

## Wallace, the other father of evolution

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150 years ago, on the 1<sup>st</sup> of July 1858, the theory of evolution by natural selection was presented for the first time to the Linnaean society of London. The discovery was credited to two British natural scientists; Charles Darwin was the first. The other, frequently forgotten, was a self-taught young biologist, who came to the same conclusions through studying species from the Malayan Archipelago in S.E. Asia. His name was Alfred Russel Wallace.

150 years later history selected Darwin as the supreme thinker of evolution. Wallace was reduced to the status of an endangered species, outshone by his scientific idol. Few today know that Alfred Russel Wallace existed. Even fewer know that he started his career as a natural scientist in Brazil!

Wallace spent four years in the Amazon, collecting plants and animals on the margins of the black river and the middle Amazon. He disembarked at the Port of Belem on the 26<sup>th</sup> of May 1848, accompanied by another young British natural scientist, Henry Bates. They were only 25 and 23 years of age respectively.

The idea was to collect the largest number of exotic plants and animals possible, which would then be taken to England for study. They took birds, fish, butterflies and other interesting insects. To pay their bills they sent duplicates to an agent in London, who sold them to collectors and museums and sent them back money.

### *Disaster*

The plan almost went right. After 4 years of hard work living in the forest and in fragile health, Wallace took what he had collected and embarked to return to England on the 12<sup>th</sup> July 1852. In the middle of the Atlantic, disaster struck, the boat caught fire. Wallace watched from a lifeboat as his collection went up in flames. He only saved some notes and drawings which were in his cabin, amongst them some drawings of fish and palm trees that Brazilian scientists use today as reference material.

The Brazilian customs house gave its contribution. The majority of specimens that should have been dispatched to England in the last two years of the expedition were retained in Manaus (town in Brazil), meaning that it all had to be taken back in one go, making the loss much bigger.

'With what pleasure had I looked upon every rare and curious insect I had added to my collection! How many times, when almost overcome by the ague [fever], had I crawled into the forest and had been rewarded by some unknown and beautiful species! How many places, which no European foot but my own had trodden, would have been recalled to my memory by the rare birds and insects they furnished to my collection!

wrote Wallace. ‘..now everything was gone, and I had not one specimen to illustrate the unknown lands I had trod...’

After 10 days drifting, plugging leaks with corks, Wallace and the crew were rescued by a passenger boat. He returned to England, without money and animals but well know enough to get a free passage on another expedition, this time to the Malay Archipelago (modern day Malaysia & Indonesia). It was there in February 1858 that he formulated his theory of the origin of species.

#### *Scientific initiation*

Wallace described some Amazonian species- amongst them the piassava palm tree (*Leopoldinia piassaba*), used in the making of brooms!! But he didn’t make any big discoveries whilst there. That was not the only reason why the expedition was fruitless. The business of collecting species was not a fountain of wealth. What Wallace wanted principally, from the time he first set foot in the forest was to discover the origin of species.

‘He already had a hypothesis when he embarked to Brazil’ says George Beccaloni, researcher at the Natural History Museum in London and specialist on Wallace. ‘That was his principal motivation - very different from Darwin who was still a Christian, he didn’t believe in evolution, and he didn’t have an hypothesis when he sailed on the Beagle’.

The Amazon was the school that Wallace had never before attended (born into a poor family, he abandoned his studies at 13 years of age). ‘The extraordinary biodiversity of Brazil was a decisive point, put to him in a pressing question of how to explain it all rationally?’ says the physicist and scientific publisher Ildeu de Castro Moreira.

Wallace is considered the father of biogeography, the science of the relationship of geological and geographical factors and the distribution of species. He was the first to describe how big Amazonian rivers are geographic barriers for biodiversity- a basic concept of modern ecology.

Wallace noted that, in the wide parts of big rivers, the monkeys on one side were different to the species on the other side. Later that observation turned into one of the pillars of evolutionary theory, describing how isolation could turn two populations of one species into different species.

‘There is no speciation without geographical and reproductive isolation. Wallace understood that completely’ says Nelson Papavero, retired biologist of the Zoological Museum of São Paulo.