

LANDSLIDES IN THE AREA OF MIDDLE BUNTER SANDSTONE
(A translation)

Sobotha, Ernst, Erdfälle im Gebiet des Mittleren Buntsandsteins:
Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin, 1941,
pp. 213-214.

Translation by Mrs. Severine Britt, U. S. Geological Survey, 1947

Different authors have described landslides that occurred in the middle Bunter sandstone of the Kuhrhessen area and neighboring regions. V. Linstow (1929, p. 71) treated the origin of landslides near Trendelburg; V. Koenen (1888, p. 5) described landslides near Rotenkirchen; Sobotha (1933, p. 44) gave a picture of a landslide in the Upper Hessian Fulda region.

Originally the cause of these landslides was attributed to the underlying Permian salt beds. The continuous leaching of these beds in all the places mentioned above was attested by adjacent salt springs. It seems rather strange, however, that the leaching should extend to the surface and cause the formation of narrowly delimited landslides, especially since the Permian salt formations are generally not encountered at depths less than several hundred meters. At variance with the above theory, V. Linstow (1929, p. 72) believes that landslides are associated with fractures. Besides the larger landslides which he relates to the underlying Permian limestone, K. Koenen (1888) also mentions small landslides which appear in rows in the Bunter sandstone. He traces their occurrence back to an open fracture. Sobotha (1932) shows that strong tectonic strain appears on the rims of flat-lying sandstone slabs which

subsided and were displaced due to leaching in the horizontal Permian limestone; in addition stresses result from tension (Zgl. Rollshausen, Sobotha 1931) and cause open fissures. Unfortunately, very few studies of such fractured zones have been made.

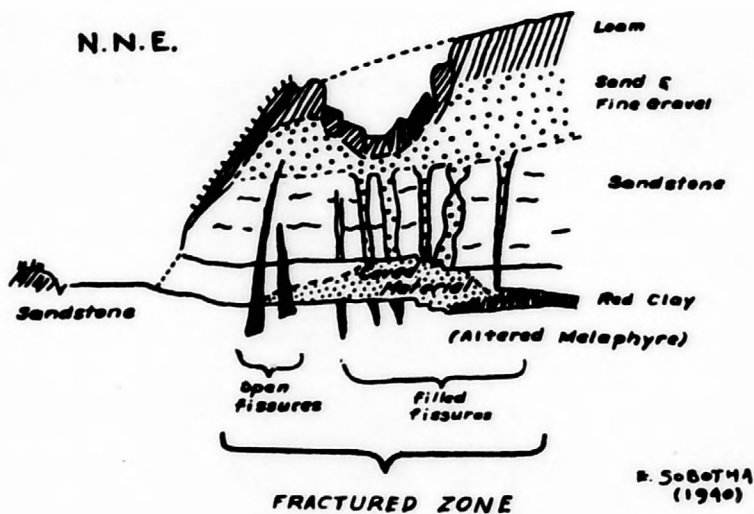
In 1939 the author was able to follow up the occurrence of a landslide over fissures in a fractured zone in middle Bunter sandstone near Dreisbach on the Saar River (Bl. Morzig). A tunnel was begun here in the middle Bunter sandstone. It first passed through firm, massive rocks, but then met a fractured zone. Fissures up to 20 cm. wide were encountered; they were succeeded a few meters further by fissures a few cms. to 1 decimeter wide which were filled with loose sand. Here and there the fissures were filled by fine gravel. This gravel was derived from terrace deposits of the Saar River which overlay the sandstone and had slipped into the fissures. The loose sand ran out when the fissure was broken open. Cubic meters of sand flowed as a thick jet into the tunnel from openings only a few cms. wide. Therefore, driving the tunnel farther into the partly quartzitic sandstone was technically especially difficult. The wall of one of these fissures, which was about 1 cm. wide, was broken open at a time when the author was absent. It was not possible at first to stop the sand which poured out until the tunnel was full. Upon the removal of the sand, a landslide occurred on the surface over the fissure. The sand and gravel overlying the sandstone "purled" into the small fissure, and the overhanging loam cover subsequently broke and formed a steep-sided landslide about 3 m. deep and 6-8 m. wide. From the surface, only the conical depression in the loam made by the landslide could be seen, but the succession of strata (sandstone, sand and gravel loam) involved in the slide was disclosed from a nearby slightly inclined shaft. When the tunnel was

driven further, it passed through the fractured zone and, in its course, cut across the base of the Bunter sandstone into the underlying red clay which caps a layer of altered melaphyre. The attached cross-section of the tunnel and the landslide was drawn as seen from the inclined shaft.

These observations at Dreisbach illustrate how a landslide may occur in a fracture zone (unknown up to now) in Bunter sandstone when masses of loose material overlies a fissure within the massive sandstone.

References cited

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CROSS-SECTION THROUGH TUNNEL AND LANDSLIDE
NEAR DREISBACH/SAAR

The open unfilled fissures close toward the top; those filled with sand and fine gravel open toward the top and close downward. The caved material consisted almost exclusively of sand and fine gravel. Only a few sandstone fragments were found. Strike of the fissures: NW to NNW.