

## TRACE FOSSILS IN THE PERMIAN ROCKS OF SOUTH-WEST ENGLAND

R.W. GALLOIS AND J.D. MATHER



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Trace fossils in the form of presumed annelid burrows have been known from the Permian rocks of the Devon coast for over 150 years. Notwithstanding the presence of almost continuous exposures of up to 1000 metres of Permian sediments on the coast between Torbay and the River Exe, indisputable trace fossils are only known from three localities where they are confined to narrow stratigraphical ranges: one in the Torbay Breccia Formation and two in the Watcombe Formation. The authors have looked at all the accessible coastal sections between Goodrington and Exmouth for the present review, but have not recorded any burrow localities other than those previously been mentioned in the literature. They have, however, recorded a greater variety of burrow forms together with additional localities that contain possible trace fossils. All the undoubted burrows recorded are morphologically similar endichnial meniscate backfilled forms that can be assigned to a single ichnogenus, either *Beaconites* or *Taenidium*. Their sizes range from 3 mm to 150 mm in diameter and the sediments in which they are preserved indicate that they were formed by a variety of animals that lived in the vadose zone in wet-desert environments.

92 Stoke Valley Rd., Exeter EX4 5ER, U.K.  
(E-mail: gallois@geologist.co.uk)

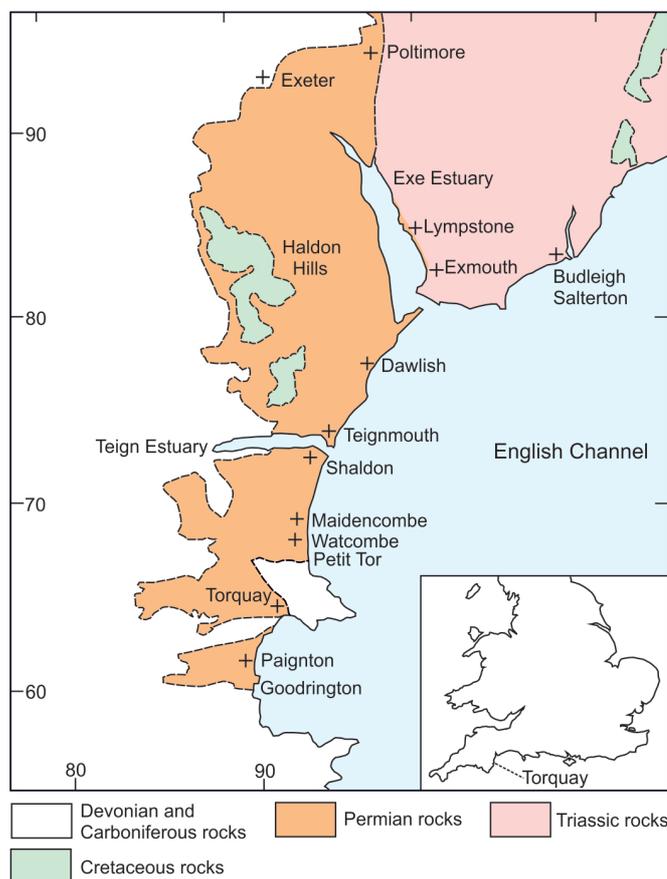
4 Crockernwell Court, Crockernwell, Exeter, EX6 6NA, UK.  
(E-mail: mather@jjgeology.eclipse.co.uk)

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### INTRODUCTION

A strict definition of a trace fossil is any disturbance of sediment caused by an animal. They range from the obvious such as borings in shells, reptile footprints and worm burrows to pervasive mottling as a result of the complete re-sorting of a sediment. In practice, the less obvious examples are commonly only identified as trace fossils on the grounds that they do not appear to have been caused by sedimentary processes such as scouring, slumping, loading, dewatering or fluid-escape. Trace fossils are classified as ichnogenera and ichnospecies following Linnaean taxonomy, but because they are morphological forms they can only rarely be linked to a specific animal, and in some cases apparently identical forms have been formed by different animals or mechanisms. The International Commission on Zoological Nomenclature (ICZN) adjudicates on the names of trace fossils, and although many ichnologists consider structures formed by plants as trace fossils and have given them names, these are not recognised as such by the International Code of Botanical Nomenclature (ICBN) which deals with plants, algae and fungi. Possible plant-related structures are included in this account for completeness as *incertae sedis*.

There are numerous published classifications of trace fossils, most of which are based on their presumed mode of formation or their assumed purpose. For example, *domichnia* and *repichnia* are dwelling burrows and footprint trails respectively (Seilacher, 1953). More elaborate classifications include



**Figure 1.** Geological sketch map of south Devon coastal area showing the distribution of the Permian and Triassic rocks and localities referred to in the text.