

Sand Dune Formation Is Result of Wind and Waves Through Years

Inexhaustible Supply of Sand Makes Area Economically Important to Industry

THE dunes region of Indiana forms the southern boundary of Lake Michigan between Gary and Michigan City. It is a narrow strip and only locally does it exceed one mile in width.

The dunes have been formed as a result of wind and wave action. The action of the wind is two-fold: first, the movement of the water seems to depend mainly upon the wind, and second, the wind moves the loose material brought in by the waves inland.

Near the shore the bottom of Lake Michigan is uniformly covered with sand. At the shore line this sand is about ten (10) feet deep and extends out to where the water is about 35 feet deep. Beyond this depth of water the lake bottom is composed of a stiff, tenacious blue clay, which is thought to contain pockets of sand that, in part, furnishes the supply which is constantly carried to the shore by the waves. Much sand is doubtless blown from the dunes to the surface of the lake and is again brought to land. Storms and ice jams also dislodge much material from projecting points along the lake, which is returned to the shore by the waves. Thus much of the

sand is in constant circulation, and the necessary new supply is not as great as it seems to be.

If one stands on the southern shore of the lake and observes the waves coming in, it will be noticed that each wave carries a small quantity of sand, which when rolled up far enough to be out of reach of other waves and has had time to dry, is rolled farther inland by the wind and added to the great amount of sand already accumulated in the dunes and ridges.

The winds which have passed over broad expanses of the lake, and have developed high velocities, carry the loose material deposited by the waves inland. The transporting power of the wind varies as the sixth power of the velocity, if the velocity be doubled the carrying power is sixty-four times as great. Consequently, any increase or decrease in velocity rapidly changes the carrying and erosive power of the wind. As the sand-laden wind encounters some obstacle, the velocity is checked and the sand is dropped. The embryonic dune itself becomes an obstacle and rapid growth takes place. The dune moves inland as the sand (Continued on page 15)



Typical scene in the Indiana Dunes region along Lake Michigan.

SAND DUNE FORMATIONS

(Continued from page 11)

rolls up the gentle windward slope and over the crest of the steep leeward slope. In its inland journey the dune encounters shrubs, trees, and even whole forests, covering them as it migrates. The inland movement of the dune is checked as the sand supply is cut off by new dunes being formed between it and the lake shore.

Objects in its path influence the outline of the dune. Also, any change in direction of the wind will alter the form of the dune, as well as change the direction of movement. A prevailing south wind, such as occurs for short periods during the summer months, will produce a lakeward movement of the dunes. During the spring months when north winds prevail for a few days, the movement is inland. The prevailing winds are more

often from a westerly direction, which causes still a different movement of the dunes.

The inexhaustible supply of pure white quartz sand of fine to medium grain, makes the dunes area important economically. It is loose and easily handled and is free from impurities which usually accompany indurated deposits.

It is high in silica content which is the major constituent of all sands. A sample of sand from this area contained 91.98 per cent of silica, 4.44 per cent of alumina, .56 per cent of iron oxide, 2.20 per cent of lime. The alumina, iron oxide, and lime are impurities but can be removed in part, if not completely, by washing. This dune sand is used extensively in the manufacture of glassware. The proximity of the deposits to the manufacturing district adds to the value of the deposits.