containing one equivalent each of calcium and magnesium; but with an admixture of silica in the one case of about 17, and in the latter case of 14·5 per cent. in excess.

This ingredient is doubtless a mechanical adjunct to the diopside, and is derived from the silica brick, to the presence of which the formation of the diopside is due. The portions of the mass in which the alkaline earths are in excess do not contain the diopside, and they gradually become slaked on exposure to the air. The composition of such an ideal diopside would be that indicated by the numbers in column (4), its formula being $CaMg2SiO_3$.

Column (3) represents the results of an analysis by Rammelsberg of a diopside from Retzbanya, which is given for comparison with that of the artificial diopside rock. The artificial production of an augitic mineral is no new fact; but the formation on a considerable scale of a veritable diopside rock appears to be as novel as it is interesting.

XIII. *Enstatite Rock from South Africa.* *By* N. S. Maskelyne, *F.R.S.*

Mr. Maskelyne exhibited sections of a rock from two different localities in the Transvaal, which, when examined under the microscope, presented all the characters of a very crystalline enstatite without affording evidence of the admixture of other minerals; and this anticipation of its nature has been subsequently confirmed by Dr. Prevost in Mr. Maskelyne's laboratory at Oxford. The specimens from which the sections were made were collected by Mr. Dunn, who described the two rocks in question as forming hills of boss-like form at Korn Kopje, and at a place twelve miles south of Holfontein in the Witfontein Mountains, to the south of Lydenburg in the Transvaal.

The occurrence of a pure and massive enstatite rock is new to petrology, though rocks (such as lherzolite) are known in which enstatite is a very prominent ingredient mineral. Its occurrence in South Africa has, moreover, a special interest, since Mr. Maskelyne first asserted the enstatitic or bronzitic origin of the rock in which the diamonds occur in that region of the world. The serpentinized mass of which the diamond-mines are composed was first shown, on crystallographic and microscopic grounds, to have contained, and in no inconsiderable degree to have consisted of, bronzite (ferro-magnesian enstatite); and this was confirmed by actual analysis, by Dr. Flight, of the grains of bronzite still left unaltered in that rock. (See Quart. Journ. Geol. Soc. vol. xxx. p. 406, 1874.) The diamantiferous rock, however, contains other minerals, and must have been not very dissimilar to lherzolite. The enstatite rock from the neighbourhood of Lydenburg is, on the other hand, composed nearly exclusively of that mineral, which is chiefly familiar to the mineralogist from its being an important ingredient of meteorites, and is likely, in other respects, to become recognized as a more frequent ingredient of rocks than has hitherto been anticipated, though, like the kindred mineral olivine, the more ferruginous kinds have frequently undergone a more or less complete serpentinization. The Baste rock in the Hartz and the so-called pseudophite of Zdjar are known to be still rich in enstatitic mineral, though otherwise almost completely metamorphosed; and in many serpentines, such as that of the Lizard, crystals whole or in part still survive as witnesses to the original nature of the rock. Mr. T. Davies has also pointed out to the author of this notice that the eulysite from Tunaberg presents, under the microscope, the characteristic features of enstatite or bronzite in one of its ingredient minerals—the other minerals associated with it being olivine and garnet, as is the case in some specimens of lherzolite, though the two rocks are quite dissimilar in aspect.

The following Table exhibits the analysis (1) of the Korn-Kopje rock by Dr. Prevost, in which all the iron is assumed to be in the ferrous condition; (2) of a rock from the Radauthal (occurring in bastite) in the Hartz, by Streng (*Jahrb. Min.* 1862); (3) of that in the lherzolite of L. Lherz, by Damour (*Bul. Géol.* xxix. p. 413):—

	(1)	(2)	(3)
Silica	53	54·15	54·76
Alumina	2·6	3·04	4·90
Ferrous oxide . . .	9·27	12·17	9·35
Manganous oxide . .	2		
Magnesia	25·5	28·37	30·22
Lime	6·6	2·37	
	98·97	100·10	99·23

The excess of lime in the analysis is probably traceable to an augitic mineral, a diopside, probably present as an ingredient, although not yet recognized by the microscope in the sections made from the South-African rocks. In fact the microscope, so invaluable as an instrument for pioneering in the realm of petrology, is frequently an untrustworthy guide when too much relied on—that is to say, when the results obtained by it are not checked and confirmed, and in fact supplemented by the more tedious methods of investigation pursued in the laboratory.

XIV. *On a Horizontal Goniometer.* *By* Victor von Lang.

[Plate IV. figs. 7 & 8.]

The instrument represented in fig. 8 owes its existence to the necessity of being able to measure refractive indices at different angles of incidence. This is of great importance when one wants, like Professor Stokes, to verify the theoretical formulæ of double refraction by experiment, or when one tries, on the contrary, to determine with the aid of these formulæ the constants of double refraction from observations on a prism of arbitrary position.

The measurements I made in order to determine the figure of the wave-surface in quartz near its axis belong to the first kind of researches; whereas the determination of the refractive indices of gypsum I have just finished gives an example of the second kind of researches, as for that determination one single prism was made use of.

The chief requisites of such an instrument are two concentric axes—the inner one carrying the vernier and the prism-table, the outer movement carrying the telescope and the graduated circle. A collimator with slit is, of course, fixed to the tripod of the instrument.

The two axes are not put into one another, as is done in geodetical instruments, for the sake of repeating the angles; but here the tripod (G) is terminated in a strong cone that forms the axis on which the circle (C) turns, whereas a hole in the centre of the cone supports the axis (A) of the vernier (n). Fig. 7 shows this arrangement in a sectional drawing.

Both axes may be clamped by the screws L L′, and micro-