

## Southeast Asia Fauna and the Wallace Line

By Jim Bartos, Docent, *Docent Newsletter*, 06/03, Columbus Zoo and Aquarium, Columbus, OH. Columbus Zoo and Aquarium recently opened a new "Islands of Southeast Asia" exhibit.

In the May 2003 issue of [the Columbus Zoo and Aquarium's newsletter], the article about the new Islands of Southeast Asia begins with, "Experience the adventure of the Islands of Southeast Asia at the newest geographic region at the Zoo. Visitors will enter the region by crossing a foot bridge over the boat canal to the central plaza."

When the Australia exhibit opens next year, that boat canal will separate the two regions. There'll be no kangaroos in the Southeast Asia exhibit and no gibbons in the Australia exhibit. That's because the different species are native to different continents separated by hundreds of miles of ocean. Well, it is true they are on different continents. But in terms of earthly dimensions, the separation is not much more than that symbolic boat canal in the exhibit.

In 1856, Alfred Wallace<sup>1</sup>, a British naturalist and contemporary of Charles Darwin, attempted to book passage from Singapore to Celebes (now known as Sulawesi) while exploring the Malay Archipelago. Unable to book a direct passage, he instead arrived in Bali. He spent his few days ashore observing and collecting birds and hunting butterflies. He then set sail across the very deep fifteen-mile channel to the next island, Lombok (now known as Lombok).

He began observing the birds of Lombok and was especially captivated by the Megapodes or bush-turkeys. They have short rounded wings, large tails, and stout legs with strong claws and are much like the turkeys of North America. They do not brood their eggs but lay each of them in a separate hole in a huge mound of earth mixed with twigs and leaves. Each hole is carefully filled and the heat from decomposing plant matter hatches the eggs. These mounds may reach fifteen feet in height and represent the work of many generations of the birds.

This one bird family set off a chain of events in Wallace's thoughts. He was struck by the idea that the **birds on Lombok are strikingly dissimilar from those of Bali even though they are separated by only fifteen miles of sea.** As he explored the island, he realized that the differences in the birds on either side of the channel were much greater than could be observed in voyages of longer distances elsewhere. He found that honeysuckers did not exist west of Lombok and no barbets were east of Bali. This led him to an extraordinary conclusion.

In *Letters & Reminiscences* (1916), Wallace wrote, "*In this archipelago there are two distinct faunas rigidly circumscribed which differ as much as do those of Africa and South America and more than those of Europe and North America; yet there is nothing on the map or on the face of the islands to mark their limits. The boundary line passes between islands closer together than others belonging in the same group. I believe the western part to be a separated portion of continental Asia while the eastern part is a fragmentary prolongation of a former west Pacific continent.*"

In 1863, Wallace traced a hypothetical line that extends from the Indian Ocean through the Selat Lombok between the islands of Bali and Lombok, northward through the Makassar Strait between Borneo and Celebes (Sulawesi), and eastward, south of Mindanao, into the Philippine Sea. Later, after again examining the fauna of Sulawesi, Wallace redrew the original line so that it ran southeast of the island. Unknowingly, he moved his line to a new position that accurately matches the plate tectonic history of the Malay Archipelago.<sup>2</sup>

The Australia and Eurasia plates collided fifteen million years ago. This brought the two areas into contact after being isolated from one another since the close of the Cretaceous age, 65 million years ago. When glaciers were at their maximum, Sulawesi was in contact with the Eurasian mainland, while a deep ocean trench kept it separated from islands immediately to the southwest that were connected to Australia and New Guinea.

The illustration [at http://www.mongabay.com/images/wallacemap.gif](http://www.mongabay.com/images/wallacemap.gif) shows the islands of the region. ~~I added the two Wallace lines to the map.~~ The shaded areas around the islands mark the lands that were exposed during recent glacial periods because of the drop in global ocean levels. These land bridges permitted animals to travel between areas much as the bridge between Asia and North America permitted the transfer of many species. When the glaciers melted, the ocean level rose and those land bridges disappeared.

Many zoogeographers have tried to refine Wallace's line and some no longer consider it a regional boundary. Regardless, it does represent an abrupt change in the distribution for many animals. Asia's tropical region is the poorest in parrots

while Australia's is the richest. Cockatoos and the lorries extend up to the edge of the line without a solitary species passing into the western islands of the Archipelago. Parakeets and thrushes are confined with equal strictness to the Asian region. The line also acted as a barrier to Asian species of freshwater fish and large mammals, which can not be found east of the Wallace Line.

The fauna northwest of the line is similar to Asia's and the fauna on islands southeast of the line is similar to Australia's. All of the striking characteristics of the wildlife on each side of the line are almost unimpaired up to the very edge of their respective ranges. The islands in the middle, notably Sulawesi, were isolated from both the Australia and the Orient land masses. They are therefore independent of the two zones and subsequently have species characteristic of neither realm. As is true of most regions, the core areas of both are clearly distinct, but things are a little fuzzy on the periphery. Thus some zoogeographers recognize the island region between Java and New Guinea as a mixing zone of mostly unique animal life and designate it Wallacea.

So [if you visit Columbus,] when you cross the bridge into the Islands of Southeast Asia, think of the water canal as something more than just a boat ride. Think of it as the Zoo's version of the Wallace Line.

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<sup>1</sup> **Alfred Russel Wallace (1823-1913).** Independently of Charles Darwin, Wallace developed the theory of natural selection. Indeed, some say that the well-connected and UK-based Darwin stole the idea from poor unheralded Wallace who was isolated in malarial Indonesia ... but that's another story.

<sup>2</sup> **Plate Tectonics.** The theory of continents drifting from place to place, breaking apart, colliding, and grinding against each other. The theory was formulated in the 1960s and 1970s as new information was obtained about the nature of the ocean floor, Earth's ancient magnetism, the distribution of volcanoes and earthquakes, and the flow of heat from Earth's interior.

**Webmaster's Note:** Map illustration is from article . "A Place Out of Time: Tropical Rainforests and the Perils They Face" by Rhett A. Butler- San Francisco, Ca. – Unpublished- 2001, <http://www.mongabay.com/home.htm>