the National Center for Atmospheric Research at Boulder, Colorado have discovered that the eruption released 40,000 tons of chlorine into the stratosphere. Man-made fluorocarbons were previously thought to be the major source of the chemical in the atmosphere. the discovery of additional natural sources of chlorine in the atmosphere could modify our understanding of the chemistry of the ozone layer.**

***via: Rock Buster News 10/93***

# Rocks and Minerals

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| I | S | L | C | B | E | Q | S | B | C | R | I | R | W | Y |
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Amethyst
Barite
Calcite
Diamond
Emerald
Fluorite
Garnet
Halite
Iron
Jade
Kaolinite
Limonite
Malachite
Nickel
Opal
Pyrite
Quartz
Ruby
Sapphire
Thomsonite
Unakite
Vermiculite
Wulfenite
Zinc

From Pick and Shovel (Feb., 1997)

## CLUB MEMBERS RUN SILENT AUCTION

Many thanks to the helpful hands who staffed the silent auction and consignment tables at the South Bend Gem & Mineral Show in April. Over $200 in proceeds will go to support the club's field trips and other activities.

Tom Noe organized the sale, with other members coming in at various times to help out, including Bill and Emily and their son Bill, Herb and Phyllis, Bess, Gladys and of course, Bob and Margaret, who organized the whole show at Century Center and welcomed the club's participation.

Tom invites club members to donate items for the silent auction at the club's September show, or to consign items related to our hobby to the sales table. The club will receive 15% of the proceeds from consigned items. Pieces in high demand in April were leaf fossils and petrified wood (donated by Leo and Elma from their Wyoming travels), nice crystals and fluorite specimens. Children attending the show received a free southern Indiana geode half, compliments of Pam and Alec Rubenstein.

## MIDWEST FEDERATION NEWSLETTER BRIEFS

Anyone interested in chairing the MW Junior Activities committee can give President Bob Miller your name. Contact Bob at 291-0332.

Remember the auction of deaccessioned specimens from the Seaman Museum, to be held after the Saturday night closing of the Dearborn Society's show on May 17. The weekend-long show and auction (on Saturday night) are at the Civic Center in Dearborn, MI.

The Bureau of Land Management is hinting it may begin enforcing the policy that *every* collecting trip on BLM managed land be approved in advance. This has been on the books for some time, but not enforced. If you are planning any summer trips to hunt on BLM managed lands, take note! Right now it isn't clear what the policy will be, but you will be expected to know what it is, after it is decided.

(Editor's note from Tom: I just heard from a BLM office in Wyoming about a site for fossil plants I want to hunt at. They said they "no longer requi written authorization" at this site. In fact, they are *encouraging* non-commercial collectors to hunt these fossils so the full range of plants from the formation can be discovered.)

## Three Methods of Lapping

Vibra-Lap: These machines do an excellent job on flat stones, geodes, bookends, pen bases, etc. These laps usually have two pans supplied – one for grinding and one for polishing. First try to have the smoothest saw cuts possible to save on grinding. Depending on your supply house, start with a coarse 80 or 100 grit for the first step. Depending on the size of the pan, add grit with water in proportion to make a light solution just thick enough not to splatter when the lap is turned on. Some rock may not be heavy enough to get a good grinding; this could be helped by adding weight to the top side of the stone you're grinding. Also, to prevent chipping of the edges of your stones, put heavy rubber bands around your stones. Lapping by this method may take days, depending on your stone's hardness and saw cuts. The lapping machine may stay on unattended, but must be checked periodically for water and grit to be added as they are used up. Between each grit size, wash pans and stones the best you can. After you have gone through coarse 80 grit, to the medium 400, and fine 600 grit, you will be ready for the polishing. Use your pan for polishing with a pad of felt or indoor-outdoor carpet, or your favorite pad material. Use cerium oxide or your favorite polishing agent. As before, keep a check on the water and polish during the last stage. The drawback for this method is time (days) and constant checking of work.

Hand Lapping: This method of lapping is the least expensive of the three being discussed. All you need is time, a pie plate, a piece of glass 1/4 inch thick, grit, polish and pad. What is nice about this method is you can polish a smaller flat stone than you can by any other method. As you are watching TV, you can work with a pie plate with a glass at the bottom, add a little coarse grit and water, use your hand to rotate the stone around on the glass, adding grit and water as needed. As I mentioned before, try to have as few saw marks as possible. Wash all – pie plate, glass, and stone – before each grit. Continue through 80 or 100 to 400 to 600 grit sizes, and then polish. To polish, place felt or your favorite pad in the pie plate, add water and polish in the same manner you used to grind.

Rotating Lap: This is my favorite method of lapping. I have found it to be the fastest way for me to get a true flat stone right to the edge. This is very similar to the other methods but a little more care is needed. The first thing is to set up the machine to work in the proper way. First, the speed of the lap at the arbor should be no greater than 400 rpm – 325 rpm is best for a 10-inch or larger lap. For up to a 10-inch lap, 400 rpm could be used, but the rule of thumb is the slower the better. The water supply should be suspended above the lap so the water could be added at the center of the lap. The water should be added at a slow drip, of a count of five between each drop, so the water will not wash the grit off before it could be used for grinding. The first step of coarse 80 or 100 grit will show what I mean. The grit is large in size and has a tendency to bounce off the lap. The finer the grit you use, the more the grit will cling to the lap. Again, the fewer the saw cut marks the better the grinding will be. Be sure you wash the lap and the stone between each grit used. I found that if I put the grit into medicine vials and sprinkled it just in front of the stone being lapped, it seemed to cut down the use of grit and placed the grit where it was needed. For the polish I use a felt pad on a plywood backing with cerium oxide and polish as I would any other stone. I have used this method for about 15 years, and it seems to be the fastest and with a true flat. I use a light to check for polish and flatness. If you can read the wattage your polish is good. If the fluorescent light bends on the ends of the light reflection as you move the light across the stone, it is not flat.

– Robert Hites, member of MMLSD, in The Rockpile, March 1991

## Flat Lapping Without a Lapping Machine

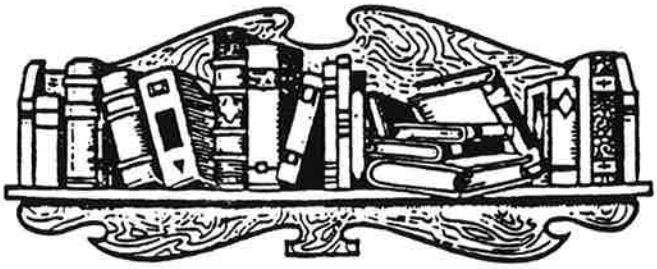
The process of flat lapping is so simple that anyone can do it even if you don't have a flat lap. So go to it, and polish the bookends you want, or that clock face. Just get a piece of aluminum about 12 or 14 inches square. Place it on a flat surface. Take a teaspoon of 120 grit (or even 90 grit if you have saw marks on the slab), mix with Vaseline or water. (I like Vaseline because it holds the grit better.)

Now take your slab to be polished or sanded and dop a piece of wood to it so that you have a handle and can hold it down on the grit. Just keep twisting and pushing it over and around on the grit. Be sure that your grit is always under your slab. Don't run it over the dry aluminum. Soon the aluminum will be well covered. Spread out the grit as you move the stone over it, in any movement pattern you like. Be sure to add more grit so it doesn't get too fine. Keep at it until all saw marks are well sanded off.

Next, wash the stone well and the aluminum too, so that there is no grit left. The next step is to mix 220 grit as before and start sanding all over for a finer finish. Then wash everything again well and mix 400 grit, and start sanding again. Finally, mix 600 grit and sand again. Your slab should now be ready for polishing.

For polishing, obtain a piece of leather. You can get it at some shoe repair shop or leather shop. Get a square about 12 x 12 inches. Stick it to a board and keep it for polishing only. Don't tack it down because the tacks can scratch your stone. Put your favorite polish mix all over the leather. Start polishing it as you sanded it. When polished, wash well and you will have a lovely shine. This is the oldest way to do it before we had motors. It takes time and work, but a little time each night will do the trick.

– Virgil Stine in Osage Hills Gems



**FOR FURTHER READING....**

The Permian period's *Coelurosauravus* is the oldest known flying vertebrate (probably more like a glider, since it couldn't flap its wings). It differed from all other flying animals in its wing structure, which has recently been examined by German scientists. Usually an animal adapts skeletal structures such as fingers or arms to develop wings for flight. In this case, however, *Coelurosauravus* developed wing bones that were not attached to the rest of the skeleton; they were apparently specifically meant for flight.

*Science* (Mar. 7, 1997)

The end of the last North American ice age has traditionally been set at about 10,300 years ago, when the well-documented Younger Dryas ended. However, core samples from the bottom of Seneca Lake in upstate New York tell a slightly different story. Oxygen isotope ratios indicate that the area around Seneca Lake experienced a prolonged chill from about 10,000 to 8,000 years ago, and there are hints of a comparable cold period in Europe and other locations. This previously unknown cold spell was longer and more intense than the Younger Dryas.

*Geology* (Feb., 1997)

Speaking of lake bottoms, studies of fossil diatoms from a lake in eastern North Dakota have concluded that extreme droughts were much more common on the Great Plains of the past. Over the last 750 years, droughts have been uncommon. From about the year 1200 back, however, droughts were more intense and longer in duration. Very dry spells lasted, for example, from the years 200 to 370, 700 to 850 and 1000 to 1200.

*Nature* (Dec. 12, 1996)

Researchers at the South Dakota School of Mines and Technology in Rapid City are using bacteria to make cement. In test tubes they mixed sand with two ordinary soil bacteria (*Bacillus pasteurii* and *Sporosarcina ureae*, to be precise) and speeded up natural processes by adding a urea-based nutrient with added calcium chloride. The bacteria happily metabolized the chemicals and created calcium carbonate crystals around themselves and around each grain of sand. Presto, limestone. Possible uses include the fixing of cracks in concrete structures (they've already fixed cracks in concrete blocks in the lab). What next, fixing Mount Rushmore's cracks? As a matter of fact, that's what they're hoping.

*Discover* (April, 1997)

U. Cal. San Diego geochemists have identified what they call unmistakable signs of life processes in the oldest sedimentary rock on earth, from Akilia Island off Greenland. In the carbon cores of cell-sized grains of apatite from the rock, they found isotopes which have a ratio which could not have been produced by inorganic processes. If true, this would push the evidence for life on earth back to 3.85 billion years ago.

*Discover* (April, 1997)

400,000-year-old spears have turned up in a coal mine in Germany, lying among the remains of butchered horses. Many scientists had thought that big-game hunting had only developed about 100,000 years ago, but the new finds push that date way back. The spears are finely balanced, and carved so that the heaviest part of the shaft is one-third the distance from the spear point, as in a modern javelin. No human remains have yet been found at the site, leaving open the question of whether they were made by *Homo erectus*, early *Homo sapiens* or the predecessors of the Neanderthals.

*Science News* (Mar. 1, 1997)