June 12, 1838.

The PRESIDENT in the Chair.

Captain Robe, R.E. and James Thomson, were elected Associates.

Mr. Bruff exhibited an improved form of Levelling Staff. Improved Levelling Staff.
The figures on this staff are inverted, so that when viewed by an inverting telescope in the usual manner, they appear erect, and are read off without any danger of mistake; which may readily occur when some figures, as for instance 6 and 9, are read off inverted. The mechanical arrangements for extending it are with the view of securing greater steadiness. The principal improvement consists in there being attached to the bottom an universal joint, fixed to an iron plate; this plate remaining fixed, the necessary errors consequent on moving the staff for reversing its face, when the last forward station is to become the next back, are avoided.

It was suggested that the universal joint would be attended with great advantages in sloping ground; in general, however, the tripod invented by Mr. Simms was sufficiently convenient.

Mr. Bald suggested that the universal joint would be extremely serviceable if placed on something solid. It was his practice to drive a wooden plug into the ground, on which the staff was set; these plugs were left in, and serviceable for verifying the observations. He had levelled through a distance of forty miles, leaving a plug at every station.

“Description and Drawing of the Ice Boat. By S. Ballard, Ice Boat. A. Inst. C. E.”

The principle of breaking ice adopted by Mr. Ballard, as explained in a communication made last Session,* consists in forcing the ice upwards instead of forcing through it horizontally, or by pressing it down. For this purpose a frame, coated with sheet iron, is laid over the front of a boat, with an inclination downward from the boat, the lower end being under the ice. The paper describes the construction of the boat by reference to a detailed drawing and section.

* See *Minutes of Proceedings*, Jan. 31, 1837.