

## Science Notes.

### THE MOVEMENT OF GLACIERS.

IT is a fact well-known to almost every one, that our own country, as well as Northern and Central Europe, certain parts of Asia, and also of the New World, bear unmistakable marks of having been formerly covered by glaciers. These marks are easily found by anyone who looks for them in Scotland, North Wales, the Lake Districts, and some of the Eastern Counties of England. There are perched blocks (of which rocking stones are examples) and rocks bearing deep parallel scratches on a smooth polished surface. It is plain that running water could not have left masses of such enormous weight in the positions occupied by the perched blocks, but that they must have been transported by glaciers, and left stranded when the ice melted. The parallel scratches also require, for their production, a force not possessed by running water. They were probably made by a rock jammed in a glacier, and so carried along by an irresistible force, scoring the rocky bed of the ice-river as it flowed. So the rock played the part of a tool in the grasp of a powerful hand. To the paleontologist there are yet other evidences of the existence of an ice age. The vegetation of the high Alps resembles that near the shores of the Arctic Ocean, and the remains of similar plants have been discovered above the glacial deposits in the British Isles, Sweden, and Russia.

For a long time the nature of the movement of a glacier was not fully understood. It is, at first, difficult to believe that ice is sufficiently mobile to flow and adapt itself to the inequalities of the earth, like a river. It is true that, more than thirty years ago, James Forbes expressed the opinion that ice-rivers flowed in exactly the same way as rivers of water, but more slowly. Professor Tyndall opposed Forbes's views, and suggested that the ice of glaciers was constantly cracked and broken as it moved, and welded together again by the enormous pressure behind. This theory of regelation is still constantly taught, though the soundness of Forbes's view has been fully proved by numerous experiments and by the observation of Nature. This shows how much additional influence the teaching of a scientific man gains when he is also a brilliant popular lecturer, and how such influence may hinder the recognition of the work of others not similarly gifted.

Experiments on the flow of solids show that the difference between a solid and a liquid is only one of degree in mobility; it is not that the latter is mobile and the former not so. Increase of temperature produces increase of plasticity in solids, and, at the melting point, the increase is very rapid. Lead pipe is made by raising the temperature of the metal and forcing it, while still much below its melting point, through an opening in the shape of a ring. Similarly, the milled edge of a coin is produced by placing it in a milled "collar," and striking it with a die. Under the force of the blow the metal flows into the crevices of the "collar," showing that metals are plastic at the ordinary temperature, if sufficient force is applied. Ice, like other solids, is more plastic near its melting point than at lower temperatures, but an increased pressure will compensate for a low temperature in pro-

ducing movement; this is proved by the recently ascertained fact that some of the glaciers of Greenland move more rapidly than any in the Alps. The theory that glaciers move by virtue of the plasticity of ice is thus fully established. Geologists are, however, still very much in the dark as to the cause of the lower temperature which must have existed at the time of the glacial period. On this point some very important suggestions have recently been made, of which a short account will be given next week.

## Notes on Art.

### OLD MASTERS AT THE ROYAL ACADEMY. (SECOND NOTICE.)

LAST week we looked at the modern pictures in this interesting Exhibition, and considered especially the works of F. Walker, John Philip, and George Mason, in the first room, and dwelt at some length on the work of Pettie to whom an entire room is devoted. There is one exquisite picture in the first room which I did not mention—the landscape No. 3, by James Stark, which I want you to study carefully, a picture in browns and pale golds, painted at, almost, twilight.

The second gallery is mainly devoted to Dutch Art, a phase of Art which we come to for the first time in this series of papers, and we must, therefore, consider what are its main characteristics. First, it is of the earth earthly; its contemplation makes you neither better nor worse, unless admiration for careful and minute work unconsciously educates the mind and tends to make us patient and laborious; and yet we are warned never to demand an exact finish when it does not lead to a noble end. It is absolutely true that no incidents of the lower life are painted by the Old Dutch Masters for the sake of the incident, but only for the effects of light. Look, for instance, at No. 78, a *Dutch Interior*, by Peter de Hooghe; examine the back of the room—it will take you a moment or two before you realize the marvellous painting of the stamped gilt leather—it is truly wonderful, and so are the details of the woman's dress, with her string of pearls; and yet you feel that the painter did not care for the woman, but only for the lustre on the gold and pearls. Turn where you will among the Dutch works, it is the same story, whether it is the dainty *Diamant de la Curiosité*, No. 55, by Nicholas Berghem, the *Landscape with Cattle*, No. 48, by Van de Velde, *The Peddler*, No. 49, by Frans Van Miers, or the wonderful work, *Saying Grace*, by Jan Steen, there is everything that is wonderful, and nothing that is in the least helpful. The last is thoroughly typical. A woman with a child on her lap is seated at a table in the corner of a room; on the tables in front of her are bread and cheese and a ham. Any one with local knowledge would probably fix the district in which the cheese was made; its structure is so wonderfully rendered, while as regards the ham, not only is the succulent, juicy texture painted with wonderful accuracy, but the marks of the thin-bladed knife which was used to cut it, are clear and distinct, the light and shade are so wonderfully managed. But Jan Steen, as if doubtful as to the moral value of his

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