the proceedings of the Institution, and on several topics which could not be introduced in the Report of the Council.

Resolved, That the President be requested to permit his address to be printed and circulated with the Minutes of Proceedings.

The Ballot having been open more than an hour, the scrutineers, after examining the papers, announced the names of the gentlemen who were elected to fill the several offices in the Council, for the ensuing year.*

Resolved, That the thanks of the meeting be given to Messrs. Gordon and Davison, the scrutineers, for the promptitude and efficiency with which they have performed the duties of their office.

February 6, 1844.

The **PRESIDENT** in the Chair.

The following candidates were balloted for, and duly elected:—

Stephen Robinson and John Fowler, as Members. Robert Cowen; Benjamin Hall Blyth; John Wilson; John Houldsworth; Andrew John Robertson; James Taddy Blackburn; Æneas Coffey; John George Cockburn Curtis; and George Nasmyth, as Associates.

No. 582. "Description of a Water-wheel constructed by Mr. W.

Fairbairn, M. Inst. C. E., and erected in Lombardy." By Shute Barrington Moody, Grad. Inst. C. E.

Water-
Wheel.

The chief peculiarities of this wheel, are stated to consist, in the introduction of the tension principle for the arms, and the ventilating system for the buckets.

The use of wrought-iron bars for the arms and braces, materially diminishes the weight, as, owing to their superior strength in resisting shocks, fewer centres and arms are required, and consequently a lighter shaft can be used. The repairs are also less frequent, and are not so expensive as in wheels with cast-iron arms.

The advantage of the ventilating system is; that all the water, which in the ordinary construction, would splash with the air from the bucket and be lost in the race, is conducted by an inner sheathing or sole plate, into the lower buckets, while the air is enabled to pass off freely, behind this inner sheathing; the effective power of the wheel is thus increased, and its action is stated to be very satisfactory. The average speed is 5·25 feet per second, and the buckets are generally about two-thirds filled.

* Vide page 57.

The communication is accompanied by a drawing, No. 3477, showing the elevation and section of the wheel.

Mr. Albano stated, that having been called to Lombardy in the year 1840, for the purpose of erecting a mill for spinning and weaving flax, he selected a spot at Cassano d'Adda, where he found a stream of water, which at that time could only drive two pair of corn-mill stones, and two saw frames, each containing two long perpendicular saws. He conceived that this power might be employed more advantageously by improving the water-course, and had succeeded eventually in enabling it to give motion to upwards of six thousand spindles, and a number of power looms. For this purpose he designed the general plan of the mill, and of the water-wheel which had been described, and had intrusted its execution, with other parts of the millwright work, to Mr. Fairbairn, adopting, at his suggestion, the ventilating principle for the buckets, which had proved very advantageous. In the ordinary form of buckets, the air not being able to escape, prevented them from being filled, and thus the power of the wheel was diminished. For the purpose of avoiding that loss of power, Mr. Albano had originally designed the top of the feeding cistern to be cast of an open pattern, so as to allow the air to pass away freely, but that plan had been partially superseded by the ventilation of the buckets.

The drawings did not show, what he considered an important improvement, in the method of governing the opening of the breast-shuttle. Mr. Fairbairn's usual plan was to have a shaft across the feeder, with a chain attached to the rack, and a heavy balance weight suspended from it over the water. Mr. Albano had modified this system by introducing gearing, and a second motion, with a supplementary shaft extended into a vault beneath the mill; a much smaller balance weight thus regulated the movement of the shuttle with great ease, and it was so delicately balanced, that on one set of spindles being stopped, it was immediately perceived from the action of this governor.

Mr. Fairbairn's usual practice was, to make the periphery of his wheels move at a velocity of from 4 feet to 5 feet per second for low falls; but Mr. Albano had increased the velocity of this wheel to 5.25 feet per second, which he found to be very advantageous, and more convenient for driving machinery, which was required to attain a very high velocity. He found the effective work of the wheel to be about 0.60 of the water expended.

Mr. Mallet had found that the co-efficient of the majority of the wheels constructed in this country, was between $\frac{3}{10}$ ths and $\frac{1}{10}$ ths. Mr. Mallet.