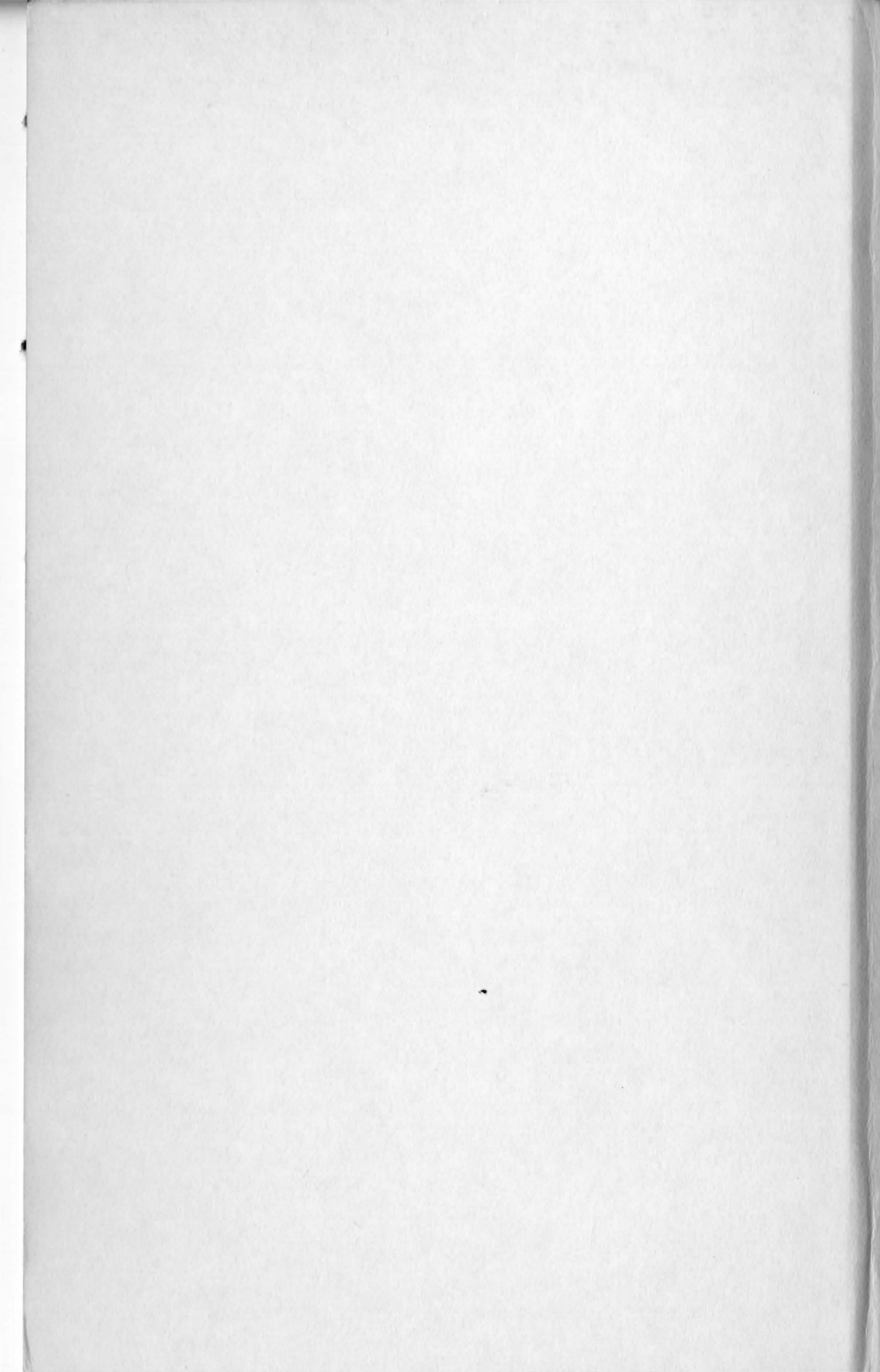


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Iowa State Conservation
Board, Ledges State Park

Iowa



LEDGES STATE PARK



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No. 1*

CARL FRITZ HENNING, Custodian Ledges State Park

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LEDGES STATE PARK

By L. H. PAMMEL

The Ledges State Park is located mostly in Worth Township on the east side of the Des Moines River. A little acreage also occurs on the west side of the river in Marcy Township. The nearest town north on the railway is Moingona on the branch line of the Northwestern between Boone and Ogden. The nearest town on the east side of the river is Luther, on the branch line of the Chicago, Milwaukee and St. Paul. The Ledges have been used for picnic purposes for about sixty years. The proposition of making this area into a state park was first presented to the State Board of Conservation April 26, 1914, again on July 28 and September 5, 1919, March 19, 1920, and August 30, 1920. The custodian was appointed July 18, 1921, and the State Park was dedicated November 9, 1924. The Ledges State Park provides possibility for recreation to about 325,000 people within a radius

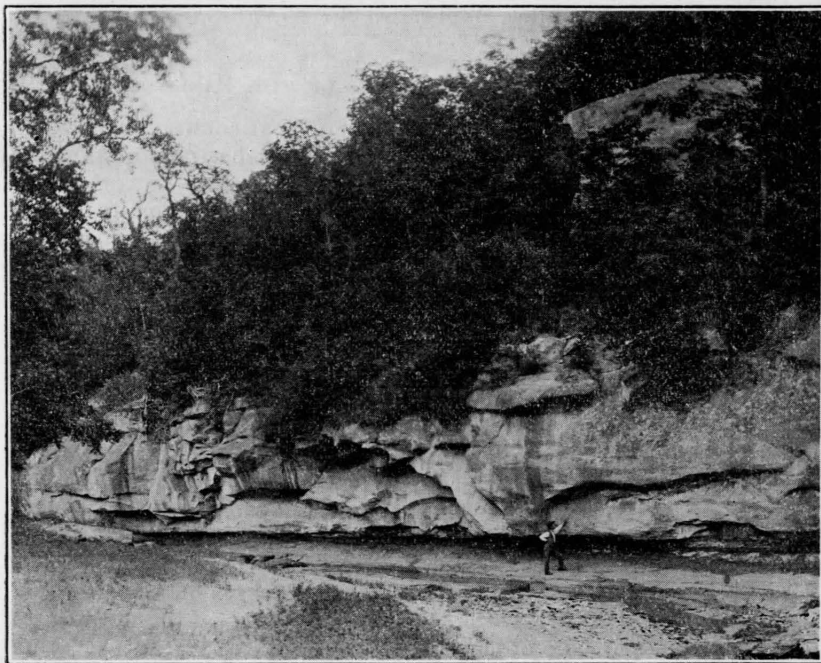


Fig. 1. Table Rock. (Photographed by A. S. Moxley.)

of fifty-five miles. It is easily accessible to people from Des Moines, Fort Dodge, Ames, Boone, and Marshalltown both by rail and auto.

HOW TO REACH THE PARK

The east entrance of the park may be reached by Highways No. 60 and No. 6 and on No. 90 by going over No. 6 to Boone. The east entrance of the park is three miles west from Primary Road No. 60.

The distance¹ to the Ledges from Iowa State College is 16 miles, from Ames, 18 miles, Adel 31 miles, Boone 6 miles, Bouton 16 miles, Boxholm 23 miles, Berkley 14½ miles, Beaver 16 miles, Colo 33 miles, Churdan 43 miles, Cambridge 28½ miles, Des Moines 37 miles, Dawson 24 miles, Dayton 28 miles, Dallas Center 29 miles, Fort Dodge 46 miles, Grand Junction 21 miles, Gowrie 37 miles, Gardiner 17 miles, Jefferson 29 miles, Jewell 37 miles, Lehigh 35 miles, Luther 6½ miles, Madrid 12½ miles, Minburn 21 miles, Muran 23 miles, Maxwell 34 miles, McCallsburg 39 miles, Nevada 26 miles, Ogden 10 miles, Ontario 13½ miles, Perry 17½ miles, Pilot Mound 19 miles, Roland 33 miles, Redfield 41 miles, Story City 29½ miles, Sheldahl 19½ miles, Scranton 38 miles, Stanhope 27 miles, Webster City 40 miles, Woodward 20 miles, Waukee 38 miles.

SOME GENERAL FEATURES OF THE PARK

The Park is adjacent to a large agricultural country, especially the more or less level prairie regions beyond the limit of the forest vegetation. It is one of the larger of the state parks, in the heart of the Des Moines valley, a valley cut with many small, comparatively short streams that generally rise in the prairie region. At one time there were a number of small shallow lakes in this prairie country and before the settlement of the region it was a paradise of wild flowers from early spring to autumn. The rough broken country of the Des Moines River once was thickly covered with giant trees of types common to central Iowa. Not much of this virgin timber is left. However, as a part of the park area there is a tract on the Des Moines River bottom on the west side of the river that contains some giant cottonwoods, elms, green ash, and soft maple. The Park, too, may be said to be unique in this respect that in the park are some of the largest elms found on the Des Moines River. One of these is the giant elm nearly nine feet in diameter at its base. The flood plain of the Des Moines River at the Ledges State Park is narrow and in some parts of the park walls of sandstone may be found close to the water's edge. One of the interesting features is a fall (Katina Falls) in what is known as the Lower Ledges. This, during the

¹This information is furnished by Mr. Carl Fritz Henning, the custodian.

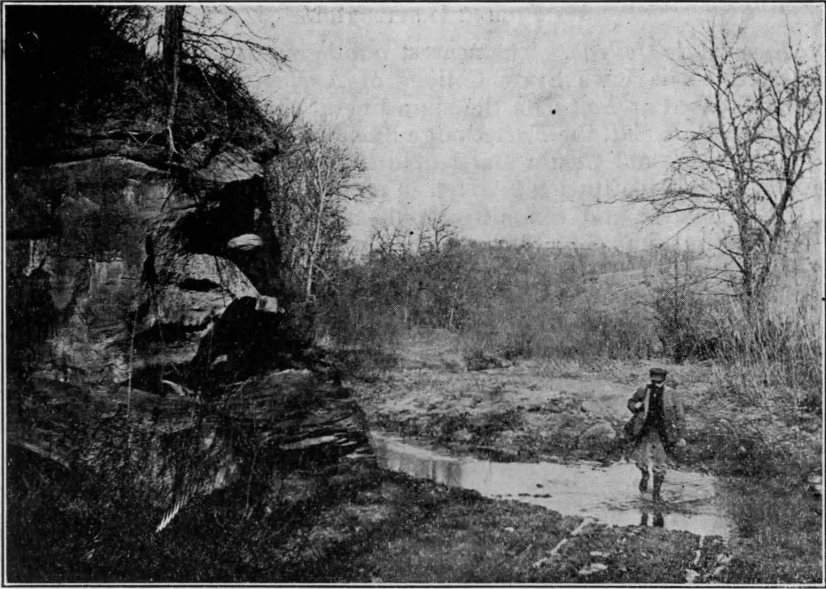


Fig. 2. Redwing Rock. Massive standstone.

springtime, carries water over the rock. At the base of these falls is a spring of pure water. A narrow hogback covered with oaks, maples, and basswood leads to the falls.

There is only one stream, Pease Creek, which flows through the heart of the Ledges and this has one main tributary, Davis Creek. Both of these streams rise in the prairie country back of it.

Mention has been made of the sandstone ledges. These ledges extend up the main stream, Pease Creek, and on Davis Creek. In some cases these ledges rise nearly a hundred feet from the floor of the little stream and it is more than two hundred feet from the floor of the ledges to the top of the hill. These hills are covered with a dense second growth of hardwood trees with an occasional red cedar.

The Ledges State Park is interesting in so far as its plant life is concerned. There are a number of species quite peculiar to the region, although some of these types also occur in the Dolliver and Eldora Pine Creek State Parks. These rare species are isolated, that is they are not connected directly with the plants found either at the Eldora Pine Creek Park or the Dolliver Memorial Park. We may therefore say that we have here an island flora.

PUBLIC INSTITUTIONS

Iowa State College. The nearest public institution to the Ledges State Park is Iowa State College of Agriculture and Mechanic Arts, located at Ames, on the main line of the Chicago and Northwestern Railroad, the Fort Dodge line, and on the Lincoln, Jefferson, Wilson, and Custer Battlefield highways. An admirable account of this institution is given in an historic sketch prepared by L. B. Schmidt and committee, published for the semi-centennial celebration June 6-9, 1920. The General Assembly of the State of Iowa in 1858 passed a bill for the establishment of "A State College of Agriculture and Model Farm," with an appropriation of \$10,000 and a board of trustees of eleven members. The board was instructed to purchase a farm. Story County voted bonds to the amount of \$10,000 and in individual notes gave \$4,320. Boone and Story counties together gave 861 acres of land. The Federal Land Grant Act of July 2, 1862, and the later acceptance of this by the state and an appropriation of \$91,000 in 1868 made possible the erection of "Old Main" and a few other buildings. The college opened on March 17, 1869. The first class graduated in 1872. The institution now numbers 4,491 students in the four-year courses in agriculture, engineering, home economics, science, and veterinary medicine; 676 students in non-collegiate courses in agriculture, engineering, home economics, and trades and industries; nearly 3,000 students enrolled in short courses during the year, making a grand total attendance of 5,167, not counting the short course students. In addition to these activities the college carries on extension work in agriculture and engineering and research work in agriculture, science, and engineering. The faculty consists of 675 instructors. Sixty commodious buildings, besides dwelling houses and the buildings for farm stock, machinery, and work have been erected by the state for the various departments of the college.

John A. Hull on July 4, 1859, made an address after the location of the college at Ames. This impromptu address was made when he was 28 years old. Daniel McCarthy was marshal of the day. The people from Boone started the night before with ox teams. Mr. Hull is said to have made this statement: "Keep your land and it will make you rich. The real benefactor was he who made two blades of grass grow where but one had grown before." Fifty years later a son, John A. Hull, a prominent attorney at Boone, on July 4, 1909, in celebration of the semi-centennial of the location of the college made a splendid address and he hopes that his son, John A. Hull, Jr., may make this speech in 1959.

Iowa Highway Commission. Another fine public institution, the Iowa Highway Commission, is located at Ames on the Lincoln

Highway. Its work is centered in a substantial brick building where the highway work of the state is conducted. The commission has not only undertaken the tremendous task of main highway work in the state, but looks after roads in state institutions and state parks and has made a survey of lakes and lake beds.

HISTORICAL

By L. H. PAMMEL

Most of the material in this historical sketch is taken from N. E. Goldthwaite's *History of Boone County, Iowa*.

The county was named in honor of Captain Nathan Boone, the youngest son of Colonel Daniel Boone. Nathan Boone was captain of Company H. He was captain of an expedition which

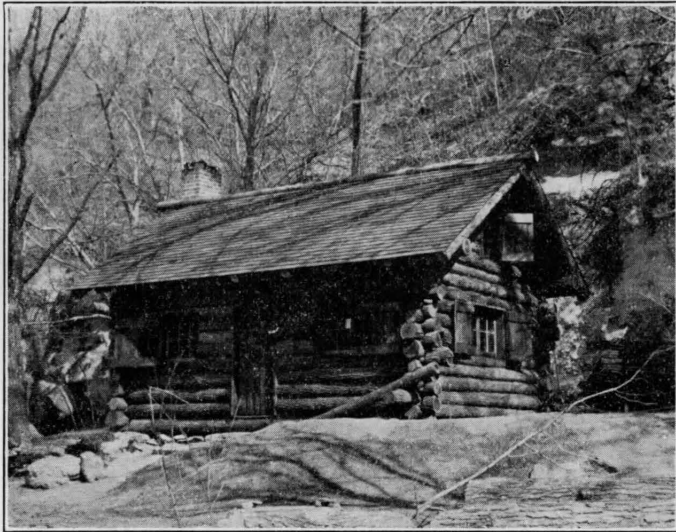


Fig. 3. Custodian's lodge in Ledges State Park. (Photographed by E. I. Featherly.)

marched from old Fort Des Moines to Wabasha's village, Minnesota. Their route was along the divide between Skunk and Des Moines rivers. On June 23, 1835, the soldiers camped a little south of Mineral Ridge and the next night near the mouth of Boone River, whence they marched to Wabasha's village, now Winona, Minn. On the return trip the little army camped again in Boone County. In 1832 Captain Boone started to survey the neutral strip. In 1853 he resigned his commission in the army and returned to Missouri, where he died at Ash Grove, near Springfield, in 1863.

Charles W. Gaston, the first settler, located in the county in January, 1846.¹ In the spring of 1846—April 15—the second settlers, John Pea and James Hull, came and settled on a tract of timber near the source of what is called Pea's Point. Here was also the first hotel in the county. In 1853 W. D. Parker and James Hull built a sawmill on Pea's branch, now known as Pease Creek. James Crooks also settled near this point. All three came from Indiana.²

In 1847 S. B. McCall was appointed sheriff of Boone County by William McKay, judge of the Fifth Judicial District, for the purpose of holding a special election on the first Monday in August of that year. This, the first election, was held August 6, 1847. Twenty-six votes were cast.

The first road located in the county was in August, 1850, at Fisher's Point. The first schoolhouse was built on Honey Creek

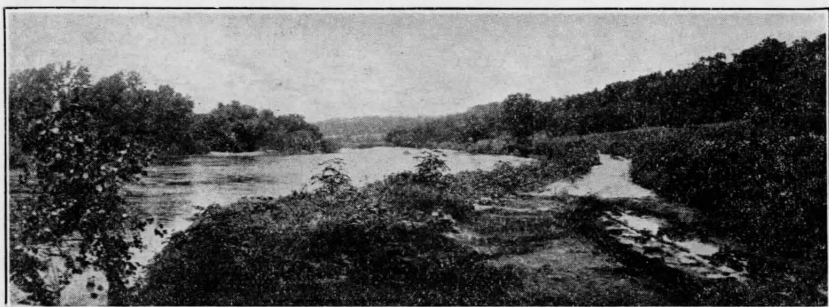


Fig. 4. The Des Moines River near the entrance of Ledges State Park. (Photographed by Caughey.)

on the above road. This road connected with the road from Saylorsville and Polk City—the Boone and Polk County roads being used by Western Stage Company in carrying mail and passengers. In July, 1851, the commissioners located the county seat at Boonesboro.

One of the interesting incidents connected with the early settlement of Boone County is the Milton Lott tragedy. Henry Lott, who, incidentally, became connected with the Spirit Lake tragedy,

¹Colonel L. W. Babbitt settled temporarily above Moingona on "Noah's bottom," or later known as "Rose's bottom," in 1843.—*History of Marion County, 1881.*

²James Hull was one of the early settlers. Other members of the Hull family located in Boone county; three came before 1850. James was a doctor, Euriah a farmer, and George a minister. Jackson Hull's ancestor was born in 1789 and is buried in Hull cemetery. Jackson Hull has lived near the Ledges since 1854.

In the early fifties a grist mill was built on Pease branch near the north boundary line of the park.

was born in Pennsylvania. Lott with his wife moved to Iowa and became an Indian trader at Red Rock, Marion County, where he did a thriving business until October 11, 1845, at which time according to the treaty of 1842 the Sac and Fox Indians moved west of the Missouri River. In the summer of 1846 Lott moved to the north bank of the Boone River in Webster County. He was informed by Si-dom-i-na-do-tah, of the Sioux, that he was on Sioux hunting grounds but he refused to leave. Evidently, the Indian chief was in error because the Sioux territory was north. Ex-Governor Gue in his *Historic Sketch of Iowa* states that Lott's cabin was the headquarters of a band of horse thieves who stole horses from set-



Fig. 5. Des Moines River looking north from Inspiration Point. (Photographed by Mrs. Ogden.)

tlers and Indian ponies from the Indians and sold whiskey. However, Geo. W. Crooks of Boone County, who knew him well, thinks that an injustice has been done to Lott. He says that Lott was a typical frontiersman, not a desperado nor a thief, but a trapper and hunter, much attached to his family. Teakle, in his *Spirit Lake Massacre*, evidently had much the same view of Lott as did Governor Gue. In the autumn of 1853 Lott built a cabin on what is known as Lott's Creek, in Humboldt County.

From a concealed place Lott saw the Indians destroy his property. Then he and his stepson, a boy of sixteen, started for the nearest settlement. The Indian chief ordered Milton Lott to catch all of the horses on the place and deliver them. The boy fled, leaving his mother alone. Lott returned from the settlement in three days bringing twenty-six friendly Musquakies and Potta-

wattamies and seven white men. The body of Milton Lott, who died from exposure, was found near the village of Centerville, where it was buried. The mother, whose life had been spared by the Indians, died a week later and was buried on the Boone River bluff. Lott moved to Dallas County, then moved to Fort Des Moines and in the spring of 1849 with his second wife moved to his old cabin at the mouth of Boone River. Three children were born of their second marriage and at the birth of the third child, a boy, his wife died. After finding a home for his children Lott sold out and with his stepson in 1853 moved to Humboldt County. Once more he became the neighbor of Si-dom-i-na-do-tah, the old Sioux chief. On one of his visits to the Indian chief Lott was shown some of the silverware stolen from the first Mrs. Lott. The Indian chief and his family were shot by Lott, an inexcusable and criminal act. What became of Lott no one seems to know. He and his stepson were indicted in Webster County, but before the officers could get them they had fled. In 1903 the Madrid Historical Society placed a monument on the grave of young Lott. This Lott tragedy therefore connects up with the Spirit Lake massacre.

Another interesting matter in connection with the early settlement of Boone County and the Ledges State Park is what is known as the Des Moines River Land Grant. The United States government gave to the Des Moines Navigation and Railroad Company tracts of land along the Des Moines River, from its mouth to Raccoon Fork, to make the Des Moines River navigable. The strip of land was five miles wide on each side of the river. General Thomas Ewing of the Interior Department of President Taylor's cabinet declined to recognize the grant beyond the Raccoon Forks. The State of Iowa, however, later conveyed some 471,597 acres of land. The company claimed to have expended some \$554,547.84 on river improvements. In 1858 an act of the legislature granted to the Keokuk, Fort Des Moines and Minnesota Railroad Company all of the land included in the river land grant made to the navigation company not then sold by the state. This proposition was submitted to the people and a large majority voted in favor of this grant. There was much litigation and the courts finally established the rights of the navigation company. A part of the Ledges State Park was in this grant and the Litchfield interests later donated some of this land for park purposes.

In the early days, soon after the present seat of state government was established, much timber was cut along the Des Moines River and rafted to Des Moines. Many citizens of Boone cut timber to which they had no right. The navigation company branded all logs placed on the banks or in rafts and when the latter reached Des Moines they were claimed by the company. The local citizens went so far as to drive the branders off and in one case this led almost to a bloody encounter.

The city of Boone was laid out by John I. Blair on March 4, 1865, and named Montana. Blair was a chief factor in building the Chicago and Northwestern Railway. When it was laid out there was only one house on the proposed town site, built by Mr. Keeler in 1856. The town was incorporated in 1866. The name was changed to Boone on September 11, 1871. In October, 1887, the town of Boonesboro became a part of Boone. To complete the transaction the legislature of 1888 designated Boone as the county seat.

The act granting the Cedar Rapids and Missouri River Railroad Company the tracts of land within the state was approved May 15, 1856. In order to complete the railway the county donated its available swamp lands and swamp land funds and Boonesboro gave twenty acres of depot grounds and \$10,000 in money. The Chicago and Northwestern Railway came to Boone County in 1865. The main line of the Northwestern formerly used the Honey Creek Valley to Ogden, crossing the Des Moines River over what became known as the Kate Shelley bridge near Moingona,¹ about two and one-half miles northwesterly from the Ledges State Park. The great viaduct over the Des Moines River with its double track was begun in 1899 and completed May 19, 1901. The construction of this, one of the greatest railroad viaducts in this country, was planned and supervised by Mr. Armstrong.

The park is made accessible by three other railroads: The Fort Dodge, Des Moines and Southern which runs from Des Moines to Fort Dodge, Rockwell City, and Ames; the Chicago, Milwaukee and St. Paul, the main line of which goes through Madrid and a branch to Luther and Boone, and the Minneapolis and St. Louis, which passes through Ogden. The first mentioned road leased the Newton and Northwestern, running from Newton to Rockwell City. Electrification, begun in 1906, was completed in 1907 with the main power house at Fraser.²

One of the interesting features of the county is the broken topography along the Des Moines River. The Ledges give expression to this part of the county. The morainic hills of Mineral Ridge and Pilot Mound are also of interest. The former, a long ridge of hills rising some seventy feet above the country, runs through Ridgeport. Pilot Mound, an early landmark of the county, is supposed by some to be an Indian mound, but this is a mistake. According to Dr. S. W. Beyer it is merely an isolated portion of the Gary moraine rising some seventy feet above the surrounding country. No doubt Indians made use of this mound and battles were fought there. There are nine Indian mounds

¹Moingona once had a population of three thousand people in the early coal mining days.

²From a clipping of the Boone County Democrat, Dec. 3, 1909.

south of Moingona in Marcy Township and some fine mounds on the right hand side of the road on the south side of the river not very far from the large elm tree. These have been partly demolished through cultivation. Other Indian mounds in Boone County occur west of Madrid. In the spring of 1910 some mounds were uncovered near the Boone viaduct under the supervision of the State Historical Department.

The mound near the viaduct west of the city of Boone was excavated under the direction of the State Historical Department of Iowa. Mr. E. R. Harlan, on April 22, 1908, had this to say concerning the mound:

"This work is completed as desired by the lamented Mr. Aldrich and as planned at his request by Mr. Van Hyning, who was then in charge of the museum of the Historical Department of Iowa."

Assisting Mr. Van Hyning in this work was Mr. Carl Fritz Henning, the present custodian of the Ledges State Park. The mound was discovered by Mr. Henning and it was he who urged that the Historical Department of Iowa take up the matter of thorough investigation.

The mound is 110 by 190 feet, 14 feet high.¹

Worth Township, in which the Ledges State Park is located, was organized in March, 1858, and named in honor of William J. Worth, a general of the Mexican War and the hero of Monterey. Attention has been called to the important part that Henry Lott played in the Spirit Lake massacre and that John Pea and Thomas Sparks came to the rescue of Lott. Thus the Ledges State Park played an important role in the early history of central Iowa.

John Pea and his family and James Hull and his family settled in section 2, township 83, range 26, May 26, 1846. The county was organized by Judge Samuel B. McCall.

Of interest in connection with Moingona is the Kate Shelley incident. The Shelleys lived near the mouth of Honey Creek. On July 6, 1881, in the midst of a raging storm which rendered the Chicago and Northwestern bridge over the Des Moines River unsafe, Kate Shelley, then about fifteen years old, crossed the bridge on hands and knees to carry to Moingona the news of danger to an approaching train. Thus a number of lives were saved. For many years after that she was agent for the Chicago and Northwestern at Moingona.²

¹Colonel L. W. Babbitt of the United States army discovered the remains of an Indian village on "Noah's bottom." It was his opinion that the members of this village might have been half-breeds between the French and Sioux. These half-breeds gave the name to the stream Des Moines from the word Moingona.

²Information obtained from a booklet of the G. A. R. State Encampment, June 5, 6, and 7, 1910.

The pioneers found plenty of wild game as evidenced by the story related by Mr. Lott who found an abundance of elk on the Des Moines River north of Fort Dodge in Humboldt County. ruffed grouse, prairie chicken, quail, wild turkey, and buffalo were common at one time. However, the early settlers did not find buffalo near the Ledges State Park.

In the Boone News, July 21, 1905, Carl Fritz Henning gives plenty of evidence to show that the buffalo were once abundant in Iowa. In his account of the search which resulted in the finding of numerous buffalo bones in bogs a few miles from Iowa Center he says:

"I wish that I were a writer so that I could give to you an idea of my feelings at finding these positive proofs of the early existence of the American bison in Iowa. But more than all, would that my pen could truthfully describe the picture that came up before us as we stood there in that lonely boggy place in the stillness of the night. The soft moonlight threw shadows across the prairie from the fleeting clouds. As cloud after cloud floated to the northward it seemed that once more the vast army of the buffalo, the grandest, noblest animal that ever roamed the American plains, was passing in review before us. If it were in my power to describe to you the feeling of sadness as I realized that same utter disregard for life—that had exterminated the buffalo—had already caused the prairie chicken to vanish from our stubble fields and meadow-lands and would ere long hush the bob-white's note along the roadside—if I could paint this to you in colors true to the real conditions, then never again would one of these noble game birds be destroyed by the hand of man without a just cause."

GEOLOGY

BY JOHN E. SMITH, Iowa State College

On the upland in the park area, during a rain or immediately after, the water, black with soil and other fine material in transit, can be seen cutting the little gullies larger and longer. On down the stream as it grows stronger the current gathers more material, taking it from the sides and bottom of the ravine and receiving that which comes by washing, sliding or falling from the slopes above and from the tributary streams. This removal continues to make the valley wider and deeper until it reaches the level of the floodplain which is formed where the water cannot flow rapidly enough to cut deeper.

Loss of soil material. This process is going on in every gully and ravine that leads from the upland to the valleys below and the total amount of soil that is washed from the upland and from the slopes in a year is very large.

The floodplain. The stream increases the width of the valley by winding across the flat and cutting under the wall here on one side and there on the other as at Devil's Cave. Where the flat is narrow as along Davis Creek nearly all of the winding curves reach the foot of one slope or of the other causing the width of the valley to increase more rapidly than it does where it is so wide that only a few of the curves touch the bluffs. During each flood much of the loose sand, gravel, and other material is moved out to the Des Moines River and a new supply is brought down by the small tributaries and distributed along the channel and over



Fig. 6. Pease branch in the Ledges State Park, an entomologist and the custodian.
(Photographed by Prof. J. M. Evvard.)

the bottom. The boulders, too large to be moved rapidly or far even by the strongest currents of flood time, were rolled along the channel to their respective positions. They wear smaller as they bump along and the fine particles worn or broken from them are carried on. Most of the work of the streams is done during flood time.

Weathering. Freezing and thawing, heating and cooling, wetting and drying by their work of expansion and contraction have separated thin layers from exposed surfaces of the rocks and have loosened the soil. This work of weathering goes on more rapidly where it can enter cracks and enlarge them as at Eagle Crag or by entering other lines of weakness and thus attack a larger area of surface. This process with the aid of plants and

animals is constantly loosening rocks, clay, and other things along the slopes that they may move down to the bottom of the valley to be carried on by running water. The Old Stone Face is the result of unequal weathering of the sandstone and the Devil's Arch is probably a cavity enlarged by weathering but formerly occupied by a big concretion which broke out and was carried away by the floods. The soils of the slopes are chiefly weathered glacial material to which organic matter, humus, has been added. The white oak soil of the upland may consist partly of wind blown material.

The valleys. The valleys have been excavated from the former upland since the glacial time by all of these processes working together, but the valley of the Des Moines River is partly interglacial. The big curves of Pease Creek valley follow slight depressions that were on the upland surface when the valley was in its earliest stages of growth many centuries ago.

The hills or ridges. Between the valleys are the parts that have not yet been cut away and removed. Reindeer Ridge, Riverview Heights, and others serve as excellent examples. Extensive ancient landslides took place south of the location of the McGaw home and disfigured the high terrace there.

Alluvial fan. A fan-shaped area consisting of several acres of material washed out of a small valley and deposited on the Des Moines floodplain at the mouth of the valley can be seen in the vicinity of the small bridge, 300 yards south of Mr. Henning's residence. This fan was ages in forming and the creek changed its position from one place to another over the whole fan while building it.

Stream terraces. Small, low terraces (former floodplains of the creek) are seen near the artesian well. Much larger ones occur in several places. As the thick glacial ice melted back toward the north from whence it came, copious floods issued from it carrying great loads of sand, gravel, and other material which nearly filled the valleys that were here when the ice came. Since that time the river has washed away part of the gravel at each of several stages during which the valley was cut deeper, leaving a series of terraces best seen on the west side of the Des Moines River.

The glacial deposits. Some of these gravels are covered with glacial till or boulder clay, showing that part of the glacial material was deposited after some of the glacial gravels were deposited. Zones of old soil and till colored by weathering, with glacial deposits above and below them, also show that there was at least two advances of glacial ice over the area. That the area was covered by glaciers more than once is also shown by a study of the region surrounding the park area.

The glacial till is recognized by its content: (1) of fragments of all kinds of bedrock passed over by the ice on its journey; (2)

of all shapes of rocks fashioned by the ice; (3) of all sizes of material from the finest clay to the largest boulders; (4) of material deposited with no system or order in its arrangement; (5) of glacially scratched or polished pebbles and boulders; and (6) by glacially striated bedrock beneath it.

The bedrock. Beneath the glacial deposits which form the upland and the slopes of the valleys, is the bedrock, a part of which is exposed as the ledges or solid rock walls of the deeper valleys. This is sandstone; that is, sand naturally cemented into solid rock. The water is thoroughly filtered by percolating through it before entering the shallow wells of the park; Ledges Rock, Glacier, and Riverside wells. In drilling the artesian well it was found that below the sandstone are the coal-bearing beds (Pennsylvanian) of clay and shale (clay, naturally cemented into rock) of this region. Still deeper, the bedrock is limestone which we know, by the fossils found in it where it outcrops near Ames and elsewhere, was formed in the salt water of the sea (Mississippian).

Artesian water. As these layers of bedrock dip toward the west from the vicinity of Ames and the water follows between the layers which make up the shale or moves along through sandy layers within the shale or beneath it, the water flowing from the artesian well has traveled underground, from the intake in western Story County, about twelve miles or more. The clay and shale are so compact and so fine grained that the water cannot come up through them except where holes (wells) are bored or drilled down to the water-bearing layers.

Coal-bearing shale. After the withdrawal of the shallow sea in which part of the shale was formed, the land stood at low elevations over large areas in several states including this section of Iowa and it was under some such conditions as these that the coal-forming plants accumulated, from which the coal beds were formed. Coal is exposed in a few places near the old McGaw home. The plants of the area at this time were largely of the ancient moss and fern types and included tree forms of each as well as the forerunners of the cone-bearing trees of today, but no plants with true blossoms, or "hard wood," were here then.

Birth of the ledges. At a later time the land area of this region stood higher above sea level and broad valleys were cut through it by the streams of that time. In one of these broad depressions was deposited the sand that has become the sandstone of the ledges. That it was built up in shallow water as similar large areas of sand are now being built, is shown by the ancient ripple marks seen on slabs of sandstone at Sentinel Rock, also near the Old Stone Face and in other places along the valley of Pease Creek. Further evidence of this is found in the undulating but somewhat horizontally arranged lines seen wherever the sandstone is exposed. Each of these lines represents a part of a for-

mer surface of a sand bar on which more sand was irregularly deposited (in dry seasons some of it may have been blown about) until the full thickness of the present ledges was attained.

Later development. The contact of the sandstone and the shale on the side of the old depression can be seen in a few places along the upper parts of the valleys. The sands and the clays were cemented into solid rock before the elevation of the area became high. The large joints or vertical cracks were formed in the sandstones by shrinkage due to drying as the water was drained out.

Concretions. The large spherical and ellipsoidal concretions which have sometimes been mistaken for fossils are composed chiefly of iron oxide which was concentrated into its present condition after the sandstone was formed.

Cycle of erosion. Before the glaciers came, an old land area existed here for a very long time, during which the region was worn down by erosion very nearly to a plain and a thick zone of soil and of sub-soil formed. During a part of this period the land again stood at a low elevation and a mild to subtropical climate existed, while palms, cycads, and similar vegetation grew as far north as Greenland.

Life of the glacial period. During the long period that the ice remained here, the climate was as cold as it now is in Greenland. The region was inhabited by animals similar to the musk-ox, caribou, arctic fox, and northern bears. As shown by fossil bones, teeth, and other remains found in the glacial gravels not far from this locality, the hairy mastodon and the large mammoth, both close relatives of the elephant, also lived in this part of Iowa. Shortly after the margin of the ice had retreated northward, the horses, camels, pigs, elks, wolves, and other animals, also birds of that time somewhat similar to our wild ones of today, were abundant in Iowa. Some of them doubtless fed on the plants of this area and drank from the streams here when the valleys were less than half as large as they now are.

That the land of the area was timbered is shown by the presence of coniferous wood found in the glacial till near Boone. These specimens now in the geological museum of Iowa State College are three to four inches in diameter and are believed to be *arbor-vitae* or some closely related form.

SOME HERBACEOUS PLANTS OF THE PARK

BY L. H. PAMMEL

The flora of the Ledges State Park is influenced to a considerable degree by the topography of the region as well as the sandstone. The plants found on the sandstone rock are quite different from those found on the shaded north and east slopes of

hills or those found on the sandstone ledges or those in the alluvial bottoms of the Des Moines River. Certain hogbacks, of which the Reindeer Ridge is a type, contain a number of very rare species of plants, at least rare so far as central Iowa is concerned. Typical of these plants, mention may be made of the pale vetch, reindeer lichen, and juniper moss.

The pioneers found in the Ledges, especially in sunny places on the exposed rock, many red cedar trees. Some of these trees were over a foot in diameter and more than a hundred years old. On the exposed rock, one may find a few of the bishop's cap and gray splashes of a lichen. It is interesting first to note that certain northern and southern types of plants meet at the Ledges. The moosewood or leatherwood, pin cherry, large-toothed aspen and nine-bark, pale vetch, reindeer lichen, and juniper moss are typical northern plants, while the Ohio buckeye, buckthorn, white ash, Carolina vetch, chestnut oak, and wake robin are southern types. Thus we have here the meeting place of northern and southern plants. We may note, however, that the buckeye does not occur in the park, although found to the north at Fraser and near Moingona on Honey Creek. It is interesting to note that the marsh marigold is abundant on the south bank of the Des Moines River west of the Ledges as is also the white bitter cress. The rue anemone, which is so abundant in the clay hills of eastern Iowa and at Ames, does not occur at the Ledges. The St. Jacob's ladder or Greek valerian, so common in eastern Iowa and rarely at Ames, does not occur at the Ledges, nor is there any sycamore which is so common along the lower Skunk nor is there any black birch. Mr. William W. Diehl, who published a paper on the flora of the Ledges, states:

"The Ledges may be said to be characterized by the presence of *Cladonia sylvatica*, *Polytrichum commune*, *Camptosorus rhizophyllus*, *Polypodium vulgare*, *Woodsia obtusa*, *Trillium nivale*, *Mitella diphylla*, *Juniperus virginiana*, *Dirca palustris*, *Lathyrus ochroleucus*, *Physocarpus opulifolius*, *Prunus pennsylvanica*, and *Rhamnus lanceolata*."

TREES AND SHRUBS

BY L. H. PAMMEL

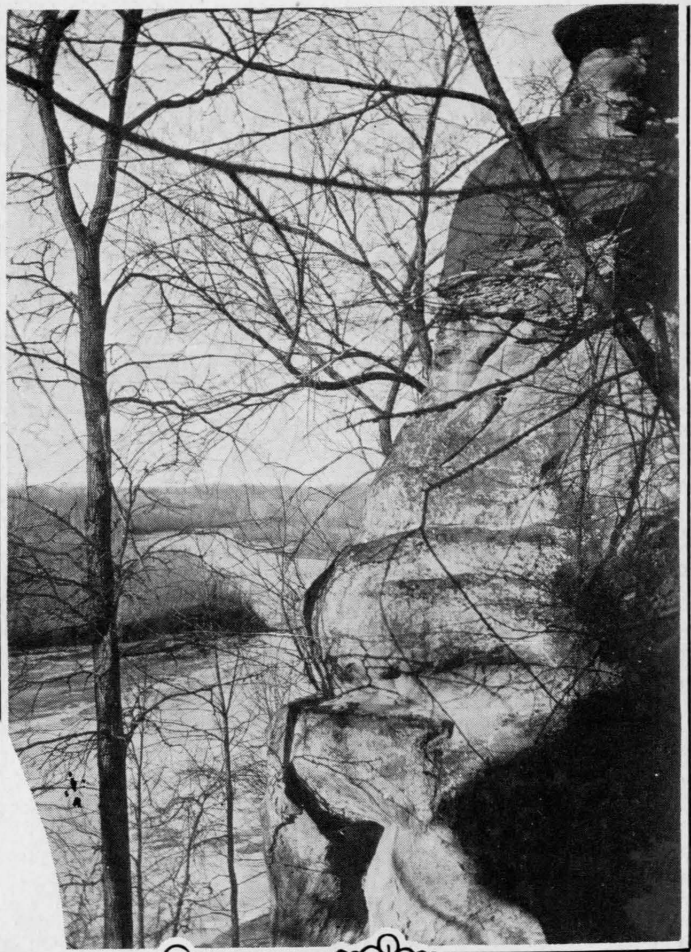
There is but a single conifer in the park, the common red cedar, which is found only on the exposed sandstone rock. The willows and poplars have a better representation. Of the willows, mention may be made of the black willow with smooth leaves found on the banks of streams, the almond-leaved willow with leaves pale beneath, the pussy willow which is only a shrub and blooms early in the spring with its pussy-like catkins, the sand bar willow found on the banks of the streams and in great quantities on



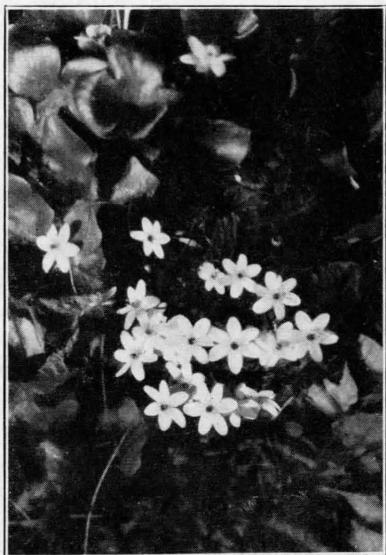
Pink lady slipper in Ledges State Park. (Photographed by Dr. A. Hayden.)



Dr. Bruce Fink collecting lichens on sandstone rock. In the foreground golden glow and Virginia creeper above. (Photographed by Caughey.)



Lower Ledges, looking north.



Wild ginger. (Photographed by H. I. Featherly.)
Hepatica. (Photographed by H. I. Featherly.)

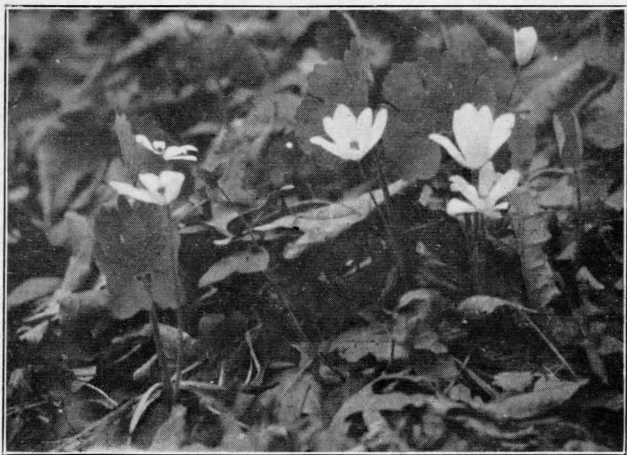


Fig. 10. Blood root in shaded woods. (Photographed by H. I. Featherly.)

the sand bars of the Des Moines River. The prairie willow is not common. Of poplars the most conspicuous and common tree is the cottonwood with rough bark. The quaking aspen is found near the tops of hills. The petioles of the leaves of this tree are flattened, hence the movement of leaves in slight breezes. The large-toothed aspen is especially common on the hogbacks. The leaves are larger than the small quaking aspen. Of the elm family the common American elm has some magnificent representatives in the park. A few corky-bark elms are found in the Ledges and are easily recognized by the corky protuberances on the small branches. There is also the slippery elm with pubescent branches and rough leaves. The hackberry is not uncommon and the red mulberry is found just outside the limits of the park. Of the oaks mention may be made of the red oak, which is numerous, the chestnut oak found on the knolls and a few in the floor of the valley, the white oak and bur oak. Of the maples the common soft maple found everywhere in the bottoms of streams, the black maple common on slopes of hills, and the box elder. The buckeye, related to the maples, is found near Moingona, but not in the Ledges. The basswood is common throughout the park, as is also the ironwood and the hop hornbeam. The ironwood or blue beech is found at the base of the Reindeer Ridge. The hop hornbeam is easily recognized by the fruit, which resembles a hop, and the bark is rough. There are but two hickories, the common shell-bark hickory and the pignut hickory. The butternut and walnut, of the same family, are common in the park region. The butternut is found especially on the slopes of hills and to some extent in the floor of the valley. It is, of course, easily recognized by the character of the bark, with its larger scales and the downy, clammy hairs on the petioles and the clammy, elongated fruit. The black walnut has spherical, roughly dotted fruit and the leaves are somewhat smaller and smoothish. This occurs on the lower slopes of hills and along the bottoms of Pease Creek and the Des Moines River, usually out of the region of flood waters. There are three ashes, the American ash on the slopes of hills with leaves that are pale beneath, the green ash on the bottoms of the Des Moines River and along Pease Creek, the black ash on the shady north slopes of hills and a few in the floor of the Ledges. Of the cherries mention may be made of the pin cherry, which is rather rare upon the slopes of ledges along the Reindeer Ridge, the black cherry throughout the woods, and the choke cherry. Mention may also be made of the beautiful wild crab with its lavender flowers, common in the park, the common American plum, and several different red haws of which the large red haw is the most common, the Washington thorn (*Crataegus punctata*), the hairy thorn, and two other (*Crataegus tomentosa* and *C. coccinea*). Two other types of haw are found in the park, the wild raisin, commonly called also

black haw, and the smooth-leaved black haw which is an early white flowered blooming plant. The hazel bush is common everywhere in the park. The nine-bark is common on the slopes in a few places.

The following trees may be found in the open spaces at the entrance to the Ledges: the corky-bark, slippery, and American elms, the basswood, green ash, cottonwood, black ash near the slope, the almond-leaved willow, and the sand bar willow, as well as the box elder and soft maple.



Fig. 9. Dells in Ledges State Park. Massive sandstone rock in layers, heavily timbered with hard maple, elm, and oak. (Photographed by Noss.)

The following shrubs are common, the black-cap raspberry or thimbleberry, the tall blackberry with stout prickles. The bladder nut of the maple family is common in shady woods. The wahoo is common in woods, especially on high banks of the Des Moines River. There are two species of wild rose, the common prairie rose and the woodland rose (*Rosa blanda*). The prickly ash, with prickly branches and inconspicuous yellowish flowers, bark and fruit with the flavor of the orange peel to which family the prickly ash belongs, is common in woods. The poison ivy with three leaflets is common in the woods. The related smooth sumac is common in open places. The leatherwood is a rather rare plant and occurs on north cool slopes. The flowers are yellow and come out in early spring before the leaves. The lance-leaved

buckthorn also occurs. It is a rare plant. The related New Jersey tea, with delicate white flower, is common in open places.

Of the creeping vines mention may be made of the Virginia creeper, bittersweet, moonseed, wild grape, and green brier.

OTHER FLOWERING PLANTS

It is not the place here to give a detailed list of the flowering plants and therefore attention will be called only to the more abundant and easily recognized types found in this park area. We have an interesting succession of herbaceous plant life in the Park from early spring until frost.

Some Early Spring Plants. The earliest of the blooming plants in the Park is the wake robin, known to botanists as *Trillium nivale*, which blooms as soon as the snow disappears. Carl Fritz Henning, the custodian, observed this year that the flowers were out on the 22d of March. The wake robin is followed by the common hepatica with the three-lobed leaf, the dutchman's breeches with delicate white flowers in racemes, the bloodroot with white flowers, the false rue anemone (*Isopyrum*) with white flowers, abundant everywhere in shaded woods, also great quantities of the delicate little windflower or wood anemone, spring beauty, the blue violet, the yellow violet, and an occasional birdfoot violet.

As the season advances in May there may be seen the small wood meadow rue, the bellwort, with yellow flowers, a plant related to the lily, the wild ginger, with fragrant rootstock and brownish flowers, the wood betony, especially on the dry ridges and slopes, the Carolina vetch, the American cranesbill with lavender colored flowers, Seneca snakeroot, the waterleaf, carrion flower, lady's tobacco or pussy's toes. There are also in the Park some yellow lady's slippers and the large pink lady's slipper as well as the showy orchis. These plants are rather rare.

Early Summer Plants. Among the most conspicuous of the early summer blooming plants is the black-eyed susan with the dark center and yellow ray flowers. On the hogbacks may be seen also the tickseed, small prairie lobelia, many sedges and grasses, purple cone-flower, one of the most charming prairie plants with rose-colored ray flowers and a dark center, the prairie cone-flower, Missouri golden-rod, horse mint, peppermint, water horehound, hoary vervain, mountain mint, catnip, and late meadow rue in low grounds.

Mid-Summer Plants. Conspicuous among the mid-summer plants are two species of Indian hemp, the butterfly-weed and pleurisy-root, the large milkweed or silkweed, the marsh milkweed, and the culver's-root, milkwort, early Missouri golden rod, and purple cone-flower.

Late Blooming Plants. During late July, August, and September the members of the sunflower family occur in great abun-

dance. Of the conspicuous plants at this time mention may be made of the artichoke, which is abundant along the border of the Des Moines River and Pease Creek, the meadow sunflower in swampy places, and the timber sunflower, all of these with yellow ray flowers. The golden-rods are abundant and there are nearly a dozen species of these found in the Ledges State Park. The ray and disk flowers are yellow. We also have an abundance of asters of which the most conspicuous and most beautiful is the New England aster in swampy places, the willow-leaved aster and on the dry ridges the blue smooth-leaved aster and an abundance of little white-flowered aster. In low grounds one may find an abundance of the greater lobelia, the cup plant, and golden glow, in swampy places also the sneezeweed and along the margins of the creek bootjacks or pitch forks. On the margins of Pease Creek in low grounds one may find the purple gerardia. In swampy places near the Katina Falls may be found the turtle-head. One may find in swampy places also an occasional monkey flower and great quantities of the blue vervain and hedge nettle, self-heal, giant hyssop, germander, horse gentian or tinker's weed with purplish flowers, cleavers or bedstraw of which the northern bedstraw (*Galium boreale*) is rare, found especially on the Reindeer Ridge.

Grasses and Sedges. There are many species of grasses and sedges. These are too difficult for the beginner to recognize off hand. Mention may be made of the fact, however, that we find in the Park the rush or bulrush, also species of sedges, carex, and some of these rare, some blooming early in the season and some in mid-summer. Of the grasses blue grass and timothy are common, as are also some of the cheats or chesses, nodding fescue, wild rye or lyme grass of which there are three types, the Canadian lyme, the giant lyme, terrel grass, and the bottle-brush grass. There are also blue joint and wild barley, manna grass, wild oat grass (*Danthonia spicata*), slough grass, June grass, wood reed grass, drop-seed grass as well as the needle grass, rice-cut grass, blue stems, low and busy Indian beard grass.

FERNS AND HORSETAILS

At best the flora of central Iowa contains only a few ferns, but there are more in the Ledges than in the surrounding territory. We may note here the polypody spreading out over the sandstone rock, the maidenhair fern abundant on the north slopes of wooded hillsides, the common spleenwort in rich woods, the walking-leaf fern spreading over sandstone rocks, the small bladder fern everywhere in the woods, and woodsia on the sandstone rocks. In shaded woods one may also find a plant related to the ferns, known as the rattlesnake fern, and there are two species of

horsetail, the common found everywhere along Pease Creek, and scouring rush, commonly spoken of as snakes, is abundant on the margins of Pease Creek.

BIRD-LIFE IN THE LEDGES

BY CARL FRITZ HENNING

Throughout the year, as the seasons come and go, a host of birds tarry within the boundary line of Ledges State Park, some to build their nests and rear their young, others to sojourn for but a brief interval in passing from their summer to their winter haunts and in the joyful return of spring.

Nature-lovers who have visited the Ledges think it the most glorious of bird-lands, a real haven of refuge for our feathered friends.

The Ledges have an attraction all their own—there is something untamed about this scenic piece of woodland that appeals to us, a mystic wildness that lends enchantment to the high sandstone walls, sculptured cliffs, rugged hills, and ravines strewn with glacial boulders—weaving a charm about the ancient hills and sun-kissed valley.

Through this beautiful parkland flow murmuring woodland streams, babbling brooks, and the "River of the Monks," the Des Moines.

The fields and meadows of the lowlands are the feeding ground of quail, crows, cardinals, sparrows, and a host of the other birds.

In this fair valley the black walnut, butternut, basswood, maple, elm, cottonwood, hackberry, ash, locust, oak, hawthorn, wild crab, cherry, and plum grow luxuriantly. The noble American elm spreads out its branching arms in welcome, and willows wave their delicate foliage beside the streams. The red cedar, juneberry, and moosewood hug the edge of the massive sandstone walls; ironwood, blue beech, aspen, hickory, and oaks cover the hillsides.

Here and there a sturdy oak lifts its head in defiance of the elements, on the very crest of the rugged hills.

What a vision of strength is the oak in winter with its massive trunk and powerful limbs, bent and gnarled from fighting the forces of nature!

In this land of sunshine—in this mystic hill-locked valley, nature invites you to wander, to meet the birds, to seek them in glen and dale.

If we but look for them we shall find them everywhere. If we but listen for them, the lowlands as well as the hills resound with their song.

You will enjoy tramping through the valley, along the streams, and over the hills making the acquaintance of the birds; there is something about these dwellers of fields and woods that appeals to young and old alike. They take us back to the happy carefree days of our youth. "The woods of our youth may disappear, but the thrushes will always sing for us, and their voices, endeared by cherished associations, arouse echoes of a hundred songs and awaken memories before which the years will vanish."

John Burroughs says that the study of birds "fits so well with other things—with fishing, hunting, farming, walking, camping out—with all that takes one to fields and woods. One may go a



The common early blooming red haw.

The fruit is larger than any other haw in Iowa. The haws are among the typical trees of an Iowa landscape. (Drawn by Miss C. M. King.)

blackberrying and make some rare discovery, or while driving his cow to pasture hear a new song or make a new observation. Secrets lurk on all sides. There is news in every bush. What no man ever saw before may the next moment be revealed to you. What a new interest the woods have! How you long to explore every nook and corner of them!"

The winter months are ideal for bird-study. The snow-covered hills hold particular attraction at this time of the year for the lover of the out-of-doors.

Nature is now reduced to its simplest terms, and you will find it the best time to visit the Ledges if you wish to study the wild-life of the region.

If you think that there is no inducement for getting out in the winter time, just try it once. The birds supply the incentive in ample measure.

There is a keen enjoyment in ranging the leafless woods in search of birds; climbing the hills, looking through the vistas along Reindeer Ridge, that are closed in the leafy season, but now reveal the beautiful scenery of Pease and Davis Creek valleys. Climbing steep hills, along the Ledges' trails, is a keen delight when cold contributes to activity and one is able to maintain a glow of warmth without being overheated.

From Riverview Heights, nearly two hundred feet above the old Indian spring in the valley, the winding river and miles of country can be seen. Visitors often go to the heights at the lower ledges, there to view the valley from Inspiration Point. While the winter trumper actually sees very little game, either feathered or furred, a good tracking snow reveals the wanderings of the little creatures of the wilds and tells him many things which he can learn in no other way.

Signs of fox, cotton-tails, and squirrels are abundant. The delicate tracks of cardinals, slate-colored junco, and sparrows are everywhere, and the clear trails of crows and quail reveal their feeding grounds.

With the advance of the season there is, too, a special delight in being afield when nature is awakening, when the sun becomes warm again, bringing the spring aroma from the earth and causing the early wild flowers to open to our view.

The bluebirds, harbingers of sunny days, are here. The robins, grackles, and red-winged blackbirds are returning from the southland in ever increasing numbers.

You may find a flock of migrating robins in a sheltered glen, industriously searching among the dried leaves for food. Often the birds uncover and awaken the sleeping wild flowers, through their eager scratching among the decaying foliage.

Trilliums are in bloom in the rich moist woods in the valley; the warm days and freezing nights make the sap flow freely, it is ideal maple sugar weather, and the pretty black-capped chickadee is singing his love-song.

Warmed by the sunshine, the early wild flowers, hepatica, spring beauty, bloodroot, dutchman's breeches, and violets bloom luxuriantly in the Ledges valley, bringing glad convictions of coming spring. Willow and cottonwood catkins sway in the wind and flocks of wild geese are hurrying to their northern haunts.

Many of the honking flocks of geese pass high overhead, crossing the valley in stately procession, but quite as often these hardy migrants circle and maneuver in graceful lines and alight on the river to rest and feed—they are the cossacks of the air.

When the northward movement of birds sets in strongly, the Ledges offer a rare opportunity for the student of nature.

The migration of birds is always interesting, especially during the spring months. It is a great sight to watch the waterfowl hurrying ahead of an advancing storm.

Last spring several flocks of Canada geese and large numbers of ducks, mallards, pin-tails, spoon-bills, blue-bills, and teal sought shelter on the river in the Ledges Park. They appeared to drop out of the storm-tossed clouds by the hundreds. Several thousand waterfowl tarried in secluded places along the river, within the park lines, for nearly a week. Here they stayed to rest and feed, apparently aware that the Ledges was a protected area and their haven of refuge.

Every spring one may see little parties of pied-billed grebes diving and feeding on the river, and occasionally their relative, the great northern loon, enjoys the seclusion of the waters within the park-land.

The American coot is a regular visitor and usually remains several weeks. Among the waders, the great blue heron is perhaps the most interesting representative. He fishes on the banks of the Des Moines all summer, often in company with the American bittern, while the little green heron and belted kingfisher do most of their fishing in the spring-fed Ledges brook.

Bird-life in the Ledges is both varied and abundant. The conditions that make this an attractive refuge to the feathered tribe are the variety of topography and consequently of vegetable and animal life; for within the six hundred and forty odd acres of park-land are embraced hills and valleys, dark ravines and sunny glens, massive rocks and spring fed streams, upland and meadow, river and woods, trees, shrubbery, mosses and flowers, quite an epitome of nature—with such variety of growth as to allure the different tastes of a wide range of species.

I would enjoy rambling with you with field glasses and notebook, in this woodland so richly endowed by nature—there to meet our feathered friends the birds, as they come and go with the seasons, throughout the year—but I must content myself by listing the birds, some two hundred species, that have been observed in Boone County, in the heart of which nestle the Ledges.

Pied-billed grebe	American white pelican	Green-winged teal
Loon	can	Blue-winged teal
Ring-billed gull	American merganser	Shoveller
Franklin gull	Red-breasted merganser	Pintail
Forster tern	ser	Wood duck
Black tern	Hooded merganser	Red-head
Double-breasted cormorant	Mallard	Canvas-back
	Gadwell	Greater scaup duck
Brown pelican ¹	Baldpate	Lesser scaup duck

¹The brown pelican was first recorded by Thomas Say—*Long's Expedition*. The only recent record is Henning—April, 1905.

Ring-necked duck	Passenger pigeon ³	Yellow-billed cuckoo
Buffle-head	Mourning dove	Black-billed cuckoo
Solitary sandpiper	Turkey buzzard	Belted kingfisher
Barrtramian sandpiper	Swallow-tailed kite	Hairy woodpecker
Spotted sandpiper	(very rare)	Northern downy wood-
Long-billed curlew	Marsh hawk	pecker
Ruddy duck	Sharp-shinned hawk	Yellow-bellied wood-
Lesser snow goose	Coopers hawk	pecker
American white-fronted	Red-tailed hawk ⁴	Northern pileated
goose	Red-shouldered hawk	woodpecker ⁶
Canada goose	Swainson hawk	Red-headed woodpecker
Brant	Broadwinged hawk	Red-bellied woodpecker
Whistling swan	American rough-legged	Northern flicker
Glossy ibis (accidental	hawk	Red-shafted flicker
visitor)	Golden eagle	(rare)
American bittern	Bald eagle ⁵	Whippoorwill
Great blue heron	Duck hawk (rare)	Nighthawk
Green heron	Pigeon hawk	Sennett's nighthawk ⁷
Black-crowned night	American sparrow	Chimney swift
heron	hawk	Ruby-throated hum-
Yellow-crowned night	American osprey	mingbird
heron	Phoebe	Kingbirds ⁸
Sandhill crane	Wood pewee	Chestnut-colored long-
King rail	Yellow-bellied fly-	spur
Virginia rail	catcher	Vesper sparrow
Sora rail	Least flycatcher	Savanna sparrow
American coot	Crested flycatcher	Grasshopper sparrow
Wilson phalarope	Prairie horned lark	Leconte sparrow
American woodcock	Warbling vireo	Nelson sparrow
Wilson snipe	Yellow-throated vireo	American magpie ⁹
Pectoral sandpiper	Blue-headed vireo	Blue jay
Least sandpiper	White-eyed vireo	American crow
Sanderling	Black and white war-	Clarke nutcracker ¹⁰
Marbled godwit	bler	Bobolink
Greater yellow-legs	Blue-winged warbler	Cowbird
Yellow-legs	Western parula war-	Yellow-winged black-
American barn owl	bler	bird
American long-eared	Yellow warbler	Red-winged blackbird ¹¹
owl	Myrtle warbler	Meadow lark
Short-eared owl	Magnolia warbler	Western meadow lark
Barred owl	Black-poll warbler	Orchard oriole
American golden plover	Ovenbird	Baltimore oriole
Killdeer	Saw-whet owl (very	Rusty blackbird
Bob-white	rare)	Bronzed grackle
Ruffed grouse	Screech owl	Purple finch
Prairie hen	Snowy owl (rare)	American goldfinch
Wild turkey ²	Great horned owl	Redpoll

²Extinct in Boone County.

³Extinct. Last recorded in Boone County about forty years ago. Henning.

⁴I believe that the two varieties of *Buteo borealis*—krider hawk and western red-tail hawk—occur at the Ledges. Identification not positive.

⁵Single specimen seen in Park in the heart of the ledges, December, 1924.

⁶Extinct in Boone County.

⁷One specimen taken near the Ledges. (See Auk XVI, 1899, page 96.)

⁸Arkansas kingbird was observed in 1868 by Dr. J. A. Allen at Boonesboro (now Boone).

⁹About twenty magpies in Ledges—winter 1921-1922.

¹⁰Ledges, September 23, 1894, one specimen. Henning.

¹¹Albino shot in Boone County, September 17, 1893. Henning.

American crossbill (rare accidental visitor)	Tree sparrow	Short-billed marsh wren
Pine siskin	Chipping sparrow	Brown creeper
Snowflake	Field sparrow	White-breasted nuthatch
Lapland longspur	Slate-colored junco	Red-breasted nuthatch
White-bellied swallow	Song sparrow	Tufted titmouse
Bank swallow	Swamp sparrow	Black-capped chickadee
Rough-winged swallow	Fox sparrow	Louisiana water-thrush
Bohemian waxwing	Towhee	Northern yellow-throat
Cedar waxwing	Cardinal	Yellow-breasted chat
Northern shrike	Rose-breasted grosbeak	Wilson warbler
White-rumped shrike	Indigo bunting	Golden-crowned kinglet
Northern loggerhead shrike	Dickcissel	Ruby-crowned kinglet
Bell's vireo	Scarlet tanager	Blue-gray gnatcatcher
Red-eyed vireo	Purple martin	Wood thrush
Lark sparrow	Cliff swallow	Wilson thrush
Harris sparrow	Barn swallow	Olive-backed thrush
White-crowned sparrow	American redstart	Hermit thrush
White-throated sparrow	Catbird	American robin
	Brown thrasher	Bluebird
	Western house wren	
	Winter wren	

SOME ANIMALS OF OUR CENTRAL IOWA PARKS

By J. E. GUTHRIE

Probably the birds are the most noticed of all the animals which inhabit our park system. This is perfectly natural; for their brightly colored coats, their graceful flight, and above all, their songs, are among the most evident of all the attractions which these rest havens offer. In a general way, people call themselves acquainted with the birds; yet it is surprising how many of us must stop short of a dozen that we can absolutely identify among the 350 or more that have been found in the State of Iowa.

It is not so strange, then, that our acquaintance with the shyer creatures of the woodland and meadow, the prairie and bluff, the pond and stream, should be very scant indeed. They are often small and inconspicuous, and only thus can they survive, taking little food individually and attracting little notice. Many of them seldom stir abroad in the daylight. They lead the lives of the hunted, even tho some of them may themselves be hunters of other lesser game. Some of them wear a hairy coat, and we call them mammals—or perhaps we merely name them mice and squirrels and ground hogs and gophers—and some of them wear scales and that makes them reptiles—but we prefer to refer to them as turtles and lizards and snakes; and some go naked-skinned, and with a proper amount of education would probably insist on being known as amphibians—but we point them out as frogs and toads and salamanders.

In the brave days of old, before human Iowans were; in those

slow thousands and tens of thousands of years when the great ice sheets crept slowly down from the northern ice cap, and as slowly withdrew their cold blanket during the inter-glacial periods, there were pre-Iowan animals here that stagger our imaginations. Through the long years came the musk-oxen and caribou from the north, and the camels and great ground-sloths from the south; came the several elephants that we call mammoths and mastodons; came the giant beaver as big as a bear and the giant wolf, the wild sheep and the wild pigs and six kinds of the wild horses. They came and lived through their many ages and then ceased to be, and now only the occasional bone or tooth turned into enduring stone speaks to us from the rocks to tell us

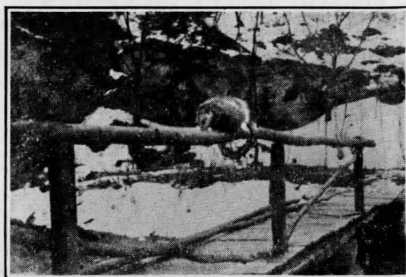


Fig. 12. Opossum on foot bridge. (Photographed by Carl Fritz Henning.)

Fig. 13. Coyote caught near the Ledges. Photographed by Dr. A. Hayden.)

what a youngster, after all, is this upstart we call a native Iowan.

But why go back to those ancient times? The days of the Indian and the bear and beaver and bison and badger and bob-cat, of the panther and elk and deer are but a century or so behind us. To those great animals of the olden time nature herself finally turned cruel; but it is man—white man—agricultural man in the last analysis, that has denied to these more recent game animals their right to exist in this land of their fathers. And it was necessary that they should go. They took too much food and too much room in the open. Only in a few relatively small preserves can they still be permitted to exist for man to re-visualize the hunting period of older Iowa.

But though these conspicuous animals of the past have vanished, we have still enough species left in our parks to add much of interest to the experiences of the rapidly increasing number of park-appreciating Iowans who are wise enough to trade the noisy chugging of the mile-devouring automobile on the dusty

road for the quiet, restful hours where unspoiled nature beckons to them to come and rest.

Of the hairy animals of our woodland parks of this region the best known is the cotton-tail rabbit,¹ everywhere common, and there is an occasional white-tailed jackrabbit.² The trees of the heavier timber are likely to shelter the gray squirrel³ and the much redder fox squirrel,⁴ while in certain localities the little red squirrel⁵ or chickaree scolds us vigorously from the tree-tops. In the twilight, from their homes in the hollow trees, come forth those most exquisite of furry creatures—the flying squirrels⁶—and scamper about in quest of their food of seeds and insects. The two kinds of chipmunks, known as the striped⁷ and the gray-striped,⁸ occupy the cavities of stumps and hollow logs, their gay stripes making them easily identifiable. In the ground, as well in the woods as in the open fields, are the haunts of many interesting park-livers. The 13-lined ground squirrel⁹ and the larger gray ground squirrel,¹⁰ known also as Franklin's spermophile, are burrowers of the woodland and the meadow. The ground hog¹¹ prefers to dig his underground habitation in woodland hillsides, and to advertise by the size of his pile of dirt at the entrance how roomy are the chambers below.

But as New York is no longer owned by the old Dutch burghers, so the woodchuck does not always keep his ancestral home in the family. You are not unlikely to find the tenant wearing a black coat with white stripes and carrying other lines of advertising that proclaim him a "woods pussy" or striped skunk;¹² or it may be his smaller relative, the spotted skunk,¹³ often called the "civet," that lives in the same kind of cave-dwelling and carries the same line of goods. And these holes are often "home, sweet home," for the fuzzy opossum¹⁴ and her numerous brood. Sometimes she prefers the big hollow trees, sycamore and basswood and elm, that have been allowed to stand long after their logging value has passed. These tree homes are also the containers of ring-tailed families of raccoons.¹⁵ Through the deeper woods and occasionally over the open fields where nature provides mice and ground squirrels for their food, range the red fox¹⁶ and the much rarer coyote.¹⁷ Along the borders of the streams roams the mink,¹⁸ and in the water of the creeks and ponds swims the muskrat,¹⁹ carrying his mouthful of the roots of rushes to his home under the bank. The open stretches of woodland and the prairie bear zigzag rows of mounds of the pocket gopher,²⁰ showing the boundaries of his mining claim.

There is a multitude of lesser folk in the mazy runways among the marsh grass, in the hollows of the rocks, in the meandering burrows just under the surface of the ground, and in all such out-of-the-way places. Some of them are the prairie white-footed mouse²¹ or deer mouse and the northern white-footed mouse.²² In

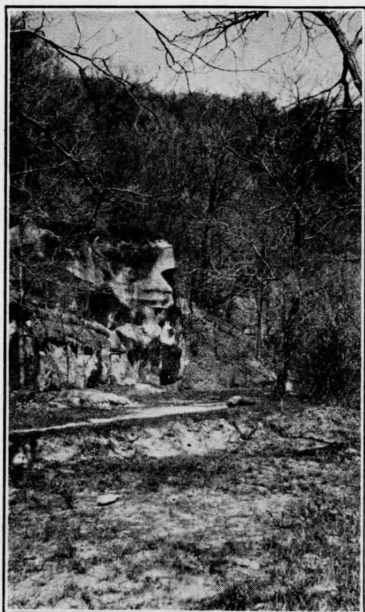


Fig. 7. Upper ledges Pease Creek. One of the sandstone outcrops, elm, basswood, and oak. (Photographed by Josephine Wallace.)



Fig. 8. Katina Falls, lower ledges, early May. (Photographed by Dr. T. C. Stephens.)

size these are mice, to be sure, but their big, intelligent eyes and their activity make you place them nearer the squirrels. The prairie harvest mouse²³ and the larger and clumsier common meadow or field mouse²⁴ drive their runways through the grass. In the dry fields and pastures where the weeds and grass have matted down is the prairie meadow mouse,²⁵ while in the shallow runways in the ground are the tunnels of the woodland vole²⁶ or pine mouse. And of all these little people the long-tailed weasel²⁷ is the *bete noir*, the terrible dragon that helps, with the aid of hawks and owls and skunks and snakes, to keep them always wary and shy. The larger, more prominent burrows that stretch away rod upon rod of crooked wandering, heaving the grass or surface soil, are the primary roads and secondary roads of the prairie mole,²⁸ along which he prospects for earthworms and insects. Among his relatives are those fiercest of all our animals: the mole shrew²⁹ and the wee long-tailed shrew,³⁰ smallest of all our hairy folk.

Finally, in the woods you may come across the dainty little red bat³¹ or the much larger hoary bat³² clinging among the branches

of a tree in the daytime waiting for their twilight mealtime; or from some deserted building or hollow tree you may dislodge the big brown bat³³ or the little brown bat³⁴ or possibly the pipistrelle³⁵ from their daytime nap.

At certain times in the year the shallow waters of the ponds are alive with tadpoles. From these come, in due time, the numerous crew of toads and frogs who act as self-appointed musicians of the springtime. The American toad³⁶ is known to all by its dry, warty skin, all the rest of its tailless relatives being moist-skinned. The small frog, which makes a sound as of striking pebbles together and which we often see in the water at the edge of streams in the summer time, is the cricket-frog.³⁷ Among low, moist vegetation the swamp tree-frog³⁸ is found and in the trees and bushes sits the rain-toad or tree-toad,³⁹ presumably attending to the weather. Everywhere present in moist situations is the spotted green jumper known as the leopard frog⁴⁰ and in some places his less common relative, the pickerel-frog.⁴¹ The jumbo of the lot is the bull-frog,⁴² now far less abundant than formerly. The only one of the salamanders that appears to be common is the tiger salamander,⁴³ though the large mud puppy⁴⁴ with the tufted gills occasionally occurs in the streams.

Of the reptiles abounding in the region with which we are dealing, there are several turtles, of which the largest is the well-known snapping turtle,⁴⁵ often a highly unappreciated guest at the alluring luncheon which the fisherman offers to his finny friends. The common soft-shell turtle⁴⁶ and the brown soft-shell⁴⁷ both abound. The little wood turtle⁴⁸ and the larger spotted box turtle, known as Blanding's turtle,⁴⁹ often travel far from the water. The Bell's mud turtle⁵⁰ or painted turtle is usually in or near the water.

Of the lizards very few are to be found. The blue-tailed skink⁵¹ and the black-lined⁵² may sometimes be seen, if one is nimble enough, and there are still a few of that strange legless lizard which people call the glass-snake⁵³ or joint-snake.

The snakes are more numerous than the turtles and lizards, but so secretive in their habits that one seldom sees any excepting a few of the more showy ones or the more common ones, such as the garter-snakes. Doubtless, the commonest snake for the region is the plains garter-snake⁵⁴ which tends rather to inhabit the fields than the woodland. The red-barred garter⁵⁵ occurs more frequently in woodland, as does also its near relative, the so-called common garter-snake.⁵⁶ A very slender garter-snake, called the western ribbon-snake,⁵⁷ seems to frequent the vicinity of streams for the most part. The open woods have many of the grayish little DeKay's snake,⁵⁸ and in the grass and bushes is found the smooth green-snake⁵⁹ or grass-snake. Sandy uplands are suitable for the spreading adder⁶⁰ or blow-snake. The fields yield rodent food to many bull-snakes,⁶¹ the largest species likely to be found.

Fox-snakes⁶² inhabit a wooded country by preference, but the blue racer⁶³ may turn up almost anywhere in the long grass. The water-courses may yield the beautiful banded water-snake,⁶⁴ while the vicinity of the homes of man are often sought by the milk-snake.⁶⁵

MAMMALS

1. Mearns' cottontail rabbit, *Sylvilagus floridanus mearnsi*
2. White-tailed jackrabbit, *Lepus townsendi campanius*
3. Northern gray squirrel, *Sciurus carolinensis leucotis*
4. Western fox squirrel, *Sciurus niger rufiventer*
5. Southern red squirrel, *Sciurus hudsonicus loquax*
6. Flying squirrel, *Glaucomys volans volans*
7. Striped chipmunk, *Tamias striatus striatus*
8. Gray-striped chipmunk, *Tamias striatus griseus*
9. Thirteen-lined ground squirrel, *Citellus tridecemlineatus tridecemlineatus*
10. Gray ground squirrel, *Citellus franklini*
11. Ground hog, *Marmota monax monax*
12. Striped skunk, *Mephitis mesomelas*
13. Spotted skunk, *Spilogale interrupta*
14. Opossum, *Didelphis virginiana*
15. Raccoon, *Procyon lotor*
16. Red fox, *Vulpes fulva*
17. Coyote, *Canis latrans*
18. Mink, *Putorius vison*
19. Muskrat, *Fiber zibethicus zibethicus*
20. Pocket gopher, *Geomys bursarius bursarius*
21. Prairie white-footed mouse, *Peromyscus maniculatus bairdi*
22. Northern white-footed mouse, *Peromyscus leucopus noveboracensis*
23. Prairie harvest mouse, *Reithrodontomys megalotis dychei*
24. Meadow mouse, *Microtus pennsylvanicus pennsylvanicus*
25. Prairie meadow mouse, *Microtus ochrogaster ochrogaster*
26. Woodland vole, *Microtus pinetorum nemoralis*
27. Long-tailed weasel, *Putorius longicaudus*
28. Prairie mole, *Scalopsus aquaticus machrinus*
29. Mole shrew, *Blarina brevicauda*
30. Long-tailed shrew, *Sorex personatus*
31. Little red bat, *Nycteris borealis*
32. Hoary bat, *Nycteris cinerea*
33. Big brown bat, *Eptesicus fuscus*
34. Little brown bat, *Myotis lucifugus*
35. Pipistrelle, *Pipistrellus subflavus*

AMPHIBIA

36. American toad, *Bufo americanus*
37. Cricket frog, *Acris gryllus*
38. Swamp tree-frog, *Pseudacris triseriata*
39. Tree-toad, *Hyla versicolor versicolor*
40. Leopard frog, *Rana pipiens*
41. Pickerel frog, *Rana palustris*
42. Bull-frog, *Rana catesbeiana*
43. Tiger salamander, *Ambystoma tigrinum*
44. Mud puppy, *Necturus maculosus*

REPTILES

45. Snapping turtle, *Chelydra serpentina*
46. Common soft-shell turtle, *Amyda spinifera*

47. Brown soft-shell turtle, *Amyda mutica*
48. Wood turtle, *Clemmys insculpta*
49. Blanding's turtle, *Emys blandingii*
50. Bell's turtle, *Chrysemys marginata bellii*
51. Blue-tailed skink, *Eumeces fasciatus*
52. Black-banded skink, *Eumeces septentrionalis*
53. Glass-snake, *Ophisaurus ventralis*
54. Plains garter-snake, *Thamnophis radix*
55. Red-barred garter-snake, *Thamnophis sirtalis parietalis*
56. Common garter-snake, *Thamnophis sirtalis sirtalis*
57. Western ribbon-snake, *Thamnophis proximus*
58. De Kay's snake, *Storeria dekayi*
59. Smooth green-snake, *Liopeltis vernalis*
60. Spreading adder, *Heterodon contortrix*
61. Bull-snake, *Pituophis sayi*
62. Fox-snake, *Elaphe vulpina*
63. Blue racer, *Coluber constrictor flaviventris*
64. Banded water-snake, *Natrix sipedon sipedon*
65. Milk-snake, *Lampropeltis triangulum sypila*

Boone City Parks: The city of Boone is fairly well supplied with parks. A fine city square planted with trees. The Herman Park in Honey Creek Valley, on the outskirts of the city, consisting of 61.62 acres, of which the Herman family, mostly Miss Emma, gave 35 acres. It has all of the conveniences and is much used. This is the older of the city parks. J. B. McHose generously gave the city another fine park of 128 acres, of which 92½ has been purchased. This park is adjacent to the Herman Park. There are many fine red, white, and bur oaks, slippery and white elms, hickory, basswood, and ash in these parks and a large variety of native shrubs and flowers abound. These parks are located where prairie and woodland meet.

THE LEDGES

JOHN E. SMITH

of The Earth Science Club, Iowa State College, Ames

Once a surface nearly level, now a land of hill and dale,
Flooded streams have carved the valleys which reveal the wondrous tale
That the massive sculptured ledges, towering to the sloping land,
Represent an ancient valley filled with shining river sand.

In the brooks are sand and bowlders, residues from glacial clay,
Telling stories of the ages they have moved along the way
From the northland with the glaciers, forming soil of slope and hill
And of every nearby upland which the generations till.

Land of flowers, wooded bowers, haunts of birds, and wild life glee;
Is the joy of all the people who its beauty chance to see,
Share a nook or quaff its water, climb a steep or cross a glea,
Find a lofty inspiration in this book by Nature's pen.

"All my treasures of the ages, glories of the present, too,
Are the pleasures of the sages that I've hoarded here for you,"
Say the Ledges to their lovers. "As you carve a picnic ham,
Love, preserve my gems of beauty; keep me ever as I am."

—From the Boone News-Republican, May 28, 1923.

STATE PARKS IN IOWA

DESIGNATION	ACRES	COUNTY
Backbone State Park.....	1,300	Delaware
Bellevue State Park..Not completed	4-16-25	Jackson
Theo. F. Clark State Park.....	24	Tama
Clear Lake State Park.....	20	Cerro Gordo
Devil's Backbone State Park.....	210	Madison
Dolliver Memorial Park.....	457	Webster
Eagle Lake State Park.....	27	Hancock
Eldora Pine Creek State Park.....	200	Hardin
Farmington State Park.....	100	Van Buren
Fort Defiance State Park.....	50	Emmet
Fort Atkinson State Park.....	5	Winneshiek
Gitchie Manito State Park.....	40	Lyon
Oak Grove State Park.....	92	Sioux
Lacey-Keosauqua State Park.....	1,400	Van Buren
Ledges State Park.....	64	Boone
Lepley State Park.....	9	Hardin
Lewis and Clark State Park.....	300	Monona
Lost Island Lake Park.....	27	Palo Alto
Medium Lake Park.....	20	Palo Alto
Merrick Park	5	Winnebago
Morehead Caves	15	Jackson
Oakland Mills	77	Henry
Orleans Park	20	Dickinson
Palisades	140	Linn
Pilot Knob State Park.....	235	Hancock
Rice Lake	55	Winnebago
Rush Lake	Palo Alto
Silver Lake	13	Delaware
Silver Lake	Dickinson
Silver Lake	Palo Alto
Okemanpado (Tuttle) Lake and Park..	10	Emmet
Twin Lakes and Park.....	20	Calhoun
Wall Lake	12	Wright
Wapsipinicon State Park	168	Jones
Flanders-Bixby	Not completed	Marion
Little Wall Lake.....	Hamilton

In addition to the above all of the meandered lakes like Spirit Lake, Okoboji, Storm Lake, and meandered streams of Iowa, including the Nishnabotna River, Raccoon River, Des Moines River, Cedar River, Iowa River, Skunk River, Maquoketa River, Wapsipinicon River, Turkey River.

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