

ary 26, 1859; while, from 1893 to 1900, twenty-seven strong shocks were felt, six of them being of ruinous strength.

Many of these earthquakes were closely connected as regards time with Etnean eruptions. The earthquake of 1805 occurred after, and that of 1859 during, a period of activity. The earthquake of 1865 took place eighty-eight days after the conclusion of a violent eruption; and that of 1911 twenty-two days after the close of the last eruption, which began on September 10 of that year and lasted for twenty-three days. The recent shock occurred about two years and eight months after the end of the same eruption.

The same phenomena seem to characterise all the earthquakes of this district. The disturbed area is small, the intensity of the shock great in its central portion, and the isoseismal lines extremely elongated in form. In some cases the axes of the isoseismal lines are directed towards the central crater; in others (as in the earthquake of 1911) in a perpendicular direction. The small depths of the foci, their situation within the Etnean boundary, the direction of the meizoseismal bands, and the close connection of many of the earthquakes with eruptions of Etna—all these phenomena point clearly to the volcanic origin of the earthquakes, their immediate cause being probably local slips along radial and peripheral fissures.¹

C. DAVISON.

THE BACHELET LEVITATED RAILWAY.

THE daily Press, or rather a section of it, has been greatly excited during the past week by the exhibition of a model railway, the invention of M. Emile Bachelet, in which a metal carriage is levitated in the air above the rails in a model railway, and then flung forward with very great speed through a series of solenoids. The reporters for the daily Press have discovered new and tremendous possibilities in a scientific principle entirely new to them, but which has been perfectly well known to every electrician and physicist for the last twenty-five years.

The repulsion of a metal plate or ring by an electromagnet or coil carrying an alternating current was discovered independently by Dr. J. A. Fleming and by Prof. Elihu Thomson. In 1887 Dr. Fleming invented and described in the *Electrician* of March 25, 1887, an alternating current galvanometer, in which a copper disk suspended in the interior of a coil carrying an alternating current was repelled and deflected. On June 10, 1887, Prof. Elihu Thomson published in the *Electrician* a lecture on novel phenomena of alternating currents, in which he described the repulsion of copper disks and rings by an alternating electromagnet. Prof. Thomson's apparatus was exhibited at the Paris Exhibition in 1889, and the experiments shown by Prof. Fleming to the Royal Society of Arts in a lecture in May, 1890, and also at a Royal Society *soirée* in the same year,

¹ M. Baratta, *I terremoti d'Italia*, 1901, pp. 829-33; A. Riccò, *Boll. Soc. Sis. Ital.*, vol. xvi., 1912, pp. 9-38.

as well as at a Friday evening discourse at the Royal Institution in March, 1891.

Dr. Fleming expounded the whole matter with numerous striking illustrations. Heavy copper rings were made to float in the air, or were shot up into the air with great velocity. This repulsion is due to the repulsion between the currents in the magnet coil and the eddy currents set up by the alternating field in the plate or ring.

The principle was applied by Prof. Elihu Thomson in the invention of an alternating current electric motor, and it has been developed in the well-known compensated repulsion motor of Winter and Eichberg. It is also applied in several forms of rotating and recording electric meter. The phenomena known as "electromagnetic repulsion" are therefore perfectly familiar to electrical engineers, and except in the ingenious application to the support of a model railway carriage there is nothing new. Press reporters and others who have been astonished by the exhibition of this force are merely learning afresh facts which were publicly exhibited and described by Profs. Fleming and Elihu Thomson nearly a quarter of a century ago. Careful experiments and quantitative measurements will, however, be necessary before any valid opinion can be formed whether the principle admits of economical application in the propulsion of real railway trains. Nevertheless M. Bachelet deserves credit for his highly ingenious application of this well-known principle of electromagnetic repulsion.

NOTES.

LORD LAMINGTON, G.C.M.G., G.C.I.E., has consented to be president of the Research Defence Society, in succession to the late Sir David Gill, K.C.B., F.R.S.

ON the recommendation of the council and of the special committee on the Hayden award, the Academy of Natural Sciences of Philadelphia has this year conferred the memorial gold medal on Dr. Henry Fairfield Osborn, in recognition of his distinguished work in vertebrate palæontology.

AT the annual meeting of the Irish Forestry Society on April 23, it was stated by Prof. Campbell that the department hoped to secure 15,000 acres for State forestry in Ireland. A grant had been obtained from the Development Commissioners of 31,430*l.*, spread over fifty-two years, for a scheme of forestry in Cork, and the department is applying for a further grant of 45,000*l.* It is thus evident that State forestry in Ireland has broken ground in earnest, and this makes it all the more remarkable that State forestry in England and Scotland should still be waiting to start.

THE sixtieth general meeting of the Institution of Mining Engineers will be held in London, on Thursday, June 4, in the rooms of the Geological Society, under the presidency of Sir William E. Garforth. The following papers will be read, or taken as read:—Sinking and equipment of Blackhall Colliery for the Horden Collieries, Ltd., J. J. Prest