of the groups, Cl—Ag^{I}—Cl and $Pd^{IV}(NH_3)_2Cl_4$, in these crystals.

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Kornerupine from Rannu, Uttar Pradesh, India

KORNERUPINE, a rare magnesium–aluminium borosilicate, is reported for the first time from India. It occurs in a small band of coarse biotite-schist in the pre-Cambrian pink biotite-gneisses, about a mile and a half north-west of Rannu (24° 53′ 45″ : 83° 13′), Dudhi *tehsil*, Mirzapur District, Uttar Pradesh.

The kornerupine prisms occur in aggregates, which are sometimes radiating. Well-developed crystals with the characteristic faces were not noted. The mineral is light to dark grey, has a semi-vitreous to greasy lustre and breaks with an uneven fracture. Its hardness is 6–7 (Mohs's scale); specific gravity of a fairly pure lump, 3·27. In thin sections, the mineral is colourless, non-pleochroic, with one set of indistinct, prismatic (110) cleavages. Fractures transverse to the elongation direction, usually parallel, are common. The refractive indices determined in sodium light at room temperature (32° C.) are $N_x = 1{\cdot}6755$ ($\pm$ 0·0015), N_y and $N = 1{\cdot}6905$ ($\pm$ 0·0005); $N_z - N_x = 0{\cdot}015$. $2V_x$ determined on a four-axis Federov stage is 17° ($\pm$ 1). Prismatic sections show straight extinction, and are length fast. The optic axial plane is parallel to (100); $c = X$, $b = Z$, $a = Y$.

Thin sections of the kornerupine aggregates show, in places, intergrowth with a few grains of green spinel and colourless corundum, both of which are occasionally surrounded by narrow plates of sapphirine (colourless to pale blue pleochroism). Euhedral sapphire and irregular grains of rutile are often present. Radial cracks are common around zircon inclusions. Two small sillimanite needles were noted within the kornerupine in one of the sections.

Some parts of the biotite schist are rich in thin aggregates of short sillimanite needles; here spinel and corundum are rare and kornerupine appears to be absent. Where kornerupine is well developed, spinel and corundum occur only in minor amounts. The felspathized schists do not show kornerupine and the associated minerals.

Kornerupine has been reported previously in association with sapphirine, gedrite, corundum, sillimanite, andalusite, etc.[1]. The Rannu occurrence is apparently the only one in which the mineral is associated with green spinel. Further work on the mineralogy and paragenesis of the kornerupine is in progress.

Mr. B. J. Skinner, of the Department of Geology, Harvard University, has confirmed the identification of the mineral by X-ray analysis and I thank him for the same. This communication is published by permission of the Director, Geological Survey of India.

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A New Type of High-Voltage Machine

THE Van de Graaff high-voltage generator is limited as to its current output by the electrostatic charges which can be carried on moving belts. If a belt could be made to carry charged condensers instead of such surface charges, the current output would become much greater.

This can be achieved in the following way. A series of condensers is attached to or incorporated in an endless moving belt and it is so arranged that they become charged on passing a certain point (A, Fig. 1), but later become connected in series as they travel away (B). In this way, it should be possible to add voltages together and generate very high potentials.

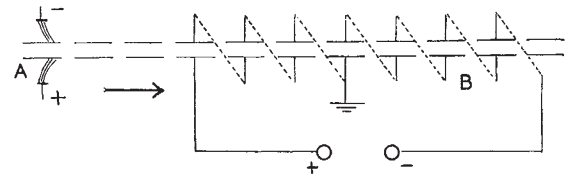

Fig. 1

To test the principle, thirty 8-kV. porcelain tubular condensers of capacity 0·001 mfd. were mounted between two disks of 'Bakelite' board (30 cm. in diameter) forming a circle near the periphery. The terminals of the condensers were connected to brass segments fastened to the outer rims of the disks, and the whole system was mounted on an axle and driven by a motor. Two brushes (at the bottom of the machine) connected to a 7-kV. d.c. supply charged the condensers as they passed. Over the upper half of the disks a set of stationary wire links was provided which connected in series the thirteen condensers that at any moment happened to be at the top. The middle of this set of links was earthed to minimize sparking from either end.

On rotating the wheel at 750 r.p.m., a discharge occurred between blunt wires up to a distance of 11 cm., corresponding to a potential difference of at least 80 kV. It thus appears that very high voltages can be built up almost additively in this way, and with suitable capacity quite heavy currents should be available.

Dr. J. E. Best has kindly directed our attention to an earlier reference[1] in which the same principle has been employed before, chiefly for the purpose of isolating circuits, but with no reference to the production of high voltages.

We have now constructed a larger machine at Newcastle in which the condensers are stationary and