the useful effect obtained was equal to $\frac{6}{10}$ths. of the power expended, which was higher than many of the best wheels had attained; he then described a very ingenious adaptation of the balance weight governor for the penstock, for regulating the flow of the water to the wheel.

A description of *a Water-meter*, by Mr. P. Carmichael was then read. The mode of operation of this meter, which was attached to the feed pumps of three steam boilers supplying an 80 horse engine, was thus described: as the water proceeds through the discharge valve, the float sinks until it comes in contact with a detent or catch attached to a rod, which is suspended from a lever, this moves round a spanner and pendulum, until it passes the centre of gravity, when the pendulum falls and strikes a spanner, which shuts the discharge valve and opens the inlet valve from the reservoir to the closed box which supplies the boiler; a dial, the hand of which was acted upon by the spanner, indicated the number of times of the emptying of the reservoir, and it was stated that the action of the reservoir was very correct.

DR. ROTH'S *Automaton* calculator was exhibited, and its action explained by Mr. Wertheimber. He gave a short review of the various attempts at constructing calculating machines, noticing the Roman Abacus, the calculating boxes of the Chinese and Russians; the several classes of instruments invented by Napier in 1617, by Perrault and others in 1720, and subsequently; the slide rule invented by Michael Scheffelt of Ulm, in 1699; the more important machines attempted by Pascal in 1640, by Morcland in 1673, by Gersten and by Leibnitz, which were submitted to the Royal Society of London, and the Académie des Sciences in Paris: he then mentioned the machine of Mr. Babbage, upon which upwards of £20,000 had been expended before the project was abandoned, and the finished part, which formed tables of progression up to five figures, was consigned to the museum of King's College, London. Dr. Roth's machine appeared very simple, and its results, which were severally tested, were very accurate; it performed all the operations of arithmetic from simple addition, subtraction, multiplication, and division of numbers, or of pounds, shillings, and pence to vulgar and decimal fractions, involution and evolution, and arithmetical and geometrical progression: it appeared particularly adapted for checking long calculations of quantities, for contractors, for the merchant's counting house, or for government offices. The same principle had been adopted as counters for rotary or reciprocating machines, and they appeared from the compactness of their form and their regularity of action to be well adapted for the purpose.

ACADEMY OF SCIENCES, PARIS.

Jan. 2.—The first business of the evening was the election of officers. M. Charles Dunin was elected President and M. [illegible]

the elevation of the bed of the river, which he recognised as secondary causes, but to a meteorological phenomenon, arising from the deposition of rain by the south and south-east winds. This evil, he avers, is irremediable, but he recommends all engineering measures of defence to be adopted.

M. Chevandier read a paper "*On the Cultivation of Forest Timber.*"

Jan. 29.—M. Chaussenot's Safety Valves were again brought before the Academy, being now adopted in several places.

M. Morin made some observations on steam engines, from experiments made with Watt's steam pressure indicator. He considered from the examination of the curves made by the indicator—1st. That notwithstanding the various modes of communicating motion to the distributive valves, the pressure which takes place in the cylinder during the admission of the steam, is sensibly constant, and that to obtain this constant pressure from the beginning of the piston stroke, it is sufficient to give a little advance to the admission of the steam. 2nd. That in well-proportioned engines, in which the orifices, tubes, &c. have a sectional area of about $\frac{1}{30}$th of the piston in low-pressure engines, and $\frac{1}{18}$th to $\frac{1}{20}$th or less in high-pressure engines worked expansively, the pressure in the cylinder differs a little from that in the boiler. 3rd. That it is essential by regulation of the slide valves, to give a certain advance to the emission of the steam, in order to diminish the resisting pressure from the beginning of the stroke.

A paper was read by M. Eugène Chevandier, on the elements of the composition of the various woods grown in France, and the annual average produce of hectare (2½ English acres) of forest land.

M. Raulin, vice-secretary of the Geological Society of France, read a paper on the opinion of M. Marcel de Serres, that native mercury is not to be found in more recent strata than the red granite, and that there does not exist in the Aveyron any native mercury analogous to that of Idria.

A communication was read from M. Duchartre, on an *exhausted volcano* near Beziers, on the *Rocque-Haute*. He states that the crater is perfectly distinct, and can only account for its not having been mentioned in any of the recent works of geology by supposing that the wood with which the plateau of *Rocque-Haute* is crowned has caused it to escape notice.

A communication was read from M. Micallet, a physician of Malta, on the surprising effects of the sesquiodine of mercury in ulcerations of the cornea, particularly with scrofulous patients.

A communication was read from M. d'Hombres Firmas, on the electrometer of M. Majocci, of Milan. The writer states, that with this instrument the nature of every kind of electrical current may be fully ascertained.

NOTES OF THE WEEK