

**KANSAS GEOLOGICAL SURVEY
OPEN-FILE REPORT 33-1**

INVESTIGATION OF SURFACE SETTLING IN SOUTHWESTERN
MCPHERSON COUNTY

BY

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Sink Hole Is Swallowing A Bridge In The Blaze Fork District Southeast Of Inman

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The sink holes are active again in
the Blaze Fork area southeast of In-
man in southern McPherson county.
The latest trick is the swallowing of
a bridge.

top of the railing of the old bridge is
visible above the water and the rail-
ing of the bridge is three feet high.
Farmers believe the land around the
bridge has sunk 12 to 15 feet below
its original level several years ago.
The sinking area appeared to be
spreading and how large an area it
will cover is a question.

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Two miles east and two miles
south of Inman there are several sink
holes that have been puzzling the
farmers in that area for the last sev-
eral years, but this summer the
holes have shown renewed activity
by swallowing up greater portions of
the land.

Another sink hole has made its ap-
pearance one mile west of the sub-
merged bridge and this hole too is
spreading.

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In this area is a large canal which
has been in use for many years to
drain the Lake Farland district dur-
ing the rainy seasons. Several years
ago the bridge across the canal, locat-
ed two miles south of K17 two miles
east of Inman, started settling. Fin-
ally it settled down into the water.
The bridge was torn out and the
land filled in six or seven feet deep
and the bridge rebuilt at the same
place. The settling started again
and a year ago it was necessary to
abandon the bridge and another one
built 100 feet to the east.

Years ago the field northeast of
the sinking bridge was as flat as a
table top. Today there is a draw run-
ning diagonally from the southwest
to the northeast through this field
deep enough to hide a cow. Farmers
say the draw is about a mile long
and each year continues to sink.

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Today only about one foot of the

Farmers can give only one answer
to the puzzle. The hard rock layer
below the surface has broken through
and the heavy rains this summer
have been causing the quick sand be-
low the rock to come up through the
cracks, therefore causing the land to
settle.

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8/5/39
McPherson daily paper

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To the County Commissioners of McPherson County:

Report

on

Investigation of surface settling in southwestern McPherson County

Location: Two miles south and two miles east of Inman. The SE. corner of section 23 and adjacent corners of sections 23, 26, and 27 all in T. 21 S., R. 4 W.

Evidences of sinking: According to dwellers in the vicinity and maps of the drainage district the surface through this area previous to the summer of 1928 was smooth and higher than the land to the west and north (the drained bed of Lake Farland). Now the vicinity of the section corner is depressed several feet below the level of the land farther out. The bridge over the drainage canal has been raised once since the settling began and needs raising again.

Evid?

Local geology: The surface rock is unconsolidated sand and loam belonging to the McPherson formation. The underlying bed rock is the Wellington formation. Oil wells drilled at distances of four miles and more west of the depressed area encounter 200 feet plus of salt interbedded with shale in the Wellington formation. Wells drilled to the east of the depression encounter little or no salt. The salt has been leached out by underground waters. The first step in this dissolving process produces caves. The second step consists of the collapse of the roofs above these caves with consequent surface settling. For many miles immediately east of the eastern margin of the salt occurs a series of shallow lakes and swamps created by the accumulation of water in such surface depressions. This belt of lakes and swamps crosses McPherson County from south to north in Range 4 West and

includes Lakes Farland and Inman, several small lakes in the vicinity of Croveland, and the large basin between Conway and McPherson. The higher areas along that belt are surfaces which have not yet settled but which are underlain by cavernous bed rock and which eventually will settle due to collapse of the shaly roof material.

Cause of depression investigated: The depression was caused by the settling of the surface and near surface rocks into salt caves in the Wellington formation.

Discussion: The Shell Oil Company drilled a 577 foot core hole between September 10 and September 15, 1927, in the SE. cor. of sec. 23. Dwellers in the vicinity of the settling blame the core hole for the settling for the following reasons:

1. No settling was observed before the core hole was drilled.
2. The initial subsidence took place at or very close to the core hole.
3. At least two other subsidences have taken place in McPherson County in the vicinity of core holes.

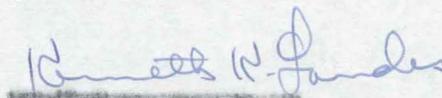
There is a possibility that the core hole initiated the subsidence by weakening the roof rock above the cavernous portion of the Wellington formation. The fact that the first observed sinking occurred in the immediate vicinity of the core hole is in favor of this theory. The length of time (about nine months) between the drilling of the well and the first subsidence is contrary evidence, however. It is obvious from the large size of the depressed area that the cave roof has failed not only beneath the site of the core hole, but also beneath several acres adjacent. Subsidence in this area was inevitable, due to the cavernous condition of the underlying rock. The drilling of the core hole may or may not have caused this subsidence to take place sooner than it would have otherwise.

Two facts should be kept in mind: (1) Hundreds of core holes have been drilled in Kansas without attendant subsidences. (2) Subsidences have occurred in widely scattered parts of the state without a core hole or any other well having been drilled in the vicinity.

I cannot agree in this instance to any theory postulating draining of quicksand or other mobile material down an improperly plugged core hole, for the following reasons:

1. If such took place the subsidence should be funnel-shaped, with relatively large depth and small area.
2. The deepest point would be right at the core hole.
3. No separate depressions such as the one occurring in the southwest corner of section 23 could possibly be formed.

Respectfully submitted,



Kenneth K. Landes

Assistant State Geologist.

March 27, 1933.

