

successively with petroleum ether, chloroform and chloroform-alcohol (2:1). The solid material separated at the interphase during these extractions was removed by centrifuging. The original aqueous extract was further concentrated, half-saturated with sodium sulphate and extracted with chloroform-alcohol (2:1).

The petroleum ether extract gave an oily residue which when chromatographed over alumina gave a crystalline compound, m.p. 134–36°. It was identified as β -sitosterol by direct comparison with an authentic sample⁶ and by preparing its acetate, m.p. and m.m.p. 124–26°.

The chloroform-alcohol (2:1) extracts obtained before and after half-saturation with sodium sulphate gave identical spots in t.l.c. Repeated crystallizations of the residues from acetone-alcohol gave shining prisms, m.p. 238–40°, $[\alpha]_D - 68.2^\circ$ (methanol) (yield 0.01%). The substance thus obtained answered the usual reactions for alkaloids. It was soluble in sodium hydroxide and gave a green colour with ferric chloride. It did not possess a methylenedioxy group (negative gallic acid test) and analysed for the formula $C_{16}H_{19}NO_4$ with one methoxyl. With diazomethane the compound formed a monomethyl ether, $C_{17}H_{21}NO_4$, needles from methanol, m.p. 228–32°. These properties closely resembled those of pseudolycorine and its methyl ether. The identity was established by direct comparison, m.m.p. and t.l.c., of the methyl ether with authentic methylpseudolycorine kindly supplied by Prof. W. C. Wildman. Further confirmation was obtained by comparison of the i.r. spectra of the alkaloid and its methyl ether with the standard spectra of pseudolycorine and methylpseudolycorine.

The solid material separated at the interphase was refluxed with chloroform-alcohol mixture. The solution on concentration deposited a crystalline compound, m.p. 265–68°, $[\alpha]_D - 85.3^\circ$ (ethanol) (yield 0.015%). This was found to be a non-phenolic alkaloid having a methylenedioxy group. It analysed for the formula $C_{16}H_{17}NO_4$ and formed a diacetate, m.p. 218–20°, $[\alpha]_D + 25.4^\circ$ (chf.). These properties suggested that the alkaloid could be lycorine. Mixed m.p. of the acetate with authentic lycorine diacetate⁷ confirmed the identity.

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Dept. of Pharmacy, E. VENKATA RAO.
Andhra University, M. NAGESWARA RAO.
Waltair, February, 24, 1969.

1. Ganguly, S. N., Battacharya, A. K. and Ganguly, G., *Indian J. Chem.*, 1967, **5**, 654.
2. Kondo, H., Tomimura, K. and Ishiwata, S., *J. Pharm. Soc. Japan*, 1932, **52**, 51.
3. Fales, H. M. and Wildman, W. C., *J. Am. Chem. Soc.*, 1956, **78**, 4145.
4. Shan-Hai Hung, Kuang-En Ma and Ming Chu, *Chem. Ab.*, 1966, **65**, 2512.
5. — and —, *Ibid.*, 1964, **61**, 3154.
6. Rangaswamy, S. and Rao, E. V., *Proc. Ind. Acad. Sci.*, 1960, **52 A**, 173.
7. — and —, *Ind. J. Pharm.*, 1955, **17**, 67.

MESOLITE FROM POONA

This note reports some new work on mesolite. It occurs commonly in the cavities of Deccan basalts in association with stilbite, heulandite, apophyllite, etc., and calcite. Such occurrences are generally grouped under natrolite¹ but it is desirable that the minerals like scolecite, mordenite, mesolite, etc., should be reported precisely. The sample under study has been collected from Poona (Erandawana quarry), which exposes beautiful prismatic crystals about 8 cm. in length and from 0.5 to 1.0 mm. in width.

Mesolite from Poona was originally described under the name Poonahlite by Brooke (1831).² He concluded that the crystals although bearing an apparent similarity to mesotype (natrolite) or needle-stone (scolecite), they differed from both the substances in measurement: Poonahlite being a rhombic prism of 92° 20'. Bowman (1909)³ described specimens answering precisely to Brooke's² description as mesolite. Bowman's³ analysis and optical studies agree with those of mesolite. However, the prism angle of mesolite is 91° 29'. He attributes the difference to confusion from internal reflections.

Scolecite often occurs in large crystals as those of mesolite under study, but chemical data affords easy identification (very poor in soda and very rich in lime). Optically the crystals are twinned, extinction about 10 degrees to elongation, birefringence fairly strong. Mordenite usually occurs in thin

fibres, with a much lower refractive index but higher birefringence than mesolite. It shows straight extinction and is not easily attacked by acids. Much of the so-called mesolite from Bombay-Poona railway cuttings has been proved to be mordenite. Natrolite forms untwinned needles and prisms with medium birefringence, straight extinction and positive elongation. Natrolite however is unlikely in a lime-rich paragenesis as Poona. Stilbite is often radiated, platy and is very easily distinguished from other platy zeolites as it is almost always twinned, cleavages show sectoral pattern, with sectors extinguishing about 10° apart.

The crystals of mesolite are colourless or white, prismatic, acicular and radiating. They are elongated and twinned along *b*-axis, hardness 5, and specific gravity 2.2897. Figure 1 shows the crystals of mesolite under study.



FIG. 1. Showing habit of mesolite crystal.

Colourless and clear crystals of mesolite were separated, crushed and analysed using standard gravimetric methods.⁴ The water content was determined by loss on ignition in a platinum crucible. Na₂O and K₂O contents were determined by using Shand's techniques.⁵ The results are shown in Table I. It will be seen that the results are in accordance with published data.⁶

TABLE I

SiO ₂	..	46.05
Al ₂ O ₃	..	28.93
CaO	..	8.76
K ₂ O	..	0.45
Na ₂ O	..	4.35
H ₂ O±	..	11.59
Total	..	100.13

The crystals are invariably twinned along *b*-axis, (sectors on basal sections) positive or negative elongation, birefringence very low (grey of I order). They show straight extinction but may appear to be inclined (2-5 degrees) if the crystal is not lying truly flat on the slide as optic axes emerge nearly normal to the prism faces. The interference figure is biaxial with a very large axial angle. The X-ray studies on this material by Dr. Hey show the mineral to be mesolite.

Thus from the chemical, physical, optical and X-ray studies it is concluded that the mineral under study is mesolite in very large crystals. It will be interesting to study the other similar (scolecite, mordenite, etc.) prismatic, acicular, fibrous zeolites and to report them as distinct members, and not under the natrolite group.

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Department of Geology, M. R. BELSARE.
Walchand College of Engineering,
Sangli (Maharashtra),
January 23, 1969.

1. Sowani, P. V. and Phadke, A. V., *Poona Univ. Jour.*, 1964, No. 2³, 81.
2. Brooke, H. J. *Phil. Mag.*, 1831, Series II, 10, 110
3. Bowman, H. L., *Min. Mag.*, 1909, 15, 216,
4. Groves, A. W., *Silicate Analysis*, Allen and Unwin, 1949.
5. Shand, S. J., *The Study of Rocks*, Thomas Murby, 1947, p. 229.
6. Hey, M. H., *Min. Mag.*, 1933, 23, 367 & 421.

ON THE RHYOLITES OF PAVAGAD HILL

THE rhyolites of Pavagad Hill were first noticed by Blanford¹ who described them as flows of volcanic mud of great tenacity. Fermor² recognized these as rhyolite and described the following types; rhyolite, silicified rhyolite breccia, ash and pitchstone. Fermor considered the rhyolites and the basalt as interbedded and described a specimen from near Atak Gate, as *in situ*. In their first report on the magma types in the Deccan Traps, Mathur and Dubey³ considered the rhyolite as forming only top flow, but later Dubey⁴ reported that the eruption of the rhyolite took place from several vents during the last phase of the Deccan Trap igneous activity. From his study