LOCAL INCLUSIONS OF PRAIRIE WITHIN FOREST

ARTHUR G. VESTAL, EASTERN ILLINOIS STATE NORMAL SCHOOL, CHARLESTON

The accounts of early settlement in Illinois and neighboring states mention frequently the occurrence of small openings or glades in the forest, covered with prairie vegetation. Probably most of them were small patches of upland prairie, surrounded by xerophytic oak forest which had slowly spread from nearby stream valleys. These small prairies, and most of the forest which surrounded them, are now destroyed by cultivation. But there may also have been prairie openings of a second type, which because of their small size and scattered distribution, have escaped notice, and are practically unknown today, although they are still fairly numerous. Probably they would be regarded as mere open places in the woods, without being recognized as prairie. These small prairie inclusions were first noted in 1916 in the neighborhood of Charleston. It is generally known that at the present time forest tends to encroach upon treeless areas where cultivation does not prevent, but it is not generally known that in many places local exceptions to this tendency may be found. Probably the greatest interest which these prairie inclusions may claim lies in the fact that many of them seem to be holding their own against forest invasion, and that in places prairie vegetation has even replaced forest, in recent years.

The commonest topographic site for these small areas of prairie is the windward crest of a valley or ravine running down to the east, southeast, or south, and the side-slope beneath which accordingly faces to the south, southwest, or west. The essential condition is the great insolation and exposure to the dry summer winds from the south and southwest, making for local xerophytism. This is apparently a static rather than a dynamic feature of the environment, since both habitat and

xerophytic vegetation may persist indefinitely, even though there is a slow lateral migration as the valley widens. It is probable that the dryness occasioned by the slope to the south is in most places not in itself sufficient to preserve the prairie from forest encroachment, for forest is able to establish itself in quite xerophytic habitats in the vicinity, and has in fact done so over most of the south-facing ravine slopes. Other physical factors aid the original exposure afforded by direction of slope. One is instability of surface, due partly to steepness, partly to the meagerness of protection against erosion afforded by the open and sparse ground-cover.* Others are accidental and artificial factors which destroy or check forest growth, such as fire, cutting, grazing, and trampling. These operate in places only temporarily, but in other places recur frequently enough to permit the continued existence within the forest of small but rather numerous patches of prairie, with more or less shifting boundaries, wherever the basic condition of southward exposure is fairly extensive. The spur-tops and other small upland areas adjoining the slopes may also show prairie vegetation, especially in those ends and corners of uplands which are too small or too narrow to tempt the farmer to invade them with the plow, even if there are no trees. This type of situation is a distinct geographic or topographic entity and should have a name. *Upland salient* or simply *spur-top* might answer this need.

The locality which shows these local prairie inclusions best is hardly more than a mile east of the southern part of Charleston, along a large ravine ("Endsley's ravine" or "Endsley's Hollow") which runs east and a little south to the Embarras river. A topographic map showing some of these patches of prairie was made so that situation and extent could be quite definitely shown (Fig. 1). Most of the prairie is below the crest

*It is of interest that even in flat areas like east-central Illinois, the topographic diversity of the broken country of the valley-slopes and ravines results in vegetation-diversity, in a manner entirely comparable to that which prevails over the general area in a mountainous region. Thus in the rock exposures along the Embarras river three miles east of Charleston, and in the various slopes and valleys of the district, there can be found many of the types of physical habitats common in mountain areas. One thus can learn much of the relations of topography and vegetation as developed in mountains without visiting the mountains themselves.

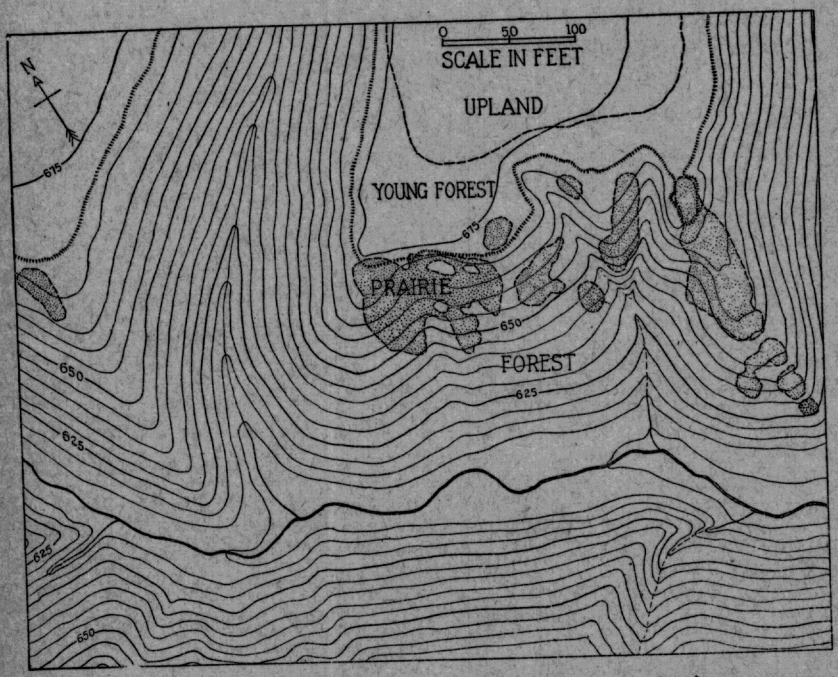

Fig. 1. Map of a ravine area with prairie inclusions, near Charleston, Illinois.

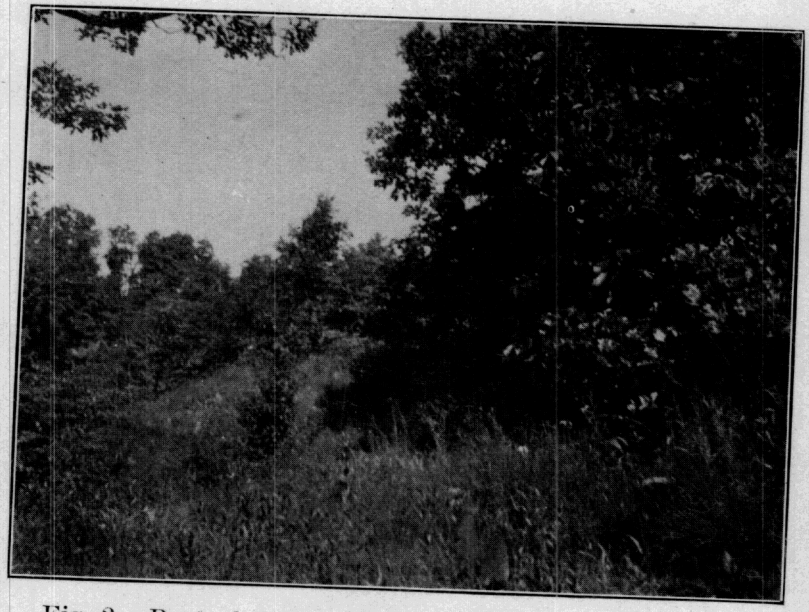

Fig. 2. Part of the largest patch of prairie shown in map. Leaves of Silphium in foreground.

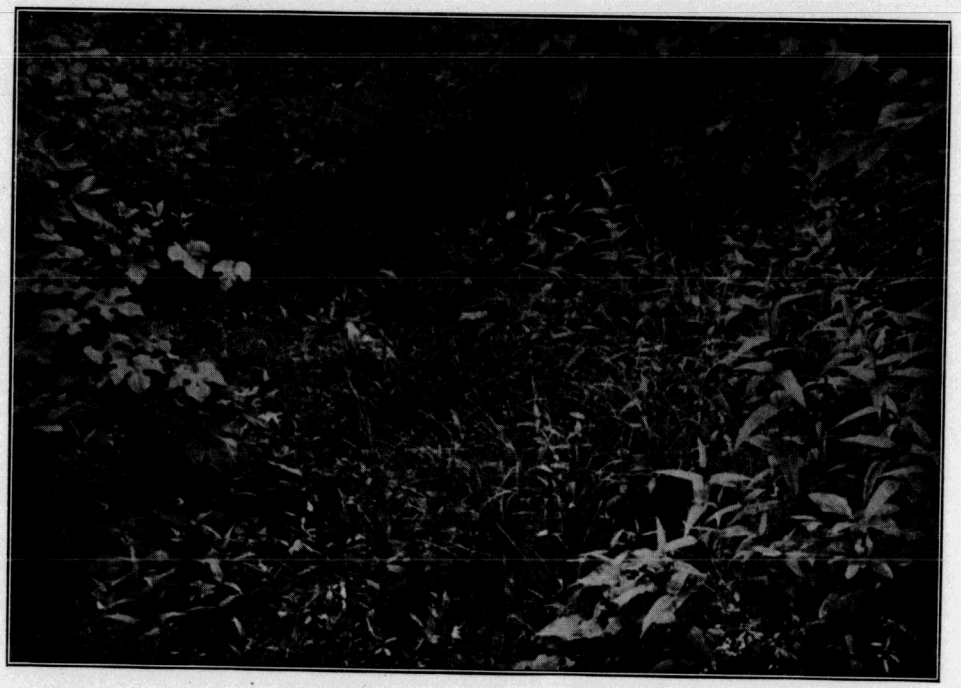

Fig. 3. A very small opening about 15 feet across, near Embarras river, almost entirely enclosed by forest. Grapevines on trees, border of sunflowers at right and in back. Silphium, Parthenium, and several prairie grasses are found even in some of the smallest patches.

Fig. 4. Andropogon furcatus in gravelly clay on spur overlooking Embarras. The treeless area is about 15 feet on either side of the trampled path, and there are numerous prairie species.

or edge of the upland, shown by the line of short hachures. Forest had at one time spread about a quarter-mile from this edge, and had since been cleared for cultivation. New forest growth near the edge has come in since about 1911. Prairie and forest herbs occur in mixture in open spaces between saplings. The largest prairie patch has almost luxuriant vegetation, in which grasses, and Parthenium integrifolium, and the coneflower Brauneria purpurea, are conspicuous. There are also a few long-lived perennials, such as Silphium terebinthinaceum (Fig. 2), which are commonly absent from prairie that has not been established for many years. The invasion of forest seems to be upward, because the shade falls on the part of the slope just above the position of the trees. The boundary between prairie and forest vegetation is in places somewhat ragged and indefinite, partly because prairie and forest herbs intermingle along the border, where also occur the forest-border sunflowers, Helianthus strumosus and H. divaricatus (Fig. 3), and the bushy legume Baptisia leucantha, and the half-shrub Ceanothus americanus. The badly washed spur at the right in the map is mostly bare clay with scattered bunches of Andropogon scoparius, and a few interstitial annuals, including two small species of Lespedeza, which are typical in new growths of clay hillsides. The taller bunch-grass Andropogon furcatus is common in places (Fig. 4). A long, narrow spur-top just east of the area mapped is covered with prairie of apparently recent development from forest.

Small prairie patches in the woods are common also along the Embarras river, especially on the south-facing flanks of spurs, on both sides of the stream. Figures 3 and 4 illustrate two of these patches. One extensive south-facing hillside, once forested, is now part of a large pasture. Many kinds of prairie plants persist on this hillside, due to the topographically determined dyness and instability of soil, which keep the bluegrass from driving out the native plants, as it does in level or in well-watered pasture.

In conclusion, it appears that these small enclaves or openings of prairie in forest must be of fairly general occurrence, that they deserve to be generally known, and some of them set aside as natural history preserves. They illustrate admirably

the influence of topography in control or modification of vegetation-distribution and vegetation-development. They show that while forest invasion of prairie is general, it is by no means universal.