XII. *On an Artificial Diopside Rock formed in a Bessemer Converter.* *By* N. S. Maskelyne, *F.R.S.*

Mr. Maskelyne drew the notice of the Society to the production of diopside on a considerable scale at Blænavon by Mr. Percy Gilchrist and Mr. Sidney Thomas, during some experiments those gentlemen conducted having in view the elimination of phosphorus in the Bessemer converter. The artificial diopside was produced in a downdraught kiln at a very intense and prolonged heat—the kiln being lined with silica bricks, which were in contact with a moderately aluminous and siliceous magnesian limestone. The product resulting from the action of the bricks on the limestone occurs in large masses, portions of which present the appearance of an interlaced mass of glistening crystals of a grey hue.

Here and there, in hollows, minute crystals are met with presenting faces; and on placing one of these on the goniometer the nature of the mineral was placed beyond doubt.

It is, in short, diopside, with the forms m, $\{1\,1\,0\}$; b, $\{0\,1\,0\}$; o, $\{\bar{2}\,2\,1\}$; s, $\{\bar{1}\,1\,1\}$, as is seen from the following comparison of the calculated with the measured angles:—

	Calculation.	Found.
$m\,m'$	= 87° 5′	87° 18′ 45″
$m\,b$	= 43 32½	43 36
$a\,b$	= 46 27½	46 21
$m'\,o$	= 35 25	35 39½
$m'\,s$	= 58 46	59 38
$m\,s$	= 78 56	78 44

Two specimens of this artificial rock were analyzed by Mr. Gilchrist, and gave the numbers in columns 1 and 2:—

	(1)	(2)	(3)	(4)
FeO . . .	1·63	1·63	1·38	
Al_2O_3 . . .	2·47	2·47		
CaO . . .	19·50	21·00	25·05	25·93
MgO . . .	14·45	16·49	17·36	18·52
SiO_2 . . .	63·00	58·75	56·03	55·55
	101·05	100·34	99·82	100·00

These analyses correspond very nearly to that of a diopside 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