the map almost due east of Lexington, and distant 51 miles.

Two other saplings in the vicinity of where No. 3 fell, distant, respectively, about 100 and 200 yards, in an easterly direction, have been broken off by missiles striking them from the west. Search for where these buried themselves in the ground was not rewarded with success.

The dent in the road made by No. 1 had become obliterated, but from the accounts of those who saw it soon after it was made, it dipped eastward, and so is in line with the evidence afforded by the other fragments.

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THE PROTECTIVE FUNCTION OF RAPHIDES.

To the Editor of Science: In view of Dr. Wiley's interesting account (printed in Science of July 24) of the raphides of *Colocasia antiquorum*, it may be worth while to quote the description of these crystals and the cells containing them given by Haberlandt in his 'Physiologische Pflanzenanatomie,' edition 2, pp. 448, 449, 1896, translating literally:

"That in numerous cases the crystals of calcium oxalate, when they occur as raphides or spear-shaped crystals, are also to be regarded as functioning secondarily as a mechanical means of protection against animals that would feed upon the plant, is beyond doubt. Schroff has proved that the irritating effect of the sap of the bulb of *Scilla maritima* depends upon the penetration of the skin by the raphides, and that filtered sap produces no irritation. Stahl * afterwards demonstrated the same thing as holding true for other plants, especially *Arum maculatum*, and showed by experiment that leaves of that plant, when merely treated with alcohol, were hardly touched by snails, while on the other hand, leaves treated with dilute hydrochloric acid, in which the raphides were dissolved, were very quickly devoured. The ejection of the numerous crystal needles from the cell containing them is largely effected through the absorption of water by the strongly swelling mucilaginous substance which always encloses the bundle of raphides. That the form of the containing cell, as well as the manner in which its walls are thickened, is in many cases an adaptation to the protective function of the raphides, is indicated by the following example.

"In the leaves of *Pistia Stratiotes* [which like *Colocasia* and *Arisæma* belongs to the Arum family], the one-layered plates of parenchyma that make up the aerenchyma (breathing tissue) contain transversely placed, spindle-shaped, elongated cells [almost cigar-shaped in Haberlandt's figure] containing raphides. Both ends of these cells project into the intercellular air spaces. The blunt ends of these cells have an extremely delicate cell wall, while the rest of the cell wall is rather thick, although not cutinized. Upon mechanical injury to the cell, although not, however, through the simple presence of water, the raphides are ejected, generally one at a time, with considerable force through the swelling mucilaginous envelope, whereby the thin portion of the cell wall is pierced and soon completely disappears. The place of exit of the raphides is in this case determined by the thin part of the wall and, furthermore, the conical tapering of the ends of the cells prevents the whole bundle of raphides being ejected at once. As the raphides are projected one after the other, the attacking animal can be wounded in different parts of the body."

Thos. H. Kearney.

* The utility of raphides in protecting plants from snails is quite fully discussed by Stahl in his interesting paper entitled 'Pflanzen und Schnecken: Eine biologische Studie über die Schutzmittel der Pflanzen gegen Schneckenfrass,' *Jenaischen Zeitschrift für Naturw. und Med.*, Vol. 22, pp. 84–99 of the reprint.

SHORTER ARTICLES.

CARBONIFEROUS FOSSILS IN 'OCOEE' SLATES IN ALABAMA.

The age of the semi-crystalline and crystalline schists which extend in continuous belt from New England to Alabama, has long been a subject of discussion and of wide difference of opinion among geologists. On the one hand, they have been considered as pre-Cambrian;