purpose. The placing of wire netting around the louvered shelter where the meteorograph is installed might give this instrument protection from electric shock, but the projection of the wind vane and anemometer masts from the shelter may attract sufficient electricity to fuse the netting and reach the instrument by way of the mechanical connections. There has been actual danger on Mount Rose, so far as known, only this single time during the past three years.

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THE BLOWING OF SOILS

WHEN a boy on my father's farm in Iowa I experienced a three days' dust storm, when the air was so full of dust that one could hardly see, and the sun was almost obscured. After the storm I noticed that drifts of loose earth had accumulated in all the protected hollows, in the lee of corn shocks and fences, and on the grass lands adjacent to the cultivated fields. We had no other storm so severe as this one, but I noticed that the drifting soil particles in the air were gradually filling up a small pond that adjoined a plowed field. This little pond was so situated that no wash from the plowed area could enter it, and its filling up was undoubtedly due to the deposition of wind-blow particles. Some years ago I again visited the place and found that this pond was dry and filled up practically level with the surrounding land.

In the spring of 1889 I had occasion to observe the erosion by the wind of a recently plowed field on my father's farm, near Yates Center, Kan. The field sloped gently toward the southwest, and for several days the wind blew violently from that direction, carrying away the soil in some of the most exposed places to the full depth to which it had been loosened by plowing. Most of the soil was, of course, dropped in the lee of the first obstruction; but the finer particles were probably carried for many miles. Other fields in the vicinity suffered the same fate, and after the storm was over our neighbor adjoining us on the north had the bulk of our soil. Most of it was piled in big drifts just back of an osage hedge.

Later, near Albuquerque, N. M., and at Cibicu, Ariz., I was impressed by the strong indications of eolian origin offered by the adobe clay of this region. This material can hardly have been formed by glacial action as no traces of such can be found, and fluvial action is in most cases excluded by the topography. The deposit is found superimposed on many geologic formations and at a wide range of altitudes. It may be partly rain wash from the hills, but were it entirely so it would show a non-uniformity of mechanical composition—becoming finer in grain with distance from the hills. This does not occur—the deposit being very uniform. It is also remarkably level, showing no traces of the descending slopes characteristic of alluvial fans. Becoming convinced that this deposit was largely of eolian origin, I began to look about for evidences that deposits are made and materials moved by the wind. The following observations resulted:

1. On the Jemez coal lands near Albuquerque, N. M., it was noticed that, on windy days, a sheet of dust was continually blown completely over the region from Mesa Blanca and adjacent ridges.

2. At Cibicu, Ariz., fine dust settled on anything spread on the ground after a reddish southwestern sky at sunset, indicative of dust storms in the Gila-Salt River desert many miles away. This happened even when there was apparently no wind at Cibicu during the previous night and the day.

3. During a year of very slight rainfall at Fort Apache, Ariz., the adobe flats received even more increment than in years when the rainfall was normal. In this region the soil particles are continually being blown to the eastward from the region to the south of the long tongue-like ridge of the Mogollon range which extends to within a few miles of Fort Apache, and the dirt is being collected in the grass-covered area to the leeward of this ridge, but so slowly that the growth of vegetation keeps pace with the deposition.

4. The accumulation of wind-blown earth is

so great in the lower Salt River and San Y Sidro-Zia regions, New Mexico, that the cactus and yucca plants are half submerged by it. In the vicinity of the Indian village of Santa Anna, lower down in the same valley, the wind-blown sand has in recent years completely covered the farm lands of the tribe, so that the government was finally compelled to give them another reservation across the Rio Grande at Bernalillo.

5. At the Indian village of San Felipe in the valley of the Rio Grande, the settling of dust particles blown from the almost barren mesa adjacent is very noticeable.

6. Around the White Thunder camp of the Rosebud Indian Reservation, in the valley of White Thunder Creek, S. D., the soil is a clay; yet the sands from the Arikaree strata some six miles away are blown by every wind storm completely across the valley and even into the houses, so that after every heavy wind one can write in the sand on the window sills inside the houses.

7. Last year I laid down a board in some grass on the lee side of Pacific street ridge in the village of LaPush, Wash., near the beach of Quillayute Bay. Several months later I looked at the board and found it covered with one eighth of an inch of beach sand which had been blown about half a mile and over the above ridge, which is completely covered with grass.

Various means have been adopted to prevent the movement of soil by winds. The Moqui Indians do not plow their soil at all. They simply dig a hole in the sand for each hill of corn and then tramp down the dirt with their feet to keep it from blowing away. Many people in the southwest do not plow their ground until the windy season is over. And in the irrigated regions the ground is flooded as soon as plowed. To prevent the movement of soil by the wind as well as to level the land, the farmers of the plains region roll their land or crush it with a weighted plank float. So far as the writer knows, these are the only means now used by farmers to keep the soil from being blown away by the winds. But others could be employed. Groves and hedges could be planted on the windward side of fields to break the winds. Also, at least for small farms, wind breaks like those used by railroads as protection against snow and sand drifting in cuts could be used to advantage, especially in regions too dry for the rapid growth of trees and hedges.

Albert B. Reagan

LaPush, Wash.

A FAULT IN AN ESKER

About three quarters of a mile from East Templeton, Mass., on the southeast side of the direct road from that town to Gardner, there is a cutting in one of the large, esker-like ridges typical of this locality. The deposit consists of distinct layers of fine, compact sand, with a few beds of gravel, of which the pebbles vary in diameter from less than an inch to six inches.

Where the stratification is well marked, near the northeastern end of the pit and about half way up the slope, the horizontal beds are found to terminate abruptly against a flat, narrow layer of sand and gravel, striking roughly east and west and dipping 63° northwards. This layer can be clearly discerned for a distance of more than twenty feet on the face of the pit; but above and below, like the beds which it traverses, it is covered by loose slide material.

That this layer may represent a fault zone, analogous to a fault breccia, in which the slipping destroyed original structures, is suggested by two facts: First, the beds are displaced; where they are best shown, the order of coarse gravel (2 ft.), fine, cross-bedded sand (2 ft.), fine gravel (4 in.), and very fine, compact sand (10 in.), on the south, is repeated, on the north side of the fault, about two feet lower. Second, the strata on the south side are plainly bent downwards next the fault.

Whether this dislocation is restricted to the glacial deposit only, or extends down into bed rock, can not be determined, for no bed rock outcrops here. The first supposition (of limitation to the deposit) seems most reasonable, since (1) the plane of the displacement is near the steepest slope of the deposit; (2) it strikes more or less parallel with the length of the