

*Ilmenite from Jacupiranga, Brazil.*

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**D**URING the summer of this year certain crystals of zirkelite from Ceylon were entrusted to the author for crystallographical investigation, and in that connexion the specimens placed under this species in the British Museum collection were examined for the sake of comparison. The whole of the latter specimens come from Jacupiranga in São Paulo, Brazil: some of them had been presented by Dr. E. Hussak and formed part of the material on which he and Dr. G. T. Prior<sup>1</sup> conducted their investigation which led to the first discovery of zirkelite, while the remainder were purchased subsequently. The latter included a lot of small, brilliant crystals (numbered 86034 in the General Register) which differed so markedly in lustre from the other crystals as to suggest that they had been incorrectly determined. Goniometrical examination leaves no doubt that the crystals are really ilmenite, a mineral already described by Dr. Hussak<sup>2</sup> from the same locality. His crystals have three habits, viz., *cr*, *crn*, and *crsn*.<sup>3</sup>

The crystals examined by the author have also three habits, viz., *cam*, *camrX* (fig. 1), and *cnX* with *r* and *s* small (fig. 2), slightly different

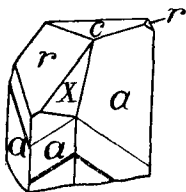


Fig. 1.

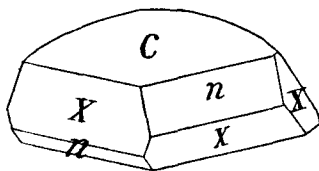


Fig. 2.

Ilmenite from Brazil.

<sup>1</sup> Min. Mag., 1895, vol. xi, pp. 86-88.<sup>2</sup> Min. Petr. Mitt. (Tschermak), 1895, vol. xiv, p. 407.<sup>3</sup> The notation adopted in Dana's 'System of Mineralogy,' sixth edition, 1892; and used also by Dr. Hussak.

from the above. The form  $X = (53\bar{1}) = (4483)$  had not been definitely noted on ilmenite until it was found by Mr. R. H. Solly<sup>1</sup> on crystals collected by him in the Binnenthal, Switzerland: on these crystals the form is represented by very small faces, whereas on those from Brazil it is most prominent, particularly in the case of crystals such as that shown in fig. 2. It must, however, not be overlooked that Dr. Hussak<sup>2</sup> described prismatic crystals in which the prism-faces are strongly striated in the horizontal direction and which are terminated by a relatively small basal plane and by a pyramid-form steeply inclined to it. This form is no doubt  $X$ , although, as he points out, since there is no form present to determine definitely the orientation, it might possibly be  $l = (4\bar{1}\bar{1}) = (5052)$ . Further, these crystals give a relatively strong reaction for magnesia, and in minute splinters transmit light of a violet colour.

The present crystals were found by Dr. Prior, using a microchemical test (the precipitation of ammonium-magnesium phosphate), to contain some, but probably only a very small percentage of magnesia. On the other hand, they are opaque, even in the thinnest fragments, and the prism-faces are striated obliquely (cf. fig. 1). The faces of the form  $\alpha$  are, indeed, frequently striated parallel to their intersection with the contiguous faces of the form  $r$ , and thus reveal the hemihedral type of symmetry characteristic of this mineral; occasionally each face of the form  $X$  is also striated parallel to its intersections with the nearest face of the form  $r$ .

The measurements made on eight crystals are summarized in the following table:—

*Measurements from  $c = (111) = (0001)$ .*

Form.	Calculated <sup>3</sup> Values.	Observed Means.	No.	Limits of Observations.
$r = (100) = (10\bar{1}\bar{1})$	$57^{\circ} 58\frac{1}{2}'$	$57^{\circ} 58\frac{1}{2}'$	12	$57^{\circ} 49' - 58^{\circ} 6'$
$X = (51\bar{3}) = (4483)$	$74 50\frac{1}{2}$	74 49	18	74 25 - 75 8
$n = (31\bar{1}) = (2243)$	61 33	61 33	5	61 16 - 61 45
$s = (11\bar{1}) = (0221)$	72 38	72 21	2	72 14, 72 28

<sup>1</sup> Min. Mag., 1906, vol. xiv, pp. 184-186.

<sup>2</sup> Loc. cit., p. 408.

<sup>3</sup> Calculated from the element of N. I. Koksharov, 'Materialien zur Mineralogie Russlands,' 1870, vol. vi, p. 357, which is adopted by Dana, 'System of Mineralogy,' sixth edition, 1892, p. 217.

The azimuthal readings closely approximated to  $30^\circ$  or  $60^\circ$ . The differences from these values rarely exceeded  $2'$  in the case of well-defined reflections;  $10'$  was the maximum noted even in the case of a confused blur. The observed values for  $ca$  and  $cm$  approached  $90^\circ$  closely.

The forms  $crX$  and  $n$ , and, where present,  $a$  and  $m$ , are well developed. The form  $s$  was only twice observed and in each case the face was minute.

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