

1992 ELECTED OFFICERS

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3 Years: Dwight Miller
Janet Wright
2 Years: Gerald Moore
Don Phillips
1 Year: James Null
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3 Years: Fred Holbert
Roger Pabian
2 Years: Kevin Schwartzman
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1 Year: Bob Wright
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Field Trips: Kevin Schwartzman
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Study Group Coordinator: Ralph Ulrich
Housing/Property: Jim Parks
Junior Activities: Pam Killion
Librarian: Jim Parks/Charles Wooldridge
"Gem Palette" Correspondent: Pam Killion
"Geology Day" Coordinator: Francis Belohlavy

Programs: Charles Wooldridge
MWF Liaison: Vera Lyman
Scholarship: Dwight Miller
Christmas Party: Billie Heffelbower
1990 Rockhound/Year: Ewald Paul
1992 Show: Phyllis Parks
1993 Show:
1992 Swap: Roger Pabian
1993 Swap:

AUDITING COMMITTEE, 1987-1988

Charles Wooldridge
Francis Belohlavy
Shirley Rockel

YOUR PICK & SHOVEL STAFF

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CALENDAR OF EVENTS

- MARCH MEETING:** Saturday, March 28, 7:30 PM
Nebraska Center for Continuing Education
33rd and Holdrege Streets.
- PROGRAM** **Basic Faceting** by Ralph Ulrich.
Bring your curiosity and questions.
We have a very good chance to learn.
- JUNIOR MEETING:** Pam Killion will be in Mexico during the
March meeting date. Look for a meeting
in April.
- COMING EVENTS:** SHOW, March 21, 22, Lincoln, Nebraska, Pershing
Auditorium. LG&MC 34th Annual Show.
- SHOW, March 28-29, Cedar Rapids, Iowa
- SHOW, April 24-26, Wichita, Kansas, Rocky
Mountain Federation Show.

REGIONAL SHOWS:

HAYWARD, CA, August 21-23	HARRISBURG, PA, Sept. 19-20
BRUNSWICK, OH, July 23-26 (AFMS)	WICHITA, KS, April 24-26
ALPINE, TX,, April 17-19	BUTTE, MT, date pending

NEW MEMBER: James L. Woita
 6112 Seward #2
 Lincoln, NE 68507

FUTURE MEETING DATES, PLACES:

REGULAR MEETING: April 25, 1992. NCCE,
33rd & Holdrege Sts., 7:30 PM.

May Meeting, Saturday, May 23, Bethany Park
Shelter House, Cotner and Vine Streets,
Dessert Supper.

DISPLAY MATERIALS Show Acquisitions. Two fine shows will be
under our belts by the March meeting. Ours and
Kansas City's. Bring along some of the items
you obtained at these events to share with your
colleagues.

PRESIDENT'S MESSAGE

Spring is upon us once again with its promise of warmth and green and flowers (and rain and mud!). One of its harbingers is the annual Geology Day held at Pioneer's Park. We had beautiful weather and a splendid turnout. Over two hundred visitors along with many of the club's faithful. My thanks to Roger Pabian, Francis Belohlavy, Bill and Shirley Rockel, Charles Wooldridge, Mike Smith, Pam Killion, Emily Rieur, Eddie Ridge, Jim and Phyllis Parks, Ralph and Rosalie Ulrich, Grant and Goldie Quinn, Kevin Schwartman and Kathy Pavlisch, the Millers, and of course Billie Heffelbower. It was a rewarding experience for all and we made many new friends.

With spring comes our annual show (same weekend in fact) and the opportunities which this brings. I would urge all of you who possibly can to participate in this in whatever way you can. Don't feel that you have nothing interesting to display or no skills to share: believe me, you do!. We realize that some are better than others for some have not enjoyed the hobby as long as some, but all of you have something to contribute, something to learn, and something to enjoy at the show: please some and see!! You will be very pleasantly surprised. Remember, we do this because its fun.

And speaking of fun the time is rapidly approaching when we can get out and have fun outdoors. I am referring to field trips and our field trip chairman, Kevin Schwartman would like your help. If you have any ideas, and I know many of you do, please call him and help him get something going. With luck we can get several good field trips set up and get cooperation from Mother Nature. Please set this up for a warm weekend with no rain (when pigs fly.)!

I'll see you all at the show; remember, the more you do, the more fun it will be. Until next spring!

David Heffelbower

AT LENTZ CENTER FOR ASIAN CULTURE

Club members are reminded that the temporary exhibit "Dragon's Tears: Minerals in Oriental Art" will be removed on March 30, 1992 and replaced with another traveling exhibit. If you plan on seeing this show, be sure to do it soon. +++

WORDS OF WISDOM

Back in about 1950, a wise but now unknown or forgotten sage in the Orient casually remarked that if all of the automobiles in the world were lined up bumper to bumper, somebody would try to pass them all.

The spring season brings about a number of shows and puts a lot of us on the road traveling to these events. If that wise unknown or forgotten sage were to have words of wisdom today, they would probably be: "That somebody is still alive and well and out there trying to pass them all." Moral: Drive defensively and carefully! Travel to and from shows and field trips is the most dangerous part of rock collecting. ++

FEBRUARY MEETING RECAP

The February meeting consisted mostly of show business before President Heffelbower introduced Scholarship Chairman, Dwight Miller, who, in turn, introduced Dr. Eric Durrance, Chairman of the Geology Department at UN-L. Dr. Durrance introduced the club's 1992 research grant recipients, Michael Myers and Kevin Cornwell. Myers spoke about Pliocene age wind-blown deposits beneath the Nebraska Sand Hills and explained how understanding past climatic changes might help us to determine whether climatic changes are a natural thing that we can not alter or if they might be induced by human activity. Cornwell is working on loess closed basins east of the Sand Hills and on the geomorphic development of valleys in the Himalayas in Pakistan. Both presentations were very interesting and lengthy question and answer sessions followed. Because the sessions were longer than planned, the program on faceting by Ralph Ulrich was postponed until the March meeting.

In addition to the club's grants to Myers and Cornwell, Hannan LaGarry-Guyon received a grant through the thoughtfulness of Adeline Nolde and the Taylor Family. Adeline requested that when she retired last summer that donations be made to a research grant fund in Memory of Howard J. "Jim" Taylor, Jr., and be given to a paleontology student. Roger Pabian introduced Hannan to the membership. LaGarry-Guyon will present his poster session from North-Central Section of the Geological Society of America Meeting at Iowa City to the club at the May Meeting.

There were some excellent displays including agates from Eddie Ridge, Fred Holbert, Marie Wells, David Heffelbower, and Roger Pabian and a nice example of a micromount sand crystal from Michael Smith. The red, white, and blue theme for Washington's Birthday was really capped off by the red ruby and white and blue sapphires furnished by Wooly.

Several books were also on display for members' perusal and they included topics such as opal appraisal, folk art of the Soviet Union, and arts and crafts of Turkestan. Reviews will appear in subsequent issues of Pick & Shovel. +++

NEWS ITEMS NEEDED

The Pick & Shovel is always in need of articles dealing with lapidary, gems, fossils, minerals, field trips, etc. Copy is due by the meeting date to be considered for publication in the succeeding issue.

Copy is acceptable in any form. However, if you use a computer or word processor, please make copy 70 spaces wide by 55 lines to the page, preferably right justified margins. Print with a new ribbon on one side of the paper only. This will be camera ready and will save much time on this end. Copy need not be camera ready, however.

In addition to additional articles, I can use news about things rock-related that members have done. If you do any school or service club presentations, science fairs, scout group presentations, or similar gem and mineral activities, let me know what group, where and when you made the presentation, and how many people attended.

Because of copyright restrictions I am unable to use items that have appeared in print in newspapers, magazines, or other media. RKP

NEWS ABOUT MEMBERS

Adeline Nolde reported that Helena Baegl was returned from Tabitha Home to Bryan Hospital where the pin and plate were removed from her hip and she had a total hip replacement on January 27. Helena returned to Tabitha, 4720 Randolph, Room 212N, Lincoln, NE 68510 on February 13. Helena would appreciate cards, letters, and visits from club members and friends. Helena's sister, and frequent club visitor, Emma, is at Orchard Park Place, 3110 South 48th (68506). Short visits from club members would cheer them both up.

Professor Bob McDougal, a friend of Lois and Irl Everett reported to Adeline that Evvy is now out of Veterans Hospital at Harlingen, Texas, where he received a battery operated defibrillator during open-heart surgery recently. Son Gary will fly from Colorado to Texas in April to drive Evvy and Lois back to Lincoln in their camper.

Paul Brauch suffered a heart attack on January 13 and reported to Adeline that he was home and able to go out walking on February 19. Paul attended the February 22 meeting and we are glad to see him on the road to recovery.

All of the above folks would appreciate your cards, letters, and visits. +++

ON BRAZILIAN AGATES

By Roger K. Pabian

Compared to many agates, especially those from northern Mexico, agates from Brazil are often thought to be lacking the strong, almost gaudy colors that characterize Laguna, Moctezuma, Coya Mito and other of the North American agates.

Brazilian agates when cut in thick slices are often dull gray-green, yellow-gray, dull brown, or similar unattractive shades. Some cutters have tried to remedy this situation with heat treating but the resulting colors are more carnival-like than natural.

The next time you run across some of these dull agates, try slicing them very thin, about 1/16 inch, and making a flat, slab-like cabochon. The added translucency causes the formerly dull colors to take on very subtle shades of oranges, orange browns, yellows, and pinks. They are very lively stones when displayed on a white background.

As an added bonus, a number of these gems have proved to be very fine iris agates, something not observed easily in the thicker slabs required for a contoured cabochon.

Don't throw away the onyx-agates, those with parallel bands. Try making the cut at about 5 degrees to the parallel planes seen in the onyx bands. This can produce some very aesthetically pleasing pictures, some of which are almost of a fantasy nature.

And don't think you have to make a cabochon to fit a standard oval template, and don't think that the pattern has to be perfectly centered to make an ideal stone. Go to the art gallery and look at the paintings and photographs. Get some ideas about composition there. +++

FORMING STALACTITES

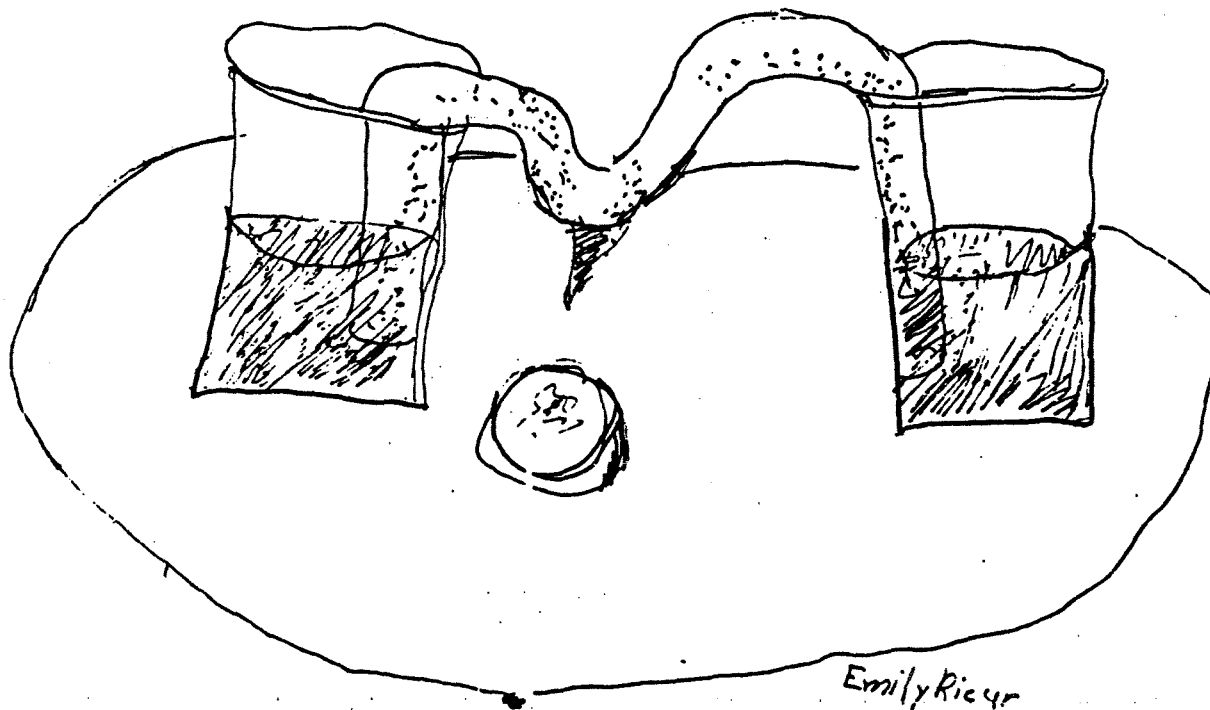
By Emily Rieur

You need:

2 cups, Thin strips of toweling, lid or container to catch drips, 6-12 TB of Washing Soda, and Two cups of Hot Water.

1. Mix the Washing Soda with the hot water until no more soda will dissolve. (This is called saturated.)
2. Divide the solution into the two cups.
3. Put the ends of toweling into each cup. (Make the strip dip in the middle so the stalactite will form there.)
4. Set the experiment in a spot where it won't be disturbed and watch the stalactite form. (As the solution drips some of the crystals cling together to form a stalactite. When the water has evaporated the soda will be hard but fragile.)

If you want to form other crystals you might want to read Crystals and Crystal Gardens You Can Grow, by Jean Stangl. (Crystals are formed not grown because they are not alive.)



GEOLOGY DAY, 1992

By Phyllis Parks

Sunday February 16 was the Annual Day set aside by Pioneer Park's Chet Ager Nature Center for Lincoln Gem & Mineral Club's members to share their wonders of Earth Science in the new Prairie Interpretive Center.

Club members Charles Wooldridge, Ed Ridge, Fred Holbert, Roger Pabianm David & Billie Heffelbower, Jim & Phyllis Parks, Michael Smith, Pam Killion and daughter Emily, Francis Belohlavy, Kevin Schwartzman each brought cases of rocks, gems, and fossils as well as equipment to show, demonstrate, and discuss. Andy Zarins with son Julian, Grant and Goldie Quinn, Dwight and Dorothy Miller, Kathy Pavlisch, and Shirley and Bill Rockel came to view and talk with the many visitors as they looked, admired, and asked questions. Chet Ager kept track with a manual counter and logged 237 persons, largest number to date for us.

Roger had at least two Cub Scout Dens, #15 and #45 who brought their rocks for identification and discussion. Andy helped with this.

The accommodations and assistance given by Chet Ager Center Staff were much appreciated and LGMC wishes to Thank them for this yearly invitation to share our fascinating hobby.

This event was chaired by Francis Belohlavy with help from Roger and Charles. It was stimulating to share the occasion via Channel 10 and see our hobby on the news.

The demonstration by 8 year old Emily with a bit of help from Mother Pam was of special interest to not only the youth but the adults attending. We hope to see more of this.

A fun day, a beautiful day to visit other parts of the Center, walk the nature trails and enjoy the view across the lake, and a day in which we could look forward to next year. +++

FROM YOUR SHOW CHAIRMAN

My thanks to all of the individual Committee members who have attended Show Committee Meetings. Sometimes meetings are boring and hard to schedule into your busy lives but like most well oiled machines are needed to keep ideas and plans coordinated so that the end production will be up to LGMC usual standards. I'm so pleased that each of the persons involved has been doing preliminary work and planning. Friday, March 20, 1992 will be a fun day for the LGMC Participants and for our Dealers, Demonstrators, Exhibitors, and Workers.

My THANKS also to club members who have indicated their desire to help with the Friday Set-up and Sunday Tear-down and who have promised displays.

Our club needs every one of us on Show Week-end and I feel that Hospitality is very important if you have no displays and do not have the strength to work.

See you all at Pershing on March 20, 21, and/or 22. Sincerely, Phyllis. +++

SCIENCE FAIR

Nearly 500 people attended the Park School Science Fair on February 25th. Displays of Nebraska Gemstones by your editor were very popular with the audience. +++

PUNCTUATION OR GRADUALISM

by Roger K. Pabian

A key concept in paleontology is that of evolution, an idea that was first brought to large audiences by Charles Darwin with publication of "Origin of Species" in 1859. Deciphering the sequence of events that took place to shape the earth as we see it today is possible to a large extent because plants and animals have changed in response to the changes in their environments throughout geologic time. Paleontologist R. C. Moore of the University of Kansas once described organic evolution as one of two irreversible geologic processes. The other is radioactive decay.

Darwin's theory of organic evolution was called natural selection and in its simplest terms stated that any advantage a species had over competitors, regardless of how small, would favor the development of one species over another over a long period of time. Darwin felt that species were not immutable and that over long spans of time, through gradual changes, one species might arise from a more primitive progenitor. In Darwin's way of thinking, organisms evolved at a uniform rate in their world wide distribution. This process is called phyletic gradualism, or simply "gradualism."

Darwin's ideas remained relatively unchallenged, especially in paleontology, for many years. The first challenges to Darwin's ideas were not really from paleontologists but geneticists such as Theodosius Dobzhansky and Ernst Mayr who published his now classic *Animal Species and Evolution* in 1963. Any reader who studies the history of evolutionary theory will sooner or later learn that Darwin never opened his reprint from Mendel, the Monk who did the first research in genetics, and one of the first papers to appear that related evolution to genetics was published by Sewall Wright in 1931. It was called *Evolution in Mendelian populations*, and appeared in a then relatively new journal (volume 16) called "Genetics." All of these workers suspected that Darwin's theory that animals evolved gradually over long spans of time did not fully explain evolution. In 1972 Niles Eldredge at the American Museum of Natural History and Stephen Jay Gould at Harvard University published a paper called "Punctuated equilibria: an alternative to phyletic gradualism. Eldredge and Gould proposed that evolution happened quickly over short spans of time in isolated populations of living organisms. Their ideas met with some initial resistance but their ideas could be demonstrated in the fossil record. In not too many years, paleontologists began talking more about punctuated equilibria or "punctuationalism" and most paleontologists now agree that it is a valid contribution to the science.

What punctuation suggests is that some populations of organisms become isolated from the main body. This isolation may be caused by some natural barrier such as a mountain range coming into being, a change in ocean currents, or a change in climate that may put a large desert between two formerly adjacent groups of animals or plants of the same species. Each group or population has its own separate gene pool and this gene pool can be affected by such things as climate, food supply, natural contaminants or pollutants, or simply what groups of individuals become the dominant males in each isolated population. At any rate, the genetic changes in the isolated populations do not change in the same ways or at the same rate. Hence, a new species can arise from one isolated population but not necessarily the other.

It is interesting to note that R. C. Moore and Harrell L. Strimble published a paper in 1969 on the evolution in the Mississippian camerate crinoid family Acrocrinidae and found that evolution was happening quickly in isolated populations. They coined the phrase "explosive populations" to describe this phenomenon. Several other workers also reported the same kind of evolution before Eldredge and Gould but none of their terms to describe the phenomenon stuck. It may be that Eldredge and Gould's real claim to fame is having developed the term "punctuated equilibria" which is the term that became adopted. It should be pointed out that their work much better documents the phenomenon they named.

One of my former students, Jim Borovich, also a LG & MC research grant recipient, tested punctuation versus gradualism in the crinoid genus Apographiocrinus from Desmoinesian (Middle Pennsylvanian) and Missourian and Virgilian (Late Pennsylvanian) from the North American Midcontinent. The theory of gradualism suggested that a series of plates in the crinoid cup called the anal plates or X plates or anal X slowly migrated out of the cup through time, first losing contact with the basal plate below and finally getting above the radial plates (See figure 1).

Careful examination of the forefacetal and facetal areas (Figure 2) on the radial plates of samples of Apographiocrinus showed that the oldest Desmoinesian forms had very wide forefacetal areas and insignificant prongs between adjacent radial plates. This was also observed in the very early Missourian forms. The natures of the forefacetal areas abruptly changed in the oldest populations and there was shown to be a proliferation of species early in the history of the genus. Not too far into the Missourian the nature of the forefacetal areas had changed to the point that they were absent to insignificant and prongs had fully developed between adjacent radial plates. Evolution in the genus Apographiocrinus began with a bang and a proliferation of species, most of which were very short lived. Most of these species quickly became extinct and A. typicalis carried the torch for the genus into the middle Virgilian. There appears to have been a minor radiation of Apographiocrinus in the early Virgilian when a couple of new species made debuts and quickly became extinct. Punctuation at its finest.

What about gradualism and the anal X plates. Jim showed that there was a tendency for Apographiocrinus to expel the anal X plates from their cups but no real statistical significance could be attached to this phenomenon.

Jim's study gave us a surprise we weren't prepared for and didn't even anticipate. In paleontological studies it is now as important to describe the environments of deposition that a fossil lived in as it is to describe the fossil itself. The earliest apographiocrinids cups all had thick, ornamented, robust plates that suggested that they lived in warm, shallow water, and the latest apographiocrinids from the long lived lineages all had thin, inornate, frail plates suggesting that they lived in cold, deep water. The cyclothemic positions of the sediments that yielded the apographiocrinid cups also suggested warm, shallow water for the former example and cold, deep water for the latter. Jim's work showed a migration of apographiocrinids from a more hospitable to a much less hospitable environment at least in people terms. After all, who wants to go to Greenland to go swimming.

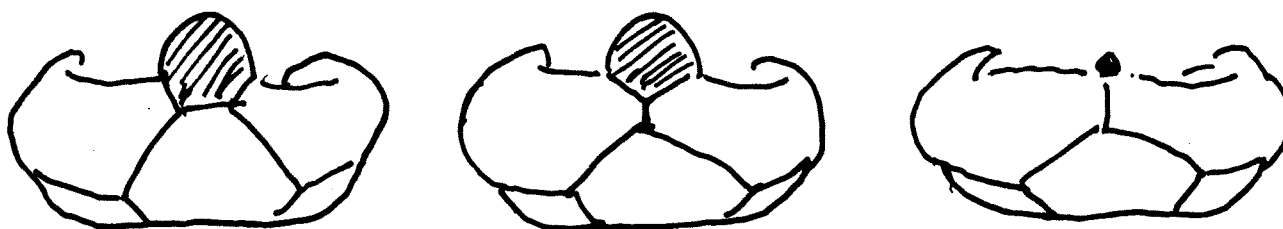


Figure 1. Posterior view of cups of Apographiocrinus showing how anal X plate can be expelled from the cup.

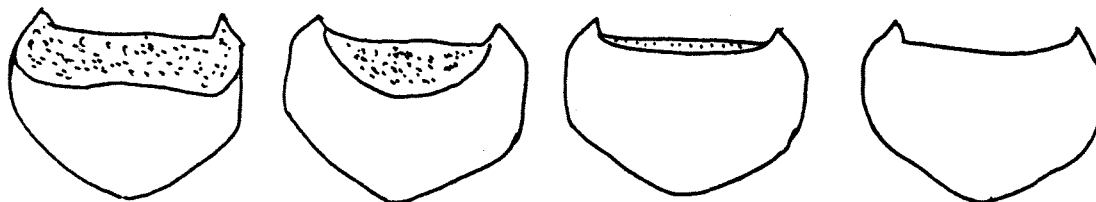


Figure 2. Forefacetal and facetal areas in early and late species of Apographiocrinus showing nature of changes through time. From Borovich (1990).

SUGGESTED READINGS

- Borovich, J. H., 1990. Evolution of the late Pennsylvanian crinoid Apographiocrinus Moore and Plummer from the North American Midcontinent. University of Nebraska, unpublished MS thesis.
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- Mayr, E., 1963. Populations, Species, and Evolution, an abridgement of Animal Species and Evolution. Belknap Press of Harvard University Press, 1970. 453 pp.
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- Wright, S., 1931. Evolution in Mendelian populations. Genetics 16:97-159.

OTHERS WRITE

From "Osage Hills Gems", Bartlesville, OK, November, 1991

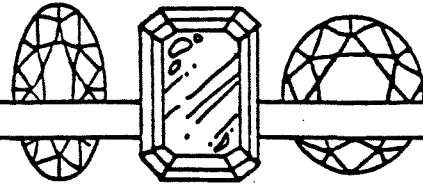
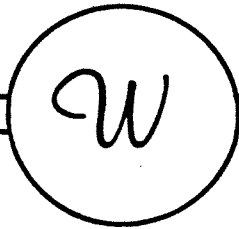
More About Opal- Charles A. Stratton

In the previous article, *What is Opal*, we discussed the fact that opal is made of tiny spheres of non-crystalline silica (SiO_2) about 1.0 to 2.5 microns in diameter and arranged in a fairly good semblance of spherical close packing. It was not mentioned that opal has an appreciable and significant water content. The water can vary from 1 to 21%; however, in precious opal, the range is from 6 to 10%. The water can occur in two ways: one being *free* water, the other being *bound* water. The bound water is water of hydration of silica and is generally represented by: $\text{SiO}_2 \cdot n\text{H}_2\text{O}$. As water of hydration, it would be uniformly distributed through each sphere. The free water would be held by capillary attraction in the voids between the spheres.

Now, what holds the spheres together? It could not be the capillary attraction of the free water in the voids. It is certainly some kind of mineral cement, and the most likely prospect is *silica cement*. As such, its composition would not differ significantly from that of the spheres; only its form and function would be different. The breaking (fracture) of opal is most likely to be the result of failure in the cement bond between the spheres. This would give the irregular fracture which is usually perceived. However, much conchoidal fracture is found in opal, and the latter may be due to the fairly regular packing of the spheres. Of course, nothing resembling crystalline cleavage is found in opal. Considering how it is put together, opal is fairly durable at a hardness of 5.5 to 6.5, since quartz (a very tough mineral) has a hardness of only 7. It is safe to say that we know why opal is softer than quartz. Some loss of stability (crazing, cracking, increased tendency to break) is associated with the drying of opal. At the same time, an increased opacity (loss of translucency) occurs. This must mean that the loss of bound water in the cement decreases its strength. Free water in the interstices can act as a reservoir keeping the cement hydrated.

Many rough opals are kept in water for viewing prior to sale. This has about three advantages. First, the surface irregularities are covered by water, giving the pseudo-polish effect. Water can enter the voids, giving greater translucency or, in some cases, transparency, enabling play of color to be seen at its best. Finally, the stability of the rough is safeguarded. Opal never looks better than in a jar of water. The real test is how it ages in the open air, since very few people want to wear their opals encapsulated in water (although this is done with opal chips as a novelty). The fire opals of Mexico have a high incidence of the development of opacities. These opals should be exposed several months before a time-consuming job like faceting is done on them. Of course, the time wasted in capping such an opal would be of no consequence. Opal from Humboldt County, Nevada is bad to crack and craze on the surface after being mined. Obviously, opal cut from this or similar sources should be stored for quite a while before it is mounted.

An effort has been made to show how the gem properties of opal could be explained by its chemical nature. The inclusion of heavy metal impurities was not discussed, although the color of fire opal is from iron. The possibility of other cementing materials was not treated, due to a general lack of information on the subject. Suffice it to say that the different varieties of this simple but highly variable gem are a fascination to all opal lovers. Every cabber should be one.



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Dues to LINCOLN GEM & MINERAL CLUB are as follows:

Adult membership fee \$10.00 (age 16 and over)
Junior membership fee \$2.00 (age 12-16)
Family membership fee \$22.00 (husband, wife, and all children under 16---permanent residents of household).

New memberships must be approved by the Board, after applicant attends at least one (1) regular meeting of the club, and pays the above dues plus \$5.00 registration fee.



H.E.L.P.

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