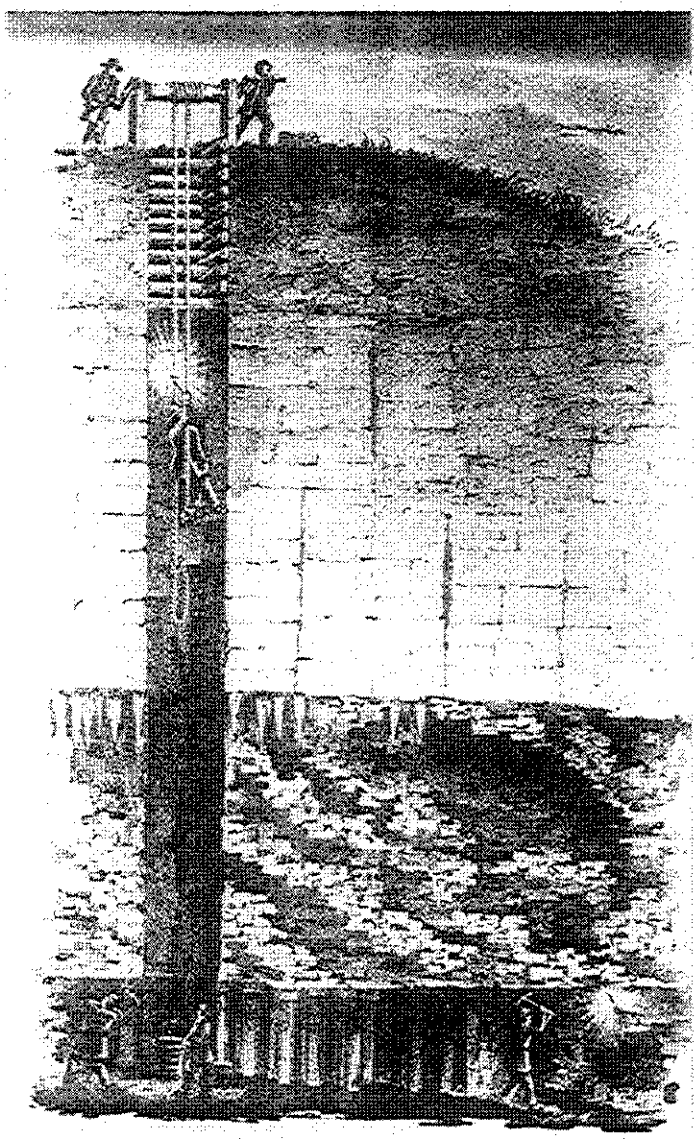
NATURAL AND CULTURAL HISTORY OF THE MINES OF SPAIN

DUBUQUE COUNTY, IOWA



Iowa Natural History Association
Guidebook 7

Geological Society of Iowa
Guidebook 53

April 20, 1991

Cover illustration:

Copy of a drawing by David Dale Owen, published in 1852, showing the process of lead mining in the Dubuque area. From: *Report of a Geological Survey of Wisconsin, Iowa, and Minnesota*, Lippincott, Grambo and Co., Philadelphia, 638 p.

NATURAL AND CULTURAL HISTORY OF THE MINES OF SPAIN

DUBUQUE COUNTY, IOWA

Jean C. Prior, Geological Survey Bureau
Iowa Department of Natural Resources, Iowa City

Shirley J. Schermer, Office of the State Archaeologist, Iowa City

John Pearson, Preserves and Ecological Services Bureau
Iowa Department of Natural Resources, Des Moines

Martha Maxon, Environmental Planning, Brice, Petrides-Donohue, Waterloo

Iowa Natural History Association Guidebook 7

Geological Society of Iowa Guidebook 53

April 20, 1991

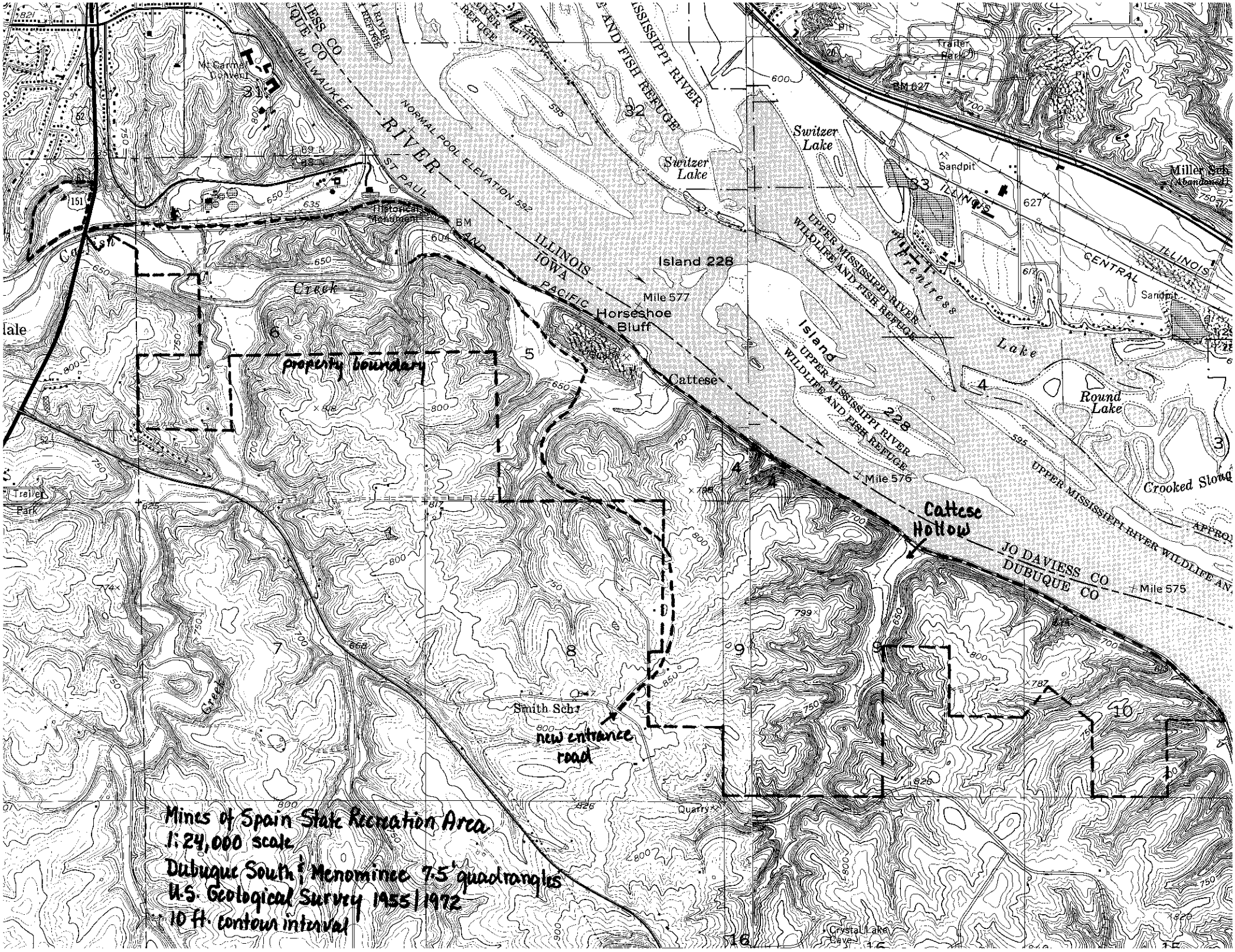
CONTENTS

THE MINES OF SPAIN

INTRODUCTION

This field trip is sponsored by the Iowa Natural History Association and the Geological Society of Iowa for the purpose of examining the geological, biological, and cultural aspects of the Mines of Spain State Recreation Area. The 1,300-acre tract south of Dubuque was acquired by the state in December, 1980. Its rugged, timbered bluffs and valleys are bounded on the east by the entrenched valley of the Mississippi River. The bedrock-dominated topography hosts an interesting variety of woodland and prairie communities. Archaeological research confirms evidence of prehistoric Indian occupation for at least 6,000 years. Historically the area was important in the Indian-French fur-trading culture, and the first record of lead mining is associated with the French trader Nicholas Perrot in 1690. At the time of the American Revolution, this area was the country's major source of lead. Julien Dubuque arrived in the 1780s, and in 1788, the Fox (Mesquakie) Indians granted him permission to mine lead on their land. Dubuque settled close to the village of Kettle Chief, located at the mouth of Catfish Creek, and founded the first Euro-American settlement in what is now Iowa. Concerned that growing Spanish authority within the Mississippi Valley might question the legality of his concession from the Indians, Dubuque petitioned the Spanish governor of Louisiana seeking permanent possession of his lands, which he named The Mines of Spain to "honor" the governor. Dubuque died in 1810, and his gravesite on the high bluff at the north end of the property overlooks the Mines of Spain and the city that bears his name.

This trip is being held in conjunction with the Annual Meeting of the Iowa Academy of Science in Dubuque. It is intended to offer participants an opportunity to see some of the highlights of this scenic area, to appreciate its diverse natural and cultural values, and to understand some of the land-use issues that are shaping its future.


property boundary
new entrance road
Cattese Hollow
Mines of Spain State Recreation Area
1:24,000 scale
Dubuque South & Menominee 7.5' quadrangles
U.S. Geological Survey 1955 | 1972
10 ft. contour interval

GEOLOGIC ASPECTS OF THE MINES OF SPAIN

Jean C. Prior
Geological Survey Bureau
Iowa Department of Natural Resources

The geologic setting of the Mines of Spain is dominated by the geomorphic impact of the Mississippi River valley, by the bedrock-controlled upland landscapes of Iowa's Paleozoic Plateau, and by the mineral deposits associated with the Upper Mississippi Valley Lead-Zinc District.

The Mississippi River valley is one of the most distinctive physiographic features of the midcontinent. Its sweeping contours of water, islands, bluffs, rock exposures, and scenic vistas are a geological oasis in the midst of landscapes otherwise committed to the geometric cultural patterns imposed by agricultural activity. At the Mines of Spain, the valley's island-laced channel is entrenched 200 feet below the surrounding uplands and is bounded by abrupt bluffs of Ordovician-age dolomite. The Silurian Escarpment, another significant regional geomorphic feature, forms a visual boundary to the southwest. This prominent wooded bluffline marks the leading edge of the outcrop belt of Silurian-age rocks in Iowa, and its elevation above the Mississippi Valley floor boosts the local relief in this vicinity to well over 500 feet. To the east, on the Illinois horizon, stands Sinsinewa Mound, an isolated erosional remnant of these same Silurian rocks which were once continuous across the entire region. These distinctive features can be observed from the higher elevations within the Mines of Spain property, as well as scenic overviews of the sharply dissected, bedrock-dominated terrain which characterizes the Paleozoic Plateau, one of Iowa's principal landform provinces.

The glacial events that affected the North American continent, particularly during the last (Wisconsinan) glacial episode, strongly influenced the present appearance of and deposits within the Upper Mississippi Valley, including Catfish Creek and Granger Creek.

Evidence of this landscape evolution is recorded in the floodplain and terrace deposits, alluvial fans, entrenched valleys, incised meanders, rock-cored meanders, abandoned channels, hanging valley, and examples of massive drainage alterations on the Mines of Spain property. The entrenched valley of the Mississippi is backfilled with as much as 200 feet of outwash sand and gravel to the level of the present floodplain. The prominent, flat-floored, steep sided, now abandoned valley at Horseshoe Bluff was once occupied by either Granger or Catfish Creek, both of which took different routes through different valleys to the Mississippi than they do today. From about 14,000 years ago to about 9,500 years ago, meltwater from the retreating Wisconsinan ice sheet significantly impacted erosional and depositional activity in the Mississippi River system. Periods of river downcutting were periodically interrupted by large meltwater floods, possibly the result of rapid draining of glacial lakes to the north. During these episodes, the Mississippi back-flooded into its tributary valleys depositing laminated silts and clays which today are preserved in stream terraces near the mouths of these side valleys. For example, Catfish Creek once flowed to the Mississippi through the abandoned valley seen just north of the Dubuque Monument at the north end of the Mines of Spain property. This valley segment now exists as an alluvial terrace 30 to 50 feet above the level of the present Catfish Creek floodplain. Two samples of wood collected from the upper part of this terrace remnant, in laminated gray, silty clays typical of these slack-water deposits, were radiocarbon dated at 12,500 and 11,000 years B.P. These drainage events and diversions resulting in the formation of terraces, the "capture" of waters from one stream valley by another, and the isolation of upland remnants such as Horseshoe Bluff are related in time to similar features just north of Dubuque in the Little Maquoketa River valley and to the large abandoned channel, known as Couler Valley, through downtown Dubuque. Early workers called these abandoned channels "Kansan" in age. Ongoing geologic investigations are disproving the great antiquity they assigned to these features --

and much of the Paleozoic Plateau landscape -- and are revealing a much younger landscape than previously thought..

The Galena Group dolomites (Wise Lake and Dunleith formations) that outcrop on the Mines of Spain contain a record of marine environments that submerged the midcontinent 400 million years ago. The Horseshoe Bluff quarry provides a good opportunity to observe the characteristics of these sedimentary carbonate rocks, including large calcite crystals, chert (marking the Dunleith), marine fossils (including signs of burrowing organisms on the Ordovician sea floor), evidence of karst processes, and vertical fracture systems known as joints. Naturally occurring exposures of these rocks elsewhere on the property contribute to the site's scenic aspects and to the distribution of high-quality plant and animal habitats. Cattese Hollow is especially rich in picturesque, differentially eroded rock outcrops and in concentrations of slump blocks tilted at unusual angles along the ravine's sideslopes. The dolomite here, and along the rimrock blufflands bordering the Mississippi Valley, displays pitted, rough-textured surfaces that are characteristic of carbonate rocks long-exposed to the forces of weathering.

The Mines of Spain is an excellent site for examining the geologic occurrence of ore deposits associated with the Upper Mississippi Valley Lead-Zinc District. It was the availability of galena (lead sulfide), a heavy, cubic, metallic-gray mineral, at shallow depths along this particular segment of the Mississippi Valley that put this area on late seventeenth-century European maps of North America and supported the mining activity exemplified by Julien Dubuque. The galena was found as mineralized vein-fillings along crevice and cave openings associated with the regional north-south and east-west joint systems which extend vertically through the shallow bedrock. These stress-related fractures were induced by regional warping of the Paleozoic strata and are especially noticeable where they shape the long linear bluff lines and the sharply angled changes in stream directions throughout the region. Upward migrations of mineral-rich

hydrothermal brines through these fracture openings precipitated the lead ores during the geologic past. Mining patterns clearly define an upper, middle, and lower zone of activity where sulfide ores of lead, zinc, and iron concentrated along vertical fractures that intersected with horizontal bedding planes in the sedimentary rocks. Today the Mines of Spain property exhibits a wide range of past mining technologies through numerous old pits, adits, and shafts where the lead ore was extracted. These surface and subsurface excavations trace nearly straight lines as miners worked the linear fracture patterns present in the underlying bedrock.

The Mines of Spain is an exceptional area because of this diversity of interesting geologic features in combination with other significant natural and cultural resources. It is the largest area in public ownership where the rich association of natural and human history in the lead-bearing region can be seen.. The site's topographic and geologic characteristics also establish an interesting range of habitat variations for a diverse local flora and fauna. Additionally, the geologic conditions provided the basic natural advantages which encouraged the historic as well as prehistoric occupation of the area. Today these geologic features offer recreational, educational, and interpretive advantages to a wide range of visitors.

REFERENCES

Bettis E. Arthur III. 1987. History of the Upper Mississippi Valley: Iowa Geology, no.12, p. 12-15.

Brown, C. Ervin and Jesse W. Whitlow. 1960. Geology of the Dubuque South Quadrangle Iowa-Illinois: U.S. Geological Survey Bulletin 1123-A, 93 p.

Calvin, Samuel and H. Foster Bain. 1900. Geology of Dubuque County: Iowa Geological Survey Annual Report vol. 10, p. 381-622.

Hallberg, George R., E. Arthur Bettis III, and Jean C. Prior. 1984. Geologic overview of the Paleozoic Plateau region of northeastern Iowa: Proceedings of the Iowa Academy of Science, vol. 91, no. 1, p. 5-11.

Heyl, Allen V., Allen F. Agnew, Jr., Erwin J. Lyons, and Charles H. Behre, Jr. 1959. The geology of the Upper Mississippi Valley zinc-lead district: U.S. Geological Survey Professional Paper 309, 310 p.

Keyes, Charles R. 1913. Historical sketch of mining: Iowa Geological Survey Annual Report, vol. 22, p. 89-121.

Ludvigson, Greg A. and James A. Dockal. 1984. Lead and zinc mining in the Dubuque area: Iowa Geology, no. 9, p. 4-9.

Ludvigson, Greg A, Bill J. Bunker, Brian J. Witzke, and Paul L. Garvin. 1983. A burial diagenetic model for the emplacement of zinc-lead sulfide ores in the Upper Mississippi Valley, USA: In Proceedings Volume, International Conference of Mississippi Valley Lead-Zinc Deposits, G. Kisvarsanyi, S.K. Grant, W.P.Pratt, and J.W. Koenig (eds), University of Missouri-Rolla, Missouri, p. 497-515.

Owen, David Dale. 1852. Report of a geological survey of Wisconsin, Iowa, and Minnesota: Lippincott, Grambo and Co., Philadelphia, 638 p.

Prior, Jean C. 1976. A regional guide to Iowa landforms: Iowa Geological Survey Educational Series 3, 71 p.

Wright, J. Curtis. 1981. Geological study of the Mines of Spain preserve: Iowa Conservation Commission Special Contract Report, 34 p.

MINES OF SPAIN: Archaeological Resources

by
Shirley J. Schermer
Office of the State Archaeologist

The Mines of Spain is a portion of Julien Dubuque's original land grant which he received from the Spanish government in 1796. The Mesquakie Indians, who moved into the area in the mid-1700s, allowed Dubuque to mine for lead in their territory from 1788 to Dubuque's death in 1810. Prior to this, native Americans had occupied this same area for at least 6000 years. The Mesquakie continued mining this area until around 1830. Following Dubuque and the Mesquakie Indians, white settlers continued to mine for lead. When lead mining declined in 1860, lumbering became a major activity from 1865 to 1880. Small-scale farming has occurred from the 1840s to the present. Known archaeological sites at the Mines of Spain include prehistoric campsites, villages, rockshelters, and burial mounds; an historic Mesquakie village; and historic mine pits, shafts and adits, smelters, stone fences, old roads, foundations and a small cemetery. The state purchased 1260 acres in 1980. Additional land has since been acquired and E.B. Lyons Nature Preserve leased from the City of Dubuque. In 1988 a multiple district nomination for Mines of Spain was submitted and accepted for listing on the National Register of Historic Places.

Archaeological Investigations

The initial archaeological investigations in the Dubuque area and within the Mines of Spain began during the late nineteenth and early twentieth centuries. The focus of these investigations were with locating, mapping, and excavating burial mounds and mound groups. Investigations of the Mines of

Spain area waned until 1968 when the Iowa Office of the State Archaeologist personnel attempted to locate the remains of Julien Dubuque's residence. Although unsuccessful in this venture, the investigations did encounter an 1830s era miner's cabin and a Late Woodland burial. Two other archaeological surveys in the area prior to the 1980s included additional attempts to locate prehistoric and historic occupations in the vicinity (Straffin 1973; Till 1977).

Aquisition of the Mines of Spain by the Iowa Department of Natural Resources instituted an intensive survey of the area's natural and cultural resources. The Iowa Conservation Commission contracted with the Office of the State Archaeologist to conduct archaeological resource surveys in 1981 and 1982 (Abbott 1981, 1982, 1983; Schermer and Kurtz 1986). Ten of the 15 previously recorded sites were verified, and an additional 58 prehistoric and 79 historic sites were recorded in 1981. The 1982 investigations yielded 85 more prehistoric and historic sites and provided additional information on 44 previously recorded sites. In 1987, an archaeological field school (Schermer 1988), sponsored by the Office of the State Archaeologist, the Iowa Archeological Society, and the Department of Natural Resources, recorded five new sites and supplied supplementary information for five previously recorded sites. During 1988, the impact zone for the proposed entrance road and picnic grounds was investigated (Anderson 1988, 1989). In 1990, the Julien Dubuque monument parking lot area was surveyed prior to parking lot expansion (Mehrer 1990).

Cultural Resources

The natural resources of the Mines of Spain attracted both prehistoric and historic inhabitants to the area. For the prehistoric people, the Mississippi River was a source of food, water, and a transportation route; the rock formations provided surveillance points, landmarks, shelter, and possibly ceremonial sites; abundant plant resources and wildlife provided food and clothing for the prehistoric people and, later, also attracted Euro-American interest in hides and furs and the subsequent influx of trappers and traders. The lead deposits in the area drew international attention to the region as early as 1682.

The prehistoric cultural sequence of the Mines of Spain follows the general pattern for the midwestern United States. Prehistoric evidence such as earth mounds, rock shelters, village and camp sites, and numerous artifacts indicate previous occupation on the Mines of Spain dating as far back as approximately 8,000 years ago. The Archaic culture in eastern Iowa, dating approximately 8000 to 2500 years ago, was an adaptation to forest and riverine conditions with intensive hunting and gathering. It has been suggested that this basic hunting and gathering subsistence strategy continued from the Archaic period and was pursued during all of the Woodland cultural phases. The retention of these seasonally mobile settlement patterns seem to have been a response to the seasonally diverse environment.

The Woodland culture which dates back approximately 2500 years ago is known for its use of pottery, cultivated plants and burial mounds. The character of Woodland culture can be summarized into two generalizations: 1) the intensification and elaboration of ritual behavior (symbolic artifacts, cooperative construction efforts seemingly associated with birth /rebirth and

death--i.e., mounds), and 2) improved technologies (ceramics, horticulture, and bow and arrow) leading to an overall increase in productive efficiency and social differentiation. Several mound groups are scattered throughout the Mines of Spain property. These mounds are believed to have been used primarily for religious, ceremonial and burial purposes. The appearance of pottery in the archaeological record during Woodland times is significant because it indicates that life was more sedentary. Numerous rockshelters at the Mines of Spain show evidence of prehistoric occupation and have the potential to provide floral and faunal evidence of seasonal use that would be important in furthering the understanding of prehistoric settlement patterns.

By 1000 A.D., these hunting and gathering groups had been replaced by cultures based primarily on agriculture--in eastern Iowa, the Oneota. Early Euro-American trappers and traders would have likely encountered the Ioway, Dakota, Sauk and Mesquakie tribes. The Oneota are believed to have been the prehistoric ancestors of the Ioway. By the early to mid-1700s, the Ioway were moving west due to increasing pressures from groups to the east. By the early to mid-1700s the Mesquakie were moving into eastern Iowa, remaining until the Black Hawk War treaty in 1832. The Indian-French trading culture flourished for nearly 150 years from the 17th to the early 19th century. It had started with the Marquette and Joliet exploration of the Upper Mississippi in 1673.

The lead region of the Upper Mississippi Valley was controlled by Native Americans until ousted by Euro-Americans in the 1820s-1830s . The presence of lead ore in this region had been known to Europeans since the 1600s. Early lead mining was extensive but seldom intensive. Miners exploited the ore near the surface. In 1788, Julien Dubuque was given permission by the Mesquakie Indians to mine lead. He spent 22 years living and working with the Indians on the Mines of Spain. His business establishment included a wharf, a

blacksmith shop and forge, a mill, a smelting furnace, as well as boats, mining equipment, livestock and accoutrements of the fur trade. The Mines of Spain also contained housing for himself (possibly two dwellings), and for his French associates as well as several hundred Indians (Auge et al. 1986:15).

The sites at the mouth of Catfish Creek comprise the area that has been an intricate part of the prehistoric occupation of the region, the focus of protohistoric Native American and Euro-American interaction, as well as the site of an early American mining settlement. Controlled surface collections in this site complex during the 1982 survey (Abbott 1983; Schermer and Kurtz 1988) identified several areas suggesting the presence of historic foundations. Some of the artifacts collected were consistent with the Julien Dubuque/Mesquakie village era, ca. 1788-1830 (Abbott 1981, 1982, 1983).

Two of these sites appear to be the location of the Mesquakie village. However, the historical documentation is imprecise enough to raise uncertainty as to the exact locations of the various structures associated with Julien Dubuque's establishment. While we do not have enough archaeological evidence at this point to conclusively pinpoint the locations of these structures, it does appear that at least some of Dubuque's settlement occurred in this site complex near the mouth of Catfish Creek . Additional archaeological investigations have the potential to provide further documentation on Julien Dubuque's establishment and the Mesquakie village.

The most readily observed features of the lead mining in the Mines of Spain are the mine pits, adits, and shafts. Archaeological investigations have identified 81 exploratory mining pit clusters, 8 mine shafts, 10 horizontal adits, and 6 smelter sites. At one mining pit cluster, 570 pit features were mapped, ranging in size from ca. 1.0 to 4.0 meters in diameter and ca. 0.5 to 1.5 meters in depth. The primary evidence identifying smelter

sites is the association of earth or limestone showing burning, cinders or clinkers, and small pieces of galena (Abbott 1982, 1983).

Archaeological evidence for the lumbering and farming activities that replaced lead mining as economic pursuits include stone fences, a series of old roads, several historic foundations and a small historic family cemetery.

REFERENCES

Abbott, Larry R.
1981 *The Preliminary Archaeological Assessment of the Mines of Spain Area, Dubuque County, Iowa.* Contract Completion Report No. 195. Office of the State Archaeologist, University of Iowa, Iowa City.

1982 *A Predictive Model for the Location of Cultural Resources, Mines of Spain Area, Dubuque County, Iowa.* Contract Completion Report No. 200. Office of the State Archaeologist, University of Iowa, Iowa City.

1983 *The Cultural Resources of the Mines of Spain Area, Dubuque County, Iowa.* Contract Completion Report No. 206. Office of the State Archaeologist, University of Iowa, Iowa City.

1988 Frontier Lead Mining in the Upper Mississippi Valley. *Journal of the Iowa Archeological Society* 35:1-15.

Aley, Thomas, and Catherine Aley
1985 Evaluation of the Mines of Spain, Dubuque County, Iowa for Designation as a National Historic Landmark Status. Submitted to the National Park Service, Midwest Region by Ozark Underground Laboratory, Protem, Missouri.

Anderson, Mark L.
1988 *Archaeological Survey of the Entrance Road and Picnic Grounds, Mines of Spain Recreation Area, Dubuque County, Iowa.* Contract Completion Report No. 256. Office of the State Archaeologist, University of Iowa, Iowa City.

1989 *Phase II Intensive Archaeological Investigations of Sites 13DB374, 13DB146, 13DB384, and 13DB386, Mines of Spain Recreation Area, Dubuque County, Iowa.* Contract Completion Report No. 264. Office of the State Archaeologist, University of Iowa, Iowa City.

Auge, Thomas E., Mike Gibson, and Robert Klein
1986 The Mines of Spain in its Historical Context. A report submitted to the Iowa Department of Natural Resources, Des Moines.

Benn, David W.
1979 Some Trends and Traditions in Woodland Cultures of the Quad-State Region in the Upper Mississippi Basin. *The Wisconsin Archaeologist* 60(1):47-82.

DeVore, Steven, Kay Simpson, Joyce McKay, Shirley Schermer, and Larry Abbott
1991 The Dubuque Lead Mining District: The Archaeological Investigations and Management Concerns for the Frontier Lead Mining Industry, 1788-1865. Paper presented at the 1991 SHA Conference on Historical and Underwater Archaeology. Copy on file at Office of the State Archaeologist, Iowa City.

Iowa Department of Natural Resources
n.d. Mines of Spain Draft Master Plan. Iowa Department of Natural Resources, Des Moines.

Ludvigson, Greg A., and James A. Dockal
1984 Lead and Zinc Mining in the Dubuque Area. *Iowa Geology* 9:4-9.

McKay, Joyce
1988 "Mines of Spain Archaeological Property Group," National Register of Historic Places Multiple Property Documentation Form. USDI National Park Service, Washington, D.C.

Mehrer, Mark
1990 *Archaeological Survey of the Julien Dubuque Monument Area, Mines of Spain, Dubuque County, Iowa.* Contract Completion Report 286. Office of the State Archaeologist, Iowa City.

Schermer, Shirley J.
1988 *Mines of Spain 1987 Archaeological Field School.* Research Papers vol. 13 no. 2. Office of the State Archaeologist, University of Iowa, Iowa City.

Schermer, Shirley J., and Royce Kurtz
1986 *Archaeological and Historical Studies, Mines of Spain, Dubuque County, Iowa.* Contract Completion Report No. 242. Office of the State Archaeologist, University of Iowa, Iowa City.

Starr, F.
1895 Summary of the Archaeology of Iowa. *Proceedings of the Davenport Academy of Natural Science* 6:53-124.

Straffin, Dean
1973 Historic Sites Survey of the Mines of Spain Site, Dubuque County. Ms. on file, Bureau of Historic Preservation, State Historical Society of Iowa, Des Moines.

Till, Anthony
1977 Dubuque County Archaeology. In *Iowa's Great River Road Cultural and Natural History Resources*, part 2:311-348. Contract Completion Report No. 108. Office of the State Archaeologist, University of Iowa, Iowa City.

VEGETATION OF THE MINES OF SPAIN: AN OVERVIEW

John Pearson
Preserves and Ecological Services Bureau
Iowa Department of Natural Resources

Comprehensive studies of the vegetation and rare plant species of the Mines of Spain property were conducted by Tom Blewett, Jim Lehmann, and Susan Winters in 1981 and 1982, culminating in a master report (Blewett et al. 1983). This report identified nine major plant communities, including artificial communities such as "farm disturbance" (active cropfields and hayfields) and "alluvial disturbance" (old fields and cut-over woods in floodplain settings). The seven natural communities consisted of six forested types (oak-hickory, maple-basswood, alluvial, birch-aspen, bur oak, and juniper) and one grassland type (hill prairie). Over 400 plant species were distributed among these communities.

The seven natural plant communities occur on three general types of substrates: loess, limestone, and alluvium. Loess covers the broad upland flats and gentle slopes in the Mines of Spain; many of the narrow ridges also bear a cap of loess. Soils of the Fayette series have developed on these loess deposits. Natural communities which occupy this substrate include oak-hickory forest, bur oak groves, and birch-aspen groves. Oak-hickory forest is by far the most prevalent community-type in the Mines of Spain property and is characterized by a dominance of red oak ((*Quercus borealis*) and white oak (*Quercus alba*). Small bur oak groves (up to 10 acres in size) are found on the highest hilltops and ridges; strongly dominated by bur oak (*Quercus macrocarpa*), this community may be a relict of formerly more common savannas. A few patches of birch-aspen forest (the largest of which is approximately 40 acres in size) occur on slopes disturbed by past logging (possibly for steamboat fuel at the turn of the century). The dominant trees here are paper birch (*Betula papyifera*) and quaking aspen (*Populus tremuloides*).

Limestone bluffs occur extensively on steep slopes throughout the Mines of Spain area and support three natural communities: maple-basswood forest, juniper groves, and hill prairies. The soil which typically develops on these sites is classified as the Nordness series. Maple-basswood forest is the most common of the three vegetation types, forming a nearly continuous cover on the northeast-facing bluffs fronting on the Mississippi River. Sugar maple (*Acer saccharum*) and basswood (*Tilia americana*) -- both of which

thrive in cool, shaded habitats -- are the dominant tree species here; rare plant species associated with this community are the Jeweled Shooting Star (*Dodecatheon amethystinum*) and Glandular Wood Fern (*Dryopteris intermedia*). Juniper groves dominated by eastern red-cedar (*Juniperus virginiana*) are found on limestone outcrops, especially on hot, dry, south-facing slopes and ridges; some of these, in turn, may be former hill prairies which have been invaded by cedars. Hill prairies are presently found on the steepest, driest limestone slopes and are much reduced in area from their former extent due to the encroachment of trees and shrubs. Tall and mid-size grasses such as big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), and little bluestem (*Schizachyrium scoparius*) dominate these communities; a rare plant, the Great Plains Ladies'-tresses (*Spiranthes magnicamporum*), occurs in some of the prairies.

As its name implies, the "alluvial forest" occupies deposits of alluvium (water-carried sediments) in river bottoms and floodplains. The soils in these areas are mostly of the Arenzville and Caneek series. The few floodplains present in the Mines of Spain property are small and narrow, so the alluvial forest is correspondingly uncommon here. The best examples are located along Catfish Creek and at the mouth of Cattesse Hollow. This community is strongly dominated by silver maple (*Acer saccharinum*).

The Master Plan for the Mines of Spain Recreation Area calls for the maintenance of all the types of natural communities which are presently found on the area plus restoration of some, such as oak savanna, which have disappeared. Restoration and expansion of the hill prairies through prescribed burning and brush control is one of the most active areas of vegetation management today. The prairies which are the most accessible to the public include the Monument Prairie (by the Dubuque Grave), the prairies along the ridge trail south of the parking lot by Catfish Creek, and the west slope of Horseshoe Bluff (across from the new picnic area).

References

Blewett, T.J., J.W. Lehmann, and S.K. Winters. 1983. Mines of Spain vegetation study, Dubuque County, Iowa. Phase II: Community analyses. Final report submitted to Iowa Conservation Commission in partial fulfillment of Project MOS-3. 68 pp, plus appendices and maps.

MINES OF SPAIN ENTRANCE ROAD
HISTORY OF ROAD PLANNING

Dr. Martha Maxon, Department Head, Environmental Planning
Brice, Petrides-Donohue Co.
Waterloo, Iowa

This road was included in the master plan for the Mines of Spain State Recreation Area by Iowa DNR to provide an easily accessible (off Highway 52) and attractive entrance road for visitors to the state recreation area. The current, unpaved entrance road from the north is hard to find, passes by the city wastewater treatment plant and is impassable at times.

The location and the design of this road were given special attention by Iowa DNR and the engineering consultant recognizing that this was not just another road to get from Point A to Point B. Rather, this road would pass through a sensitive natural, archaeological, historical and scenic area and the site resources and integrity needed to be protected.

The road was located in order to take advantage of existing roads and to minimize the impacts to wooded areas on the site. Over one mile of the two-mile roadway was located in an upland agricultural area. The .8 mile that was laid out in the woods was located to take advantage of .4 mile of an old logging road that had already cut a swath through the woods. Only .2 mile of the road is on new location through the wooded area.

The road was also located to avoid sensitive natural and cultural features on the site. Before final location decisions, an archaeological study of the proposed road corridor was conducted by the Office of State Archaeologist, and the road was changed to avoid one archaeological site. OSA also evaluated the significance of the old logging road as an historic site.

A small population of a state-endangered species, jeweled shooting star (Dodecatheon amethystinum), is on a south-facing slope above the old logging road. Botanists in the area expressed concern about the construction impacts and possible microclimatic changes on this population. Iowa DNR and the engineering consultant mapped the extent of the population and estimated the amount of shade that would be lost on this slope when trees were removed on the slope below the road. The population boundaries were found to be well above the construction impact zone, and the trees to be removed would not provide shade to the population. A barrier fence was constructed along the base of the slope below the shooting star population to keep all construction activities and personnel from going on the slope. A barrier was also extended throughout the wooded areas on both sides of the road throughout the construction of the project.

During the engineering design of the road, the project biologist and landscape architect worked with the project engineer to provide features that would lessen the road's visual intrusion into the landscape. Some of the features that were included in the design are the following:

- Application of a buff-colored gravel sealcoat to obscure the black asphalt road surface.

- Elimination of the roadway embankment and replacement with reinforced earth walls to reduce the width of the road. This also saved a number of trees that would have been cut for the embankment.

- Application of a rock texture and buff color to the reinforced earth walls to give the appearance of an old stone wall.

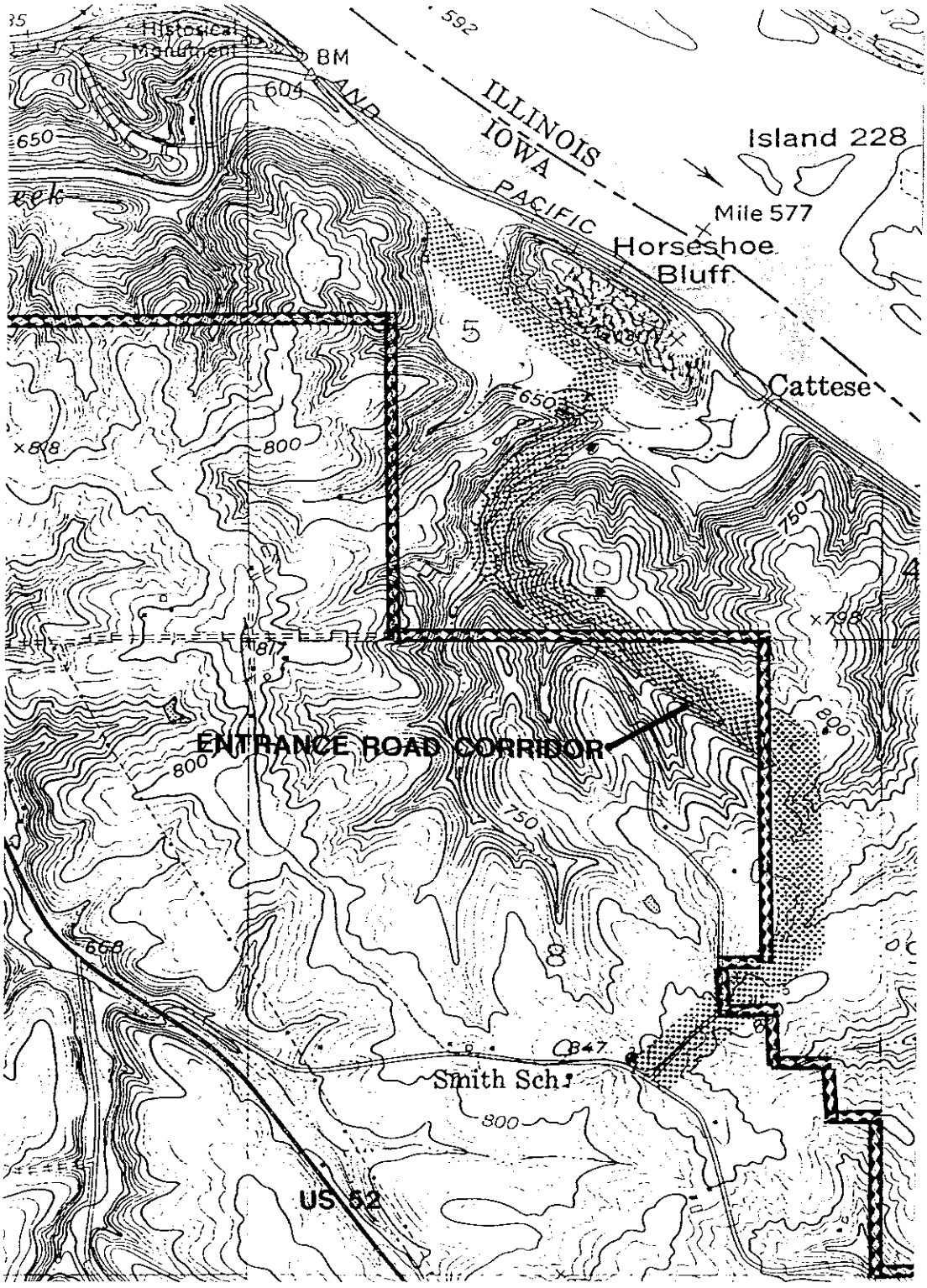
- Application of limestone to the faces of the bridge, again to give an old wall appearance.

- Provision for a limestone wall on the upslope bank cuts.

- Use of wood chips as mulch to provide a natural-looking erosion control material. The wood chips were obtained from the trees that were cut for the road.

The project biologist was on the construction site during the initial cutting of the roadway through the wooded area and periodically throughout construction to check on the barrier fencing and effects on adjacent vegetation. Post-construction reviews of this area confirmed that the jeweled shooting star population was not adversely affected.

T/M/E04


Historical Monument
BM
604
650
592
ILLINOIS
IOWA
AND
PACIFIC
Island 228
Mile 577
Horseshoe Bluff
Cattese
5
650
800
750
817
ENTRANCE ROAD CORRIDOR
800
750
668
847
Smith Sch
800
US 52

Geological Society of Iowa
%Iowa Department of Natural Resources
Geological Survey Bureau
123 North Capitol Street
Iowa City, Iowa 52242