Mineralogy. — *On manganite*. By L. P. G. KONING. (Communicated by Prof. H. A. BROUWER.)

(Communicated at the meeting of November 29, 1947.)

In a collection of minerals used for pyrochemical experiments in the Geological Institute of the University of Amsterdam I found a piece of ore wholy consisting of manganite.

Though the place of occurrence is not known the very well-developed crystals, among which also a beautiful penetration twin, containing a large number of forms, justified a detailed crystal description. The crystal measurements have been made with a two-circle goniometer.

Nine prismatic crystals elongated parallel to the *c*-axis and a penetration twin, with a size of 1—5 mm, have been subjected to crystallographic investigation, the results of which will be given in the present paper.

The crystals are characterized by the following prismatic forms:

$a(100)$, $b(010)$, $m(110)$, $l(120)$, $d(210)$, $q(310)$, $t(250)$ and the rare forms $r(1\bar{5}0)$, $w(520)$, $k(230)$, $i(430)$, $y(720)$, $h(410)$, $z(490)$, $\delta(\bar{5}80)$, $\varepsilon(5\bar{6}0)$, $\omega(470)$, $\mu(5\bar{1}0)$, $\eta(370)$, and by the following pyramidal forms: $u(101)$, $p(111)$, $n(121)$, $v(221)$, $g(313)$, $\alpha(515)$, and the rare forms: $s(212)$, $\varphi(323)$, $\beta(525)$, $\gamma(\overline{535})$, $x(4\bar{1}4)$, $\psi(7\bar{1}7)$, $\sigma(10.\bar{3}.10)$, $\varrho(3\bar{4}2)$, $\vartheta(\overline{344})$, $\tau(\overline{12}.5.15)$, $\theta(103)$ and $c(001)$, see fig. 1.

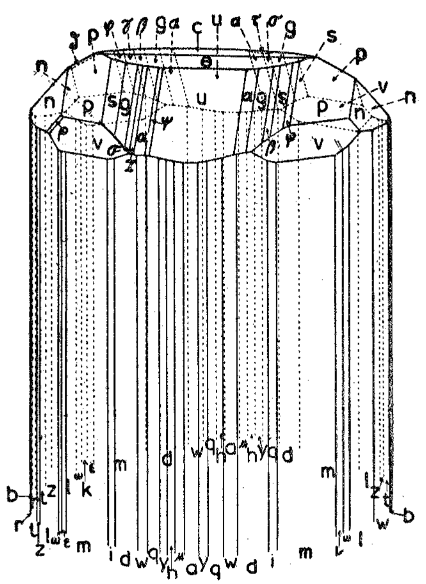

Fig. 1.

Terminal faces are only found at one side. Among these forms the prism $m(110)$ has the principle development, whereas $b(010)$ is present in very narrow faces. Among the pyramidal forms, $u(101)$, $p(111)$ and $n(121)$

TABLE I.

Face \ Nr. crystal	1	2	3	4	5	6	7	8	9	Twin I	Twin II
m (110)	*m*	*m*	*m*	*m*	*m*	*m*	*m*	*m*	*m*	*m*	*m*
l (120)	*l*	*l*	*l*	*l*	*l*	*l*	—	*l*	*l*	*l*	*l*
q (310)	*q*	*q*	*q*	*q*	—	*q*	*q*	*q*	*q*	*q*	*q*
d (210)	*d*	*d*	*d*	*d*	*d*	—	*d*	—	—	*d*	*d*
k (230)	—	*k*	—	*k*	*k*	—	*k*	*k*	—	*k*	*k*
h (410)	*h*	*h*	*h*	*h*	—	*h*	—	—	—	—	*h*
ω (470) *	—	*ω*	*ω*	—	—	*ω*	*ω*	*ω*	*ω*	—	—
b (010)	*b*	*b*	*b*	—	*b*	—	—	*b*	—	—	—
t (250)	—	—	*t*	*t*	—	*t*	—	*t*	*t*	—	—
i (430)	*i*	—	*i*	—	—	—	*i*	—	—	*i*	*i*
w (520)	—	*w*	—	—	*w*	—	—	—	—	*w*	*w*
y (720) *	—	—	*y*	—	—	*y*	—	—	—	*y*	*y*
z (490) *	*z*	*z*	*z*	—	—	—	—	*z*	—	—	—
$\mu\ (5\bar{1}0)$ *	—	*μ*	—	—	—	—	—	*μ*	—	*μ*	*μ*
a (100)	—	a	—	—	—	—	—	—	—	—	a
$\delta\ (\bar{5}80)$ *	—	—	—	—	—	—	—	—	—	*δ*	*δ*
η (370) *	—	—	—	—	—	—	—	—	—	*η*	*η*
$r\ (1\bar{5}0)$	—	—	—	—	—	—	—	*r*	—	—	—
$\varepsilon\ (5\bar{6}0)$	—	—	*ε*	—	—	—	—	—	—	—	—
g (313)	*g*	*g*	*g*	*g*	*g*	*g*	*g*	*g*	*g*	*g*	*g*
p (111)	—	—	*p*	—	*p*	*p*	*p*	*p*	*p*	*p*	*p*
s (212)	—	*s*	—	—	*s*	*s*	*s*	*s*	*s*	*s*	*s*
u (101)	—	*u*	*u*	*u*	—	—	*u*	*u*	*u*	*u*	*u*
n (121)	—	—	*n*	—	*n*	*n*	—	*n*	*n*	*n*	*n*
α (515)	*α*	—	*α*	—	*α*	—	*α*	—	*α*	*α*	*α*
v (221)	—	—	*v*	—	—	*v*	*v*	*v*	—	*v*	—
θ (103)	—	—	—	—	—	—	*θ*	—	—	*θ*	*θ*
φ (323)	*φ*	—	*φ*	—	—	—	—	—	—	*φ*	—
β (525)	*β*	*β*	—	—	—	—	—	—	—	—	—
$x\ (4\bar{1}4)$	*x*	*x*	—	—	—	—	—	—	—	—	—
$\sigma\ (10.\bar{3}.10)$ *	—	—	—	*σ*	—	—	—	—	*σ*	—	—
c (001)	—	—	—	—	—	—	—	—	—	c	—
$\gamma\ (\overline{535})$ *	—	—	—	—	*γ*	—	—	—	—	—	—
$\psi\ (7\bar{1}7)$ *	—	—	—	*ψ*	—	—	—	—	—	—	—
$\varrho\ (3\bar{4}2)$ *	—	—	—	—	—	—	—	—	*ϱ*	—	—
$\vartheta\ (\overline{344})$ *	—	—	—	—	—	*ϑ*	—	—	—	—	—
$\tau\ (\overline{12}.5.15)$ *	—	—	—	—	*τ*	—	—	—	—	—	—

are the principle ones, whereas the other faces belonging to the zone [101] are present in more or less narrow faces. In some cases the form $v(221)$ has a minor development. The distribution of the several forms observed in the investigated crystals have been tabulated in table I, the new forms being marked *.

Several faces of manganite show a distinct striation, particularly the faces belonging to the zone [001] and those faces of the zone [101] lying between $p(111)$ and $u(101)$.

Manganite has been determined morphologically as orthorhombic, though BUERGER [1]) has presented X-ray and polished section evidence showing that manganite is monoclinic.

The results of the crystallographic measurements have been tabulated in table II.

TABLE II.

Face	Symbol	φ	ϱ	Face	Symbol	φ	ϱ
1 c	(001)	—	0°	20 δ	$(\bar{5}80)$*	323° 24′	90°
2 b	(010)	0°	90	21 u	(101)	90	32 53′
3 t	(250)	25 22′	90	22 p	(111)	49 50	41 15
4 z	(490)*	27 56	90	23 n	(121)	30 43	51 45
5 l	(120)	30 43	90	24 s	(212)	67 12	35 10
6 ω	(470)*	34 06	90	25 g	(313)	74 31	33 56
7 k	(230)	38 29	90	26 v	(221)	49 50	59 32
8 m	(110)	49 50	90	27 α	(515)	80 27	33 10
9 i	(430)	57 36	90	28 φ	(323)	60 25	36 30
10 d	(210)	67 12	90	29 β	(525)	71 28	34 15
11 w	(520)	71 28	90	30 γ	$(\overline{53}5)$*	243 15	35 49
12 q	(310)	74 31	90	31 x	$(4\bar{1}4)$	102 08	33 25
13 y	(720)*	76 39	90	32 ψ	$(7\bar{1}7)$*	96 48	33 03
14 h	(410)	77 52	90	33 σ	$(10.\bar{3}.10)$*	103 59	33 28
15 a	(100)	90	90	34 τ	$(\overline{12}.5.15)$*	288 35	28 25
16 μ	$(5\bar{1}0)$*	99 33	90	35 ϱ	$(3\bar{4}2)$*	138 23	55 24
17 ε	$(5\bar{6}0)$	135 33	90	36 θ	(103)	90	11 53
18 r	$(1\bar{5}0)$	162 42	90	37 ϑ	$(\overline{34}4)$*	221 13	37 02
19 η	(370)*	26 46	90				

From these results the following numerical data could be calculated:

$$p'_0 = 0{,}6455 \qquad a = 0{,}8431$$
$$b = 1$$
$$q'_0 = 0{,}5442 \qquad c = 0{,}5442$$
$$d = 61° \; 27'$$
$$f = 57° \; 09'$$

[1]) J. M. BUERGER, The symmetry and crystal structure of manganite, Zeitschr. f. Krist., **95**, 163 (1936).

The calculations of the elements according to HAIDINGER [2]) differ slightly from te above-mentioned results:

$$p'_0 = 0{,}6454 \qquad a = 0{,}8441$$
$$b = 1$$
$$q'_0 = 0{,}5448 \qquad c = 0{,}5448$$

The calculation of the characteristic angles for orthorhombic manganite according to BARKER's [3]) systematic crystallography of crystals leads to the following results:

$$\mathbf{cr} = \mathbf{40° \; 10'}$$
$$bq = 52° \; 24\tfrac{1}{2}'$$
$$am = 42° \; 21\tfrac{1}{2}'$$

The twin of manganite.

As has been mentioned in litterature on manganite this mineral may occur either as contact or as penetration twin. The twin plane is (011). The twin crystal investigated was a very nice-developed penetration form with twin plane $(0\bar{1}1)$. The two individuals penetrate each other excentrically (see fig. 2).

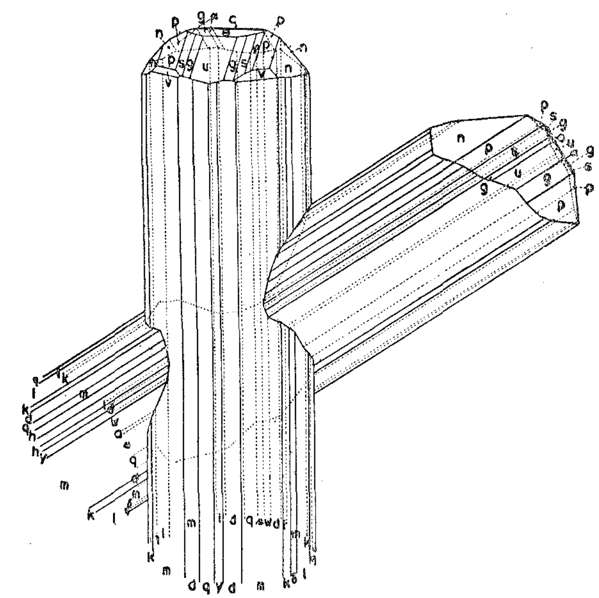

Fig. 2.

[2]) As the publication of HAIDINGER (Edinburgh J. Sc., **4**, 41 (1826)) has not been accessible to me, reference is made to DANA, A system of Mineralogie, 249 (1892) and the new edition by PALACHE, BERMAN, FRONDEL, Vol. I, 646 (1946).

[3]) T. V. BARKER, Systematic crystallography, an essay on crystal description, classification and identification, London (1930). — P. TERPSTRA, Kristallometrie, Groningen (1946).

Investigation of the polished section.

Under the microscope the polished section of the manganite appeared to be composed of manganite crystals with veinlets and small particles of probably pyrolusite. The manganite showed distinct anisotropy between crossed nicols: parallel to the prismatic direction bluish grey and perpendicular to this direction dark violet grey. Distinct cleavage lines parallel to $b(010)$ or to $m(110)$ have been observed.

The pyrolusite, stronger reflecting than manganite is yellowish white and showed reflection pleochroism. Anisotropy between crossed nicols was also observed. The pyrolusite is only present as veinlets and small particles and may originate from manganite [4]). In many cases the pyrolusite veinlets follow the cleavage lines of the manganite.

[4]) H. SCHNEIDERHÖHN und P. RAMDOHR, Lehrbuch der Erzmikroskopie, 2. Bd., 555 (1931).

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Zoology. — *Remarks upon the species of the genus Lagenorhynchus.* I.
By W. H. BIERMAN (Haarlem) and E. J. SLIJPER (Institute of Veterinary Anatomy, State University, Utrecht). (Communicated by Prof. G. KREDIET.)

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I. *Lagenorhynchus wilsoni* Lillie.

On board the Dutch floating factory "Willem Barendsz" we saw on the 14th of April 1947 between 11.30 and 11.45 at about 48° 59′ S. and 6° 36′ E. four small black and white Dolphins swimming and leaping around the bow of the ship. That same day between 15.00 and 16.00 and also the next day at about 46° 52′ S. and 8° 30′ E. a school of the same animals was seen by Mr H. VAN DER LEE from a whale catcher. The temperature of the sea-water on these two days was resp. 3,7° C. and 5,5° C. The animals moved very quickly, they came above water with a tumbling movement that reminded of the movements of penguins at the surface of the water, and they breathed in a fraction of a second. Sometimes they leaped completely out of the water. We often saw them swimming in pairs.

The length of the animals was estimated at 1.50—2.00 m. The short beak, well marked off from the moderately arched forehead, the high pointed back fin with concave caudal border and the medium sized, pointed flippers immediately showed that the animals belonged to the genus *Lagenorhynchus*. Fig. 1 shows that the cranial part of the head, the back fin, the tail fin and the flippers were black, as well as the whole back up to a point lying about 20—30 cm cranially of the tail-fin. The lateral side showed a black band, joining the black of the head with that of the tail-fin. At the level of the dorsal fin the ventral and dorsal black were joined by a black band extending in caudo-dorsal direction. In some animals, however, this band was very narrow. We could not see the colour of the ventral side of the head and trunk; the lower parts of the tail were white. The swimming animal is usually characterised by the two large lateral patches of white, separated just below the dorsal fin by a black band. It is also characterised by the fact that the right and left lateral patches join above the tail. Thus at the dorsal side there is an area of white between the black of the back and that of the tail-fin.

Now it is just by this area of white by which Wilson's Hourglass Dolphin (*Lagenorhynchus wilsoni* Lillie) is characterised and by which it can be distinguished from *Lagenorhynchus cruciger* (Quoi et Gaim.) [= *L. cruciger* (d'Orb. et Gerv.)]. FRASER (1937, p. 322) doubts whether the two animals belong to one single species or not and thinks that Wilson's Dolphin should be characterised by a more pronounced snout, a