SEDIMENTARY STRUCTURES PRESERVED IN FIBROUS GYPSUM NEAR GUNTHORPE WEIR, NOTTINGHAMSHIRE

by

Z. Aljubouri

Summary

Mud cracks, ripple marks and salt-pseudomorphs are preserved on the upper and lower surfaces of a fibrous gypsum vein from Gunthorpe, East Bridgford. These structures indicate a post-consolidation origin for the fibrous gypsum.

Introduction

Fibrous gypsum is of wide occurrence in the Keuper Marl of Nottinghamshire. It occurs either in association with massive gypsum beds or as separate bands and veins in the Keuper Marl (Richardson, 1922). The fibrous gypsum at Gunthorpe belongs to the East Bridgford Gypsum horizon (Firman, 1964), which is the lowest of the three gypsum horizons in Nottinghamshire.

The Keuper Marl at Gunthorpe (SK 688436) belongs to the Harlequin Formation (Elliott, 1961 and 1965), and the top of the underlying Plains Skerry is exposed when the river is low. The succession consists of brown and green siltstones with interbedded fibrous gypsum (Fig. 1). Ripple marks, mud-cracks and salt-pseudomorphs are common throughout the succession, but are especially abundant and well preserved in the hard siltstone bands.

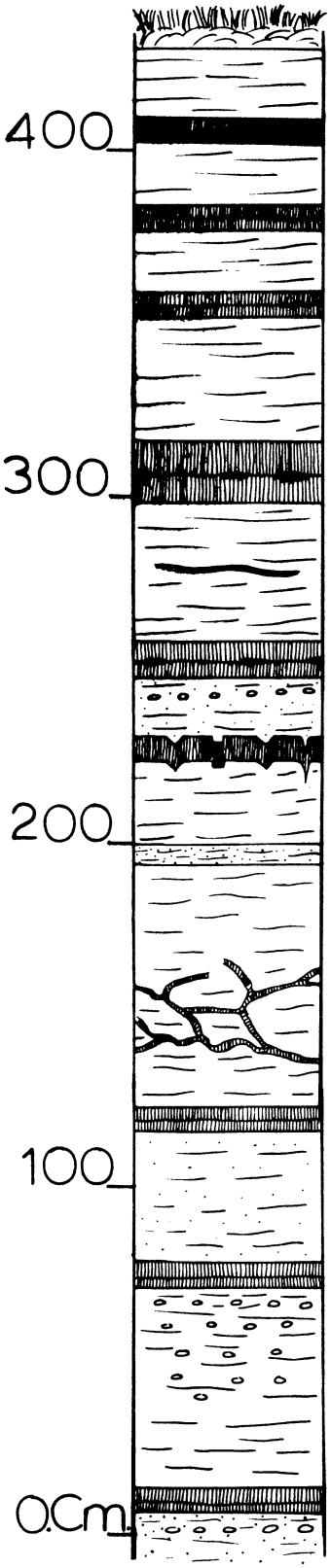
The structures

The upper surface of a specimen of fibrous gypsum collected from the band 220 cm. from the bottom of the succession (Fig.1) is marked by a long V-shaped trough, 5 mm. deep and 4mm. wide, which resembles a mud-crack. This surface is also marked by a number of small pits formed by impressions of variously oriented cubic crystals (Plate 1a). The edges of the former crystals were about 5 mm. long, giving a volume of 125 mm^3 for the crystals.

On the lower surface of the specimen, exactly the same features are present, with the same dimensions and orientation, and the same relative positions as on the upper surface (Plate 1b). The only difference between the structures on the two surfaces is that their relief is reversed. Troughs and pits on the upper surface are represented by ridges and mounds on the lower surface.

From the above description it is evident that the sedimentary structures on the upper surface of the fibrous gypsum specimen are moulds of a "mud crack cast" and salt pseudomorphs on the bottom of the overlying siltstone. The structures on the lower surface of the gypsum are a "mud crack cast" and salt pseudomorphs, formed in the original "moulds" in the top of the underlying marl.

The fibrous gypsum layer grew in the bedding plane parting, between the marl and the overlying siltstone, at some period after the consolidation of the marl. The original bedding plane structures, a mud crack and salt pseudomorphs, were thus perfectly reproduced on the surfaces of the gypsum band.



Top Soil

Brown and Green Marl

Fibrous Gypsum

Brown and Green Marl

Fibrous Gypsum

Brown and Green Marl

Fibrous Gypsum

Brown and Green Marl

Fibrous Gypsum with Median Line and Marl Lenses

Brown Marl with thin vein of Fibrous Gypsum

Fibrous Gypsum

Hard Brown Siltstone with small Gypsum Inclusions

Fibrous Gypsum with Mud Cracks and Salt Pseudomorphs

Brown Gypsiferous Marl and Marly Gypsum

Green Siltstone with Ripple Marks and Salt Pseudomorphs

Brown Marl with irregular veins of Fibrous Gypsum

Fibrous Gypsum

Hard Flaky Siltstone with Ripple Marks and Salt Pseudomorphs

Fibrous Gypsum

Brown Marl with small Gypsum Inclusions

Fibrous Gypsum

Plains Skerry: Brown and Green Siltstone with Gypsum Inclusions: Salt Pseudomorphs and Ripple Marks

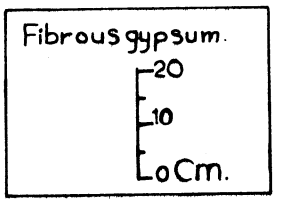
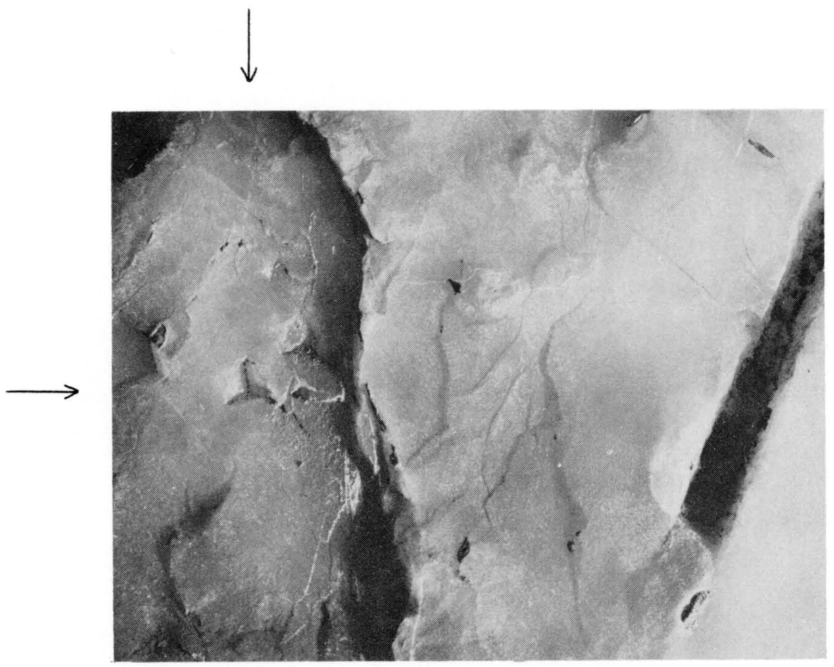
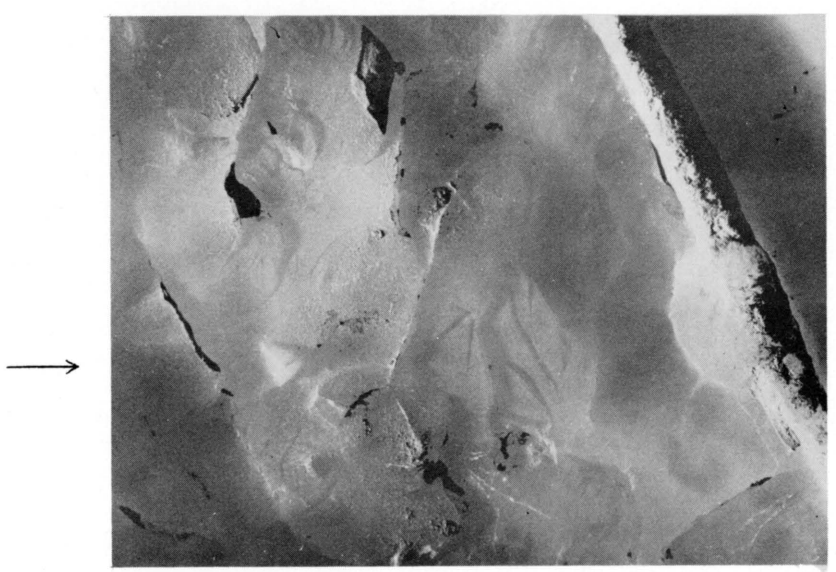


Figure 1. Succession near Gunthorpe Weir, East Bridgford, Nottinghamshire.



A



B

Plate 1. Models of a specimen of fybrous gypsum, showing sedimentary structures; A, upper surface; B, lower surface.

Correction

Volume 4, Number 1, Plate 1, facing page 10.

The explanation of this plate should read as follows:-

"Specimen of fibrous gypsum, showing sedimentary structures:

A, upper surface; B, lower surface."

The photographs were of the actual specimen and not of the models.

Conclusions

1. The fibrous gypsum at Gunthorpe is of secondary origin, formed after the consolidation of the marl sediment.

2. Sedimentary structures, such as mud cracks and salt pseudomorphs, can be preserved on both surfaces of fibrous gypsum veins, and may be used as indicators of environment of sedimentation and "way up", as in the original sediment.

Acknowledgements

I am grateful to Dr. R.J. Firman for his assistance in the preparation of this paper. My thanks also go to Mr. T. Halsall for his help in making the plaster moulds and Mr. D. Bacon for lending me a specimen of fibrous gypsum with well preserved sedimentary structures. This paper is part of a research project made possible by grants from the Abbott Memorial Research Fund and the B.P.B. Industries (Research and Development), for which I wish to express my gratitude.

Z. Aljubouri, B.Sc.,
Department of Geology,
The University,
Nottingham.

References

ELLIOTT, R.E. 1961. The Stratigraphy of the Keuper Series in Southern Nottinghamshire. Proc. Yorks. Geol. Soc., Vol. 33, pp. 197-234.

- - 1965. Field Meetings. Proc. Yorks. Geol. Soc., Vol. 35, pp. 290-294.

FIRMAN, R.J. 1964. Gypsum in Nottinghamshire. Bull. Peak Dist. Mines Hist. Soc. Vol. 2, pp. 189-203.

RICHARDSON, W.A. 1920. The Fibrous Gypsum of Nottinghamshire. Min. Mag. Vol. 19, No. 91, pp. 77-95.

Manuscript received 30th December 1970.