

rocks of Zálasy, near Krzeszowice, which break through sedimentary strata of Triassic age. The author, considering the microscopic structure of these rocks, argues that they are real Trachytes and not Porphyries, as was before supposed. This view is corroborated by the construction of the felspar in regular zones, enveloping one another, the numerous glass-cavities in the latter as well as in quartz, while there exist no fluid-cavities at all, and the abundance of glass and the want of quartz in the seemingly compact base.—Dr. G. A. Koch on the Arlberg tunnel. He showed four sheets of a large and detailed geological map on the scale of 1 : 2000, drawn from nature, representing the nearest environs of the tunnel line on the Arlberg, as it was marked out last summer, and illustrated it by a series of sections and specimen of rock. The whole mass of rock to be perforated by the tunnel belongs to the group of gneiss-phylite, which just at the Arlberg changes into quartz-phylite, wherein pure quartz abounds. The tunnel measures 6,470 metres in length, and attains its culmination in 1,423 metres above the sea, running always nearly parallel to the direction of the strata. This tunnel must be led somewhat more than 4.5 kilometres, or about 70 per cent. of its length, through a light-coloured gneiss, which may contain in the least favourable parts about one-fifth of pure quartz. Nevertheless the working of this rock will present no difficulties, as it contains a great deal of felspar, and the vaulting of the tunnel will only be necessary in a few localities where the slates of gneiss are exceptionally very thin. A little more than one kilometre, or about 15 per cent. of the length of the tunnel line passes a nod-slate (Knoten-Schiefer) similar in structure to gneiss, and easily wrought. Scarcely half a kilometre, or about 7 per cent. of the length, belongs to a very hard, small-laminated mica-schist, containing a great deal of quartz, and the rest, somewhat more than half a kilometre, or about 8 per cent. passes a ferruginous mica-schist, including garnets, that abounds more and more in quartz, when coming from Stuben, the Tyrol side of the Arlberg is reached. Dr. Koch also mentioned the difficulties arising from the direction of the strata and the dangerous influence of water in some parts, which are unfavourable to the construction of this tunnel. Finally, he stated that another newly proposed line, though it passes 10.5 kilometres in length directly through the crystalline rocks, would not only afford more security, but also would be less expensive, as the total length of the railroad would be diminished, and the management of it much easier, the culminating point of this longer tunnel lying 108 metres deeper than that of the shorter one.—Dr. R. Hörnes gave an account of his last summer's work. In Austrian countries he mapped the valleys of old and new Prax, Höhlenstein, and Sexter, then the eastern declivities of the Ampezzo Valley; in Italy he examined the valleys of Cadore, Auronzo, and Comelico. The detailed geological map presented by him comprises therefore nearly the same region, which Dr. H. Loretz had described in the Journal of the German Geological Society in 1874.—Mr. F. Gröger spoke about the occurrence of ores of antimony in the Isle of Borneo.

PARIS

Academy of Sciences, July 24.—Vice-Admiral Paris in the chair.—The following papers were read :—On observation of the infra-red part of the solar spectrum by means of the effects of phosphorescence, by M. Edm. Becquerel. Through two vertical slits in a shutter are admitted two beams of parallel solar rays. One beam, traversing a sulphide of carbon prism and a lens, gives a spectrum which is made to fall on a phosphorescent matter; the second beam passing through a white flint prism gives a spectrum, the ultra-violet part of which is thrown upon the infra-red part of the first spectrum. What occurs is this: In the infra-red part of the one spectrum, the impressionable matter excited by the ultra-violet rays has its phosphorescence destroyed, but unequally, giving an appearance of unequal illumination. Not all phosphorescent substances give the effect immediately, and some do not give it. The best substance was found to be phosphorescent hexagonal blende.—M. Becquerel gives particulars of the lines, wave-lengths, &c.—Note on paraldol, a polymeric modification of aldol, by M. Wurtz.—Second note on the reduction of demonstrations to their most simple and direct form, by M. de Saint-Venant.—Theory of the modification of branches to fulfil different functions, deduced from the constitution of the Amaryllidæ, &c., by M. Trecul. Branches may be divided into the terminated or definite, and the non-terminated or indefinite. The definite branches are the leaves, stipules, spaths, bracts, sepals, petals, stamens, and styles, or stigmatic divisions. The indefinite branches are the roots or subter-

ranean branches and the adventitious, the aerial branches properly so-called, the peduncules, the receptacular cups, the ovaries, and lastly the ovules.—Reply of M. Hira to the critique of M. Ledieu in *Comptes Rendus* of July 10.—On the flowering of *Cedrela sinensis* at the Museum, by M. Decaisne. A Chinese tree.—M. Milne-Edwards referred to the loss sustained by the Academy in the death of M. Ehrenberg, who was one of the Foreign Associates on June 27 last.—On the production of electric effluvia, by M. Boillot. Two modifications of apparatus formerly described.—Photometric researches on coloured flames, by M. Gray. He describes a new method.—Note on the radiometer, by M. Gaiffe. He makes one with the vanes painted dull-blue on one side, dull-red on the other; it will turn either way according to the source of light and heat. Solar rays move it one way, a gas flame or radiation from a heated iron plate sends it the opposite.—On radiometers with vanes formed of different matters, by MM. Alvergniat Bros. No. 1 had vanes of silver and transparent mica; No. 2, aluminium and blackened mica; No. 3, aluminium and unblackened mica; No. 4, a radiometer weighing altogether 600 mgr.; No. 5, silver and aluminium; Nos. 6, 7, 8, mica and varnished copper, green, blue, red, and yellow. Effects are described.—On the cause of movement in the radiometer, by M. Sulet. He supposes it to be a difference of temperature in the faces of the vanes. A radiometer with magnetic needle retained an invariable position of deflection four days, the light source remaining constant. Action of condensed gases cannot be admitted here. Decomposition of alkaline bicarbonates, moist or dry, under the influence of heat and vacuum, by M. Gautier.—Photographic inscription of the indications of Lippmann's electrometer, by M. Marey. The opacity of the mercury column is utilised to obstruct, to a variable extent, a slit through which light passes to the photographic screen. The electrometer is somewhat modified. M. Marey shows the curves got from variation of the electromotive force in the heart of a tortoise and that of a frog.—On the existence of alterations in the peripheral extremities of cutaneous nerves in a case of pemphigoid eruptions, by M. Dejerine.—On the physiological theory of fermentation, and on the origin of zymases (soluble fermentations), *apropos* of a note of MM. Pasteur and Joubert on the fermentation of urine, by M. Bechamp.—On the malacologic fauna of the islands St. Paul and Amsterdam, by M. Velain.—On the reproduction of diolic Volvox, by M. Henneguy. Sexuality appears by slow degrees, the male sex before the female, in proportion as the species is exhausted by a sexual reproduction.—On the geological age of some metallic veins, and especially veins of mercury, by M. Virlet d'Aoust.—On the photography of colours, by M. Cros.—On the vertical column observed above the sun on July 12, by M. Guillemin.—M. Larrey presented an Italian memoir by Dr. Minich, "On the antiseptic cure of wounds, and a new mode of dressing." He (Dr. Minich) prefers sulphite of soda to phenic and salicylic acid.

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ERRATUM.—Vol. xiii. p. 155, col. 1, line 15 from bottom, for "mile" read "rule."