season. As the trees are removed, the waters of heavy rains rush unimpeded directly to the valleys and are carried off within a short time, leaving the bed almost or quite destitute of water during the dry season. About one-fourth of the water falling in the form of rain, snow and hail in this state is carried off by rivers.

We need not have gone beyond our own state, nor referred to times longer than our own limited experience to find examples of the evils resulting from this change in the flow of rivers from one of regularity and uniformity to one of periodic floods and dry or nearly dry beds. Such has been the change in the flow of the Milwaukee river, even while the area from which it receives its supply is but partially cleared, that the proprietors of most of the mills and factories have found it necessary to resort to the use of steam, at a largely increased yearly cost, to supply the deficiency of water-power in dry seasons of the Year. Until this was done many large mills were closed for want of water in the latter part of summer and early autumn; while the floods of spring are increased until they are sufficient to carry away bridges and dams before deemed secure against their ravages. The Menomonee river, a small tributary of the Milwaukee, has been effected in the same way and to a still greater degree, because a larger proportion of the water-supplying area has been stripped of its forest trees. Several of the mills that formerly found sufficient power on this stream, have been entirely abandoned; others are propelled a large share of the time by steam. Down its channel during and immediately following heavy rains, great floods sweep along, doing more or less damage; followed in a very few days by dry pebbly, or muddy banks, and bed, in which only an occasional pool of water can be found. A small stream formerly run into the river within the sixth ward of the city of Milwaukee; it had a nearly uniform flow, and was seldom destitute of water, even in the dryest summer: in former times the beaver built his dam and constructed his curious houses upon it; but now, since the clearing away of the trees, it is only a passage way for the heavy spring rains. During the remainder of the season its bed is dry.

What has happened to the Milwaukee river and to these smaller streams, has happened to all the other water courses in the state from whose banks the forests have been removed; and many farmers who selected land upon which there was a living brook of clear, pure water, now find these brooks dried up during a considerable portion of each year.

HOW TREES PROTECT THE SOIL.

Another serious evil resulting from clearing away the forests is the washing away of the soil by the rains. The degradation of the soil by rains, especially on side hills, commences when the trees are removed. At first a slight break is made, along which the descending currents flow, carrying with them the softened earth, to be deposited upon the plains below, or carried off by
rivers. The removal of the natural turf or sod of the prairies has the same
effect upon the soil, especially in those districts where the particles are fine,
and therefore more easily suspended in water and washed away by the rain.
Even the slight interruption of the protecting vegetable carpet, caused from
an Indian trail, is often sufficient to cause frightful gullies in a very few
years. All steep hill-sides are liable to this evil when the trees or the sod
are removed. On the margin of the steep banks of lake Michigan these
deep gullies are formed, making it necessary to remove the "lake shore
road" from time to time farther from the water. Advantage is often taken
of this process, to secure the filling of village lots in low grounds, by direct-
ing the earth-bearing currents upon them, and thus avoid the far more ex-
pensive mode of filling by the intervention of a "contractor." The curiously
shaped mounds of earth representing animal and even human forms, left
by the former inhabitants, could not have been preserved to puzzle the brain
of the modern antiquary, but for the protection of the matted roots of the
forest trees of the prairie sod, with which they have been covered. When
these are removed, the form of the mound is soon lost by the wash of rains.

We hence see that trees are required, especially on steep side-hills, and
where the soil is light, to protect, by their roots and otherwise, the very soil
from being dissolved and carried away by rains.

To realize the importance of this constant absorption of the soil, we have
only to refer to the deep and broad valleys every where excavated, and to
the deltas of large rivers, where whole states owe their very existence to the
accumulations of earthy matter brought down from their channels above,
including among its particles the richest soil of the uplands. The quantity
of sand and mud carried into the Mississippi river by the principal tributaries
from this state, especially the Wisconsin and Chippewa, is such that the cur-
rent of this great river is checked in its onward flow, and formed into lakes.
With the exception of Lake Pepin, immediately above the bar caused by
the Chippewa river, these lakes have already been completely filled by the
moving sands from above. This lake remains, only because the supply of
earthy matter from above is less abundant, and requires longer time to ac-
complish the object. Already has the amount of earthy matter, brought into
the Mississippi river from the surface of our state, been so much increased,
by the destruction of the forests, and the breaking of the sod, that it begins
to disturb the former condition of things; the water is no longer clear and
dark, from decomposed vegetable matter, as it used to be, more sand accu-
mulates in the stream, and a noticable quantity of saw-dust and chips from
the lumber regions of the St. Croix, Chippewa and Wisconsin is also deposited
along the banks. So important is this action deemed by competent engi-
neers, that it is mentioned in a recent government report, as one requiring
attention; though the gradual rise of the bed of the river, occasioned by
these increased deposits, may be so slow that its effects may, for the present,
be disregarded.