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We cannot understand our own place in the universe or wisely guide our own affairs without knowledge of the processes that produced us and that still affect us and all the life around us. That fact alone makes knowledge of the principles of the history of life imperative for modern man, even if the history itself were not of intrinsic interest---and few who look into it fail to feel its fascination.

George Gaylord Simpson, Life of the Past

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ANNUAL DUES: Residents in a 50 mile radius of the Twin Cities \$ 5.00 plus \$ 2.00 additional for husband, wife, or dependent family members. For students and non-residents, \$ 2.00.

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MIDWEST FEDERATION OF MINERALOGICAL AND GEOLOGICAL SOCIETIES

and

THE AMERICAN FEDERATION OF MINERALOGICAL SOCIETIES

THE 25th ANNUAL BANQUET

The 25th annual banquet of the Geological Society of Minnesota was held Monday April 20, 1964 at the Midway YMCA with eighty-two people attending. Honored guests included Dr. & Mrs. George M. Schwartz, Dr. & Mrs. George A. Thiel, Dr. John W. Gruner, and Dr. & Mrs. Robert E. Sloan, all of the University of Minnesota. Dr. Sloan spoke on the topic "Digging Out Dinosaurs", telling of the discovery and excavation of a large Triceratops fossil found in the Cretaceous of northeastern Montana. Shells, some of which were collected near Sanibel Island off the west coast of Florida, by Bill Larson were on display.

Those elected as directors by the members following the report of the nominating committee were John O. Engen, Dr. Sylvester Koontz, Marion Skahan, and Pat Summerfield.

At the meeting of the board following the banquet meeting, the following officers were nominated and elected:

President	William F. Schroeder
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A NOTE ON THE 1963-4 LECTURE SERIES----

The excellent series by Dr. Robert Sloan during the 1963-4 season on fossils and the development of life forms through the periods of the earth's history is completed, but we're sure the enthusiastic interest of our members in fossils will continue. Whether we participate in future fossil hunting field trips; whether we visit science museums to view mounted specimens; or whether we read of discoveries of hitherto unknown or rare fossils, we will all perhaps ponder a little bit more knowingly on the ways and wherefores of fossil animals and their place in historical geology.

It is with regret that we note the deaths of three of our long standing members:

Frank Hitchcock, September 1963.

Macy L. Spracher, February 25, 1964. She was one of the earlier members of the Society. A graduate of Nebraska Wesleyan University, she came to Minneapolis in 1922 and worked at Northrup King as a seed analyst until her retirement in 1957.

Henry S. Sommers, April 26, 1964. He and his wife Helen James Sommers joined the Society in 1939. A graduate of the University of Minnesota, he became well known as an active civic leader of St. Paul, where he was the head of the G. Sommers Company.

The 1964 Convention of the Midwest Federation of Mineralogical & Geological Societies will be held at Muskegon, Michigan on July 23, 24, 25, & 26.

THE UPPER MISSISSIPPI VALLEY LEAD-ZINC DISTRICT: A Historic and Geological Sketch
with a Brief Outline of the Stratigraphic Column in the Mining District
by William F. Schroeder

The history of mining in the upper Mississippi Valley lead-zinc district, perhaps the oldest continual mining area in the United States, dates back to the time when M. Jean Nicolle traveled up the Mississippi River in 1634. The first recorded indication that lead was known in the area was in 1658-9 when Radisson and Grosseilliers heard of lead mines among the Boeuf Sioux Indians, apparently in the area where Dubuque, Iowa, is now located. When Father Marquette came west by way of Lake Michigan, up the Fox River, and down the Wisconsin River to Prairie du Chien, and down the Mississippi to Dubuque, he heard about Indians mining lead in the area.

The notations of Father Hennepin on maps in 1687 showed lead mines in the vicinity of the present town of Galena, Illinois. About 1690 Nicolas Perrot established a temporary trading post for lead opposite the present site of Dubuque. Perrot was considered as the actual discoverer of the lead deposits by the French of this period, and it was the real beginning of lead mining by the French. In 1699 Le Sueur made the first mining exploration of importance in the area. That earlier Indians, who built mounds in the district, knew of the existence of lead and copper was shown in the opening of one of the mounds in 1927-8 near Trempealeau, Wisconsin. Lead, copper, pottery, woven cloth, river pearls, clam shells, and stone artifacts were removed from the mound by the Archeological Department of the Historical Museum of Milwaukee, and the age of the mound was determined as approximately 1200 years.

The location of the upper Mississippi Valley lead-zinc district lies almost entirely within the southern portion of the "driftless area". The north boundary of the mining district follows closely the south bank of the Wisconsin River from Prairie du Chien to Mazomania, thence south through Mount Kereb, New Glarus, Monroe and crosses southwestward into Illinois to Stockton and west to Bellevue, Iowa; then in a northwestward direction on the west side of the Mississippi River in Iowa to Garnaville; then east across the Mississippi below the junction where the Wisconsin River meets the Mississippi.

Strange as it may seem, the east, south and west boundaries of (1) the upper Mississippi Valley lead-zinc mining district, (2) the area where the Silurian dolomite and limestone has almost completely disappeared by erosion (except along the ridges of the high river banks and a few interior mounds), and (3) the "driftless area" almost completely coincide.

The topography of the "driftless area" is relatively rugged, particularly bordering the main stream beds of the Mississippi and Wisconsin Rivers. Within the unglaciated area is the Kickapoo River, while the Pecatonica River lies entirely within the lead-zinc mining district, differing from the other streams by its broad sloping valleys and its meandering stream beds sluggish flow.

Throughout the entire unglaciated area there are no natural lakes or lake beds, no sand or gravel pits except in creek or river beds. Nor are there boulders of diabase, basalts or granites buried in the soil or strewn about on top. The exception is one granite boulder in a cemetery near Mineral Point marking the grave of a pioneer settler.

The soils of the unglaciated area are residually developed except such as are blown in by the wind or carried by water. There are deposits of loess throughout the entire area; in the western portion, in many places a thickness of 40 to 50 feet is reached, grading down towards the east to a foot or less.

In the fringes of the borders of the unglaciated area, the drift material is identified as that of Illinoian age for the eastern border, and pre-Illinoian for the southeastern and southern border, to the west and further north in sink holes and caves as Nebraskan. These evidences of glaciation are only in the border areas.

The general slope of the mining area is in a southwestern direction with the highest point known as Military Ridge paralleling the Wisconsin River Valley.

The Blue Mounds, 15 miles west of Madison, Wisconsin, rise approximately 1720 feet above sea level, and there are the three Platte Mounds, 4-7 miles east of Platteville, and the Sinsinawa Mound, 5 miles west of Hazel Green. These mounds are capped by resistant dolomite of Silurian age. They may have served as guideposts and landmarks to the first settlers.

The early miners who came to dig the lead out of the ground did not make mention of zinc as they were not aware of the presence of this mineral until a much later date.

With snow covering the ground most of the winter months and temperatures often below zero for days, weather not suited for well or pit mining, many of the miners during this season would turn to trapping and hunting. In so doing they became better acquainted with the surrounding forest and prairie land, thus learning of its possibilities for gardens, orchards, and farming. The result was that many miners combined the two occupations and thus agriculture had its start in this part of the Midwest.

In the early days many factors contributed to the instability of the business of mining. Not until shortly before the outbreak of the Civil War with its new demands for lead did the mining interests increase their activities and mining became more of a steady business. The mining and smelting of lead and the opening of iron mines in the Neda area to the northeast of the lead-zinc district were important factors in winning the war between the states circa 1860-5.

The stratigraphic geology for the most part is uncomplicated, there being no major diastrophic disturbances to confuse the orderly arrangements of the sedimentary rocks. Deep drilling indicates that pre-Cambrian igneous and metamorphic rocks underlie the area. The city well at Platteville (#2) at a depth of 1714 feet penetrated granite. Wells at the north margin of the mining district in Richland Center, Wisconsin, penetrated similar pre-Cambrian rocks at depths ranging from 665-8 feet, while in the Baraboo area just northeast of the lead-zinc district, the pre-Cambrian rocks are separated from the overlying Cambrian sedimentary rocks by an unconformity of considerable relief.

In the Cambrian system only the Upper Cambrian rocks are found consisting of sandstone, siltstone, and dolomite. Exposures of these beds can only be found in the northern and northwestern edges of the lead-zinc district, and further south in deep well drillings.

The earliest beds of Cambrian age in the mining district are termed the Mt. Simon sandstone. The Mt. Simon is overlain by the Eau Claire sandstone, which is normally very silty and reddish, having a thickness of 70-330 feet. This formation is overlain by the Dresbach sandstone ranging in thickness from 60-140 feet. Lead minerals have been formed in this formation at Dresbach, Minnesota, and Lansing, Iowa.

Above the Dresbach sandstone is the Franconia sandstone which is 110-140 feet thick. The glauconite in the Franconia is the principal means by which it can be distinguished from the similar overlying and underlying sandstone.

The Trempealeau formation which overlies the Franconia sandstone is mainly sandstone and siltstone, although the lower strata are dolomite. The uppermost beds of the Trempealeau formation are called the Jordan sandstone member, which is composed of clean well-sorted, coarse quartz grains that are subangular to round. The Trempealeau formation averages 120-150 feet in thickness.

In places of the mining district a unit called the Madison sandstone overlies the Jordan sandstone of the Trempealeau formation. This Madison sandstone is poorly sorted silty or conglomerate quartz as much as 60 feet thick and not consistently recognized throughout the mining district. The transition from the Upper Cambrian to the Lower Ordovician meets in many areas with disconformity in the Prairie du Chien group from 0 to 250 feet.

The Prairie du Chien group is light buff to light gray, fine to medium crystalline. It is commonly oolitic sandy with clear, rounded quartz grains and cherty. Lead mining in the Prairie du Chien group has been restricted to areas of its exposure along the north fringe of the district. The Prairie du Chien group attains a maximum thickness of about 250 feet. This group constitutes one of the potential production zones in the lead-zinc district. The overlying sandstone, the St. Peter, named by Owens for exposures along the St. Peter River, now the Minnesota River, is exposed along the Wisconsin River and its tributaries, and along the Mississippi River southward almost to Dubuque, Iowa. It also exists in areas of deep dissection within the lead-zinc district.

The St. Peter sandstone consists of clear, fine to coarse, subangular to round quartz grains, poorly cemented; where the rock is hardened the cement is dolomite, calcareous or siliceous. The sandstone is thin to massive-bedded; crossbanding is characteristic. In many places iron oxide gives the St. Peter sandstone a variety of colors. The St. Peter sandstone averages 40 feet in thickness. But in some places with the interbedding of green and red shale, it reaches a depth of 300 feet due to the unconformity of the underlying top surface of the shaly Prairie du Chien group.

Lead and zinc minerals are usually not found in the St. Peter sandstone, but it does provide an ample supply of good water for farmers, homes and industry.

Overlying the St. Peter sandstone is the Platteville formation. Exposures of this formation are numerous in natural outcrops in mines and by cuttings from wells and drill holes. The formation was first thought to be related to the Black River group of New York or the Trenton of New Jersey, but depositional characteristics and compositions indicated that it was not the exact equivalent. Thus it has been named the Platteville due to its consistent presence in this area.

The Platteville consists of the following four members in descending order:

1. Quimby Mill limestone and dolomite, called glass rock, dark purple, fine-grained, dense, conchoidal fracture; very wavy upper surface, then dark brown to black, fossiliferous, platy shale parting at the base. Thickness 1-18 feet.
2. McGregor (Trenton) limestone and dolomite in the upper part, light gray, fine-grained. Thickness 13-18 feet. The lower part limestone, light gray, fine-grained, thin-bedded, nodules, conchoidal fracture. Thickness 12-17 feet.
3. Pecatonica (quarry beds) dolomite, brown, medium-grained, sugary, thick-bedded, blue-gray where weathered. Thickness 2-24 feet.
4. Glenwood shale, green and sandy. Thickness 0-3 feet.

Total thickness of the Platteville ranges from 55-75 feet.

Overlying the Platteville is the Decorah formation; uniformly present as dolomite, limestone, and a clay-like shale, varying from a greenish to a dark brown color; mostly fine-grained, intermingled with some phosphatic nodules and very fossiliferous. At the base where it overlies the Quinby Hill member of the Platteville is often found a narrow layer of bentonite. The Decorah is divided into four member layers: the gray beds, the blue beds, the Guttenberg (oil rock), and the Spechts Ferry clay beds with their bentonite base. The Decorah ranges in thickness from 32-44 feet.

Overlying the Decorah formation is the Galena formation, the most important host rock in the lead-zinc mining district. Most of the lead ore produced was mined from this formation. Also the Galena dolomite is the principal source of water for most of the farmers in the district. And the Galena dolomite is the rock quarried for much of the road building material, while the Dubuque shale member is used for building material.

The Galena dolomite has been divided into the following three members:

1. Prosser (well rock) chert-containing, buff to drab, averaging in thickness 100-105 feet. In it are found what the early miners called "sunflower or lead" fossils, receptaculites owens.
 2. Stewartville shale, massive, noncherty, yellowish buff, coarsely granular to crystalline, medium to thick-bedded containing some Receptaculites. Thickness of this unit varies from 75-85 feet.
 3. Dubuque dolomite and limestone, shaly, noncherty, yellowish gray, finely granular, argillaceous, thin to medium-bedded. Thickness 35-45 feet.
- In the central and eastern part of the mining district the Galena is dolomite, whereas in the western part, it grades into limestone.

Overlying the Galena is a shale called the Maquoketa, named from the exposure of shales along the Little Maquoketa River about 12 miles west of Dubuque, Iowa. Maquoketa shale occurs below and at the bases of the erosional remnants called mounds. The topmost layers are a blue or gray dolomitic; the middle layers are a silty shale with some grayish buff, medium-grained, argillaceous, thin-bedded dolomite; the lower 30-40 feet of the formation is commonly brown in color. In the basal few feet phosphatic pebbles and fossils are present. The thickness is not constant with variance from 108-240 feet.

The Maquoketa shale is a poor host for lead and zinc minerals. In some of the dolomitic beds, pyrite is common and the basal shale contains much organic material which gives an oily seum to the water boiled during the drilling of wells and prospect holes.

In the fringes of the lead-zinc mining district, some rocks of Silurian age and scattered deposits of glacial drifts are in evidence. The exploration and prospecting for minerals and ores outside of the "driftless area" are still being carried out.

The origin of the ores of the upper Mississippi Valley lead-zinc district has been a controversial subject for nearly a hundred years. Theories for the deposition of the ores by meteoric and artesian water were developed and the district is regarded by many geologists as a type-area in the study of ore deposits of this nature. Many variations in theories of origins that fit into this general idea of cold water deposition have been advanced and numerous sources for the metals have been suggested. Previous to the development of the meteoric water theory the geologists who studied the district considered the ore deposits to have been formed by "emanations" from subterranean sources.

The main ores mined in the lead-zinc district are lead, zinc, barite, copper, and sulphur. The lead and zinc ores are principally of the sulphite formation with some carbonate. The barite is mostly of the type of low silica barite and the copper is the carbonate form such as malachite and azurite with some mixed oxides.

The amounts of lead, zinc, barite and copper produced to date are rather vague due to the poor records kept in the earlier years of mining operations. A rough estimate gives approximately for lead - 1-2 million tons, zinc - 1.2 million pounds, barite - 2000 tons, and copper - 480 tons.

During the First World War, the U.S. Government erected a sulphuric acid plant and roaster at Cuba City, Wisconsin. This plant was operated for some years by the National Zinc Separation Company and later was bought by the Vinigar Hill Zinc Company who operated it until 1948. Another plant operated for a number of years at Mineral Point, Wisconsin. All sulphuric acid plants are now closed.

The first official record of mining rights and mining operation in this area was made by Peosta, a warrior of the Kettle Chiefs Village Indians. It granted to Julien Dubuque at a council held in Prairie du Chien in 1788 the right to mine. By an act of Congress in 1807, the government acquired ownership of the mineral lands of the upper Mississippi Valley district and the territory of Missouri. The land office was given control of these mineral lands, which were reserved from sale with provision that they should be leased by the government at annual rental. In northern Illinois the reserve holdings amounted to more than 340,000 acres, in Iowa to 180,000 acres, in Wisconsin to more than 1,420,000 acres. A superintendent of mines was employed and a royalty was exacted of one-sixth to one-tenth of the value of the mineral mined, payable in cash or lead. This leasing system was tried with poor results until 1846 when a decision was made to sell the land.

References: Illinois State Geological Survey
Iowa Geological Survey
Madison Geological Survey
Wisconsin Geological and Natural History Survey

Editor's Note: William F. Schroeder's first-hand knowledge of this area is a result of his having traveled and worked in this area over a period of twenty years. During part of this time he was employed by a lead-zinc mining company where he was involved in the assaying and smelting processes. For most of these years he worked as a food and drug inspector of a midwest section, making his home at Darlington, Wisconsin, which is almost at the center of the lead-zinc district.

NEW METHODS IN FOSSIL RESEARCH

In the past when scientists wanted to study the microscopic structure of fossils, it was a long arduous task preparing even one slide for the 'scope.

Dr. R.W. Pohl describes for us a new method of making slides that has made possible rapid preparation of slide after slide from a fossil specimen. Microscopically thin layers of cells can be peeled from a fossil, so, naturally, the procedure is called the "peel" method.

Before development of the "peel" method, microscope study slides were prepared by slicing the fossil as thin as possible with a diamond saw, then patiently grinding and polishing away the slab until all that remained was a paper-thin slab a few microns thick. You can see the difficulties in such a process.

In the peel method of slide preparation, a flat surface is sawed on the fossil with a diamond saw, and the face is ground smooth, and polished. Then this polished surface is etched with acid. A carbonate fossil is treated with hydrochloric acid for a few minutes. A silicate must be etched with hydrofluoric acid for a longer time. After etching with acid, the surface must be thoroughly washed and dried. Acetone is then poured on the surface and a sheet of clear cellulose acetate film is placed on it. In half an hour or so the film is peeled off and with it comes a microscopically thin layer of cells from the fossil. The process of etching, washing and applying the film and peeling it off can be repeated time and again, so that the scientist can study the fossil's internal structure literally cell by cell.

From "Rocky Times", Ames, Iowa, February 1964

REVIEWS OF RECENT BOOKS

Dr. Walter C. Alvarez familiar to most of us through his daily column of medical articles in the Minneapolis Star has recently published his autobiography entitled Incurable Physician. In the chapter "Thoughts on Evolution" he tells of his long time interest in geology and paleontology. On the ways of the Great Architect and Designer of the Universe, Dr. Alvarez gives his reflections after "looking about" through the eyes of a critical physiologist and physician over a number of years.

To those of us in the Cainozoic era and Holocene period, And Then Came Man by Hartmut Bastian, a German science writer and lecturer, should be of interest. In his introductory chapters, Mr. Bastian discusses the history of the science of paleontology, the various theories and facts of the major forces involved in the changing of the surface of the earth, and the origins of some of the words used in the nomenclature of geological time. For the main part of the book, he describes the life present at successive geological periods as deduced from the fossil record and traces how these forms of life evolved. Summary chapters are given of the various discoveries of fossils of prehistoric man. Maps of land and water areas present at different periods and numerous drawings of fossil animals are given. This book gives a good general view of the geological periods with as many of the interesting details as it is possible to include in one book.

The book Fossils in America by Jay Ellis Ransom lists many known fossil localities in each of the fifty states. Under the alphabetical state headings, first a general description of the geology of the state is given covering one-half to one page of material, and then fossil locations are given under the names of selected counties of the state. Specific locations are often indicated as directional miles from towns, landmarks, water areas, or in sections of land. The geological formation and kind of rock in which the fossils may be found are often noted. Both the common and scientific names of fossils are used in the listing of fossils by state.

Other parts of the book discuss what fossils are, how to collect fossils in the field, and how to identify and prepare fossils for collections. Interesting drawings of fossils and photographs of fossil areas are presented.

THE CASE OF THE 88# OF LUGGAGE OR ROCK-HOUNDING IN MEXICO
by Clark and Orpha Pettengill

Visiting Mexico in the spring of 1960 was a real thrill to us, especially since it meant escaping the last blasts of winter. We visited the usual tourist-attraction cities--Mexico City, Cuernavaca, Taxco, Puebla, Orizaba, Fortin, Tehuacan and Acapulco. We had a wonderful time in this beautiful and colorful country full of contrast, and complete with extremely friendly people.

On our flight home we decided we wanted to go back and visit the mining sections of Mexico and particularly the heartland section which lies northwest of Mexico City. Our dreams came true when in August of 1962, raincoats and field gear in hand, we flew to Mexico City and joined Don MacLachlan, editor of the "Gems and Minerals" magazine who was leading a mineralogical trip in Mexico. Twenty-one gem and mineral hobbyists from Florida, Pennsylvania, Ohio, California, Washington, Minnesota, and Toronto, Canada, joined together for two weeks of sightseeing, visits to geological wonders, lapidary and jewelry shops, silver and opal mines as well as visiting some of Mexico's famous archeological centers.

In Mexico City we visited the National Museum of Anthropology and saw the collection from the pre-Columbian era of Mexico, including the Aztec calendar chiseled out of a block of basalt. We spent some time on the campus of the University of Mexico. The library is covered with native rough stone mosaic murals by Juan O'Gorman. The administration building is another example of native stone. It is made of native calcite onyx, slabbed and set into the face of the multi-storied wall so that the sun shines through during the day and the lights from within shine through at night.

We visited the famous malachite room at Chapultepec Castle, home of Maximilian and Carlotta when Mexico was under French rule. The doors and furnishings in this room are all inlaid with malachite of Russian origin. Several hours were spent in Mexico's National Geological Museum which contains a fine collection of Mexico's minerals as well as a complete Dana collection.

One of the highlights of our stay in Mexico City was a visit to the Palacio de Belles Artes on a Sunday morning to see the performance of the spectacular Mexican Folklore Ballet. This we recommend to all who visit Mexico City.

Before leaving Mexico City we drove to the famous Pedregal, a huge basalt flow that has been turned into an ultra modern residential area.

Leaving Mexico City, we climbed our first pyramid in Cuernavaca and then went on to the Caves of Cacahuamilpa. These huge limestone caves are the most spectacular in Mexico. While the Carlsbad Caverns are 95% dry, these caves are extremely wet and if one wandered off the path he found himself in a slimy ooze. The purchase of a cane from an Indian youngster at the entrance was well worth the price in helping to keep oneself upright.

Leaving the caves we arrived in Mexico's famous silver town Taxco. Outside this city we visited a small silver mine operation where the "jefe" (foreman) let us work over the mine dump for specimens. Some fine thumbnail and micro-mount material was obtained here. Minerals included argentite, galena, sphalerite, bornite, chalcopyrite and a host of unidentified minerals. We visited silvershops to watch artisans employ techniques of channel work, enameling and marrying of metals.

After two nights in Taxco we returned to Mexico City for the night and the next morning started out for the opal country northwest of the city. On the way we visited the Pyramids of San Juan Teotihuacan, the most famous in Mexico. We also had the pleasure of visiting a home and shop where they carved and polished figures from obsidian.

We reached Tequisquiapan that night, and here in this primitive village we were to feel, for the first time, that we were in back country. The next morning bright and early, we were on our way to Trinidad where the opal miners get their opal, not the best, but at least some fair specimens. We did our bargaining for the jars of matrix opal, and learned a few tricks in bargaining; it was a real experience. After we were well worn down bargaining we went up the mountain adjoining Trinidad to the La Carbonera opal mine, which is a huge open-pit mine and we were allowed to work on the dumps and right in the pit on the unbroken rhyolite rock. Good opals are hard to come by even by the miners, and needless to say the group didn't find anything precious, but everyone had a load of specimens and it was a lot of fun.

One day was spent visiting opal dealers in Queretaro and San Juan del Rio. The latter is noted for baskets so everyone had to get a basket for his loot of opal specimens.

After three days in the opal country we started for Pachuca, stopping off at Tula to explore the famous Toltec archeological site with its huge basalt figures, pyramids, ball court and other sights. Pachuca, known as a Spanish city, sits very high, 10,000 feet in altitude, and mine-studded mountains come right into town. A highlight of our visit here was a trip to see the Metapiles, a spectacular columnar basalt formation. In this area we collected both gold and silver-sheen obsidian. It was a problem what to leave behind. After lunch at the historic Hacienda de San Miguel Regla, now a private club owned by doctors from the U.S., we returned to Pachuca and visited silver mines as well as trying to find a vein of rhodonite about which we had heard.

We then headed for the onyx country. Out of Puebla we stopped at Amozoc and visited the steel-silver shops where they inlay steel with precious metals for harness and saddle accessories, guns and objects prized by Mexico's renowned "charros". The next stop was at Tecali and the onyx works where we watched skilled artisans handwork the Tecali (travertine) onyx, considered the most beautiful and distinctive in Mexico.

After a sightseeing tour of Puebla with visits to more onyx and tile shops, and after the women in the party had visited a beauty shop, and came back with the darndest display of hairdos says C. Pettengill, we departed for Mexico City where everyone spent hours upgrading specimens in order to get the luggage, mostly rocks, down to the limit of 44# allowed by the airlines.

As we mentioned in the beginning, we were interested in getting into the heartland of Mexico, so after saying adios to our friends on the mineral trip, we left with our driver Carlos, who had been the driver of the car we were in on the mineral trip, and his wife Teresa, a lovely Spanish girl who spoke no English, and headed for Guajuato. We stopped at San Miguel Allende for lunch. This town was founded in 1542 by a Franciscan friar. The parish church dominates the town with its Gothic style architecture. The builder copied the style from a picture postcard but in his own style replaced the two towers for a single one bristling with spires and pointed turrets. We also visited the Instituto where many Americans come especially during the summer to study the arts.

We spent the evening and part of the next day at Guanajuato, a town that lies in a narrow mountainous gorge and is known for its mineral wealth. Our guide Carlos took us to an old silver mine. The caretaker took us around even to his own family chapel. On the altar was a beautiful specimen of selenite and quartz crystals with barite intrusions. With a little persuasion and a few pesos, we were able to obtain a small portion of this 25# specimen.

We also visited the catacombs in an old cemetery where we saw mummies arranged against the wall of an underground gallery. We strolled along streets that narrowed to two feet. One of the most famous of these lanes is Callejon del Beso (kissing land), so narrow that engaged couples could kiss from their balconies on the opposite sides of the street. One might think that the modern shopping center is a new idea but the market in Guanajuato occupies a city block with a mezzanine floor around the entire building. The market building has no partitions but does contain small open stalls where every commodity imaginable is sold.

Our next stop was Guadalajara, a city of very modern buildings. Mr. MacLachlan had asked us to go to Magdalena to investigate a report that opal mines were operating in that vicinity. We got the location of five mines in that vicinity and a Sunday in Magdalena is when they conduct their opal market. Large veins and boulders of obsidian outcrop everywhere between Magdalena and Tequila.

Another day was spent visiting Lake Chapala, the largest lake in Mexico. It is 40 miles long and 18 miles wide. On the shores of this lake are the small towns of Chapala and Ajijic. Many people from the U.S. have chosen these spots for retirement.

Driving east from Guadalajara, we left the highway at Quiroga, famous for its lacquer work, and drove to Patzcuaro located on beautiful Lake Patzcuaro. The next morning we chartered a motor launch and took a trip over to the Island of Janitzio which is inhabited by some 2000 Tarascan Indians, a very old Indian civilization. They have their own language and many do not speak Spanish. The occupation of the men is fishing and many of the women do weaving. En route to the island we passed a group of men fishing with nets that resemble giant dragon flies, better known to us as butterfly nets. As we stepped onto the dock Clark handed a piece of hard candy (We had taken several pounds of candy with us.) to a youngster whereupon he yelled "dulce", and it was like ringing the firebell. Kids poured out of every doorway yelling and running toward Clark until he was surrounded and almost swamped with the young Tarascans.

Before leaving Patzcuara we drove to the small Indian village of Santa Clara where they specialize in the making of copperware. We visited a house where they had finished firing for the day, but they kindly showed us the process and then took us into a room in the home that had copperware ready for the market. Our guide wanted a copper frying pan since he declared one can't fry right unless it is in copper. We were wishing we had our car there. Such wonderful things in copper for gifts, but we came out with one lone pitcher, lovely in design.

We ended our tour at San Jose Purua, a wonder spa of the western world, containing four swimming pools fed by natural springs of mineral water, radioactive baths, miles of paths through exotic tropical flower gardens, and an excellent hotel operated on the American plan.

We hope to return someday to this land of beauty and contrast.

MIDWEST STATE GEOLOGICAL SURVEYS

ILLINOIS STATE GEOLOGICAL SURVEY	A,B,C
Natural Resources Building, Urbana, Illinois	
INDIANA GEOLOGICAL SURVEY	A,B,C
Owen Hall, Indiana University, Bloomington, Indiana	
IOWA GEOLOGICAL SURVEY	A
Geological Survey Building, Iowa City, Iowa	
KANSAS GEOLOGICAL SURVEY	A,B,C
Frank C. Foley, Director, Lawrence, Kansas	
MICHIGAN GEOLOGICAL DIVISION	A,B,C,D
Department of Conservation, Stevens T. Mason Building, Lansing 26, Michigan	
MINNESOTA GEOLOGICAL SURVEY	A
University of Minnesota, Minneapolis 14, Minnesota	
MISSOURI GEOLOGICAL AND WATER RESOURCES	A,B,C
P.O. Box 250, Rolla, Missouri	
CONSERVATION AND SURVEY DIVISION, NEBRASKA	A, C
University of Nebraska, Lincoln 8, Nebraska	
NORTH DAKOTA GEOLOGICAL SURVEY	A, C,D
University Station, Grand Forks, North Dakota	
OHIO DIVISION OF GEOLOGICAL SURVEY	A,B,C
1558 Oval Drive, Ohio State University, Columbus 10, Ohio	
SOUTH DAKOTA STATE GEOLOGICAL SURVEY	A
Science Center, University, Vermillion, South Dakota	
TENNESSEE DIVISION OF GEOLOGY	A,B
G-5 State Office Building, Nashville 3, Tennessee	
WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY	A,B
Science Hall, University of Wisconsin, Madison, Wisconsin	

CODE: A. List of all publications sent free on request.
 B. Free educational pamphlets on geology of the state.
 C. Low cost educational pamphlets on geology of the state.
 D. Rock, mineral, or fossil collections available for nominal prices.

INVITATIONAL MIDWEST CLUB FIELD TRIPS & SHOWS

CLUB SHOW	The Wisconsin Geological Society-- annual gem and mineral show, May 23-24	Wauwatosa Recreation Building, 1155 N. 73 St., Wauwatosa, Wis.
FIELD TRIP	The Ishpeming Rock & Mineral Club, Inc.-- to collect Iron Country May 30-31	minerals and cut mineral specimens. Will depart at 9 a.m. from the tourist information booth, Ishpeming, Michigan (U.S. 41). For details and reservations contact: Mrs. Richard Mortagne, Sec., Pioneer Road, Marquette, Michigan
FIELD TRIP	The Tri State Gem & Mineral Society---to collect agate, fossils, June 13	and lead and zinc minerals. Will depart 8 a.m. from Grandview Park, Dubuque, Iowa. For details and reservations contact: Mrs. Val Seipp, Sec., 1945 Carter Road, Dubuque, Iowa.
FIELD TRIP	The Lake Superior Gem and Mineral Club-- to collect agates. June 14	Will depart 9 a.m. from 203 Superior St., Duluth, Minn. For details and reservations contact: Mrs. Donald Nordstrom, Sec., 3406 W. 2nd St., Duluth, Minnesota.
CLUB SHOW	The Bloomington Mineral Club, Southdale Garden Court, Edina, Minn., Sept. 12-13	Sat. 9 a.m.-6 p.m., Sun. 1-6 p.m. For details-- Mrs. Rex Webb, 2600 W. 87 $\frac{1}{2}$ St., Bloomington, Minnesota.



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