

## A ZONE OF LARGE CONCRETIONS IN THE KNOBSTONE.

W. M. TUCKER.

My attention was recently called to a peculiar and interesting bed of concretions in the Knobstone of Monroe County. The deposit is very local in its distribution. It occurs in two ravines in sections 1 and 2, T. 10 N., R. 3 W., in the northwest corner of Monroe County. The two ravines head on the Harrodsburg limestone near the middle of sections 1 and 2 and extend northward, immediately entering the Knobstone with the characteristic rapids and small waterfalls. The main ravine (west) has a depth of seventy feet one-fourth of a mile from its source, and the smaller one (east) attains that depth in a shorter distance. The larger ravine enters the concretionary zone thirty-five feet below the contact of the Harrodsburg and Knobstone. The zone is



FIG. 1.

Fig. 1. A concretion five feet in diameter which has been dislodged from the ravine wall in the background.

fifteen feet thick. The concretions can be seen in the ravine walls for about one-fourth of a mile, just south of the Monroe County line (Figs. 1 and 2). The bottom of the ravine is strewn with concretions and fragments for this distance. Only four were found in the smaller ravine which at this point is about one-quarter of a mile east. None were found in the other ravines of the neighborhood.

The concretions vary in size from a fraction of an inch to five feet in diameter. They show none of the concentric structure which is displayed in some concretions. No distinct nucleus was discovered in any of them. The composition of the concretions is highly silicious, especially those in the upper part of the zone. Those in the lower



FIG. 2.

Fig. 2. Three concretions, each about two feet in diameter, in place in the ravine wall.

part of the zone contain considerable calcium, iron and aluminum. An examination of a specimen from the extreme top of the zone under the petrographic microscope resulted in the following estimate of contents: quartz, 8/9; calcite, 1/9; traces of limonite, pyrite and kaolinite. A chemical analysis of a specimen from the lower part of the zone gave the following results:

Si O <sub>2</sub>	.....	46.48 %
Ca O	.....	17.92
Fe <sub>2</sub> O <sub>3</sub>	} .....	19.87
Al <sub>2</sub> O <sub>3</sub>		
Mg O	.....	.395%
C O <sub>2</sub>	.....	14.69
S O <sub>2</sub>	.....	.08
Total	.....	99.435%

The concretions of this zone resemble those of the Olentangy shale of Ohio in size, mode of occurrence and general appearance but those of the Olentangy shale are of very wide distribution. Beds of limestone occur in the Knobstone south and east of this zone at about the same horizon. Small concretions are found at many horizons in the Knobstone. So far as known there is no relation between this bed of concretions and the concretions of other parts of the Knobstone nor do they seem to be related to the limestone beds. So far as known there is no similar zone of concretions in the Knobstone or elsewhere in Indiana.

Acknowledgement is made to Prof. W. N. Logan who made the petrographic estimate, Mr. Luther S. Ferguson, who made the chemical analysis, and Mr. Arch R. Addington, who developed and mounted the pictures.

*Indiana University.*