

*Motion of Glaciers.*—Professor J. D. Forbes supposes he has proved that the ice comports itself precisely like a stream of water in the following particulars: 1. The motion of the Mer de Glace, during summer and autumn, is as great as four feet in a day in some places, and only eight or nine inches in others. 2. Each portion of the glacier moves continuously, and not by fits and starts. 3. The glacier, like a stream, has its pools and its rapids. 4. The motion of the ice is favored by an increase of temperature. 5. Yet the motion does not entirely cease in the winter. 6. The centre of the glacier moves faster than the sides; and the top faster than the bottom. 7. The maximum velocity is not always in the middle of the glacier, but may be upon either side. 8. The changes in the velocity of the ice take place gradually by the yielding of the entire mass, not by the justling of fragments, or the formation of rents.

The Mer de Glace moved 16,500 feet in 44 years, or upon an average, 375 feet annually. Sometimes glaciers advance lower and lower for several years, in consequence of low temperature; or they may retreat during a succession of unusually warm seasons. As they advance and retreat they produce and leave successive moraines, especially terminal ones.

In the view of Prof. Forbes, a glacier is an imperfect fluid, or a viscous body, which is urged down slopes, like a river, by the mutual pressure of its parts. The ice is not inflexible, but more or less plastic, in consequence of having its minute pores and fissures permeated with water. As much of the water freezes in cold seasons, the motion of the glacier is retarded in winter and accelerated in summer. The decrease of the glacier in summer by ablation, and by the attenuation and collapse of the parts which move most rapidly, is repaired during the winter, when, the higher regions of the glacier moving relatively faster than the lower, the yielding mass of ice is pressed upwards.

Recent experiments show that ice has a property of plasticity called *regelation*. With or without pressure, fragments of ice will cohere at 32°, and by pressure they may be molded into any form. Hence the glacial valley is a mold, in which the ice is pressed by its own gravity. Also, when separate glacier branches unite themselves into a single trunk, regelation cements all the parts into one whole; and thus the combination of two glaciers is like the confluence of two rivers. The ribboned structure of the ice is thought by some to have been produced by pressure, like the slaty cleavage of rocks.

The theory of Agassiz imputed the onward movement of glaciers to the expansion of the water by freezing, which during