

circumstances, roots may penetrate downward are much greater than might be supposed. Thus in the loess of Nebraska the buffalo-berry (*Shepherdia argophylla*) has been observed to send a root 55 feet down from the surface, and in that of Iowa the roots of grasses penetrate from 5 to 25 feet.³²⁸

4. By attracting rain, as thick forests, woods, and mosses, more particularly on elevated ground, are believed to do, plants accelerate the general scouring of a country by running water. The indiscriminate destruction of the woods in the Levant has been assigned, with much plausibility, as the main cause of the present desiccation of that region.³²⁹

5. Plants promote the decay of diseased and dead plants and animals, as when fungi overspread a damp rotting tree or the carcass of a dead animal.

Animals.—The destructive influences of the animal kingdom likewise show themselves in several distinct ways.

1. The surface-soil is moved, and exposed thereby to attack by rain, wind, etc. As Darwin showed, the common earth-worm is continually engaged in bringing up the fine particles of soil to the surface. He found that in fifteen years a layer of burned marl had been buried under 3 inches of loam, which he attributed to this operation.³³⁰ It has been already pointed out that part of the growth of soil may be due to wind-action (ante, p. 563). There can be no doubt, however, that the materials of vegetable soil are largely commingled and fertilized by the earth-worm, and in par-

³²⁸ Aughey's "Physical Geography and Geology of Nebraska," 1880, p. 275.

³²⁹ See on this disputed question the works cited by Rolleston, Journ. Roy. Geog. Soc. xlix. 1879. The destruction of forests is also alleged to increase the number and severity of hail-storms.

³³⁰ Trans. Geol. Soc. v. p. 505. "Vegetable Mould," 1881.