Ohio Geology

A Quarterly Publication of the Ohio Department of Natural Resources, Division of Geological Survey *1999, No. 4*

SURVEY OPENS NEW CORE AND SAMPLE FACILITY

by Merrianne Hackathorn

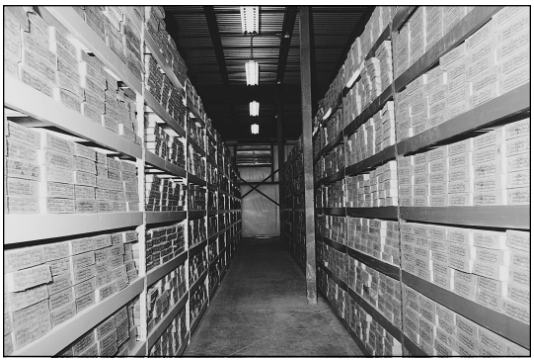
On October 12, 1999, the Division of Geological Survey held a dedication ceremony for the Horace R. Collins Laboratory. The 38,000-square-foot facility is located at Alum Creek State Park, north of Columbus in Delaware County. It includes a large conference / meeting room, offices, laboratories, a sample examination room, and storage space for the Survey's voluminous cores and samples as well as our publications inventory. The building also houses an array of seismic monitoring instruments for the Survey's Ohio Seismic Network and the Ohio Earthquake Information Center.

The facility was funded through the Department of Natural Resources' NatureWorks program and represents multi-agency cooperation. The land and reservoir are owned by the U.S. Army Corps of Engineers, and the park is managed by the ODNR Division of Parks and Recreation. The building is shared with the ODNR Division of Watercraft. ODNR Division of Engineering personnel assisted in the design of the building and served in an oversight capacity during its construction. The building was designed by Braun & Steidl Architects, Inc. Contractors for the project included Wayne Builders Co., Inc. (general construction), Radico, Inc. (plumbing), Pete Miller, Inc. (HVAC), and ESCO Electrical Contractors, Inc. (electrical).

The building is named for former Geological Survey Chief and 10th State Geologist Horace R. ("Buzz") Collins, who participated in the dedication ceremony. Other speakers at the ceremony included ODNR Director Sam Speck, Alum Creek Park Manager Victor Ricks, Watercraft Chief Jeff Hoedt, and current Geological Survey Chief Tom Berg. More than 100 people attended the ceremony and the open house that followed.

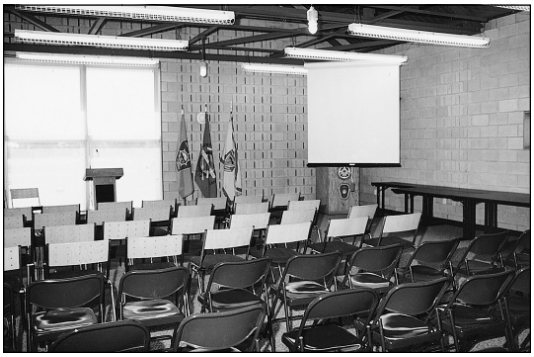
During Collins' tenure as State Geologist (1968-1988), the Survey staff tripled and its budget increased to over $2 million. In 1981, Collins secured a portion of the minerals severance tax to fund the statewide geologic mapping program. He also in-

Ribbon-cutting ceremony at dedication of Horace R. Collins Laboratory on October 12, 1999. Left to right: Thomas M. Berg, Chief of the Division of Geological Survey; Samuel W. Speck, Director of the Department of Natural Resources; Victor Ricks, Park Manager at Alum Creek State Park; Horace R. Collins, former Chief of the Division of Geological Survey; Jeffrey Hoedt, Chief of the Division of Watercraft; J. Thomas Pascoe, member of Waterways Safety Council.



Two rows of boxed core in multiple-row core-storage area of Collins Lab.

Horace R. Collins Laboratory at Alum Creek State Park.



Conference/meeting room at Collins Lab.

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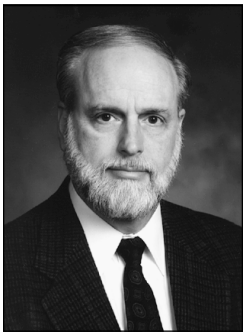

Thomas M. Berg, Division Chief and State Geologist

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4383 Fountain Square Drive
Columbus, Ohio 43224-1362

614-265-6576
614-447-1918 (FAX)

e-mail: geo.survey@dnr.state.oh.us

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From The State Geologist...

Thomas M. Berg

GROUND TRUTH: THE IMMENSE VALUE OF GEOLOGICAL SAMPLES

A buzz phrase called "ground-truthing" is pretty common among geologists. All the phrase refers to is actually looking at geological phenomena *in the field*—and probably bringing back samples. We usually conduct an investigation or a geologic-mapping job by doing a lot of background research first. That activity includes gathering lots of records of previous geological or engineering studies. The background work may also involve examining aerial photographs or satellite images. Soil-survey reports may also be consulted. We confer with experts who have prior experience with the problem at hand. Ultimately, we "ground-truth" the area or the situation and see for ourselves what the geology has to show. This could involve examination of bedrock outcrops or surficial-deposit exposures. It could also involve drilling test borings. Further, it might include conducting a variety of geophysical surveys.

No geologist ever comes back from "ground-truthing" without some samples. In fact, I would be embarrassed to come back from any field investigation without samples! (Although I must admit that I have become a bit more selective over the years; my office has almost reached capacity for rock samples!) Some say that samples like cores and drill cuttings are "worth their weight in gold." That may not be exactly true, but the information contained in one core can lead to totally new geologic interpretations and can have enormous economic implications. The cuttings from one exploratory well can lead to the discovery and development of a new oil field. Samples of borings in glacial deposits can provide crucial information on their engineering characteristics and whether or not they will provide adequate foundation support for heavy structures. Analyses of such samples can tell whether there is a risk of liquefaction during earthquakes. The list goes on and on.

Analysis of geologic samples can have profound results affecting our understanding of Earth history. For example, the collection and analysis of samples (including cores and cuttings) occurring at about the boundary between Cretaceous and Tertiary formations around the globe has revealed that Earth was struck by a large celestial body about 67 million years ago that contributed to the extinction of the dinosaurs and many other creatures. Analyses of geologic samples can be crucial to our development of strategies for dealing with such extraterrestrial threats.

Every state geological survey has some facility for storing all of its highly valued geologic samples. The Ohio Division of Geological Survey is very fortunate to have finally obtained its own geological sample repository, which has been named the Horace R. Collins Laboratory. This new facility, which is described in detail in this issue of *Ohio Geology*, was made possible by the Ohio NatureWorks program. The cores, cuttings, and samples are available to geoscience researchers, who must abide by a core and sample use policy. The Collins Laboratory shares this new ODNR facility with the Division of Watercraft District Office. It includes a geologic learning center and a fully equipped classroom, along with the Ohio Earthquake Information Center. Educational programs are being developed that will expand public awareness of the importance of the Earth sciences in our daily lives. We encourage Ohio citizens to stop by and visit the new Collins Laboratory.

Attention teachers!

The schedule and the application form for the Survey's two annual teachers' workshops—Ohio's Mineral Industries & the Environment, North and South—can be downloaded from the Survey Web site: <http://www.dnr.state.oh.us/odnr/geol_survey/edu/teacshop.htm>. The workshops, which familiarize the teachers with Ohio geology, the importance of Ohio's fuel and nonfuel mineral industries, and how environmental protection is compatible with mining, are conducted each summer by the Ohio Department of Natural Resources, Division of Geological Survey and the University of Akron. The northern Ohio workshop is based in Akron and runs June 26-30, 2000; the southern Ohio workshop is based in Columbus and runs July 10-14, 2000.

To enroll for either workshop, you must register for two semester hours of graduate or undergraduate credit through the University of Akron. The fee is approximately $165 per undergraduate credit hour and $185 per graduate credit hour (subject to change). Enrollment is limited to the first 30 applicants for each workshop.

For additional information please contact

Dr. Roger Bain, Department of Geology, University of Akron, Akron, Ohio 44325-4101; telephone: 330-972-7659, fax: 330-972-6990; e-mail: rbain@uakron.edu; or

Dr. David McConnell, Department of Geology, University of Akron, Akron, Ohio 44325-4101; telephone: 330-972-8047, fax: 330-972-7611, e-mail: dam6@uakron.edu; or

Doug Crowell, Division of Geological Survey, Ohio Department of Natural Resources, 4383 Fountain Square Dr., Columbus, Ohio 43224-1362; telephone: 614-265-6594, fax: 614-447-1918, e-mail: doug.crowell@dnr.state.oh.us.

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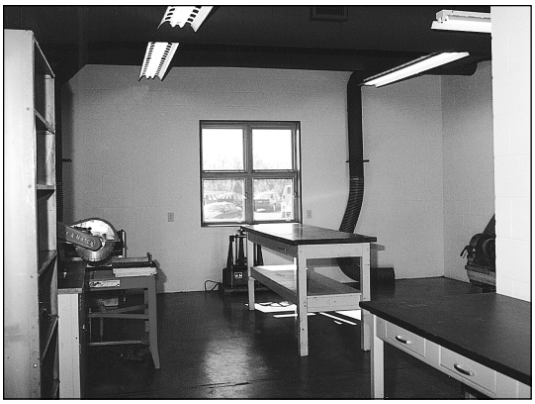
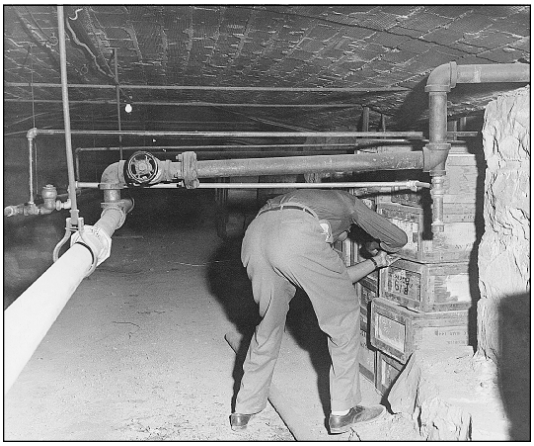
Lobby area of Collins Lab during open house on October 12, 1999.



Aggregate testing laboratory at Collins Lab.

stituted the Survey's drilling program, as well as several analytical studies that required sophisticated laboratory equipment. Other programs included the Eastern Gas Shales Project, inventory of abandoned underground mines, and a coal washability investigation.

Over the past 50 years, Survey publications and samples have been stored in various state-owned and commercially rented space, generally not together. Sample-washing and laboratory facilities were set up in state-owned buildings, until



Publications stored in wooden boxes in Statehouse sub-basement. Photo taken in 1954.

Hauling a box of core through the entrance to the basement of the Lane Avenue School, where Survey cores and samples were stored. Photo taken in 1954.

the buildings or the land were needed for other purposes. Publications were stored in the sub-basement of the State House and annex in downtown Columbus. The ceilings were so low a person could not stand up, the floor was dirt, and it was damp—far from an ideal environment for storing paper materials.

Until the 1960's, the Survey main office was on the campus of The Ohio State University (OSU), sharing Orton Hall with the Geology Department. Storage space for samples and cores was provided in the basement of the former Lane Avenue School, adjacent to the OSU campus and owned by the university. In the mid-1950's, publications were moved from the State House annex to the basement of Orton Hall. Also in the 1950's, laboratories and part of the Survey staff were located in uninsulated barracks on Hardin Road on the OSU campus. The barracks had been built to house returning World War II veterans attending OSU on the GI bill. Neither the buildings nor the road still exist; the site was in the vicinity of the current Woody Hayes sports complex.

After the loss (unlamented) of the barracks, the Hardin Road staff joined the main Survey office in

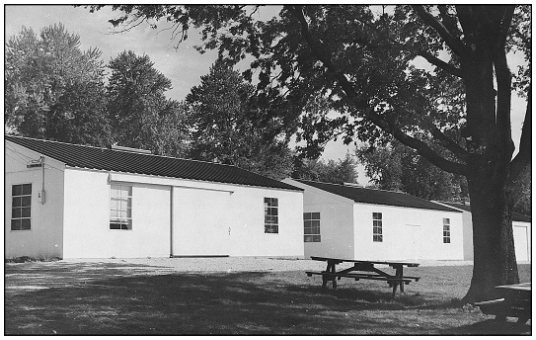
Core boxes stacked in basement of Lane Avenue School. Photo taken in 1954.

Building that housed Survey offices and labs on Hardin Road. Photo taken in 1962.

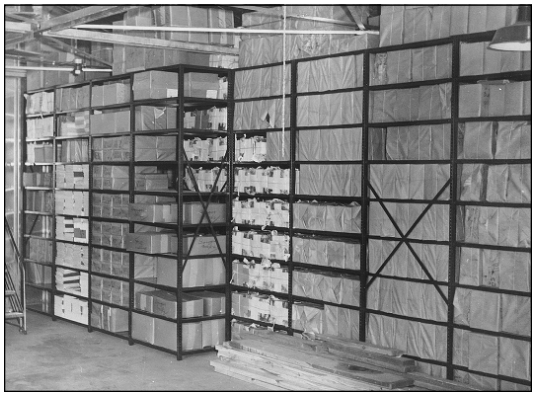
Orton Hall. The Survey had several garage-type buildings constructed adjacent to ODNR Division of Wildlife buildings on Dublin Road. Laboratories were set up in the buildings, and cores and samples as well as publications were stored there. In 1962, the Survey offices moved to Grandview Heights, south of the OSU campus and north of downtown Columbus. X-ray, petrography, and geochemistry laboratories were set up on the first floor of the Grandview building, and some samples were stored in the basement. In the late 1960's, publications were moved to an abandoned brewery on Ludlow Street, just south of downtown Columbus, in what is now the redeveloped Brewery District. At this same time, Buzz Collins secured grants for the Survey to conduct a coring project to explore for deep coal resources in southeastern Ohio. Storage space for these cores was desperately needed. In the 1970's the Survey rented warehouse space on Jenkins Avenue, south of downtown Columbus, to store cores.

The Survey offices moved to our current location at Fountain Square in 1973. Publications were stored for a few years in rented space a only a mile away on Freeway Drive. Publications were then moved to Department of Natural Resources warehouse space on Kinnear Road, southwest of the OSU campus. In the 1980's, the Division of Wildlife took over the Dublin Road buildings, and the laboratories were dismantled. When the Survey acquired its own drilling rigs for an expanded core-drilling program in the early 1980's, the Survey was able to rent a spacious commercial warehouse on Phillipi Road on the southwest side of Columbus to serve as a core and sample repository. For the first time, the Survey had a facility to store all its samples, cores, and publications in one place. The facility included a sample-washing room and also was large enough to store the drilling rigs indoors when they weren't in use.

Dave Stith in lab at Grandview Avenue, circa *1970.*



Survey buildings on Dublin Road. Photo taken in 1956.



Publications stored at Dublin Road. Photo taken in 1956.

The move from the Phillipi Road warehouse to the new Collins Lab took much planning and hard labor. Four drill rigs and support vehicles, laboratory equipment, approximately 4,300 sets of well cuttings, 225,000 feet of core, other geological samples, the entire publications inventory, and a multitude of "I don't need this but don't throw it away" items were stored at the warehouse. Division Industrial Minerals Group Supervisor Dave Stith and Repository Manager Ron Rea spent countless hours inventorying and supervising the moving of the contents of the warehouse, working closely with the Division of Engineering and the contractors. The Industrial Minerals Group, which consists of Stith, Rea, and Mineral Statistician Mark Wolfe, has relocated to the Collins Lab. Mike Hansen, coordinator of the Ohio Seismic Network, splits his time between the new facility and Fountain Square. Hours for the facility are 8:00 a.m. to 5:00 p.m., Monday through Friday. The address of the Horace R. Collins Laboratory is 3307 S. Old State Rd., Delaware, OH 43015. The telephone number is 740-548-7348; the fax number is 740-657-1979. The IM Group e-mail addresses remain the same.

ACKNOWLEDGMENTS

Several current and former Survey staff members assisted with this article. I thank especially Buzz Collins, Phil Celnar, Ted DeBrosse, and Dick DeLong for their contributions.

Paul Edwin Potter receives Mather Medal

Dr. Paul Edwin Potter, a world-renown scientist in the field of clastic sedimentology and petrography, is the 1999 recipient of the Mather Medal of the Ohio Geological Survey for his exemplary contribution to Ohio geology. He received the medal at a banquet held in his honor on November 1, 1999, in Columbus.

The Mather Medal is awarded periodically by the Division of Geological Survey in recognition of lifelong contributions to the knowledge of the geology of Ohio. The award is named in honor of William W. Mather, the first State Geologist of Ohio (1837-1838). The medal was first awarded as part of the Survey's sesquicentennial celebration in 1987. Dr Potter is the 12th recipient.

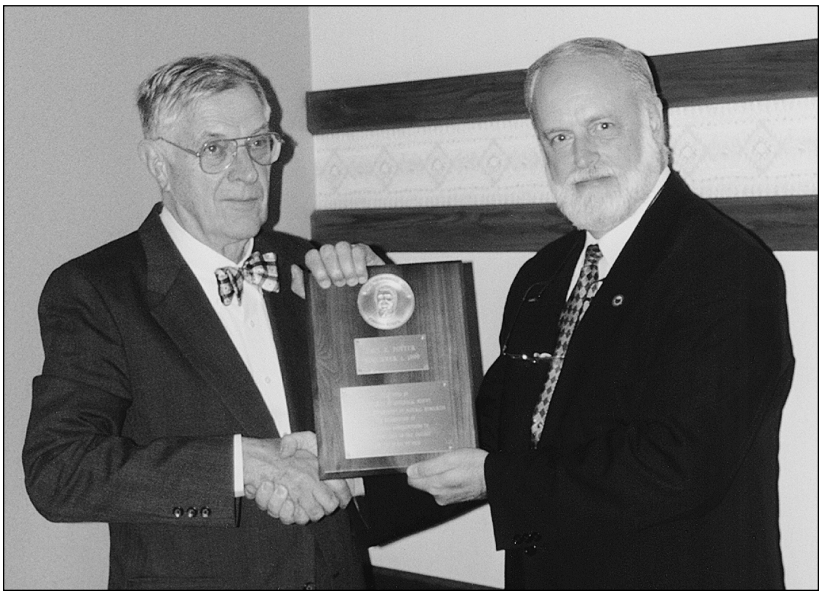
Paul Edwin Potter was born in Springfield, Ohio, situated on the Niagaran dolomites of western Ohio. He attended schools in Clermont and Hamilton Counties. Paul so excelled that his teacher recommended he attend the University of Cincinnati for much of his senior year of high school.

After graduation, Paul served in the Army during World War II; he was stationed in the Philippines. After the war, he attended the University of Chicago, receiving an undergraduate degree in 1949, a master's degree in geology in 1950, and his doctoral degree in 1952. To aid him in the quantification of geologic data, Paul obtained a Master of Science degree in statistics from the University of Illinois in 1959.

Paul's professional career began in 1952 as a geologist working in the Coal Section of the Illinois State Geological Survey. During his nine years with the Illinois Survey, he learned the many nuances of subsurface geology, which, according to Paul, was a truly great experience to learn sedimentary geology. He shared his new-found knowledge in many journal articles and maps, which at last count exceeded 120, and wrote his first two books: *Paleocurrents and basin analysis* and *Atlas and glossary of primary sedimentary structures*, co-authored with mentor and long-time friend Francis J. Pettijohn.

In 1963, Paul accepted a teaching position at Indiana University, where he continued his love for field work. He traveled the world studying sedimentary rocks in Canada, Mexico, the Bahamas, Europe, Africa, South America, and throughout the United States.

In 1971, Paul returned home to the University of Cincinnati as a professor of geology. He continued his international geologic studies, but devoted considerable time to the study of the geology of Ohio and Kentucky. He was involved in the Department of Energy's Eastern Gas Shales Project, published the *Lithologic and environmental atlas of the Berea Sandstone (Mississippian) in the Appalachian Basin*, and conducted many smaller studies of Midcontinent rocks ranging in age from the Precambrian to the Holocene. Paul finally fulfilled his commitment to contribute to his local community with the completion of *Exploring the geology of the Cincinnati/northern Kentucky region*, published by the Kentucky Geological Survey in 1996.



Paul Edwin Potter receiving the Mather Medal from Division Chief Tom Berg. Photo by Dale Wilson.

Dr. Potter's outstanding contribution to geology was recognized in 1992 when he was awarded the Francis J. Pettijohn Medal for Excellence in Sedimentology. Many students have used his seven textbooks to learn the basic concepts of sedimentary geology. His passion for knowledge is infectious and has influenced his students and fellow geologists around the globe.

Dr. Potter retired from the University of Cincinnati in 1992. His travels to South America had left a lasting impression, so he now spends 6 to 8 months a year with the South American rocks he loves so much, teaching at the Institute of Geosciences, Federal University of Rio Grande do Sul, in Porto Alegre, Brazil. He is fluent enough in Portuguese to teach sedimentary geology courses and to help professors and students translate their work to English for publication.

Paul has been a good friend of the Survey and has worked with many staff geologists on various projects, the most memorable being the deep core hole in Warren County. At the banquet in November, Dr. Potter demonstrated his ongoing enthusiasm for the science by giving a brief presentation on zircon ages of the Precambrian Middle Run Formation. The science of geology has no greater ambassador than the 1999 William W. Mather Medal recipient, Dr. Paul Edwin Potter.

—Gregory A. Schumacher

CORRECT NAME AND ADDRESS?

Is your name and address correct on the mailing label of this issue of *Ohio Geology*? If not, please let us know. If you are receiving duplicate copies, or no longer wish to receive *Ohio Geology*, please let us know that too.

Mike Hansen receives 1999 Employee of the Year Award

Mike Hansen receiving the Employee of the Year Award from Division Chief Tom Berg.

After writing about past recipients of the Employee of the Year Award, Mike Hansen, *Ohio Geology* editor, became the 1999 recipient at the Survey's annual awards ceremony and holiday luncheon. The Employee of the Year Award recognizes outstanding contributions by an employee. Awardees are nominated by fellow employees and selected by a committee representing various groups of the Survey.

In addition to serving as *Ohio Geology* editor since the inception of the quarterly in 1981, Mike is responsible for public information aspects of the Survey, fielding inquiries from newspapers, journals, educators, other government agencies, and the general public. He has coordinated the Survey's display at the annual Ohio State Fair for many years and has written numerous educational materials for the Survey, including Educational Leaflets, GeoFacts, and a guidebook on the geology of the Hocking Hills region. Mike is also the Survey's Geohazards Officer, providing information on topics ranging from landslides to radon to earthquakes. Because of his knowledge of earthquakes and seismicity in Ohio, Mike has been the lead person in setting up OhioSeis, the Ohio Seismic Network, which consists of 15 stations across Ohio connected via the Internet. (More information on OhioSeis can be found on the Survey's Web site; the network will be featured in an upcoming issue of *Ohio Geology*.)

All these accomplishments are even more impressive when one realizes Mike's main research interest is Paleozoic sharks! As Mike says, he's probably the only Ph.D. vertebrate paleontologist running a seismic network in the country.

Mike Hansen is a native of Columbus. He received B.S. and M.S. degrees from Ohio University. Mike taught high school for a few years and joined the Survey in 1972. He received a Ph.D. degree from The Ohio State University in 1986 and is an adjunct professor there. His research on Paleozoic sharks has generated interest from researchers around the world. Mike also wrote the chapter on vertebrates for the Survey's best-selling bulletin, *Fossils of Ohio*.

In addition to his geological interests, Mike collects fountain pens. He and his wife lives in Sunbury, Ohio. He has one daughter and one granddaughter.

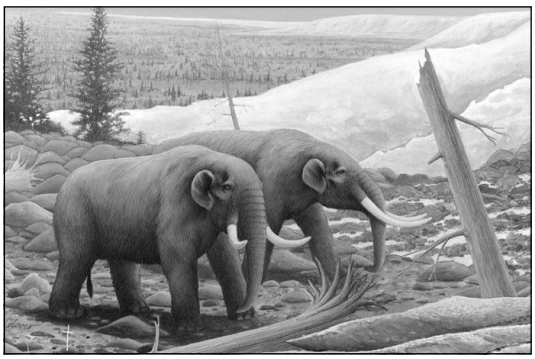
—Merrianne Hackathorn

New publications

The Ohio Division of Geological Survey has published two more guidebooks that originally were prepared for the 1998 meeting of the North Central Section of the Geological Society of America.

Guidebook 15, *Sedimentology and provenance of Carboniferous and Permian rocks of Athens County, southeastern Ohio*, was written by Gregory C. Nadon, Elizabeth H. Gierlowski-Kordesch, and Joseph P. Smith, all of Ohio University. This 23-page guidebook focuses on exposures of Pennsylvanian-age sediments in southeastern Ohio. The authors discuss the regional and local geologic settings for these sediments, which are interpreted to have been deposited in a distal foreland basin. Provenance data for 25 Athens County sandstones are summarized. The sandstones, shales, and carbonates at four stops are interpreted on the basis of geometry and sedimentological features. Guidebook 15 includes 22 figures. Price is $9.00 (plus tax and handling).

Guidebook 16, *Quaternary geology along the eastern margin of the Scioto lobe in central Ohio*, was written by Tod A. Frolking of Denison University and John P. Szabo of the University of Akron. This 40-page guidebook examines the terrain and the Pleistocene deposits on a general west-to-east transect from Columbus, near the center of the late Wisconsinan Scioto lobe, to Black Hand Gorge, at the eastern margin of the Illinoian glacial advance in eastern Licking County. An introductory section provides an overview of the geology and paleodrainage history of the area. An annotated road log describes the geology along the field-trip route. Six stops, one in Franklin County and five in Licking County, are described in detail. Guidebook 16 has 26 figures and 7 tables. Price is $9.00 (plus tax and handling).



Guidebook 16 cover illustration: Mastodons along the ice margin. From a painting by James L. Glover, Ohio Department of Natural Resources.

These publications may be ordered from the Geologic Records Center of the Survey, 4383 Fountain Square Dr., B-2, Columbus, OH 43224-1362; telephone: 614-265-6576; fax: 614-447-1918; e-mail: geo.survey@dnr.state.oh.us. Visa and MasterCard are accepted. Sales tax of 5.75 percent applies to all Ohio orders, and handling charges apply to all mailed orders (call for rates).

U.S. Geological Survey maps

To accommodate a price increase by the U.S. Geological Survey, the following prices will be in effect as of April 1, 2000. Please note: the price of the 7.5-minute series topographic quadrangle maps has not changed. Sales tax and shipping are additional.

30 x 60 minute series topographic maps, scale 1:100,000 (1 inch equals about 1 1/2 miles): $7.00 per map.

1° x 2° series topographic maps, scale 1:250,000 (1 inch equals about 4 miles): $7.00 per map.

Topographic map of Ohio, scale 1:500,000 (1 inch equals about 8 miles): $7.00.

Shaded relief map of Ohio, scale 1:500,000 (1 inch equals about 8 miles). $7.00.

The Ohio Geological Survey has acquired some older U.S. Geological Survey maps that cover Ohio. The following maps are available from the Ohio Survey while supplies last.

GP-491. **Aeromagnetic map of the Columbus-Dayton area, Ohio and Indiana,** by P. W. Philbin, C. L. Long, and F. C. Moore. U.S. Geological Survey Geophysical Investigations Map GP-491, black and white, scale 1:250,000 (1 inch equals about 4 miles), contour interval 25 gammas, 1965. Folded. $4.00.

GP-500. **Aeromagnetic map of Findlay, Ohio, and vicinity,** by R. W. Bromery and W. E. McCaslin. U.S. Geological Survey Geophysical Investigations Map GP-500, black and white, scale 1:125,000 (1 inch equals about 2 miles), 1965. Folded. $4.00.

HA-40. **Floods at Mount Vernon, Ohio,** by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. U.S. Geological Survey Hydrologic Investigations Atlas HA-40, map, scale 1:12,000 (1 inch equals 1,000 feet), with text and illustrations, 1961, revised 1964. Folded. $4.00.

HA-45. **Floods at Chillicothe, Ohio,** by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. U.S. Geological Survey Hydrologic Investigations Atlas HA-45, map, scale 1:24,000 (1 inch equals 2,000 feet), with text and illustrations, 1964. Folded. $4.00.

HA-48. **Floods at Circleville, Ohio,** by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. U.S. Geological Survey Hydrologic Investigations Atlas HA-48, map, scale 1:12,000 (1 inch equals 1,000 feet), with text and illustrations, 1964. Folded. $4.00.

HA-49. **Floods at Barberton, Ohio** (no authors noted). U.S. Geological Survey Hydrologic Investigations Atlas HA-49, map, scale 1:24,000 (1 inch equals 2,000 feet), with text and illustrations, 1962. Folded. $4.00.

HA-50. **Floods at Canton, Ohio** (no authors noted). U.S. Geological Survey Hydrologic Investigations Atlas HA-50, map, scale 1:24,000 (1 inch equals 2,000 feet), with text and illustrations, 1962. Folded. $4.00.

HA-52. **Floods at Columbus, Ohio** (no authors noted). U.S. Geological Survey Hydrologic Investigations Atlas HA-52, map, scale 1:31,680 (1 inch equals 2,640 feet), with text and illustrations, 1962. Folded. $4.00.

HA-324. **Floods at Amesville, Ohio,** by R. I. Mayo and E. E. Webber. U.S. Geological Survey Hydrologic Investigations Atlas HA-324, map, scale 1:12,000 (1 inch equals 1,000 feet), with text and illustrations, 1969. Folded. $4.00.

HA-341. **Hydrogeology of the Berea and Cussewago Sandstones in northeastern Ohio,** by J. L. Rau. U.S. Geological Survey Hydrologic Investigations Atlas HA-341, 2 sheets, several maps at scale of 1:250,000 (1 inch equals about 4 miles), text, tables, cross sections, 1969. Folded. $4.00.

HA-366. **Saline ground-water resources of Ohio,** by A. C. Sedam and R. B. Stein. U.S. Geological Survey Hydrologic Investigations Atlas HA-366, 2 sheets, map, scale 1:500,000 (1 inch equals about 8 miles), text, tables, figures, 1970. Folded. $4.00.

OC-83. **Preliminary stratigraphic cross section showing radioactive zones in the Devonian black shales in southeastern Ohio and west-central West Virginia,** by L. G. Wallace, J. B. Roen, and Wallace de Witt, Jr. U.S. Geological Survey Oil and Gas Investigations Chart OC-83, one sheet, 1978. Folded. $4.00.

Central Ohio mineral show and mineralogical symposium

The annual Central Ohio Mineral, Fossil, Gem & Jewelry Show will be held April 1-2, 2000, at Veterans Memorial in Columbus. The meeting is sponsored by the Columbus Rock and Mineral Society and the Licking County Rock and Mineral Society. Ken Harsh of Karma Crystal will speak on "Gemstones through the Millennia," which is the theme of the meeting. Michael Wise of the Smithsonian Institution will give a talk on gemstones found in pegmatites. Bob Jones, Jr., of Rock and Gem Magazine will speak on gemstones in North America. Roger Pabian of the University of Nebraska will give an illustrated lecture on "Banded agate origins: an update." The Third Annual Mineralogical Symposium, sponsored by the Friends of Mineralogy, Midwest Chapter, will be held on April 1 in conjunction with the mineral show. For information on the mineral show contact Dan Hall (614-252-0781, ext. 192; e mail: hall_dd@csg.capital.edu); for information on the mineralogical symposium contact Dr. Ernest H. Carlson (330-672-2680; e mail: ecarlson@geology.kent.edu).

HANDS-ON EARTH SCIENCE

compiled by Merrianne Hackathorn

ROCK SCULPTURE

In this exercise, the students will make a sculpture out of plaster of paris.

Materials needed:

plaster of paris powder (available at building supply stores)
self-sealing plastic bag (quart or gallon size)
water
measuring cup and spoons
waxed paper

To make the rock sculpture:

Pour a cup of plaster of paris powder into the bag. Add a half cup of water. Put one hand in the bag and squeeze the powder and water to mix them. Add water a tablespoon at a time, mixing after each addition, until the mixture looks and feels like thick mashed potatoes. Take a handful of the material and form it into a shape. Simple shapes such as spheres or blocks or pyramids are best. Set the sculpture on a piece of waxed paper. Wait about a half hour. Touch the sculpture gently to see if it has hardened. Gradually, the soft plaster will become rock hard.

The students may think that the plaster hardened because it dried out. To test this hypothesis, make another sculpture but set this one underwater in a bowl or other container. The students will be surprised to see that this sculpture also hardens.

Explanation:

Plaster of paris is powdered rock made from the mineral gypsum, a calcium sulfate mineral whose crystals contain water. The chemical formula for gypsum is $CaSO_4 \cdot 2H_2O$. If all the water is removed from the gypsum, another calcium sulfate mineral is produced, anhydrite, which means *without water*.

To make plaster of paris, the gypsum is ground up and heated at 190-200°C until about three-fourths of the water evaporates. The resulting material is then powdered and packaged. When water is added to the plaster of paris, the gypsum molecules absorb the water and recrystallize, and the material hardens or "sets." Because it absorbs the water as part of its crystal structure, the plaster of paris doesn't "dry out," and thus still hardens underwater. As the crystals reform, heat is given off. The students may be able to feel this heat while their sculptures are drying.

Plaster of paris gets its name from Paris, France, where gypsum from the soils around the city was first used to make this type of plaster. Another form of gypsum is alabaster. This typically snowy white, translucent, massive variety is used for carving sculptures, especially vases and figurines. Other forms of gypsum of interest to rock and mineral collectors are selenite and satin spar.

Gypsum is produced right here in Ohio. A quarry in Ottawa County mines about 250,000 tons of gypsum per year. All of the gypsum mined in Ohio is used to make drywall.

Sources: *Icky squishy science*, by Sandra Markle (1996, Hyperion Paperbacks for Children); *Science activity book*, by Smithsonian Family Learning Project (1987, Galison Books, GMG Publishing); *Dana's manual of mineralogy*, 14th edition, by Cornelius S. Hurlbut (1971, John Wiley & Sons, Inc.).

ODNR turns 50

The Ohio Department of Natural Resources celebrates its 50th anniversary in 1999. The legislation that created the Department was signed into law May 9, 1949, and went into effect August 11, 1949. The Geological Survey was one of the seven original divisions of the Department; the others were Wildlife, Forestry, Parks, Water, Beach Erosion, and Lands and Soil. The Division of Beach Erosion (later renamed the Division of Shore Erosion) became part of the Survey in 1961. The Survey's Lake Erie Geology Group continues the legacy of that Division.

Ohio Geology

Ohio Department of Natural Resources
Division of Geological Survey
4383 Fountain Square Drive
Columbus, Ohio 43224-1362

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