

*On the Crystallography of the Rubies from Macon County, North Carolina.*

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THE ruby crystals from the Cowee Valley, Macon County, North Carolina, show a very wide variation in their development. Although many of the crystals are so striated that no crystallographic measurements were possible on the reflecting goniometer, the faces were readily identified by means of the contact goniometer. On some of the crystals the faces were bright and smooth, making them well adapted for measurement on the reflecting goniometer. The following references are to Plate 1.

Among the crystals examined there were two common habits noticed, one, as shown in Figs. 1 and 2, which is a combination of the base  $c(0001)$  and the unit rhombohedron  $(10\bar{1}1)$ ; the other, represented by Figs. 3 to 6, where the prism  $a(11\bar{2}0)$  is very prominently developed. The rhombohedral crystals vary from those where the base is largely developed, having a diameter of 12 mm., while the rhombohedron is only 1.5 mm., to some (Fig. 1) which have the base and rhombohedron more equally developed. The majority of these crystals have, however, the base more largely developed, thus giving the crystals a flat tabular appearance. This rhombohedral development is very similar to that of the sapphires from Yogo Gulch, Montana, described by the author.<sup>1</sup>

On some of the prismatic crystals the prism reaches a length of nearly 15 mm. in the direction of the  $c$  axis, and has the rhombohedron but slightly developed (Fig. 3), while on others the prism is very short and the rhombohedron sometimes is wanting, as represented in Figs. 4 and 5.

Another habit of these crystals is shown in Figs. 7 and 8. There the pyramid  $n(22\bar{4}9)$  is well developed. This face was identified by means of the contact goniometer, the measurements approximating closely to the calculated angles. The usual form of these crystals is shown in Fig. 7, where the faces  $c(0001)$ ,  $a(11\bar{2}0)$ ,  $r(10\bar{1}1)$  and  $n(22\bar{4}9)$  are nearly equally developed. On some of the crystals the prism is very prominent, being 8 mm. in length in the direction of the  $c$  axis, while the pyramid is only 1.5 mm. On others the pyramid is only very slightly developed. A few crystals were examined which showed only the presence of the base, the rhombohedron and the pyramid, as represented in Fig. 8. The crystals,

<sup>1</sup> *Amer. Journ. Sci.* Vol. IV. 1897, p. 424.

measuring up to 7 mm. in diameter, were doubly terminated and nearly perfect in their development.

The crystals represented by Figure 7 are similar to those described by Max Bauer<sup>1</sup> from the Burma district, and are almost identical in form with a sapphire crystal figured by the author, from Emerald Bar, Canon Ferry, Magher County, Montana.

Although both the basal and rhombohedral planes are very often striated, it is only on the basal planes that these are sharp and distinct and can be measured. The striations are parallel to the three intersections of the base  $c$  with the rhombohedron  $r$ , as shown in Fig. 5.

A very common development that was noticed in nearly all the flat rhombohedral crystals, and on many of the prismatic crystals, is a repeated growth on the basal plane of the rhombohedron  $r(10\bar{1}1)$  and the base  $c(0001)$ , as represented in Figs. 1 and 6.

To better illustrate the variation in these growths, a series of figures (9 to 14) have been drawn in basal projection. In Figs. 9 and 10, which represent the more common development of these repeated growths, there is but one secondary rhombohedron and base, which sometimes has one of its rhombohedron faces a continuation of one of the rhombohedron faces of the crystal. Figs. 11 and 12 represent repeated growths, the faces of which are separate and distinct from each other and from the faces of the main crystal. In the crystals represented by Fig. 12, when the secondary growths are but slightly developed the basal plane of the crystal has the appearance of being striated with triangular markings. In Figs. 13 and 14 there are represented a series of growths where a number of the rhombohedral faces coincide.

Some of the pyramidal crystals (Figs. 7 and 8) also showed the development of the secondary growth of rhombohedron and base.

The thickness of the rhombohedron of the secondary growth varies from those that are so thin that they appear like striations to some that are 2 mm. thick.

This same style of development has been described by Bauer<sup>2</sup> as occurring in the Burma rubies, and it has also been described by the author<sup>3</sup> as occurring on the Montana sapphires.

A few crystals were observed on which there was a secondary growth parallel to the prism ( $1\bar{1}20$ ).

<sup>1</sup> *Neues Jahrb. Min.* 1896, II. 197.

<sup>2</sup> *Loc. cit.* p. 209.

<sup>3</sup> *Amer. J. Sci.* Vol IV. 1897, p. 424.