result of sulphide oxidation. The manner of growth of the numerous crystals is not clear, particularly as the caves are now completely dry; and no reasonable suggestion as to the growth of the huge crystals from the floor has occurred to the writer.

The author gratefully acknowledges his indebtedness to Prof. Palache for financial assistance from the Holden Fund of Harvard University and to Mr. A. C. Fox, superintendent of the Naica Mines of Mexico, for permission to visit the caves and collect specimens.

EUHEDRAL ORTHOCLASE CRYSTALS FROM SIERRA BLANCA, TEXAS[1]

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The crystals described in this paper were found one mile northwest of Sierra Blanca, Hudspeth County, Texas, where a dike of porphyritic igneous rock intrudes Cretaceous limestone. In this dike feldspar crystals occur as phenocrysts in a fine grained but holocrystalline groundmass. The region is arid and in the weathering of rocks disintegration is usually more in evidence than decomposition. In the rock mentioned above disintegration has loosened the feldspar crystals from the groundmass so that great numbers can be picked out, the crystals occurring much as fossils in a well weathered outcrop of sedimentary rock. The great abundance of the crystals, their perfection and relative freshness is thought to warrant a record of the locality.

The crystals secured range in size from 5 mm. to 2 cm. in greatest dimensions, averaging about 1 cm. The freshest specimens are pinkish flesh colored while altered material is chalky. Examination under the microscope shows a slight alteration to kaolinite in many of the specimens but great numbers are practically unaltered. Some of the crystals are imperfect through accidents of weathering although many are perfect. For this study imperfect crystals were discarded, only euhedral ones being included. From a relatively small amount of material 556 essentially perfect crystals were secured and examined.

[1] Published by the permission of the Bureau of Economic Geology, University of Texas.

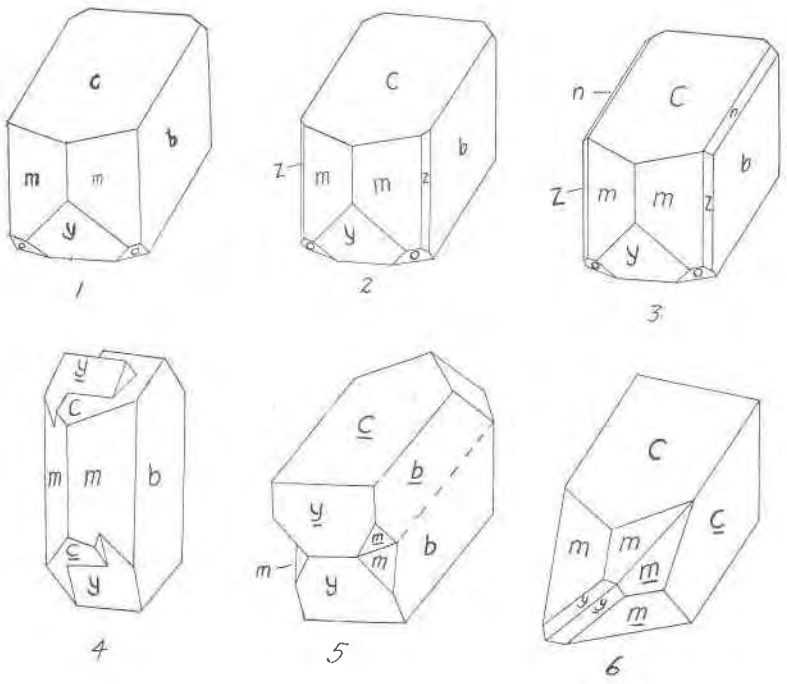

Figure 1.

Figure 1 shows the types of crystals present in the collection. The forms present include $m(110)$, $y(\bar{2}01)$, $c(001)$, $n(021)$, $o(\bar{1}11)$, $b(010)$ and $z(130)$ all determined by inspection only. The combinations and habits are as shown in figure 1. Elongation parallel to a axis is common but not universal since many of the crystals were equidimensional and some were elongated parallel to c. The distribution of types of crystals among the 556 specimens is given below.

Type	Number of Crystals	Per Cent
1	413	74.28
2	51	9.17
3	1	0.179
4	36	6.47
5	51	9.17
6	4	0.719

The simple combination (No. 1) is the most abundant by far, while Baveno twins (No. 6) and the crystal in which both $n(021)$ and $z(130)$ appear (No. 3) are rare. Carlsbad (No. 4) and Manne-bach (No. 5) twins are present in nearly the same abundance but are less common than the simple type. Crystals with $z(130)$ are relatively common. The variation in abundance of the different types of crystals furnishes interesting data on the crystallization of orthoclase. It is hoped to make this feature of the study exhaustive by the addition of several thousand crystals to the collection.

A chemical analysis of the feldspar, made in the Industrial Chemistry Experiment Station, University of Texas, is given below.

SiO_2	61.30
Al_2O_3	17.15
Fe_2O_3	3.47
CaO	2.05
K_2O	11.58
Na_2O	4.20
H_2O-	0.20
H_2O+	1.28
	101.23

The analysis does not conform to the theoretical composition of orthoclase. It is believed that most of the irregularities in the result are due to impurities in the mineral which are apparent when the crystals are examined under the microscope, magnetite and an amphibole being present as inclusions in small amounts. The water is of course due to kaolinization. If iron, lime and water are disregarded and the remainder recast to 100 per cent the results correspond approximately to a soda-orthoclase as shown below.

Per Cent		Molecular Ratios
SiO_2	65.05	$1.084 = 6\times.174$
Al_2O_3	18.20	$.178 = 1\times.178$
K_2O	12.29	$.130$
Na_2O	4.46	$.071$ $= 1\times.201$
	100.00	

This result approximates the composition of a soda-orthoclase but is slightly deficient in both alumina and silica or has an excess

of the alkalies. The analysis is supported by the optical characters which are shown in the following table.

$\alpha = 1.5180$	$X \wedge a = 6°37'$
$\beta = 1.5234$	$Z = b$
$\gamma = 1.5260$	$2V = 70°$ approximate

The orientation and extinction angle corresponds to a soda rich orthoclase. The indices of refraction were obtained by matching liquids with the mineral and the determination of the indices of the liquids by means of the refractometer.

OLIVINE FROM MONHEGAN ISLAND, MAINE

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In the spring of 1923 the writer had opportunity to collect a suite of igneous rocks from Monhegan Island. According to Lord,[1] their considerable variation in composition is chiefly due to differentiation, in place, of a deep seated basic magma. He sees in the amphibole reaction-rims between feldspar and both olivine and diallage some evidence of regional metamorphism. Though these reaction-rims may be susceptible of other interpretations, the main idea of differentiation seems tenable.

A preliminary study of the olivine in a specimen from the east side of the island, near White Head, indicated that it contained an unusually high percentage of iron. It was therefore decided to separate and analyze this olivine as a contribution to the study of the behavior of iron in the crystallization of rock magmas. Though the separation of the olivine in highly satisfactory purity was not attained, yet the results seem worthy of record.

The rock containing the olivine may be designated as an olivine-gabbro, since it is composed of approximately 50% feldspar (near bytownite), 15% olivine, 10% "diallage," and needle-like amphibole in green and in colorless varieties, brown hornblende, magnetite and serpentine, together amounting to 25%.

Preliminary separation using Thoulet's solution of Sp. Gr. 2.9 removed feldspar and serpentine satisfactorily, but attempts to isolate the olivine by use of Klein's solution, even after a strong

[1] Lord, E. C. E.: Notes on the Geology and Petrography of Monhegan Island, Maine, *Am. Geologist*, **26**, 328 (1900).