

# Wallacean Mammalogy and Zooarchaeology: Remembrances and a Renaissance

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The richness of life is not distributed haphazardly across the globe, but instead exhibits profound, non-random patterns. Numbers of species of insects, trees, and frogs, for example, abound in tropical localities, like in Brazil or the Congo, but not in Siberia or the Yukon. Species uniqueness, or endemism, peaks on large, long-isolated islands, like Madagascar or the Philippines. And different continents often have profoundly different assemblages of organisms. These types of observations regarding major patterns in the distribution of life, and their implied histories, formed the original foundation of the science of biogeography. Among the most important developers of this science was Alfred Russel Wallace, one of the architects of evolutionary biology.

One of Wallace's many fundamental biogeographic insights was the realization that the fauna of the "Malay Archipelago", extending from the Malay Peninsula to New Guinea, much of which is now encompassed within the modern nation of Indonesia, can be demarcated into zones of marked Asian and Australian character. (This was an insight based on firsthand fieldwork, collecting biological specimens for museums.) These zones of regional influence merge and meld along the island chain, but nevertheless a particularly sharp demarcation runs between the islands of Borneo and Sulawesi in the north, and Bali and Lombok, in the south. This demarcation is now known as the "Wallace Line" (Wallace, 1869, 1876; Fig. 1), and others later built on these Wallacean insights to identify additional "lines" of biogeographic significance in the archipelago (Fig. 1). We now understand more fully that the profound distinctions in the archipelago result from differential histories of continental connection and movement, with the islands of Sumatra, Java, and Borneo being part of Sundaland—the Asian continental shelf, and New Guinea an extension of the Australian, or Sahulian, continent. The area in between consists of the large island of Sulawesi and the oceanic archipelagos known as the Lesser Sundas (Nusa Tenggara) and the Moluccas (Maluku). These long-isolated islands constitute a geologically complex region that serves both as a zone of faunal transition between the two great continental faunas, as well as a realm unto itself with remarkable endemism. Today this region is called Wallacea by biogeographers, and it is rich in animal life, including mammals.

Most work on mammals in the Wallacean region has focused on Sulawesi, the largest and most centrally located island in the zone. Initial biological exploration on the island demonstrated that the fauna was a mix of mammals of both Asian and Australian genesis, with the island's forests home to native bats, rats, squirrels, shrews, monkeys, tarsiers, civets, pigs, and bovids, as well as marsupials—arboreal possums called cuscuses. Early, sporadic work by European collectors and taxonomists gave way to more systematic expeditionary collecting by British and American collectors in the twentieth century (Musser *et al.*, 2010). This work illuminated the remarkable diversity and endemism of Sulawesi's mammals and led in particular to proliferation in knowledge of the island's rich native murine rodent fauna (e.g., Musser, 1969, 1982, and many similar contributions). From the mid twentieth century, palaeontological excavations on Sulawesi also began to reveal aspects of the deeper Quaternary history of the island's mammals, including the past presence of now-extinct megafauna such as proboscideans and large pigs (Hooijer, 1958, 1975, and many other contributions). This was accompanied by other discoveries of extinct megafauna on islands in Nusa Tenggara, including Sumba, Flores, and Timor, especially of species of the proboscidean genus *Stegodon* (Hooijer, 1975).

Much better known than the mammals of Wallacea are its birds (Rheindt *et al.*, 2020), which are more colourful, more vocal, easier to find by day, and most importantly were more economically lucrative targets for early natural history collectors working in the region (Coates & Bishop, 1997). Wallacean fruit-eating bats (family Pteropodidae), from tiny blossom bats to massive flying foxes, were commonly collected by early European traders and expeditioners alongside birds and are thus the mammals best represented in historical museum collections. Because of this, much of their distributional patterns of occurrence became reasonably well documented by the turn of the twentieth century (Andersen, 1912) and more firmly fleshed out by the end of the century (Corbet & Hill, 1992; Flannery, 1995). Nevertheless, much remains to be published about the taxonomy of Wallacea's fruit-eating bats, and these species have been largely untouched by the revolution in systematics enabled by integrative approaches involving both molecular phylogenetic and modern morphometric methodologies.

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