

Sydney Basin in the Triassic—A review of the geology, flora and fauna, and ecosystems. The Hawkesbury Sandstone

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ABSTRACT. The Australian Museum has a large palaeontological collection of Triassic specimens from the Sydney Basin, including many type specimens. This study reviewed every presently described Sydney Basin Hawkesbury Sandstone plant and animal taxa that has representative specimens held in the Australian Museum. Fifty-two taxa are included from numerous sites. These include three amphibians, twenty-eight fishes, eleven insects, one horseshoe “crab”, one scorpion, three crustaceans, two molluscs and three plants. Basic taxonomic history for each taxon is noted, together with specimen registration numbers and their position in the collection. Also included are references to relevant specimens held in the Geological Survey of New South Wales and the Natural History Museum, London collections. Images of every taxa are included. To place the collection in context, particularly for educators working with students, brief descriptions of the geology that forms the Hawkesbury Sandstone, and the inferred ecosystems that existed during the Middle Triassic, are included. The results of this study will help to facilitate further researchers by providing important details of the fossil collections held at the Australian Museum.

Introduction

The Triassic rock succession of the Sydney Basin comprises three divisions: the Narrabeen Group (McLean, 2023), the Hawkesbury Sandstone (this study) and the Wianamatta Group (McLean, in prep). The Hawkesbury Sandstone was deposited after an uplift of the Lachlan Fold Belt to the southwest of the Sydney Basin at the beginning of the Middle Triassic. Tectonic tilting of the Sydney Basin to the northeast caused coarse quartzose sand to be transported and deposited in the same direction by a large system of braided rivers (Herbert, 1980a). These sands ultimately formed the Hawkesbury Sandstone over the Narrabeen Group (Herbert, 1980a).

Within the braided river systems oxbow lakes (billabongs) formed when watercourses were bypassed and blocked. This still water allowed for the deposition of fine mud. These anoxic environments preserved any organic plant and animal

material that sank into the mud. The mud ultimately became shale lenses intermittently dispersed throughout the thick sandstone. The organic material eventually became thin carbon layer impressions within the shale lenses (Conaghan, 1980), fossils which preserved fine details of their original structure.

Many quarries exploiting the shale for brick manufacture were sources of fossils, particularly the Beacon Hill Quarry. Fishes, amphibians, insects, other arthropods and molluscs have been found, together with plants such as lycopsids, horsetails, seed ferns, ferns and conifers. This study details the taxonomy of every fossil species described from the Sydney Basin, and includes images of every species. The registration numbers and storage placements for these specimens in the Australian Museum palaeontological collection are listed. Other specimens held in the collections of the Geological Survey of New South Wales and the Natural History Museum, London are also noted.

Keywords: Sydney Basin, Triassic, Hawkesbury Sandstone, fossil sites, fossil fishes, fossil insects, fossil plants, temnospondyl, crustacean
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