A NOTE ON THE PETROLOGY OF THE CORUNDUM AND CHROMITE-BEARING ROCKS OF THE SITHAMPUNDI-RAMADEVAM AREA, NAMAKKAL TALUK, SALEM DISTRICT, MADRAS

DURING the re-examination of the Sithampundi corundum belt, a hitherto unrecorded occurrence of chromite ore was located. The results of a preliminary examination of the rocks of this area are outlined below :—

Anorthite-hornblende gneisses form an arc shaped belt, with a southerly convexity, and run for a length of nearly fifteen miles, from Pattalur in the west to Kottakkalpalaiyam in the east. The general trend of these gneisses is W.N.W. in the west gradually veering to E.N.E. towards the eastern end and maintaining an uniform southerly dip. The chromite-bearing amphibolites and the associated pyroxenites and pyroxene-garnet rocks occur interbanded along the foliation planes of the anorthite-hornblende gneiss. Several bands of chromite-bearing amphibolites of varying thickness traverse practically the whole of the anorthite gneiss belt.

The anorthite-hornblende gneiss is an even grained pale coloured rock, essentially made up of basic feldspars and greenish black amphiboles, the latter arranged with their longer axis parallel to the general direction of foliation. Textural, as well as mineralogical variants of the main type are met with, some varieties being salic, wherein the development of minerals like chondrodite, zoisite, scapolite and garnet is marked. The corundum for which these rocks are quarried occurs sparsely distri-

buted in the rock and is generally surrounded by a shell of calcite, and is of a pale green colour. But a pink variety of the mineral occurs along the intrusive contacts of the anorthite gneiss and chromite-amphibolite. It is probable that the two varieties of the mineral are of diverse origin.

In thin section the rock is equi-granular and made up of a groundmass of broken up basic feldspars. These have been described as 'Indianite' (anorthite) by Count de Bournon. Determinations of the An content of a few pieces of the mineral on the Fedorov universal stage however, show them to range in composition from An = 55% to 100%. The pieces examined displayed twinning of the ALA, MANEBACH, and MANEBACH-ALA types. Variation in the An content of adjacent lamellæ to the order of 18% is a feature recorded in some of the pieces examined. The amphibole noticed in these rocks is of a pale green variety with the following optical characters :—

X = yellow green, Y pale green, Z grass green, $2V = -80° \pm 4$, $C \wedge Z = 13° \pm 2$, conforming to those of Actinolite. Other minerals noticed in micro-sections of these rocks are, chondrodite, garnet, apatite, corundum, scapolite and clinozoisite (Fouqueite) with $2V = 188°$.

The chromite bearing amphibolite is a beautiful green rock made up of acicular needles of green hornblende, and grains and stringers of chromite, while grains of pink corundum are noticed in the rocks along the contact zone. Experiments on the electromagnetic concentration of this rock show the maximum chromite content to be about 55 per cent.

In thin sections the rock is made up of an aggregate of green pleochroic amphibole with the following optical characters :—

X = green, Y = yellowish green, Z = bluish green, $2V = +78° \pm 4$, $C \wedge Z = 23° \pm 3$ (or even 30°). It is probably a variety of pargasite. In some of the microsections a non-pleochroic bladed amphibole displaying straight extinction was noticed. The optic axial angle was found to be $2V = -84°$, indicating it to be the rhombic amphibole gedrite. The fine play of colours exhibited by the mineral in hand specimens may be attributed to the presence of microscopic inclusions. Other minerals observed are zoisite, corundum, picotite, secondary chlorite and talc.

The garnetiferous pyroxenite is made up of a groundmass of diopsidic pyroxene ($2V = +56°$) in which are embedded crystals of pale yellow garnet which show alteration to kelyphite and chlorite. The rock is devoid of feldspars. The pyroxenite is an aggregate of clino and orthopyroxenes, the former has the following optical constants, ($2V = +48°$; $C \wedge Z = 40°$), while the latter is pleochroic hypersthene.

Origin of Corundum.—As already referred to, the pale green corundum in these rocks is generally covered by a shell of calcite. This is suggestive of the splitting of anorthite by the action of CO_2, produced during the intrusive period, and the consequent formation of Al_2O_3 and calcium carbonate ($CaO\ Al_2O_3\ 2SiO_2 + CO_2 = CaCO_3 + Al_2O_3 + 2SiO_2$). The possibility of such action is supported by the presence of veins of calcite and quartz in the area.

The corundum in the amphibole rock may be due merely to an excess of alumina in the original basic intrusive, probably a pyroxenite. Its abundance in the zone of contact with the anorthite-corundum gneiss may be attributed to concentration during intrusion possibly aided by chemical changes resulting in the production of free alumina.

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