UNDERGROUND FEATURES OF SINKING CREEK, WASHINGTON COUNTY, INDIANA

ROBERT E. BATES, Indiana University

Sinking Creek is a small stream draining about twenty-five square miles in the southwestern part of Washington County. It flows into Blue River where the latter stream makes a big northward bend at the intersection of Washington, Harrison, and Crawford counties.

The region in which Sinking Creek lies is near the western margin of the general karst region of southern Indiana where the clastic Chester formations make high, rugged inter-stream areas between karst valleys developed in the Mississippian limestones. Numerous ravines, descending from the ridges, end in swallow-holes, forming numerous blind valleys which terminate in the valley areas. (See Fig. 1.) The ridges reach altitudes of 850 to 950 feet above sea level. The valleys in which the sink-holes occur range from 675 to 775 feet.

The first view of Sinking Creek is on the Patton farm near the old Sinking Creek church, in the middle of the N½ of the SE¼ of Sec. 15, T1N, R2E, where the roof of the underground channel has fallen in. The stream comes out of one side of the depression, flows fifty feet on the surface, and disappears in the other side.

The next place where the stream appears on the surface is at Craven's Spring in the NW¼ of the SE¼ of Sec. 34, T1N, R2E, where it issues from the limestone rock on the west side of the valley. The opening of this spring is about a foot and a half high and twenty feet wide and in time of flood is completely filled with water which appears to flow under considerable pressure. From this place the stream follows a surface channel for about a mile and three-quarters to a series of swallow-holes just north of U. S. Highway No. 150 about one-half of a mile east of Hardinsburg, in the SW¼ of the SW¼ of Sec. 2, T1S, R2E. Here it enters an underground conduit which it follows to within a quarter of a mile of Blue River, where it issues from a bluff of its old valley as a spring, known as the Radcliff Spring. The airline distance between these two points is about two miles. Part of the water of this underground stream, however, appears at the Mitchell Spring, which is about half-way between the sink and the rise. The water coming out of this cavernous opening at the Mitchell Spring flows over the surface for about 150 yards and disappears again into a series of swallow holes.

The most interesting physiographic feature of this area is the underground conduit through which the stream passes. The writer, with the aid of Dr. C. A. Malott, of Indiana University, was able to enter and map this conduit for a measured distance of 9,230 feet, which appears to be about one-half of its total length. By adopting this underground cavern the stream has abandoned a roundabout surface

"Proc. Ind. Acad. Sci., vol. 41, 1931 (1932)."

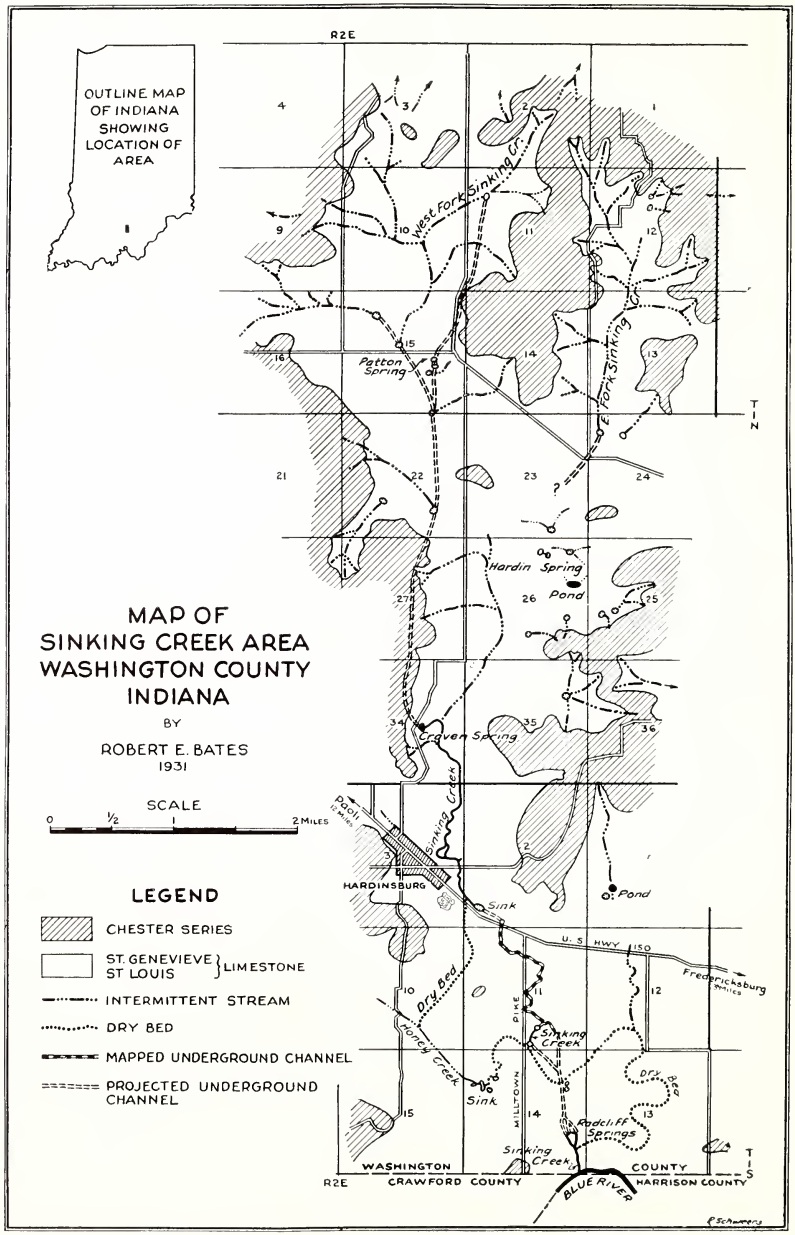
OUTLINE MAP OF INDIANA SHOWING LOCATION OF AREA
MAP OF SINKING CREEK AREA WASHINGTON COUNTY INDIANA
BY
ROBERT E. BATES
1931
SCALE
0 ½ 1 2 MILES
LEGEND
CHESTER SERIES
ST. GENEVIEVE } LIMESTONE
ST. LOUIS }
INTERMITTENT STREAM
DRY BED
MAPPED UNDERGROUND CHANNEL
PROJECTED UNDERGROUND CHANNEL
R2E
T 1 N
T 1 S
West Fork Sinking Cr.
East Fork Sinking
Patton Spring
Hardin Spring
Pond
Raven Spring
Sinking Creek
HARDINSBURG
Sink
U. S. HWY 150
Fredericksburg
Dry Bed
Honey Creek
PIKE
MILLTOWN
Radcliff Springs
WASHINGTON COUNTY
CRAWFORD COUNTY
HARRISON COUNTY
BLUE RIVER

Figure 1.

channel, about six miles in length, except in time of flood, when the underground channel is not large enough to take care of all of the water of the stream. At such times the excess water follows the old surface route.

Acting on information given us by an old resident, we entered a most inconspicuous and unassuming sink-hole which led us into this underground channel. The cavern may be said to consist of two parts, each one of which is characterized by an entirely different cross-section and appearance. One of these parts, comprising the upper 6,520 feet of the mapped channel, is significant because of its great regularity of cross-section, varying in width from twenty-five to thirty feet, or even forty or fifty feet on the turns, and in height from four to ten feet. This part of the conduit is in all places beautifully arched, and may be lined on one or both sides with banks of very tough mud, which is brought into the channel by the stream in time of flood. The second part of the cavern, consisting of the lower 2,710 feet, is much smaller than the first part, varying in width from six to twenty feet and in height from four to six feet. The roof of this part of the channel is not arched but flat, and the walls are vertical. The underground channel throughout its entire length appears to conform to two sets of joints, one having a northeast-southwest direction and the other a northwest-southeast direction.

The large room (indicated by A in Fig. 2) at the beginning of the mapped channel, about 4,535 feet from the entrance at B, is about eighty feet wide in an east-west direction and one hundred feet wide in a north-south direction. Small tributary streams flow into the room on the north and east sides but the main stream enters the room from under a low rock which touches the water on the west side, as an inverted siphon. From this pool the water flows between a high mud bank and the west wall into the main channel. The walls of this room between the inflowing streams are lined with banks of mud which settles out of the water that is ponded in the underground conduit when the channel is not large enough to allow the escape of flood waters. The mud, however, has been removed from the floor of the room by water subsequent to the flooding and has left a level gravel floor.

The channel between this room and the collapse feature at the cavern entrance is a portion of the first part of the cave mentioned above. In places where there are no abrupt turns, the channel has a typical cross-section as shown in Fig. 2, Cross-section 2. The mud may be banked on one or both sides, with the stream usually flowing in the center of the channel. In some places the stream is flowing in a trough of mud and in some places it flows on a gravel bed. Stalactites are found in zones scattered throughout the entire length of the channel. These zones correspond to a certain extent to the places where the underground conduit is nearer to the surface. On the turns the cross-section of the cavern is slightly different in that the stream follows the outside wall of the channel, thus cutting the channel deeper on the outside; and the mud is commonly found only on the inside of the turn.

The entrance to the channel (indicated by B in Fig. 2) is a collapsed portion of the roof of the underground channel. This collapse occurs at

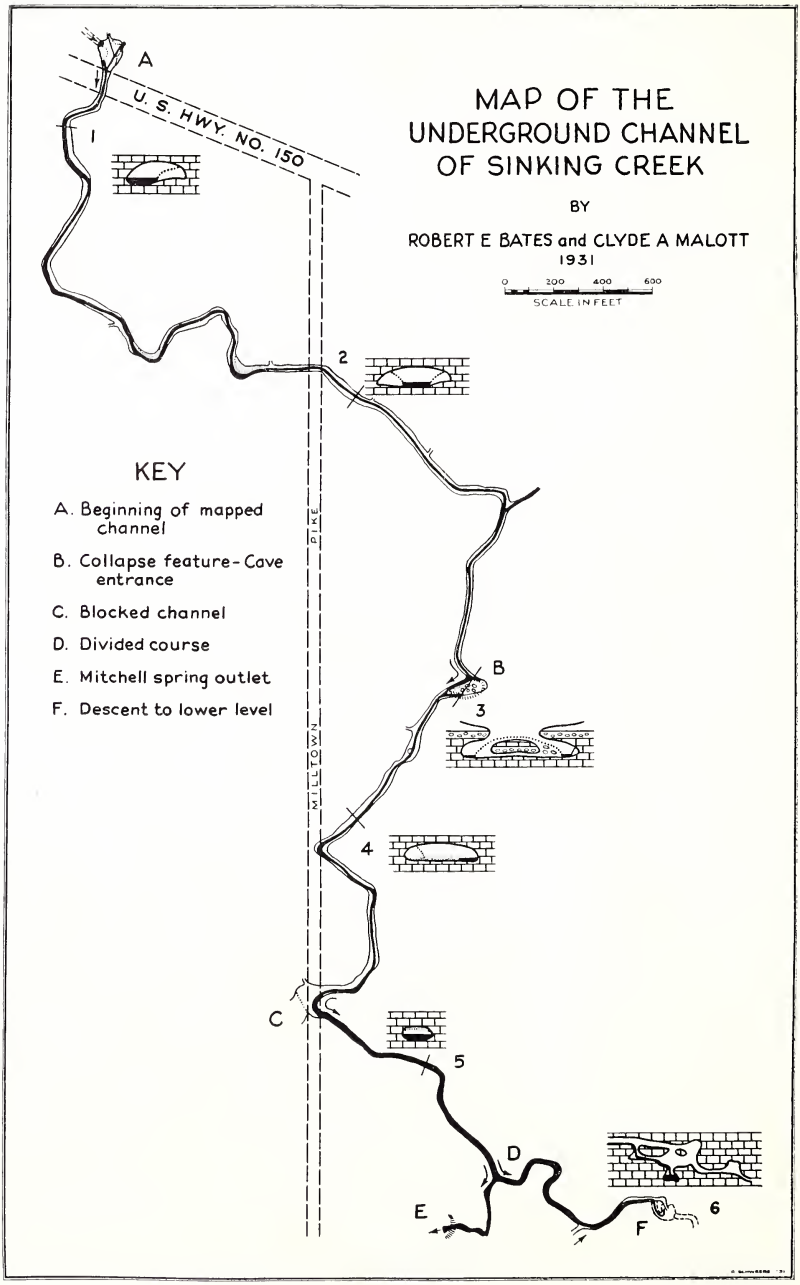
MAP OF THE
UNDERGROUND CHANNEL
OF SINKING CREEK
BY
ROBERT E BATES and CLYDE A MALOTT
1931
0 200 400 600
SCALE IN FEET
U. S. HWY. NO. 150
A
1
2
B
3
4
C
5
D
E
F
6
MILLTOWN PIKE
KEY
A. Beginning of mapped channel
B. Collapse feature - Cave entrance
C. Blocked channel
D. Divided course
E. Mitchell spring outlet
F. Descent to lower level

Figure 2.

a place where the stream in making an abrupt turn has greatly widened its channel. The water now passes on both sides of a large mass of the overlying strata which seems to have dropped into the channel as one huge block. This feature may well be considered to be an early stage in the development of a gulf. A great deal of mud has been deposited just above this obstruction because of the ponding of the water above this barrier in time of flood.

The channel between the collapse feature and the place indicated by C in Fig. 2, is in a general way similar to the channel above the collapse. The principal difference between the channel above and below the collapse is the fact that below the collapse there is a notable absence of mud for some distance. This may be explained by the fact that most of the mud carried by the stream settles out of the water while the water is ponded above the collapsed material, leaving little to be deposited immediately below it. Where there is an absence of mud the stream flows over a gravel floor. The roof of this part of the cavern is lined with numerous rope-like deposits of dripstone which are pure white in color and stand out beautifully against the muddy roof of the channel. As the stream approaches C, it is again ponded, and mud is found deposited in a manner similar to that above the collapse. It is an interesting fact that during the mapping of this channel between B and C, in two instances a noise resembling thunder or a car passing overhead was heard; and that when the channel was plotted both places at which the noise was heard coincided exactly with a road passing overhead. At another place in this part of the cave the pipe of a farmer's well passed through the cavern.

The blocked channel (indicated by C in Fig. 2) is of great importance from the standpoint of the development of the present underground channel of Sinking Creek. It now appears as a room about sixty feet wide east and west, the entire southwest side of which is a wall of mud. There is evidence that at one time the cavern continued in a southwest direction and came to the surface a short distance beyond the place where the wall is now silted up. There is a small tributary entering the north side of the room, and on the east is the channel by which the stream now leaves the room. The floor of the room is strewn with large pieces of rock which have fallen from the ceiling.

The channel below this room is of a very different type from that described above and makes up the second part of the conduit. The channel (as shown by Cross-section 5, in Fig. 2) is much smaller than the first part of the conduit. In this part of the channel the water is ponded from room C to within 250 feet of the Mitchell Spring outlet in one branch and almost to the end of the upper level in the other branch. From the ponding of the water for such a long distance and the great difference in the size and appearance of the two parts of the underground channel, it may be concluded that the greater part of that portion of the channel below room C was once a tributary channel entering the main channel at C, the main channel continuing at that time through the cavern which is now silted up. With the exception of a short distance near the Mitchell Spring outlet and a short distance at the end of the other branch of the stream, the water in that part of

the channel below C flowed, as a tributary to the main stream, in the opposite direction to what it does at the present time. Throughout this part of the channel the roof is lined with countless small stalactites, the size of which may be explained by the fact that they are probably broken off in time of flood by the water which rushes through the conduit.

The channel divides at a point, indicated by D in Fig. 2, into two branches. One of these branches soon becomes a very small stream and after passing over a small ripple it follows a very crooked channel which comes to the surface at the Mitchell Spring. This part of the stream flows on the surface for about 150 yards and sinks into a series of swallow-holes leading to a lower subterranean channel. The other branch leading eastward from the forks of the channel is similar to that portion of the channel immediately above the forks. About 850 feet beyond the forks, however, there is a small ripple, and a number of potholes and openings leading to a lower level are found in the floor of the channel.

A short distance beyond this ripple the stream enters that part of the channel represented in Fig. 2 by the longitudinal cross-section 6. Here the stream in a series of falls drops some fifteen feet into a large room, which can also be reached by continuing in the upper level. It then drops another twelve feet into a circular pit about ten feet in diameter, from which the water leaves by an opening below the water level. Before reaching the place where it falls out of the upper level, the stream does not descend more than three feet in its entire underground channel, limiting itself to the same rock stratum throughout the whole distance.

This underground channel is cut in the basal portion of the St. Genevieve limestone, the Lost River chert occuring about fifteen feet above the stream level at both the collapse feature at B and at the Mitchell Spring. It might be said in explanation of the preceding statement that as a result of field work done during the summer and fall of 1931, Dr. C. A. Malott[1] has concluded that the division between the St. Louis and the St. Genevieve limestones in Indiana is not at the Lost River chert horizon but is at an unconformity which ranges from ten to twenty feet below the Lost River chert. He has observed this unconformity near a cave on the south bank of the Lost River on the Mather farm, in the SW corner of the SE¼ of the SE¼ of Sec. 33, T3N, R1W. As evidence in support of this conclusion he states that he has found oolitic beds and the fossil crinoid *Platocrinus penicillus*, a form thought to be restricted to the St. Genevieve, below the Lost River chert. He also states that in no place has he found *Lithostrotion canadense* and *L. proliferum* in or immediately below the chert horizon.

[1] Personal communication.