

THE ROCKFINDER

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Michiana Gem & Mineral Society

Meeting: Meeting:

Doors Open 1:30 PM

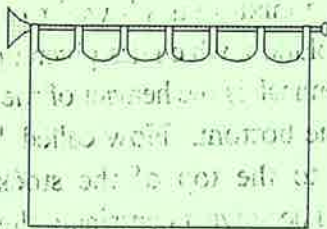
Meeting at 2:00 PM

Place: Studebaker Museum

525 S. Main St.

Downtown South Bend

Hosts:



DECEMBER 4th

The Party at Pin Hook Park Pavilion, at 1 pm

December Happy Birthday & Anniversary:

9 Margaret Shultz

10 Margie Hawkis

11 Molly Elwell

22 Rob & Judy Heinek (anniv)

24 Joan Rosback

24 Clayton Merrill

29 Bob Heinke Sr.

Interesting facts (and fiction) about your
December Birthstone: **TURQUOISE & ZIRCON**

Turquoise, prized since the remotest antiquity for its superb blue color, was known to the women of ancient Egypt. Pieces of turquoise jewelry found on a mummy dated at 7500 years old may well be the oldest wrought jewelry items known. Turquoise was prized by many ancient cultures, including those of Egypt, Persia, Tibet, and the Aztecs and Incas of Central and South America. Turquoise was used as money by American Indians of the 16th century, and the gem is associated with religious rites of the Navajos and other tribes. The importance of turquoise to the American Indian continues to the present day.

Zircon is also an archeological gemstone, carvings have been found at many ancient sites.

New M.G.M. Library Books, by Paul Godollei, Club Librarian:

#187 Guide to Rock & Minerals.

#188 Gemcraft - How to Cut & Polish Gemstones.

#189 Guide to Progression of Life.

#190 The Geological Story of Kentucky.

#191 Fossil Beds of the Falls of the Ohio.

#192 Hello Rock (Children's Book)

#193 A Child's Book of Mountains & Volcanoes

#194 Golden Stamp Book of Rocks & Minerals.

#195 Turquoise Blue Book of Turquoise and Indian Jewelry Digest.



In Search of the First Flower.

Have you ever wondered how flowering plants came to be? Paleobotanists study the fossil record to trace the ancestry of plants now living on the earth. Dr. Peter Crane, Chairman of the Botany Department at the Field Museum has prepared an informative presentation illustrated by stunning slides of flora fossils outlining his recent research into the origins of the earth's first flowering plant.

This first rate program will be presented in the Clark Lecture Hall at Fernwood Botanic Garden, Niles Michigan, on Thursday December 1, 1994 from 7:30-9:00 pm. This event is open to all with the price of admission to Fernwood - \$3.00 adults, \$2.00 seniors over 65. **ADVANCED REGISTRATION IS REQUIRED.** Call (616)683-8653 to reserve a seat and get directions to Fernwood (13988 Range Line Rd) which is about three miles northwest of Niles. (from "Fernwood Notes" Dec/Jan issue) M. Collins

[Note: DUES WILL BE GRACIOUSLY ACCEPTED AT THE CHRISTMAS PARTY!
Last month's instructions were a misunderstanding.]

Larry Hess, Rockfinder Editor
15358 Kerlin Drive
Granger, IN 46530



**Remember, our Christmas Party,
December 4 at 1:00pm. at
Pin Hook Park Pavilion.
Note: Dues will be accepted then!**

ARIZONA COPPER by Chet Smith (The Morenci Mine)

History of Copper Mining (Part 1)

The copper story at Morenci, Arizona began in 1865 when California volunteer Union soldiers passed through the area. The first prospectors arrived in 1870 looking for gold. They failed to discover significant quantities of gold, but were intrigued by the rich copper deposits of copper they found on both sides of the Chase Creek. Several companies operated the mine until 1921 when Phelps Dodge became sole owner. For sixty years all mining in the district was done by underground methods. During the great depression copper prices fell so low that by 1932 all mining been suspended. The underground mines never reopened.

Before the arrival of railroads and trucks, ore was transported by wagon train. In 1879 the first railroad was built.

In 1937 open pit mining was begun and ore was hauled in 5 yard and 22.5 yard trucks. Today ore is hauled to the crusher (located in the open pit mine) is a much larger truck. The newer vehicles carry over 240 tons of ore.

Here are a few statistics furnished b Phelps Dodge concerning the size of the operations. The mining operations cover an area of 50,000 acres. The open pit mine itself is 1.8 miles long and is the equivalent of 27 football fields placed end to end. Over two and a half billion tons of rock and ore have been removed from the open pit since it was first opened in 1937.

Refining Copper at the Morenci Mine. (Part 2)

The copper ore being mined today contains less than 1-2% copper compared to 20% that was available when the mine opened in 1872. Thus, the old method of smelting the ore to obtain the copper is not economical and newer techniques are being used. The new process is known as solvent extraction electro-winning. It is a relatively simple process to produce practically pure copper from water that has been percolated through huge stockpiles of copper bearing rock.

The process consists of four steps, as described below:

STEP 1: Leaching. The first step, leaching, starts with the sprinkling of slightly acidic water on one of the low grade ore stockpiles. The water percolates through the stockpile, dissolving copper minerals contained in the rock as it descends. The copper laden water, now called "pregnant leach solution," exists from the bottom of the stockpile, flows to a collection pond, and is pumped to one of the solvent extraction plants.

STEP 2: Extraction. In the second step, extraction, the pregnant leach solution is mixed vigorously with an equal volume of kerosene based solvent that contains an organic chemical specifically designed to extract copper. After the solutions have been mixed for about two minutes the mixture is allowed to settle.

The leach solution, which has given up its copper to the organic chemical, is the heavier of the two solutions and sinks to the bottom. Now called "raffinate" it is pumped back to the top of the stockpile to begin another cycle. The solvent containing the copper-laden organic chemical, called "loaded organic" floats to the top and is pumped to the next section of the solvent extraction plant.

STEP 3: Stripping. In the third step, stripping, the loaded organic is mixed with a copper-bearing sulfuric acid solution, called "electrolyte" and the copper migrates from the organic to the electrolyte. The mixed solutions then are allowed to settle; the solvent that has been stripped of its copper, called "burned organic" floats to the top and is sent back to the extraction step to pick up another load of copper. The electrolyte containing the copper, called "rich electrolyte" settles to the bottom and is pumped to the electrowinning tankhouse.

STEP 4: Electrowinning. In the final step, electrowinning, the rich electrolyte is pumped through a series of tanks of "cells." Hanging in the tanks are insoluble lead plates alternating with sheets of copper. Each lead plate serves as the anode pole of an electric

circuit; each cathode pole begins as a thin "starter sheet" of pure copper. A direct current is passed through the electrolyte, reducing some of the copper ions to copper metal, which accumulates on the starter sheet.

After seven days in the cell a starter sheet has grown to a slab of virtually pure copper weighing about 200 pounds. At that point it is removed from the cell and replaced with a new starter sheet. The harvested cathodes are ready for sale or for further processing into other copper products. The electrolyte that has passed through the tankhouse, partially depleted of its copper and thus called "lean electrolyte" is returned to the stripping step to have its copper content upgraded once again.

A fairly simple process yet a tremendous investment is required to efficiently produce copper from low grade ore. In 1990 nearly 150,000 tons of ore were processed in one day. The plant produces nearly 350 million pounds of copper per year. They are able to do so at a cost of approximately thirty cents per pound. To achieve this, over 145 million dollars has been invested in the Morenci Mining operations.

From: The Tulip City Conglomerate, Aug & Oct 1994

The **Carmelite Shrines**, A local attraction.

In the early 1950's chaplains of the WWII Free Polish Army were instrumental in the construction of the Carmelite Shrines in Munster Indiana. The monastery's objectives call for prayer, penance and apostolic activity.

Of special interest you will find -
"beauty collected from all parts of the world in the form of crystals and colorful rocks, some of which come alive with color when exposed to ultraviolet rays."

Visits should be coordinated with the Carmelite Fathers by calling (219)838-7111 in Munster.

 Another specialty club that could be of interest to some of you is the Mid-America Paleontological Society or MAPS:

contact: Mrs Sharon Sonnleitner
 MAPS Digest Editor
 4800 Sunset Dr SW
 Cedar Rapids, IA 52404

Membership Roster Update - Welcome:

JACOBS, Stanley
 9307 Paks Rd
 Michigan City IN 46360

SLATTERY, MICHAEL
 52332 Carriage Hills Dr
 South Bend IN 46635
 273-9532

FASHBAUGH, JOSEPH W.
 1749 Linden Avenue
 Mishawaka, IN 46544
 255-2449

LUCKERT, HERBERT
 221 Marquette Av
 South Bend IN 46617
 282-1354

HORRALL, DENNIS & JANUS
 16733 Jackson Rd
 South Bend IN 46614
 255-8249

CORSON, CANDACE
 16641 Brick Rd
 Granger IN 46530
 273-1763