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Tamarugite on the Isle of Wight, UK

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ABSTRACT

Tamarugite ($NaAl(SO_4)_2{\cdot}6H_2O$) occurs at Compton Chine (NGR SZ 36808513), on the Isle of Wight, U.K., as globular encrustations covering an area of 2.8 m^2 on argillaceous pyritous siltstones of the Lower Greensand Group, Lower Cretaceous. It is proposed that the production of H_2SO_4 from oxidizing pyrite in the siltstones releases Al ions from the argillaceous sediments, the Na content being acquired from sea spray. An analogy is made between Compton Chine and an occurrence in Victoria, Australia.

KEYWORDS: tamarugite, Lower Greensand Group, sulphate, Isle of Wight.

TAMARUGITE ($NaAl(SO_4)_2{\cdot}6H_2O$) has recently been found (1996) on the southwestern coast of the Isle of Wight at Compton Chine (NGR SZ 36808513).

It took the form of dominantly yellow, red and occasionally white globular encrustations covering an area of 2.8 m^2 on a vertical surface of tectonically disturbed beds of bluish-black, pyritous, argillaceous siltstones of the Lower Greensand Group, Lower Cretaceous. The horizon was possibly of the Sandrock Formation (Aptian–Albian) (White, 1921, Melville and Freshney, 1982, Hart *et al.*, 1987), although the section was confused by land slips, as noted by Hart *et al.* (1987, p. 104). The irregular surface areas of individual encrustations varied from < mm up to 80 mm and in thickness no more than 6 mm.

While most occurrences of water-soluble tamarugite have been reported from arid environments, there is a minority of others on coastal sections where the influence of salt water spray is constant (Hutton, 1970; Segnit, 1976). The nearest physical analogy to that of the Isle of Wight occurrence is that described by Segnit (1976), where tamarugite occurs as coatings and efflorescences on fallen blocks of black pyritous, carbonaceous shales of Eocene age on the beach at the foot of 50 m high cliffs at Anglesea, Victoria, Australia.

The genesis of the tamarugite at Compton Chine may also be comparable with that of the Anglesea occurrence, where the pyrite content of the siltstones is under constant atmospheric oxidation, resulting in the formation of H_2SO_4 which, in turn, releases aluminium ions from the argillaceous content of the siltstones. This, with sodium derived from the sea spray, forms the double sulphate.

Segnit (1976, p.643) expressed surprise that highly soluble tamarugite could form under such conditions of high humidity. The only physical difference between the two occurrences is the fact that the cliffs at Compton Chine represent the high tide level for most of the year, making the occurrence even more remarkable. The regeneration process must be constant.

The fragility of the genetic process is shown by the lingering faint sulphurous smell of the tamarugite after eleven months of storage under dry conditions. It is also suggested that the simultaneous oxidation of ferrous sulphate, surplus to the formation of the tamarugite, could account for the yellow and red colouration.

The only other British occurrence of tamarugite is that reported as a tentative identification from the now abandoned Billingham Anhydrite Mine at Billingham in Co. Durham (Raymond, 1959), but its genesis remains undetermined and its identification controversial.

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(Oxford), and in the writer's collection under No. 853-96, and field reference No. K96-14.

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References

Hart, M.B., Weaver, P.P.E., Clements, R.G., Bennett, J.A., Tocher, B.A., Batten, D.J., Lister, J.K. and MacLennan, A.M. (1987) In *Mesozoic and Cenozoic Stratigraphical micropalaeontology of the Dorset coast and Isle of Wight, Southern England.* Field guide (A.R. Lord and P.R. Bown, eds). XXth European Micropalaeontological Colloquium Brit. Micropal. Soc. Guide Book 1.

Hutton, C.O. (1970) Coquimbite from Nevis, West Indies. *Mineral. Mag.*, **37**, 939–41.

Melville, R.V. and Freshney, E.C. (1982) *The Hampshire Basin and Adjoining Areas. Brit. Reg. Geol.* HMSO. 146 pp.

Raymond, L.R. (1959) Recent secondary minerals in the Billingham anhydrite mine. *Mineral. Mag.*, **32**, 172–5.

Segnit, E.R. (1976) Tamarugite from Anglesea, Victoria, Australia. *Mineral. Mag.*, **40**, 642–4.

White, H.J.O. (1921) *A short account of the geology of the Isle of Wight. Mem. Geol. Surv. G.B.* 201 pp.

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