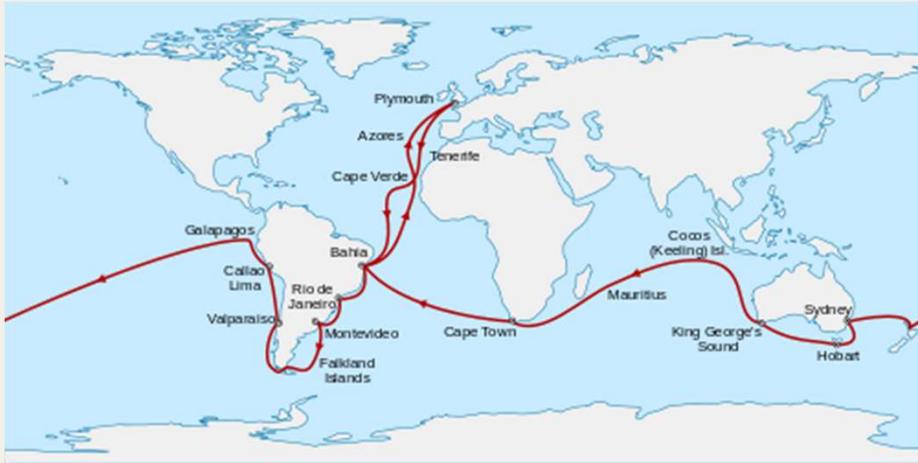
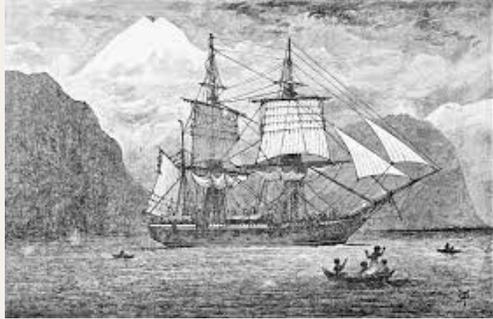
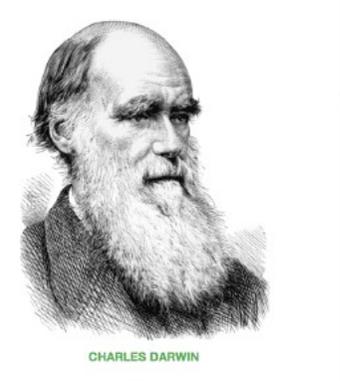
The background is a light beige color. On the left side, there are several blue dashed contour lines that curve upwards and to the right. A white circle is partially visible in the top-left corner. On the right side, there are more blue dashed contour lines curving downwards and to the right, with a solid orange line following a similar path below them. A white circle is partially visible in the bottom-right corner.

Zoogeography

Lesson 2

Early 19th century



Alfred Russel Wallace (1823-1913)

father of biogeography



The Malay Archipelago

20 April 1854 (arrived in Singapore) - 1 April 1862





Driving mech. of evolution: Natural selection

- + Any pair of animals or plants produces far more offspring than would be needed simply to replace that pair
- + There must be competition for survival among the offspring
- + Furthermore, these offspring are not identical to one another



Inevitably, some these variations will prove to be better suited to the mode of life of the organisms than others.

The offspring that have these **favourable characteristics** will then have a natural advantage in the competition of life and will **tend to survive** at the expense of their less fortunate relatives.



Natural selection

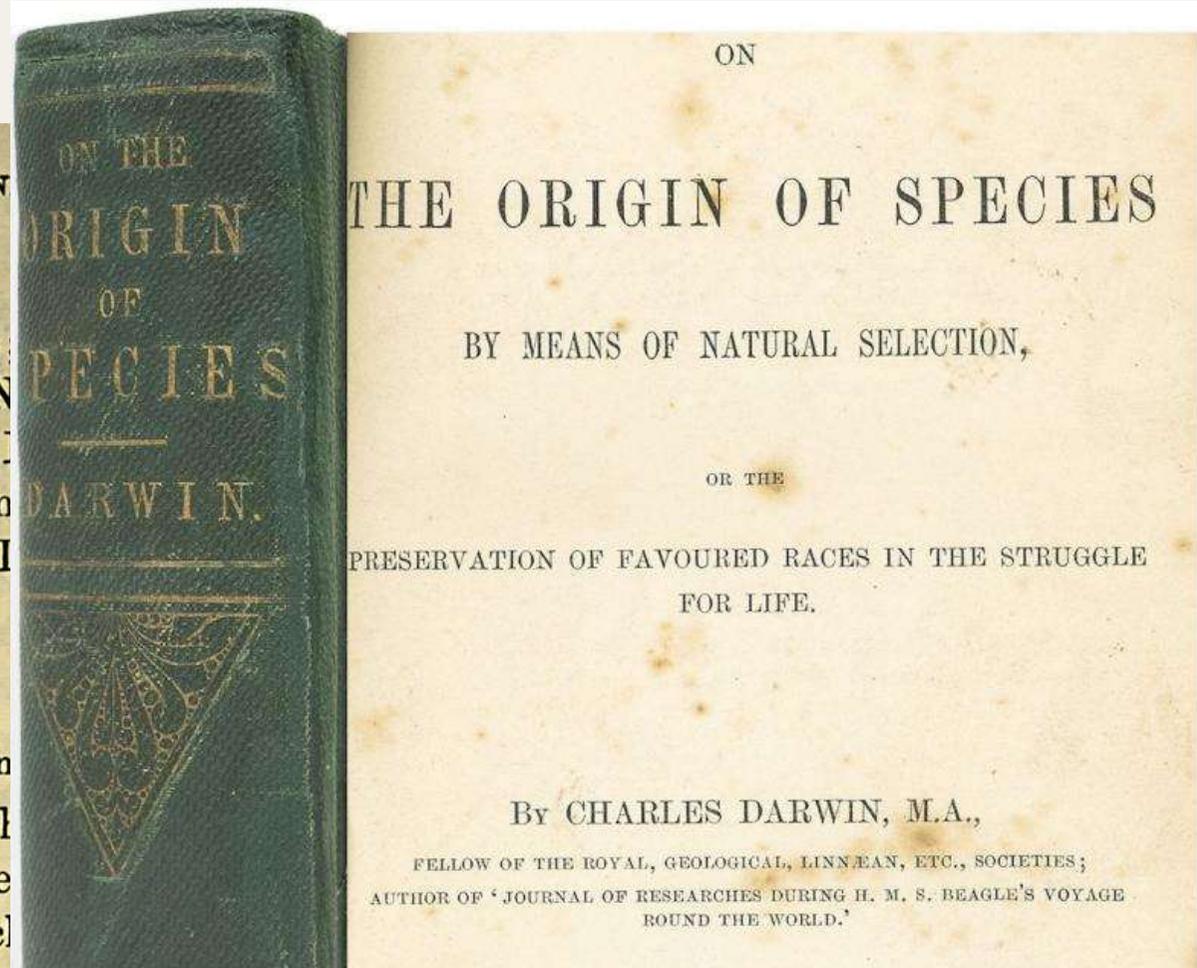
[From the JOURNAL of the PROCEEDINGS OF THE LINNEAN SOCIETY
August 1858.]

On the Tendency of Species to form Varieties, and on the
Peculiarities of the Reproduction of Varieties and Species by Natural
Selection. By CHARLES DARWIN, Esq., F.R.S., and ALFRED WALLACE, Esq., F.G.S., and
CHARLES LYELL, F.R.S., F.L.S., and J. I. SMITH, Esq., F.R.S., F.L.S., &c.

[Read July 1st, 1858.]

London

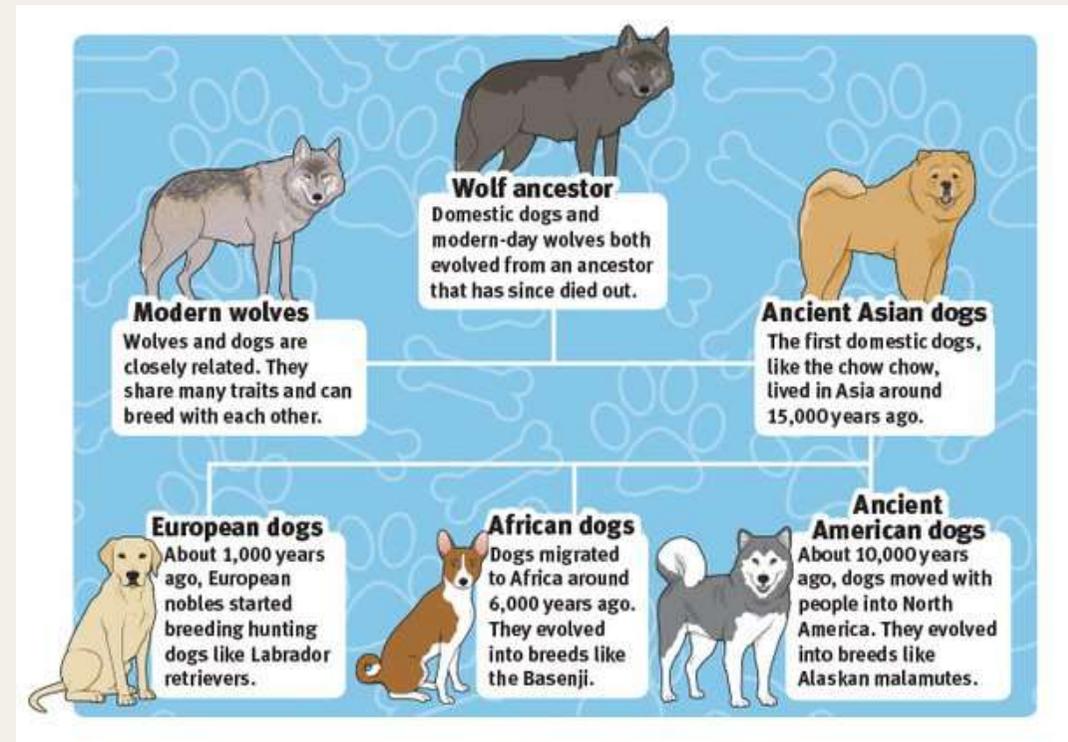
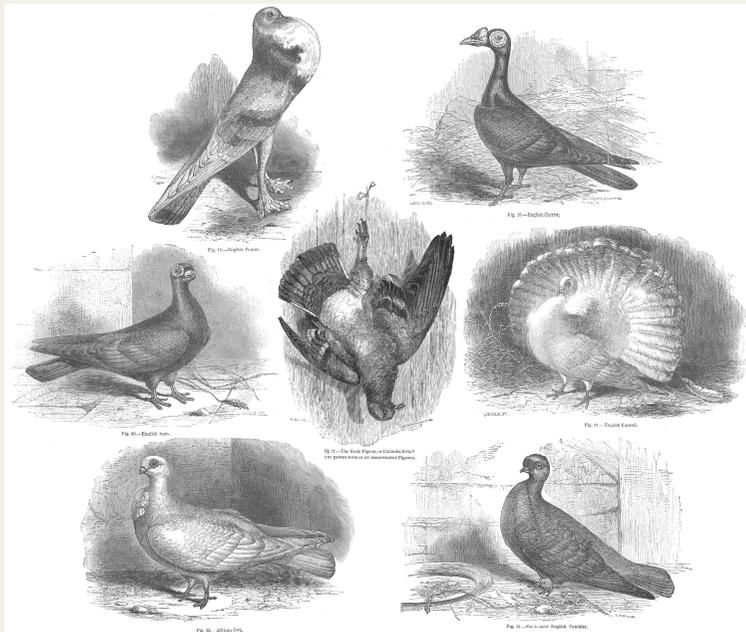
MY DEAR SIR,—The accompanying papers, which I have the
honour of communicating to the Linnean Society, relate to the same subject, viz. the Laws which govern the
production of Varieties, Races, and Species, contain the results of the
investigations of two indefatigable naturalists, Mr. Charles Darwin
and Mr. Alfred Wallace.





Artificial selection

- + Darwin's studies supported animal breeders in being able to modify the anatomical and behavioural characteristics of dogs and pigeons providing a neat parallel to what he believed had happened in nature over long periods of time.



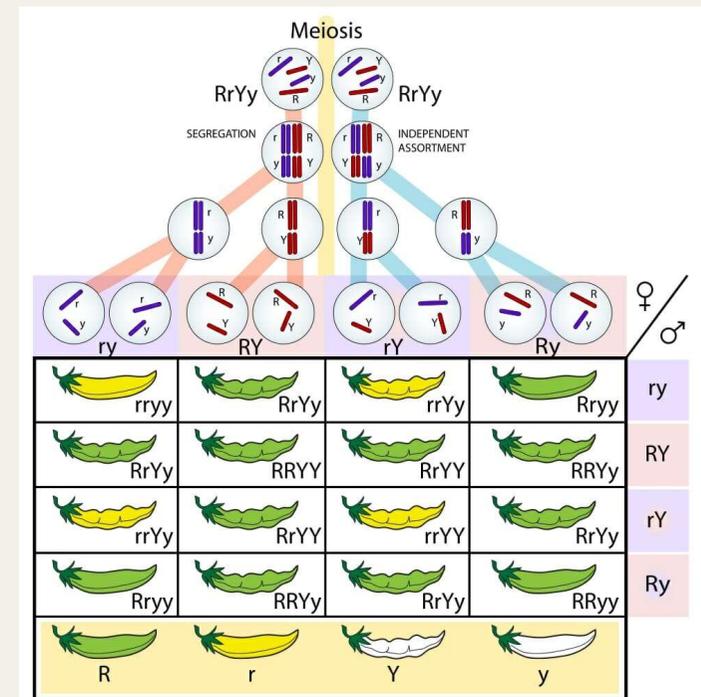
Main issues to Darwin's theory

- + all these different breeds of dog or pigeon were still able to breed with one another, which did not support Darwin's suggestion that this was the way in which new species could appear.
- + Nor could Darwin provide any explanation of precisely how the different characteristics were controlled and passed from generation to generation.
- + most people believed that the Earth was only a few thousand years old.

1866 Gregor Mendel

Genes come in pairs and are inherited as distinct units, one from each parent.

work remained unnoticed until the beginning of 1900



Early 19th century

- + Since dominant groups as mammals and birds (warm-blooded organisms) are largely insulated from the surrounding and are found in a great variety of environments

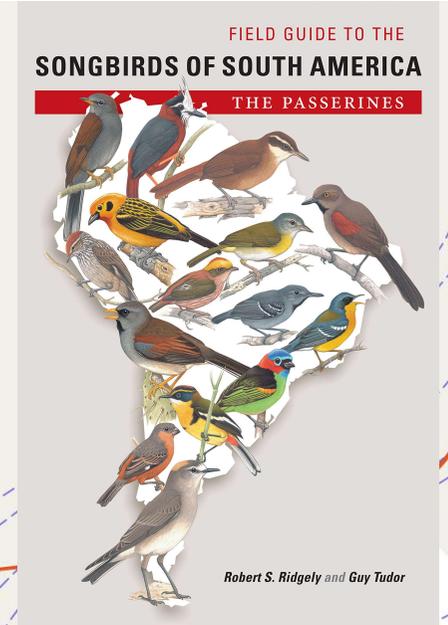
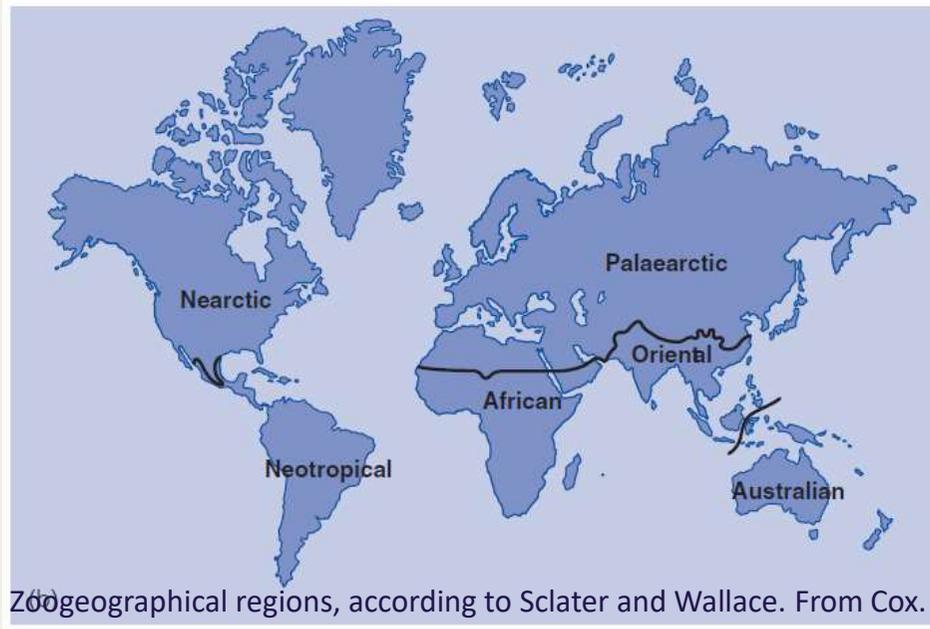


they do not show a close correlation to local ecology.

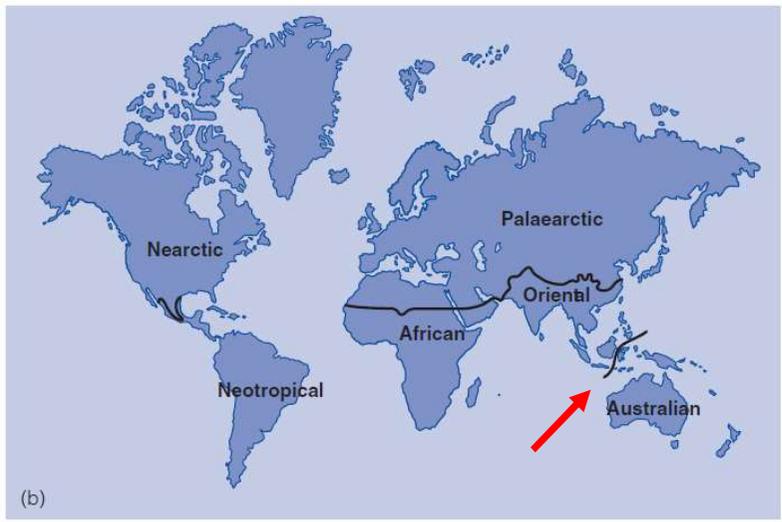
World Maps: Biogeographical Regions of Animals



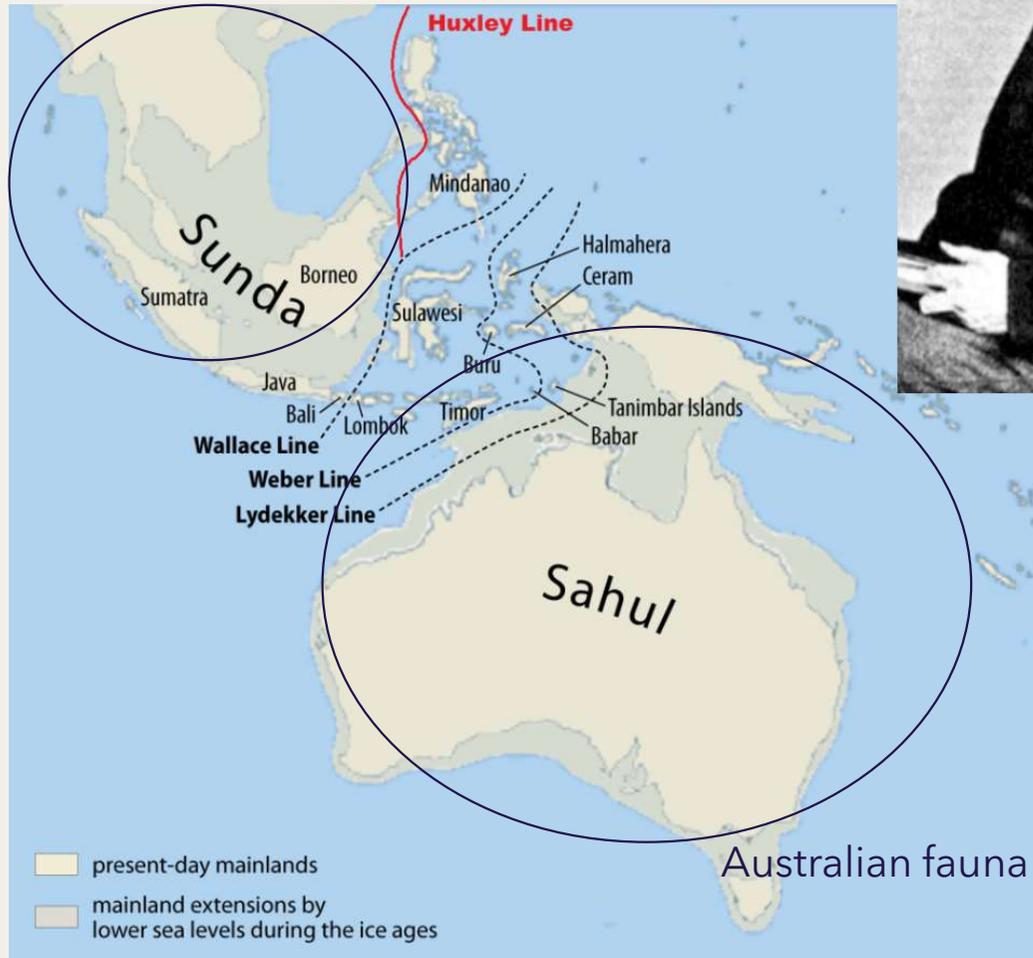
1858



Wallace immediately accepted Sclater's scheme, including his names for the regions, and expanded it to include the distribution of mammals and other vertebrates.



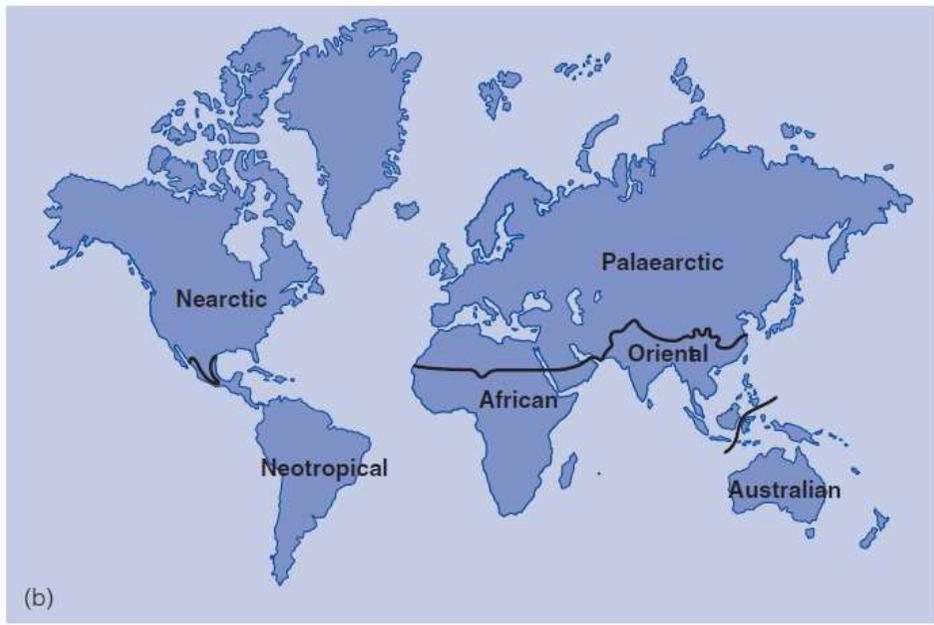
Oriental fauna



Wallace identified or commented many aspects of biogeography that still occupy us today:



- + Extinctions
- + Dispersal
- + Competition
- + Predation
- + Adaptive radiation
- + Biogeography of islands
- + The possibility that the distributions of organisms might indicate past migrations over still-existing or even now-vanished land connections



Dispersalism: assumes that where a taxon or related taxa are found on either side of a barrier to their spread, this is because they had been able to cross that barrier after it formed.

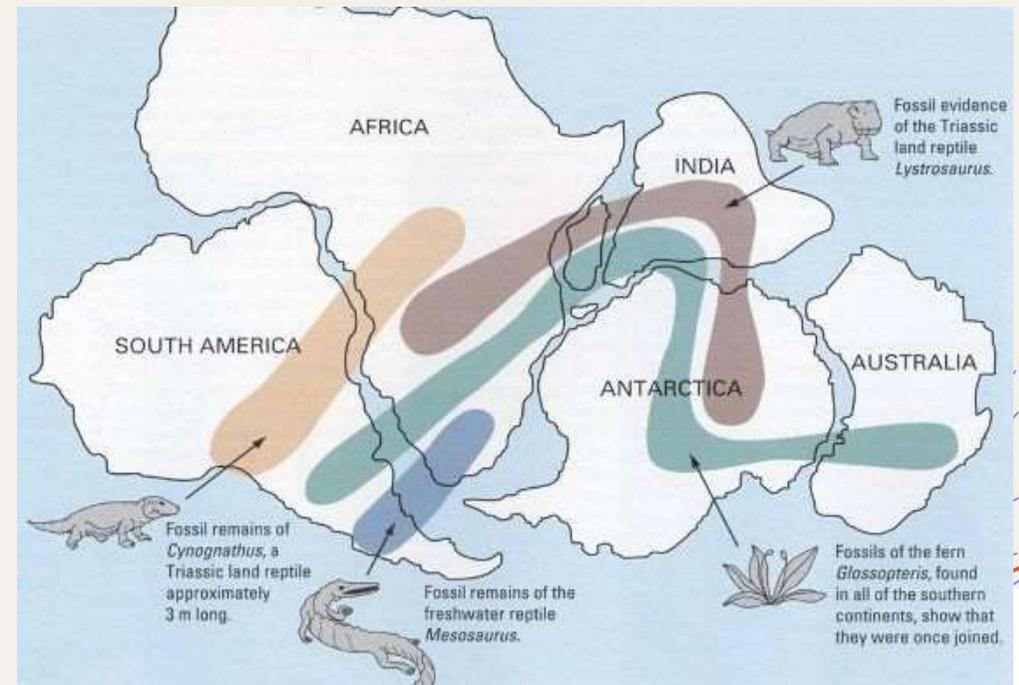


Figure 1.4 How today's landmasses were originally linked together to form a single supercontinent, Pangaea, according to Wegener. (Compare this with Figure 10.1 to see the modern, plate tectonic reconstruction of Pangaea.)



(b)

Panbiogeography (1950)

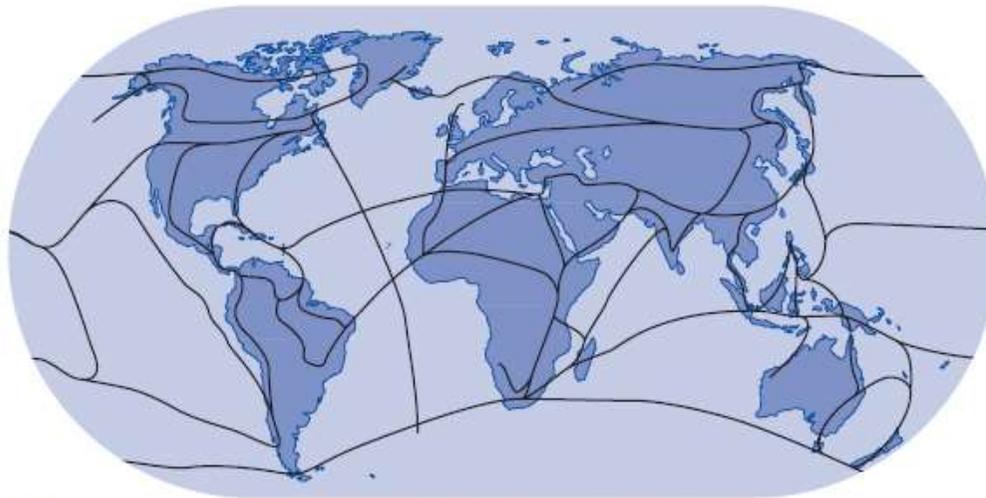
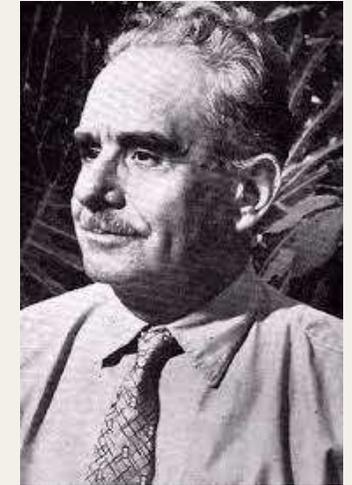


Figure 1.5 Croizat studied the distribution patterns of many unrelated taxa, and for each he drew lines or 'tracks' on the map linking the areas in which they are found. In many cases, these lines were similar enough in position to be combined as 'generalized tracks', shown here.



Leon Croizat
(1894-1982)

Croizat amassed a vast array of distributional data, representing each biogeographical pattern as a line, or **track**, connecting its known areas of distribution. He found that the tracks of many taxa, belonging to a wide variety of organisms, could be combined to form a **generalized track** that connected different regions of the world. These generalized tracks did not conform to what might have been expected if these organisms had evolved in a limited area and had dispersed from there over the modern pattern of geography, as other biologists then believed.

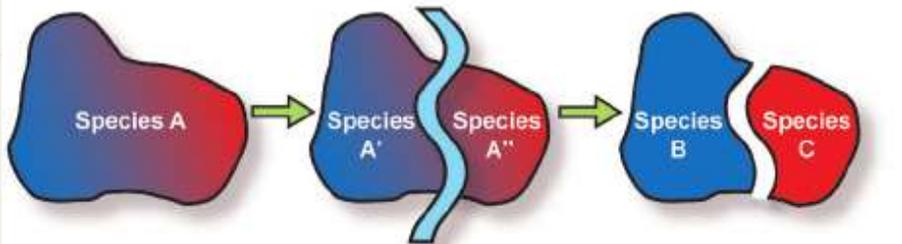
Vicariance: any barriers, such as mountains or oceans, that exist today within the pattern of distribution of the taxa had appeared after that pattern had come into existence, so that these taxa had never needed to cross them.

Dispersal vs Vicariance

Comparison Chart

Dispersal	Vicariance
Dispersal is the movement of a few members of a species from their birth or breeding site to a new geographical location.	Vicariance is the division of a population into distinct but related species due to the development of a geographical barrier.
Dispersal occurs on the onset of pre-existing geographical barriers.	Vicariance occurs in populations due to the development of new geographical barriers.
The geographic barrier is older than the geographic disjunction.	The geographic barrier cannot be older than the resulting speciation event.

Vicariance



Dispersal

