

# Evolution

October 28, 2012

Grace Chapel

Steve Schaffner

## Where I am coming from

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Belief in Christ is consistent with science  
*including evolutionary biology*

## What does science say about the history of life?

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What it *can* tell us

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When and how different kinds of life appeared.

What it *cannot* tell us

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About God's hand in the process.

## Bottom line on evolution

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Theodosius Dobzhansky:

"Nothing in biology makes sense except in the light of evolution."

"Seen in the light of evolution, biology is, perhaps, intellectually the most satisfying and inspiring science. Without that light it becomes a pile of sundry facts some of them interesting or curious but making no meaningful picture as a whole."

# Why evolution?

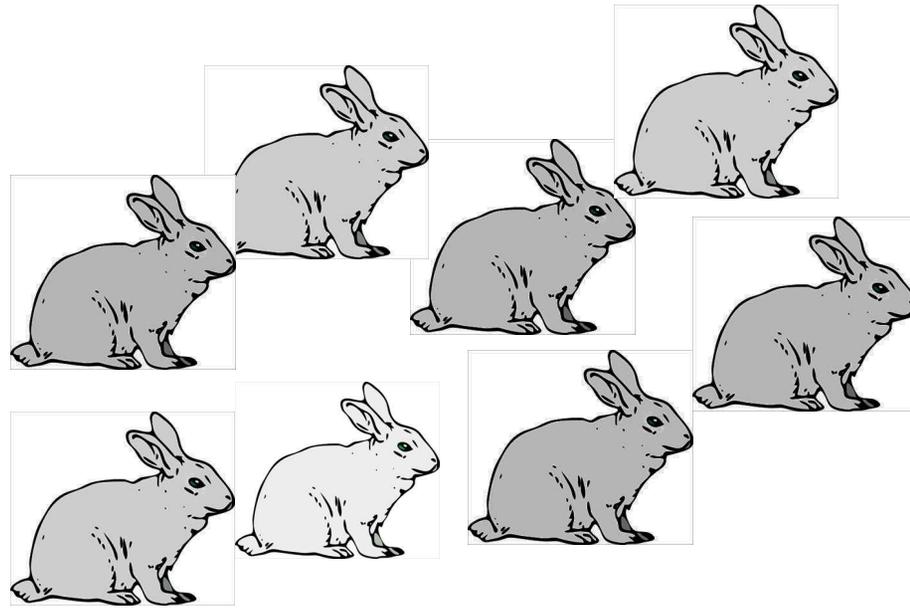
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To explain the diversity and patterns of life.



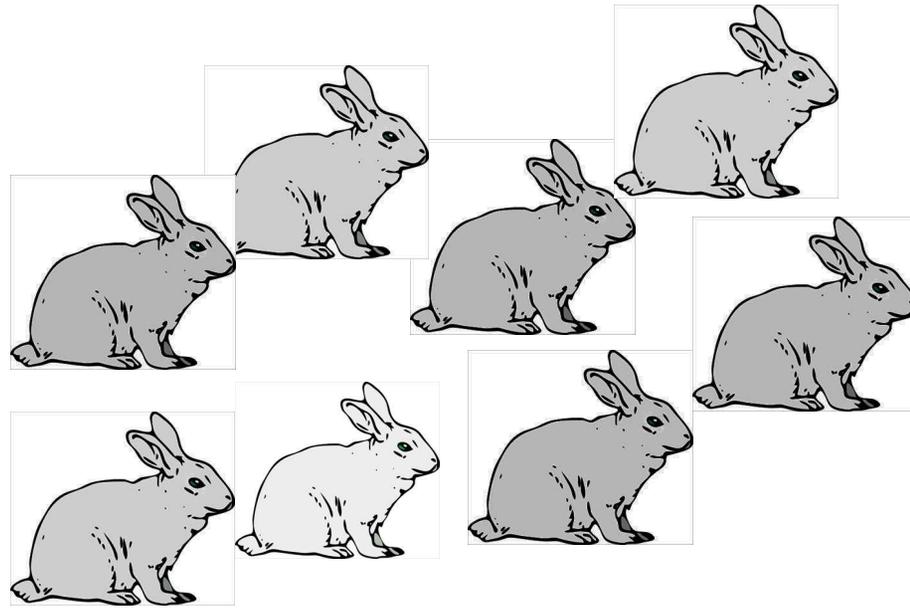
# Species change from generation to generation

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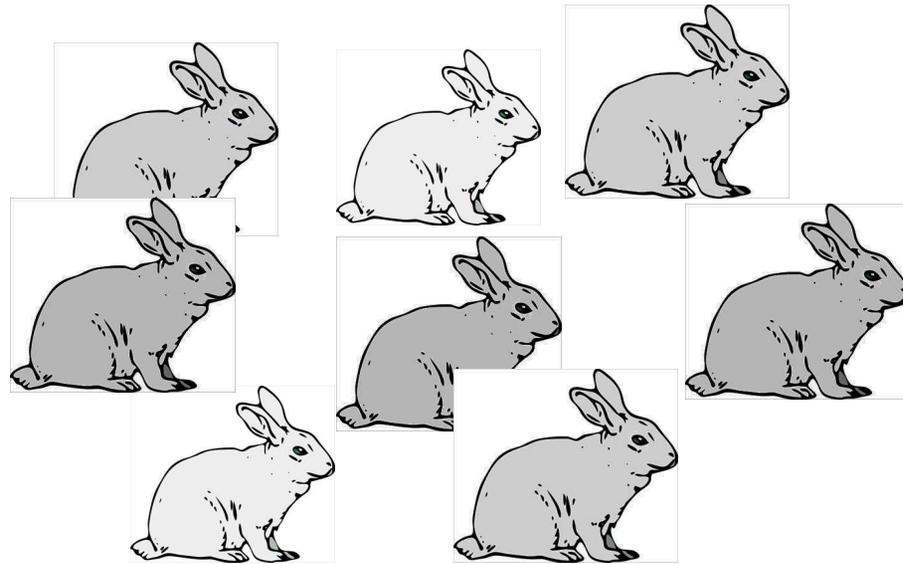
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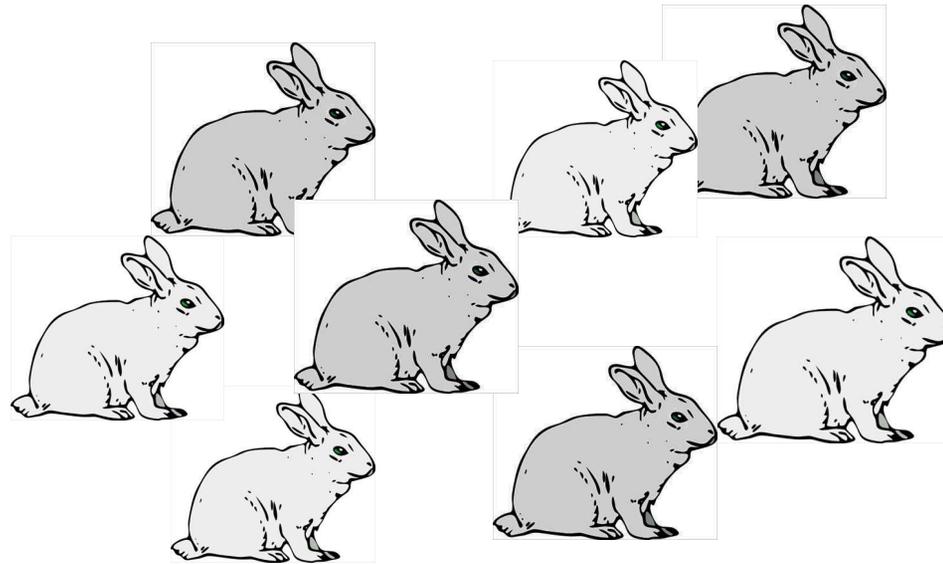
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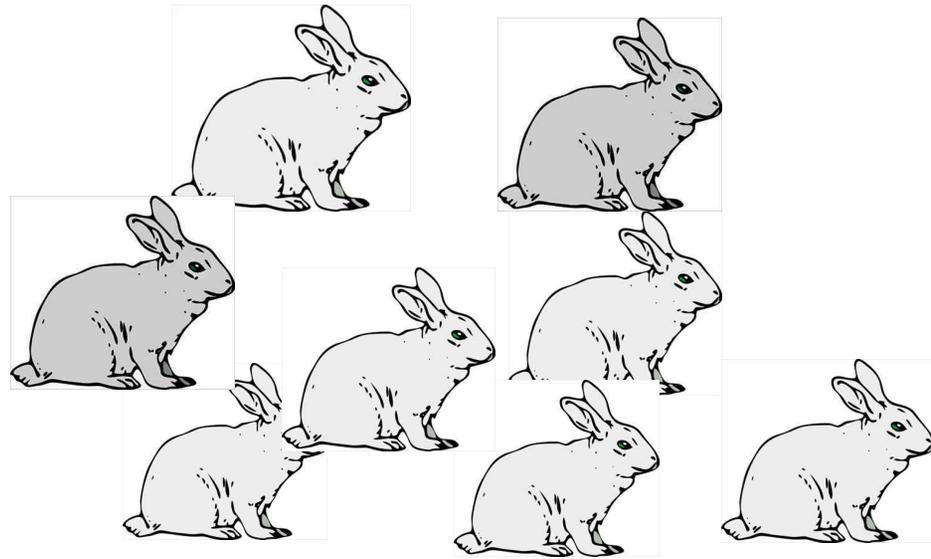
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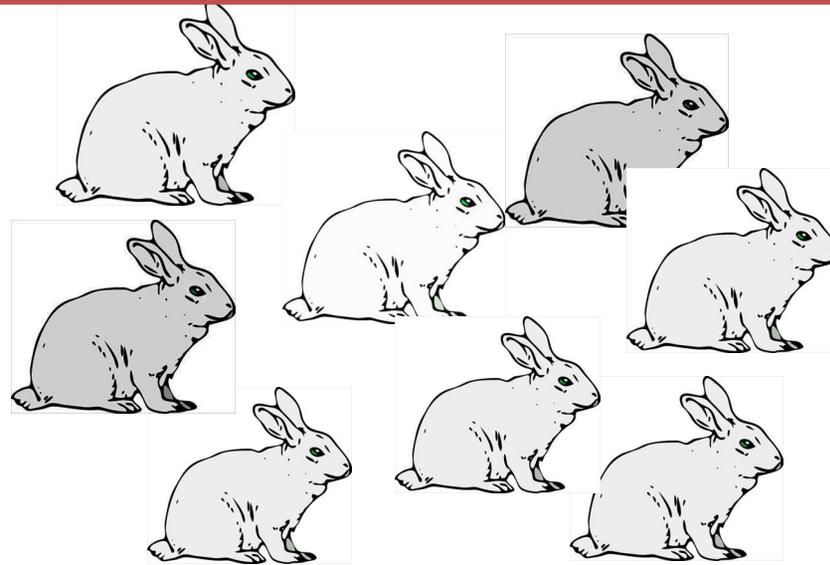
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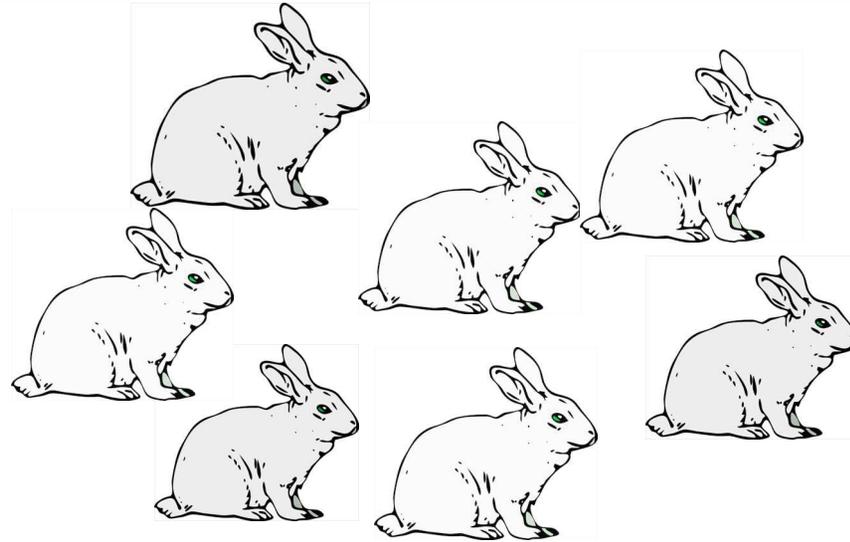
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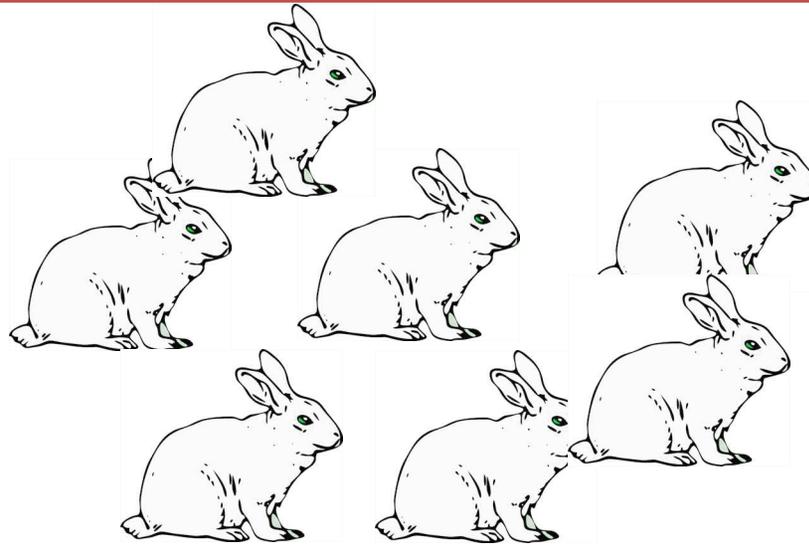
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# Species change from generation to generation

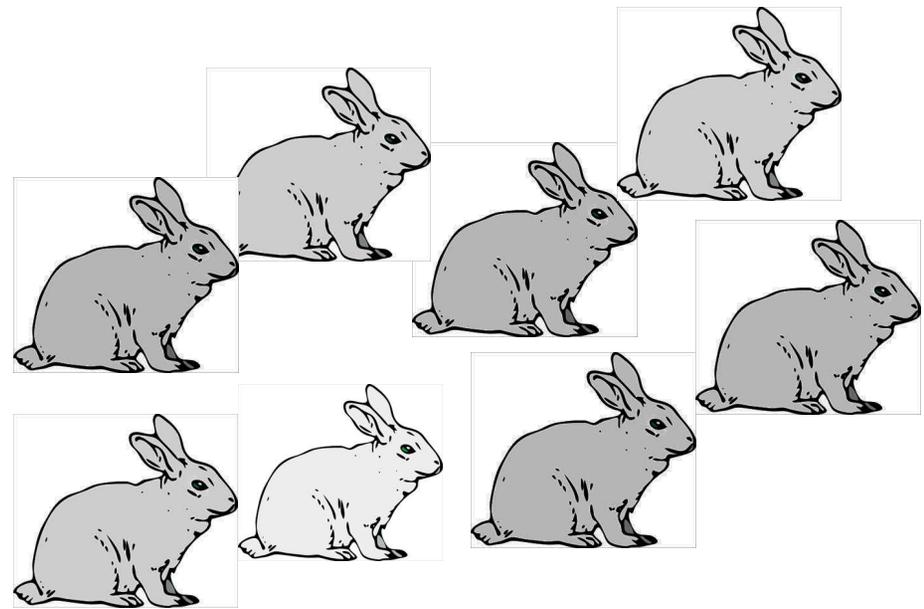
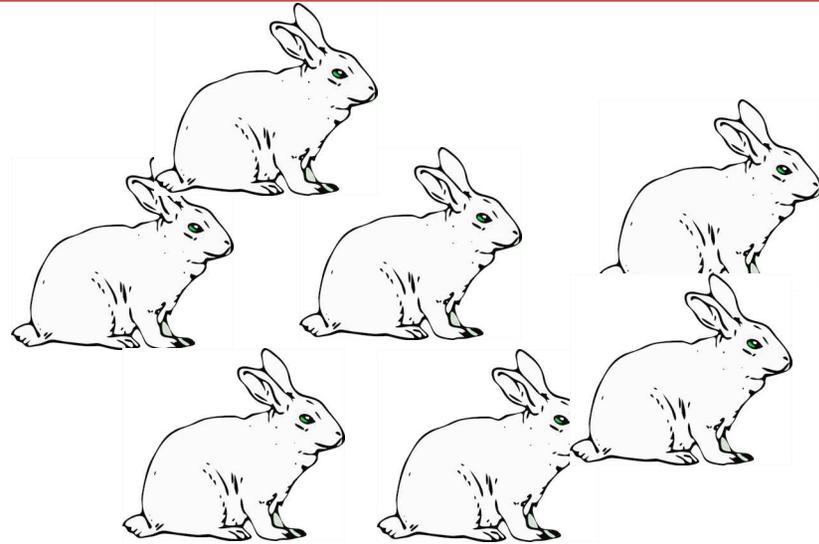
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# Mutation and natural selection

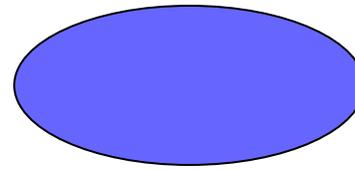
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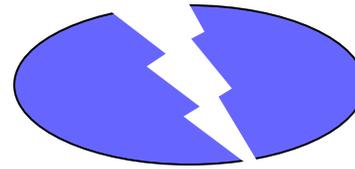
# Common descent

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One species



Barrier (river, mountain)



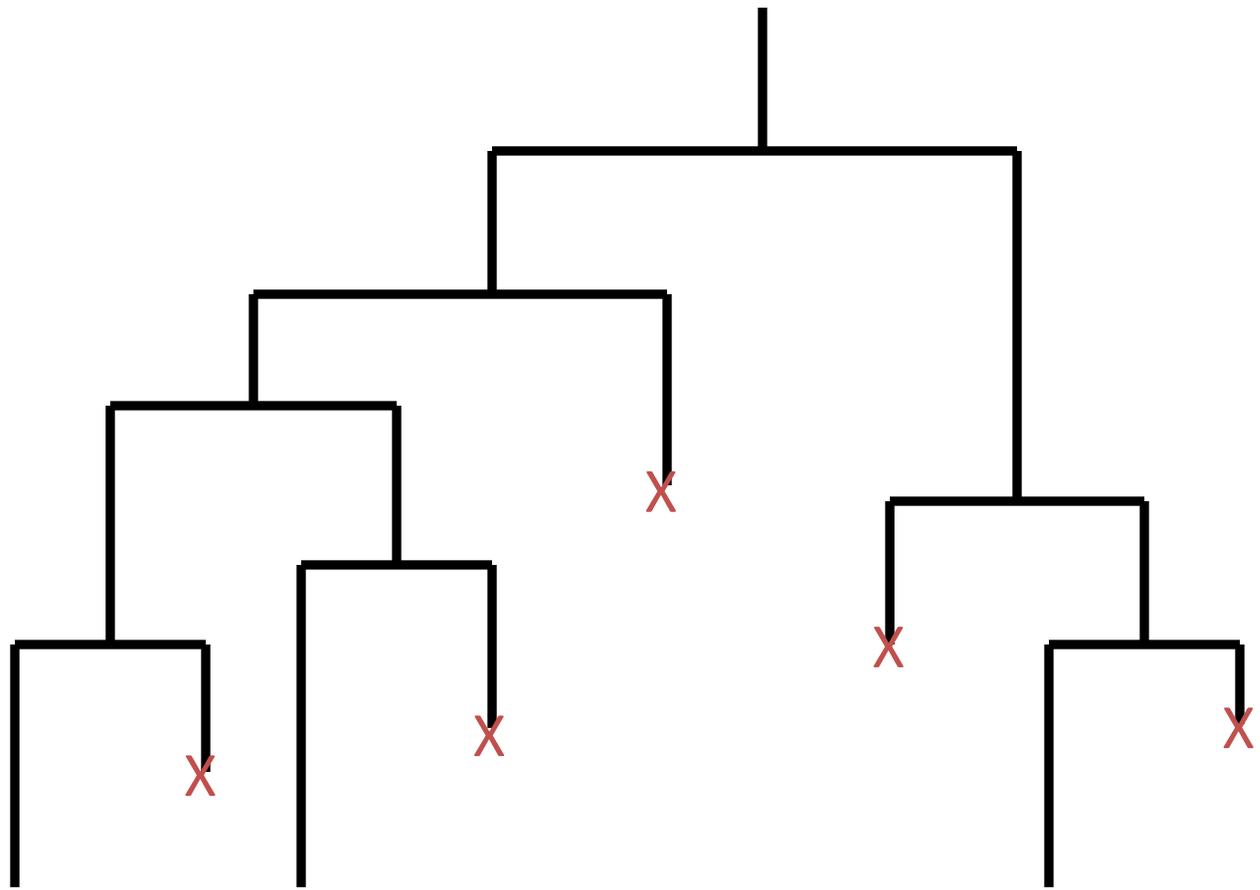
Divergence => 2 species



# Common descent

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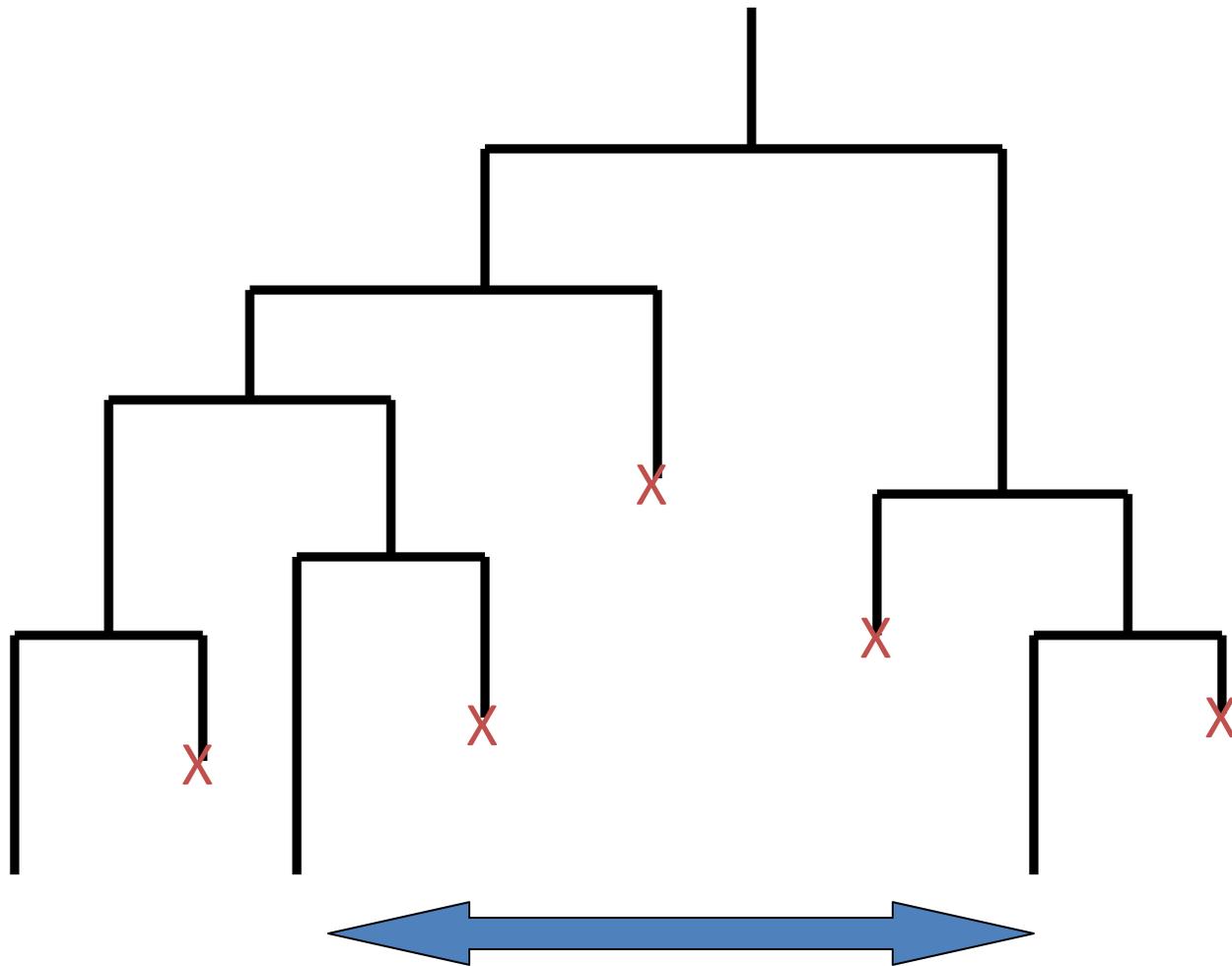
Birth and death of new species



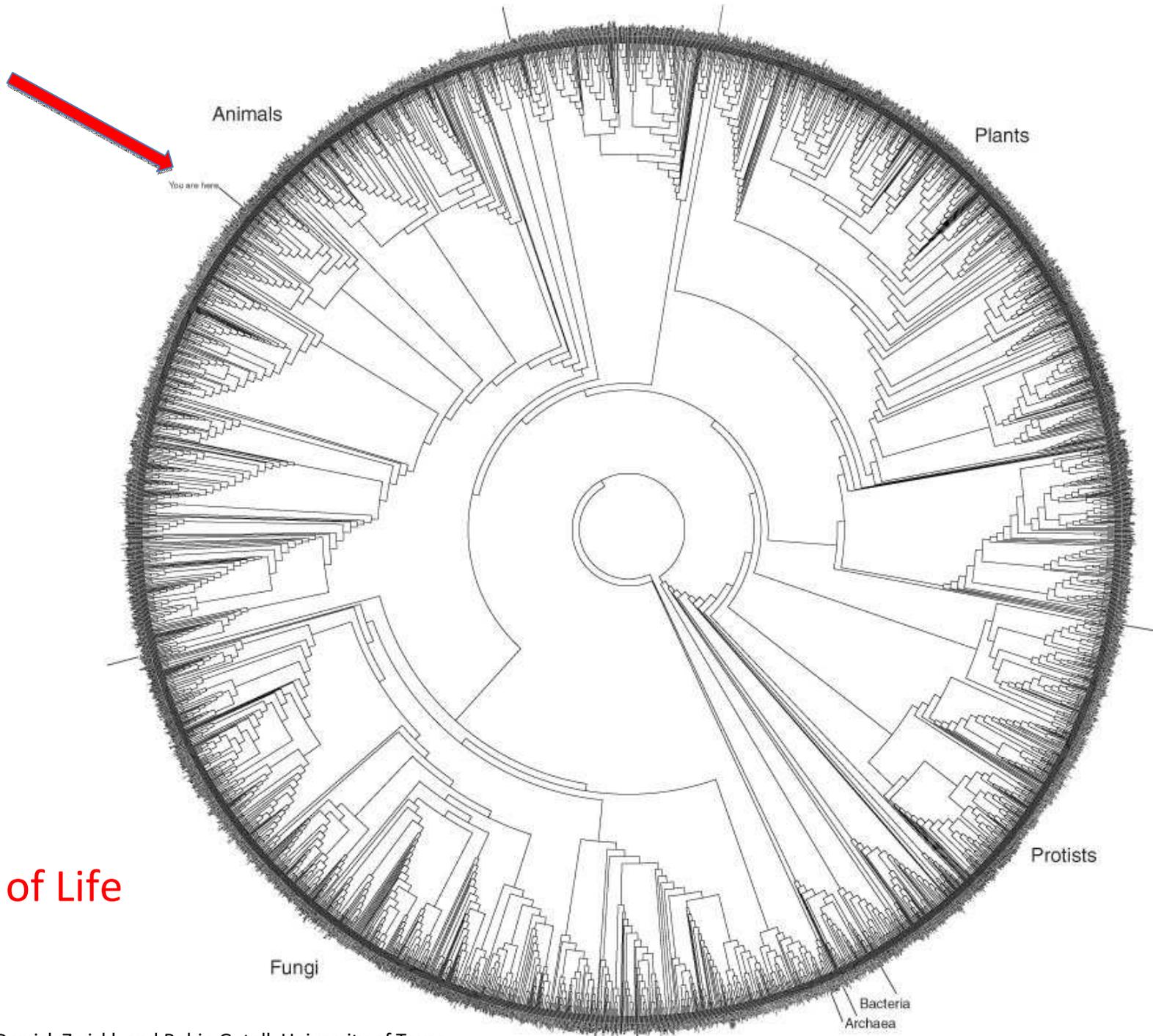
# Common descent

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Birth and death of new species



# Tree of Life

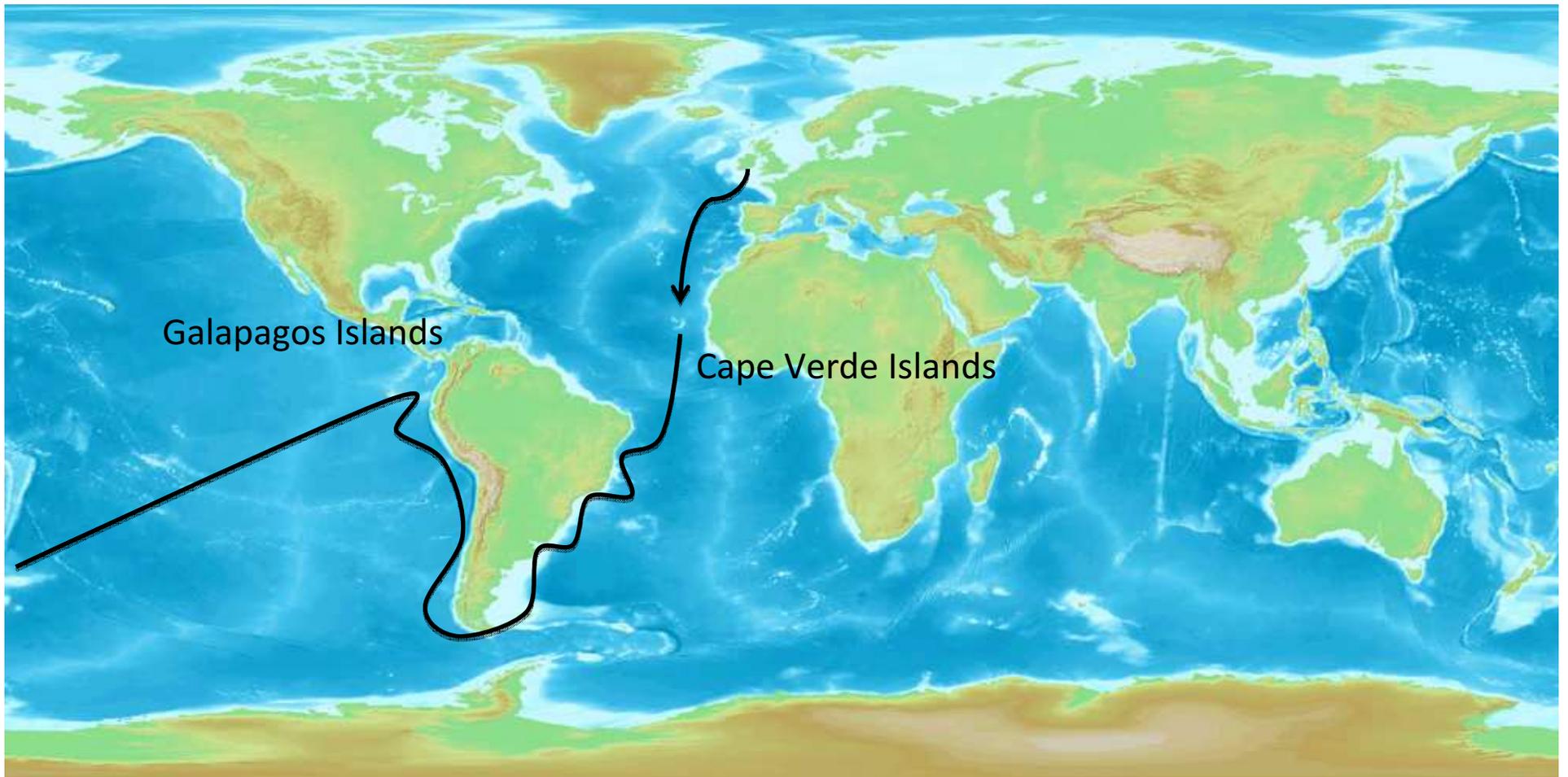


David M. Hillis, Derrick Zwickl, and Robin Gutell, University of Texas.

# Diversity and geography

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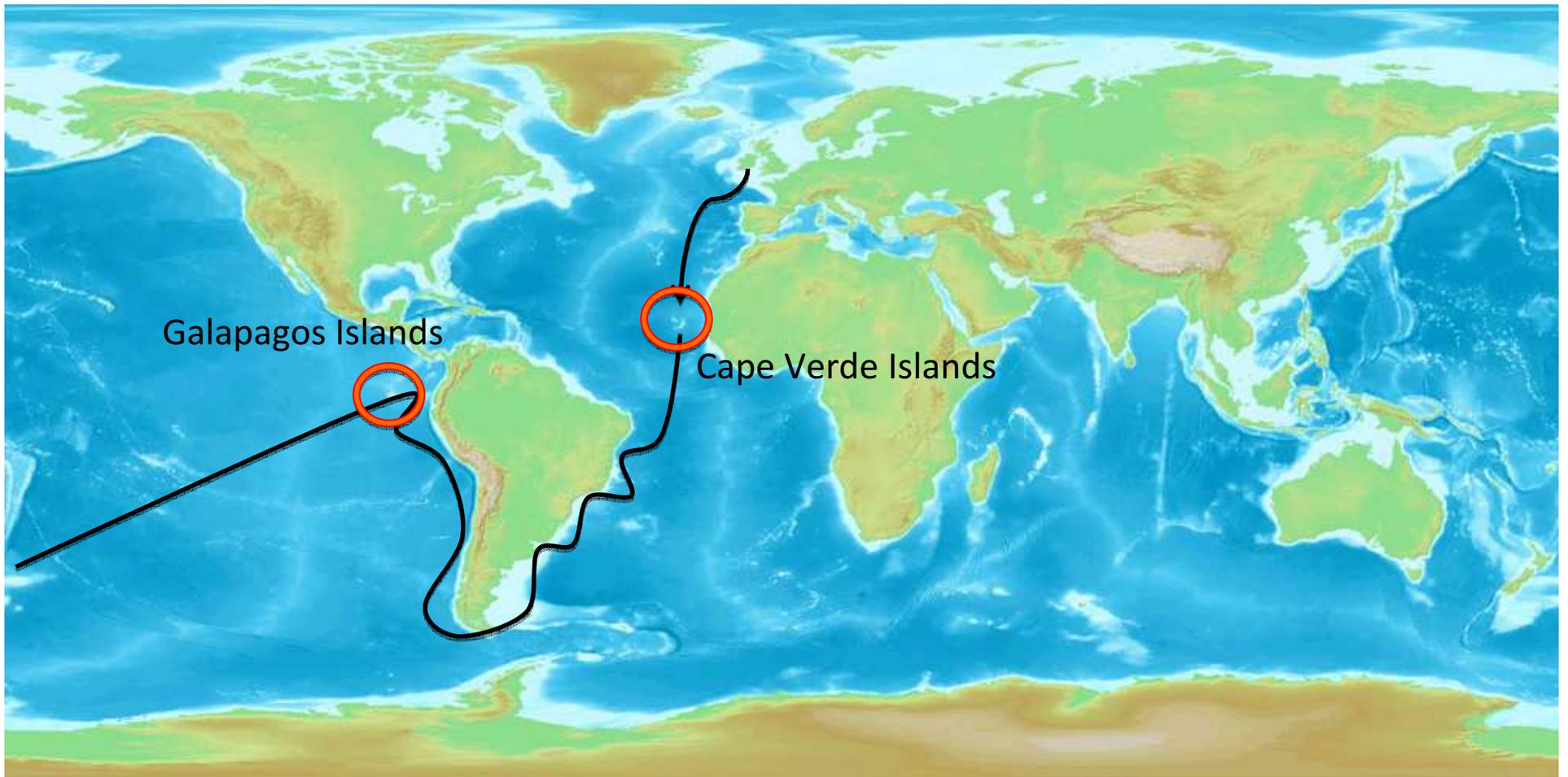
Voyage of the *Beagle* 1831 - 1836



# Diversity and geography

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Voyage of the *Beagle* 1831 - 1836



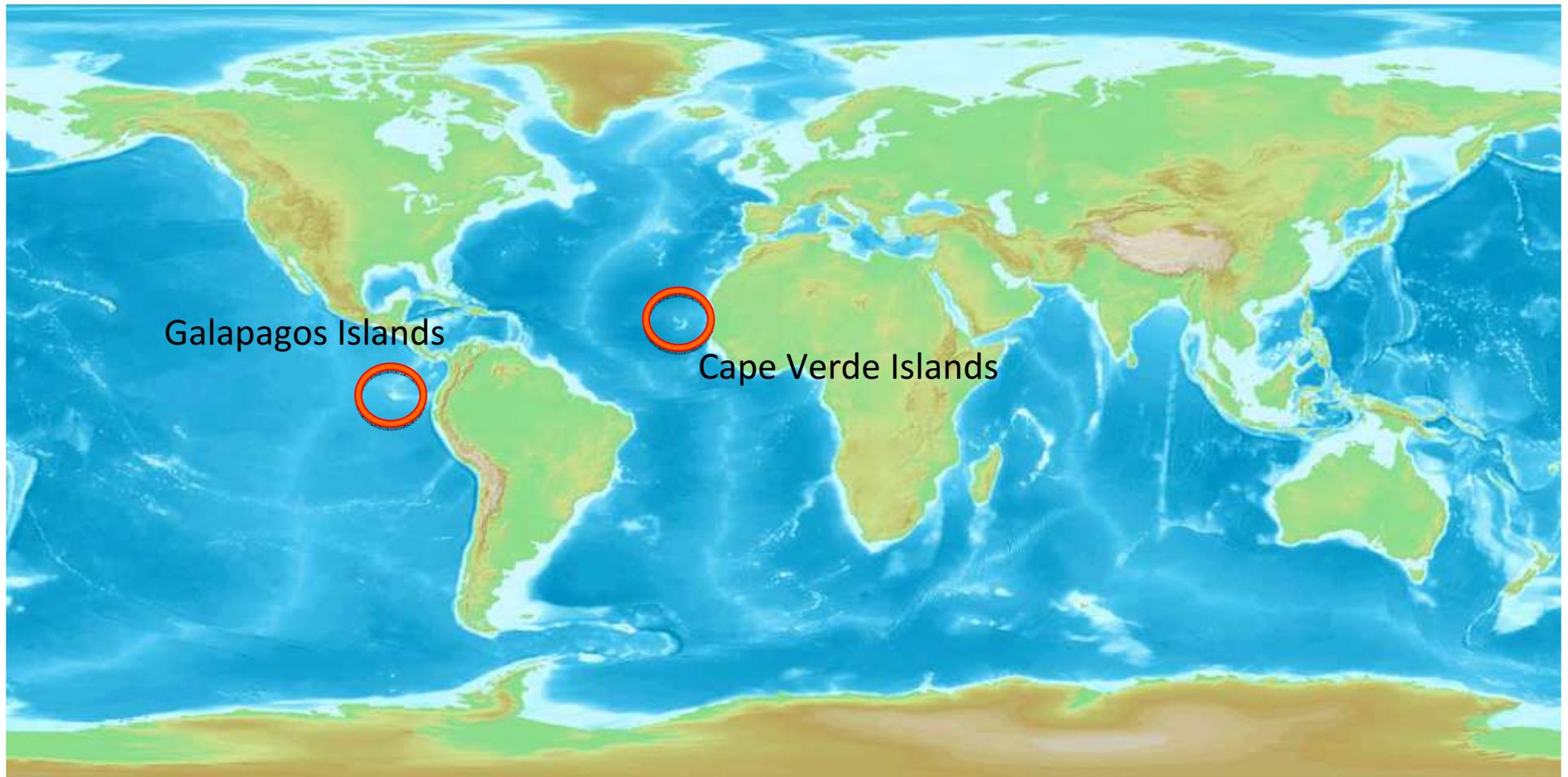
## Diversity and geography

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Darwin noticed:

Islands have unique species of birds

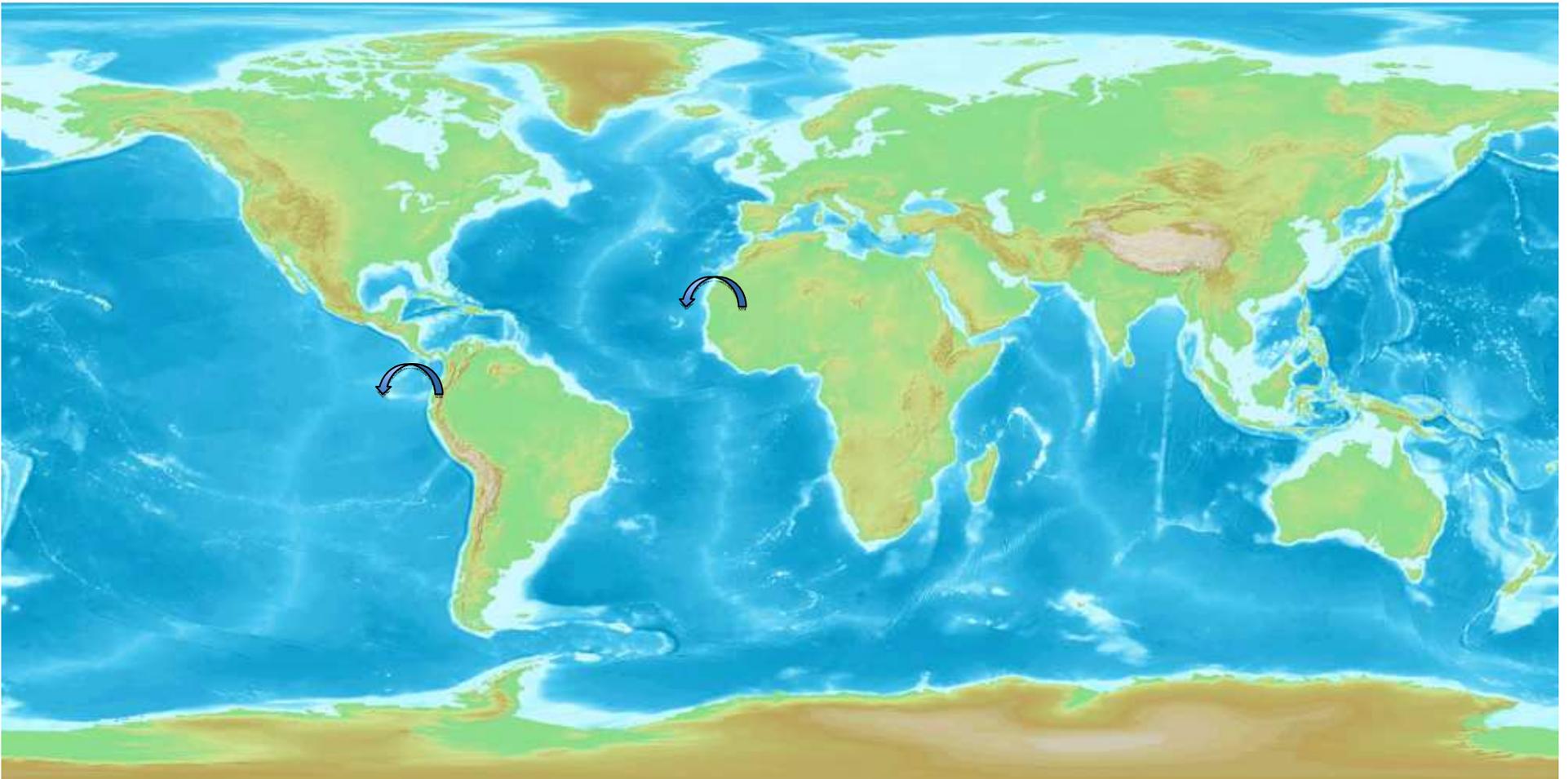
They resemble birds on the nearby mainland,  
not those on other islands



## Diversity and geography

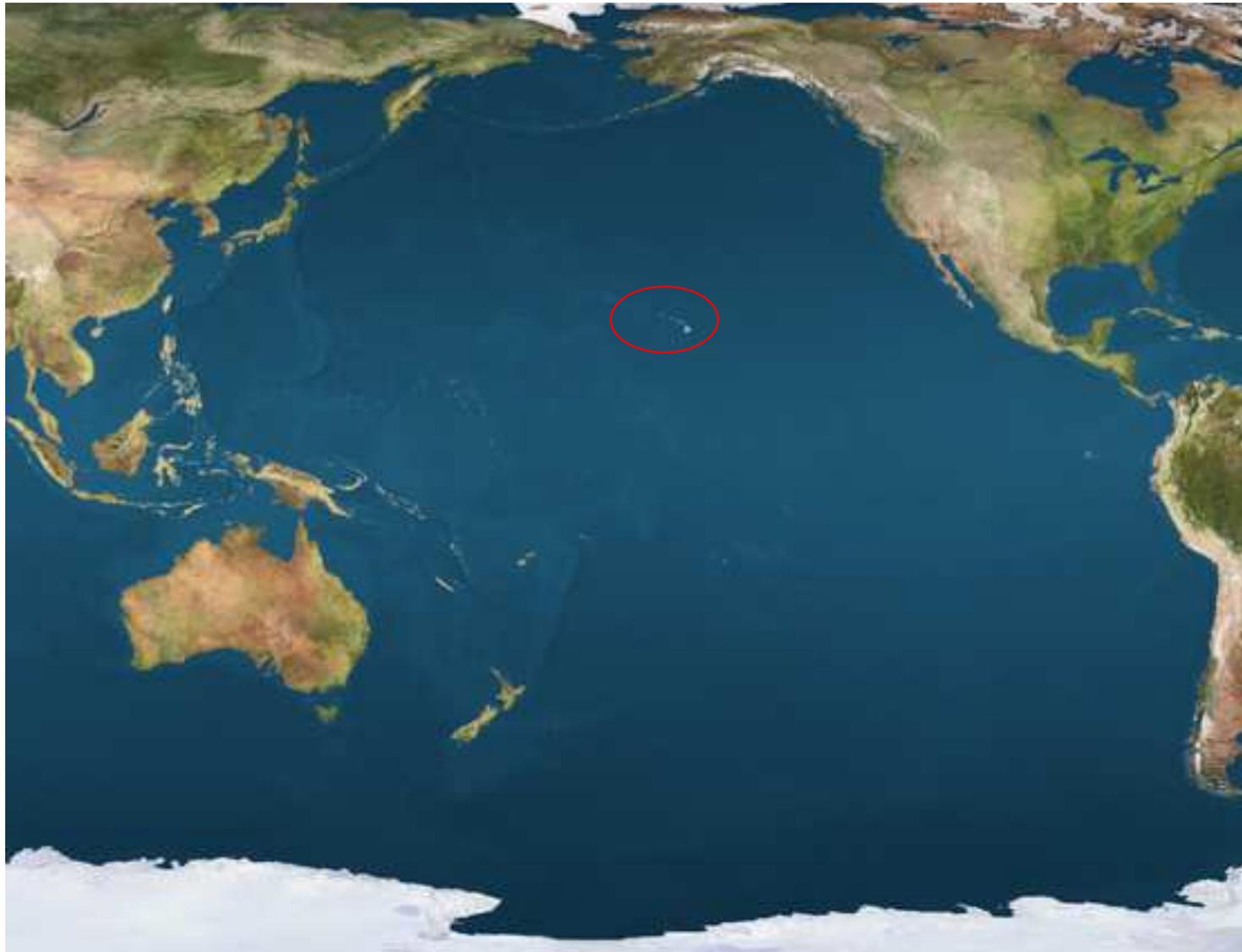
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Conclusion: island species evolved from mainland species



## Diversity and geography: Hawaii

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## Diversity and geography: Hawaii

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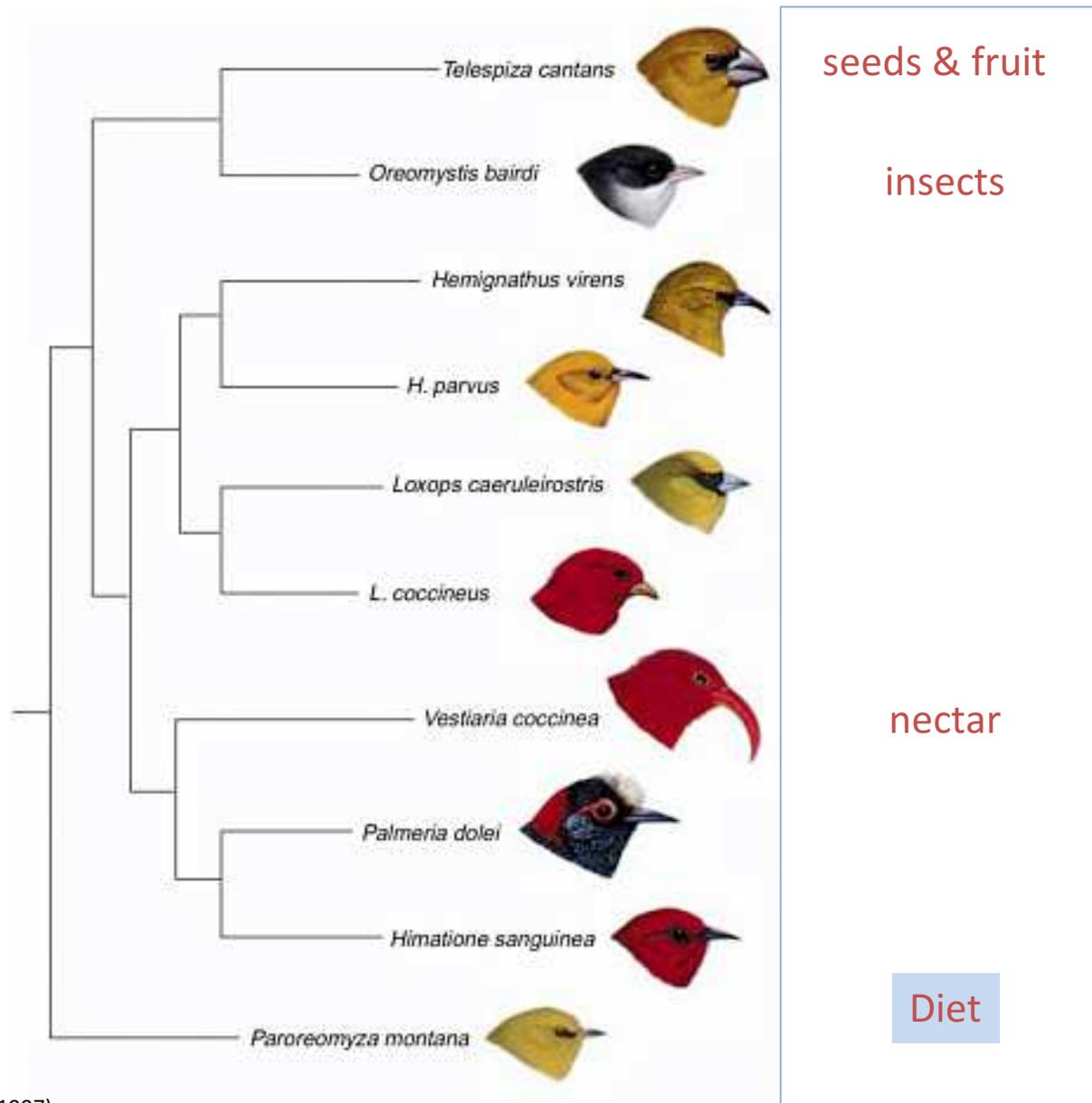
Hawaiian land animals must have arrived  
by air or on logs

- Snails
- Insects, spiders
- Birds: ~100 species
- Mammals: 1 species

No amphibians, snakes, lizards

# The branching tree of life: Hawaiian honeycreepers

1 – 5 million years of evolution



Artwork by HD Pratt  
Used with permission of the artist

Diagram: T.J. Givnish and K.J. Sytsma, eds.,  
Molecular Evolution and Adaptive Radiation (1997)

## Diversity and geography: Australia

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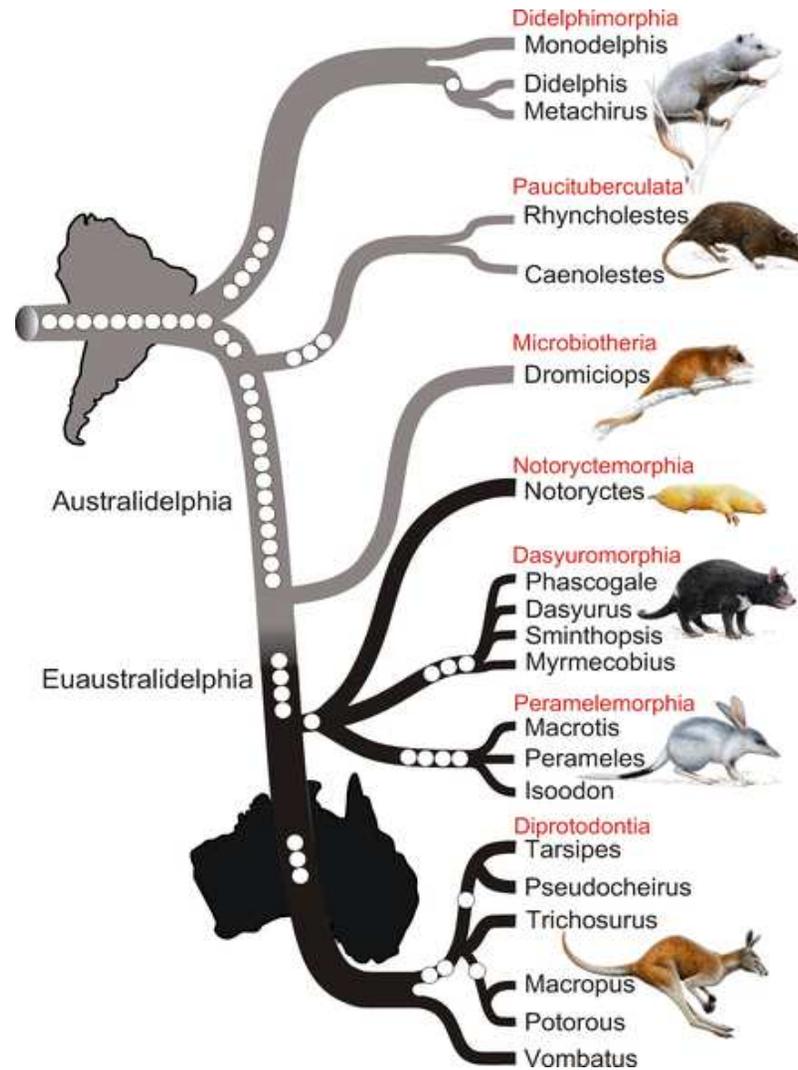
Why does Australia have so many odd animals?

- ~200 species of marsupials
- Placental animals (rodents, bats) are all fairly recent



# The marsupial branch of the tree

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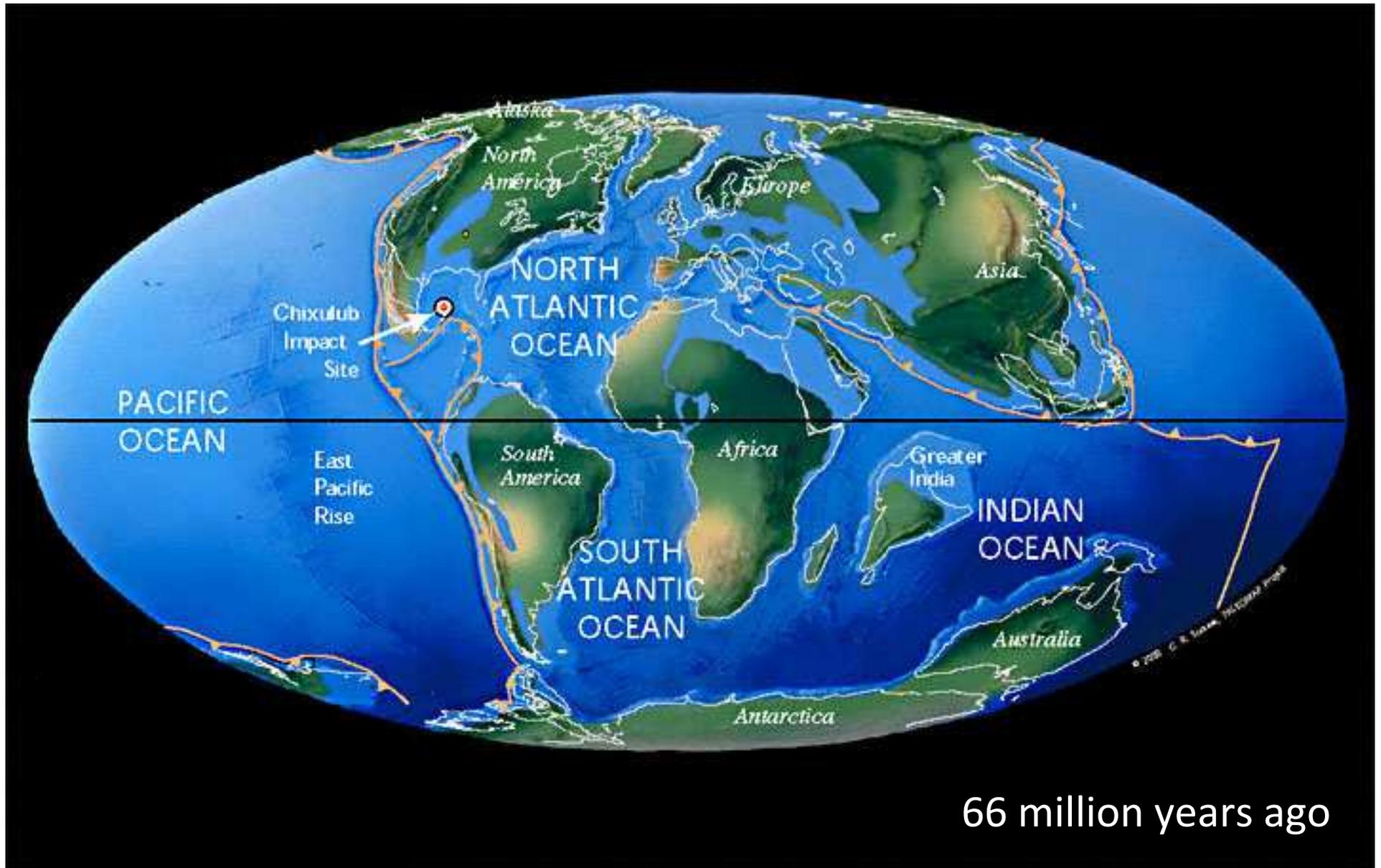


Nilsson MA, Churakov G, Sommer M, Tran NV, et al. (2010) Tracking Marsupial Evolution Using Archaic Genomic Retroposon Insertions. PLoS Biol 8(7): e1000436. doi:10.1371/journal.pbio.1000436

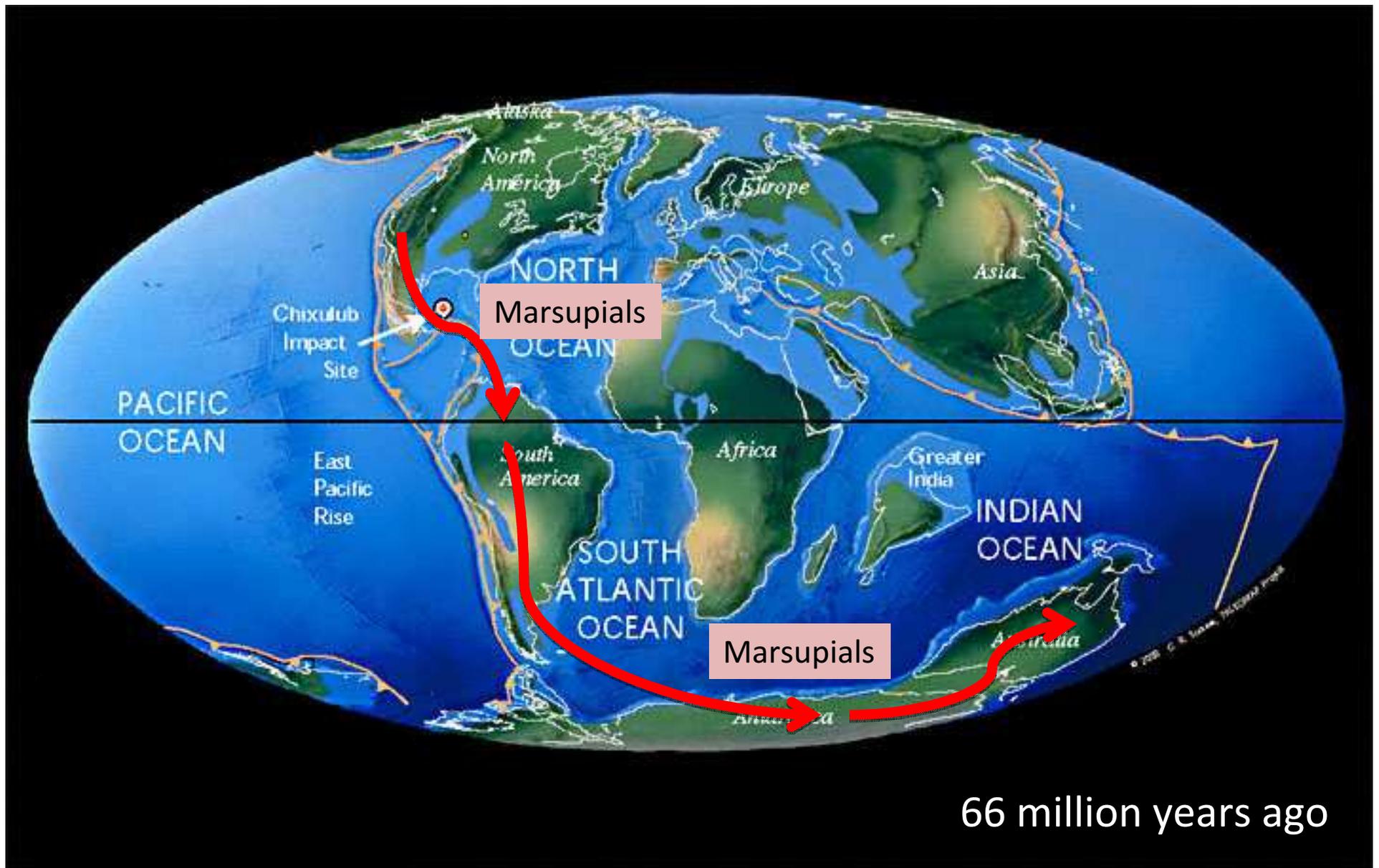
<http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.1000436>



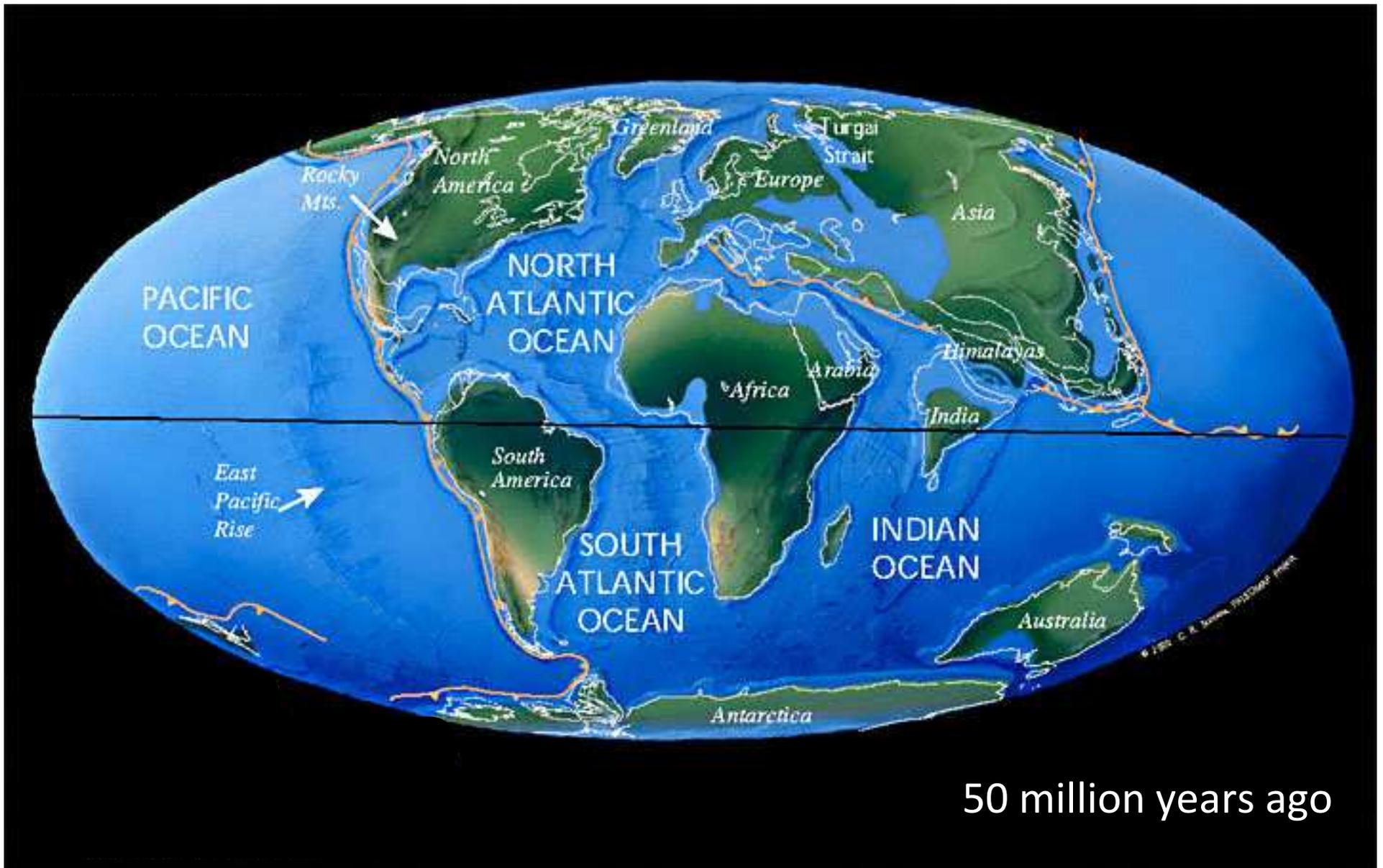
# How the kangaroo got to Australia



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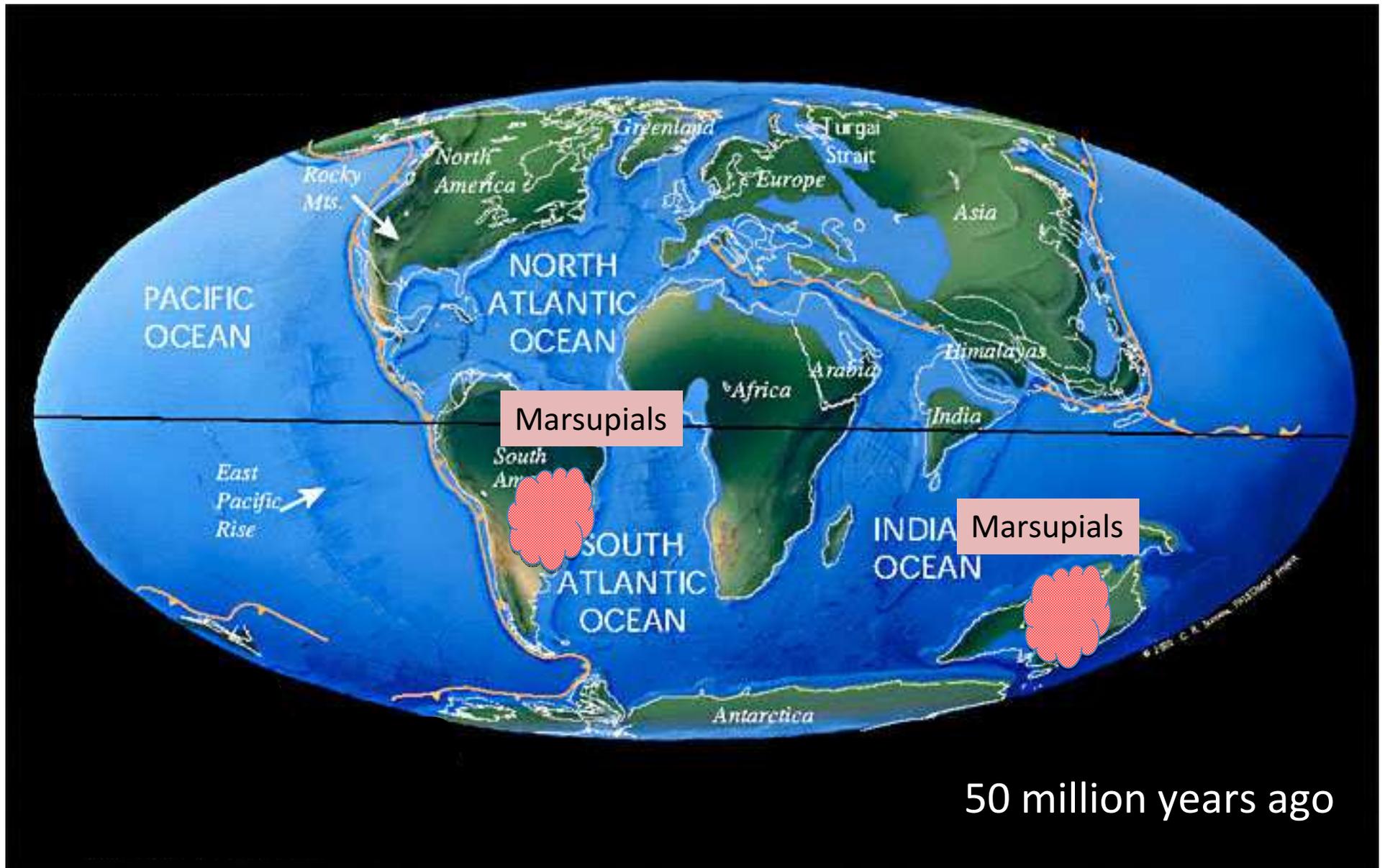


# How the kangaroo got to Australia



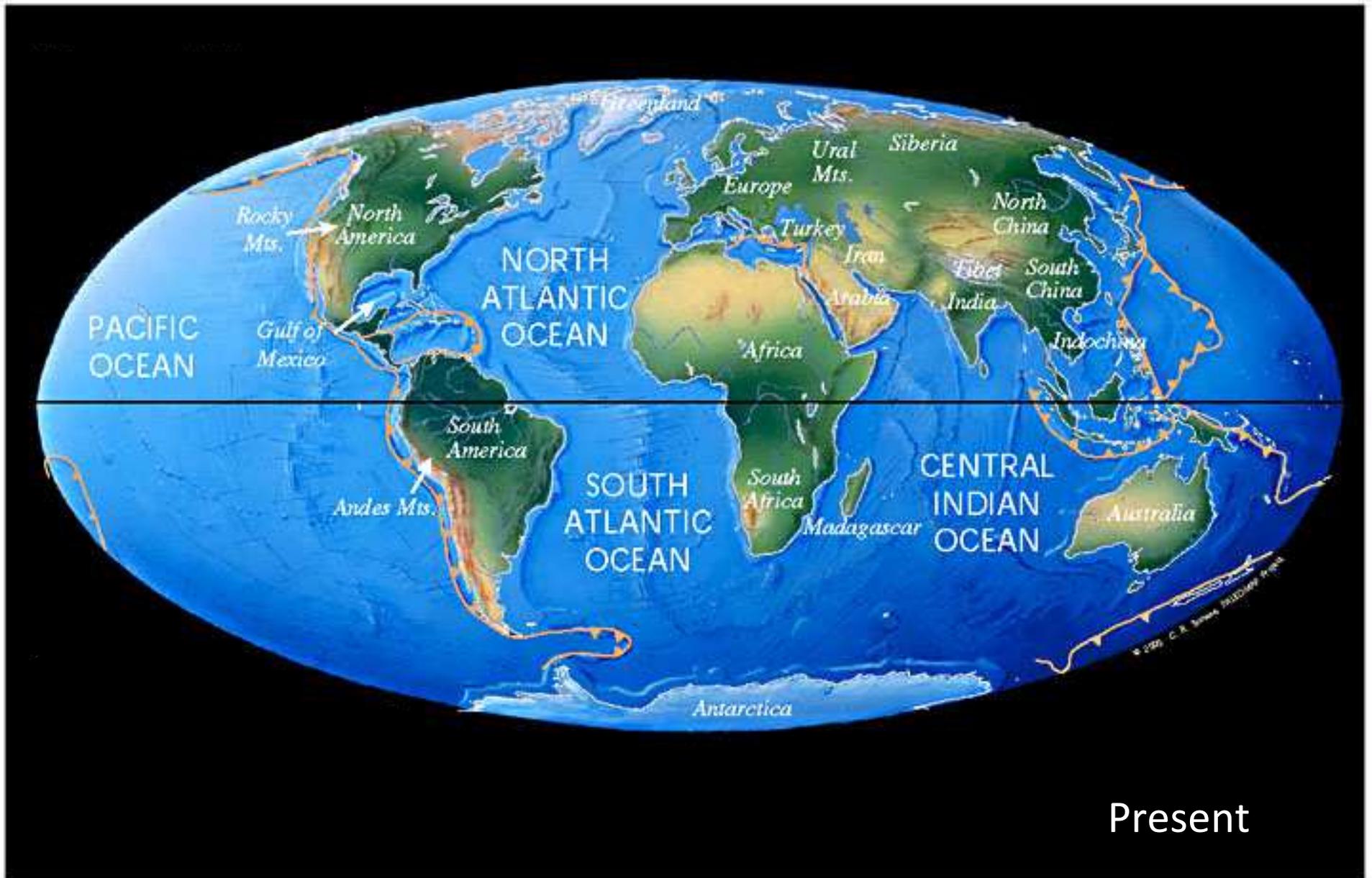
50 million years ago

# How the kangaroo got to Australia



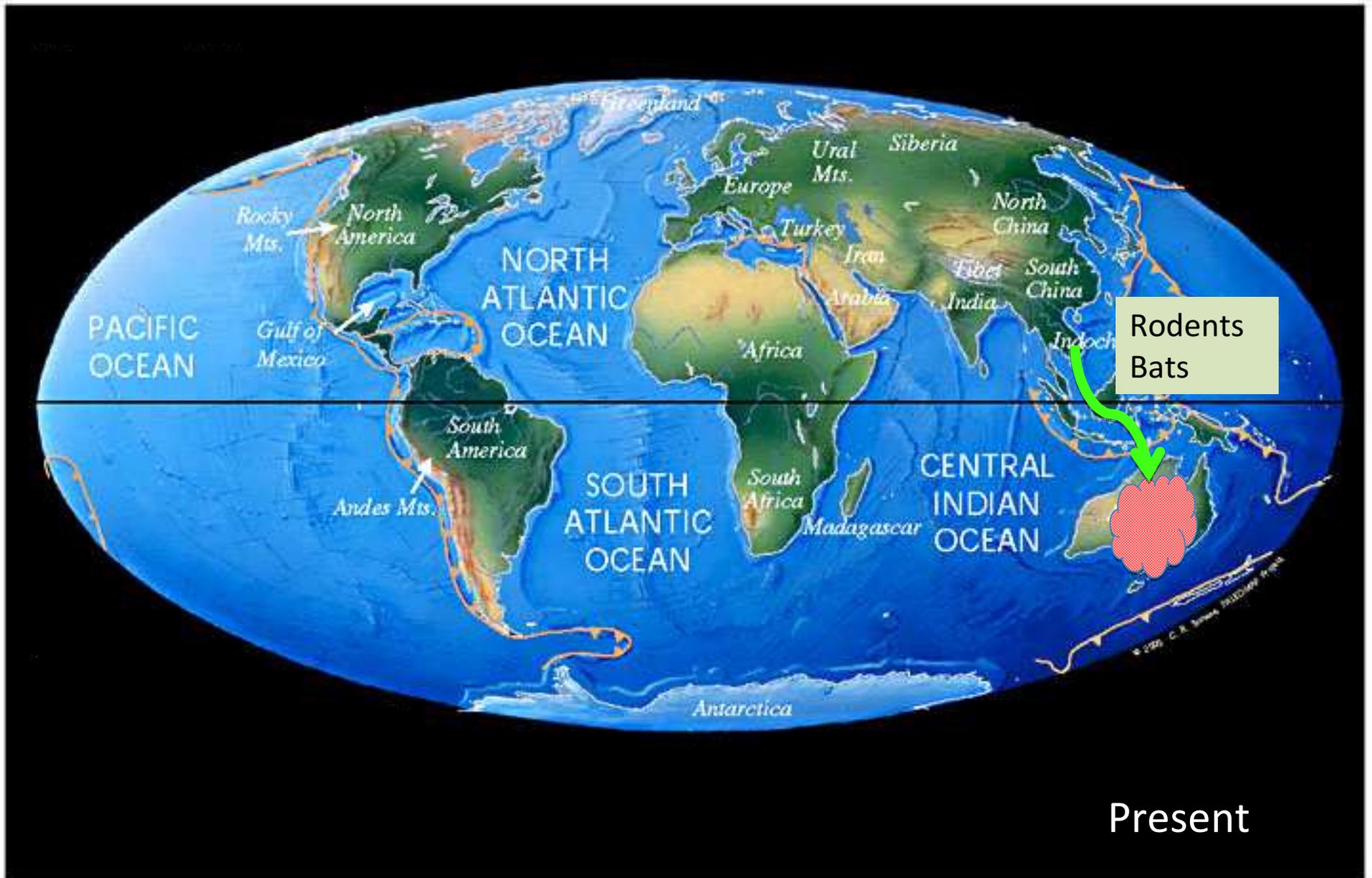
50 million years ago

# How the kangaroo got to Australia



Present

# How the kangaroo got to Australia



# 60 million years of evolution

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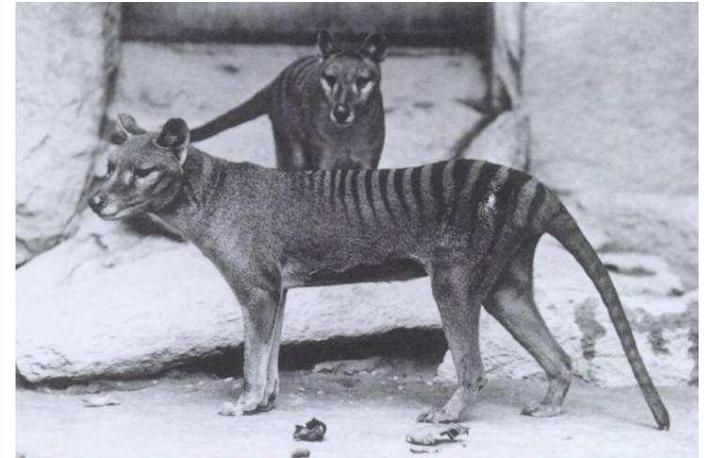
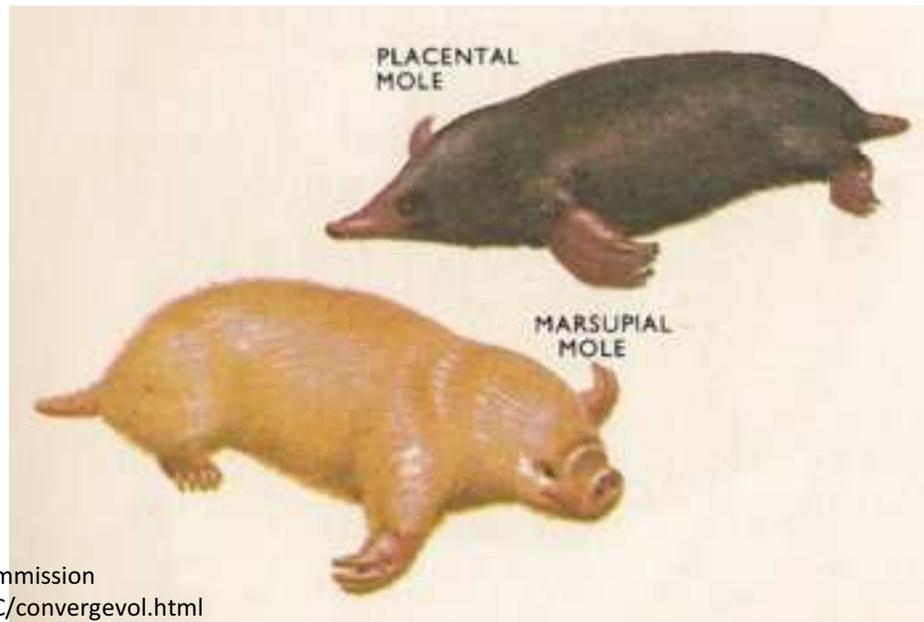


Image credits:  
Sugar glider: SunCoast Sugar Gliders  
Koala: Guillaume Blanchard  
Quoll: Sean McClean

# Convergent evolution

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## Image credits

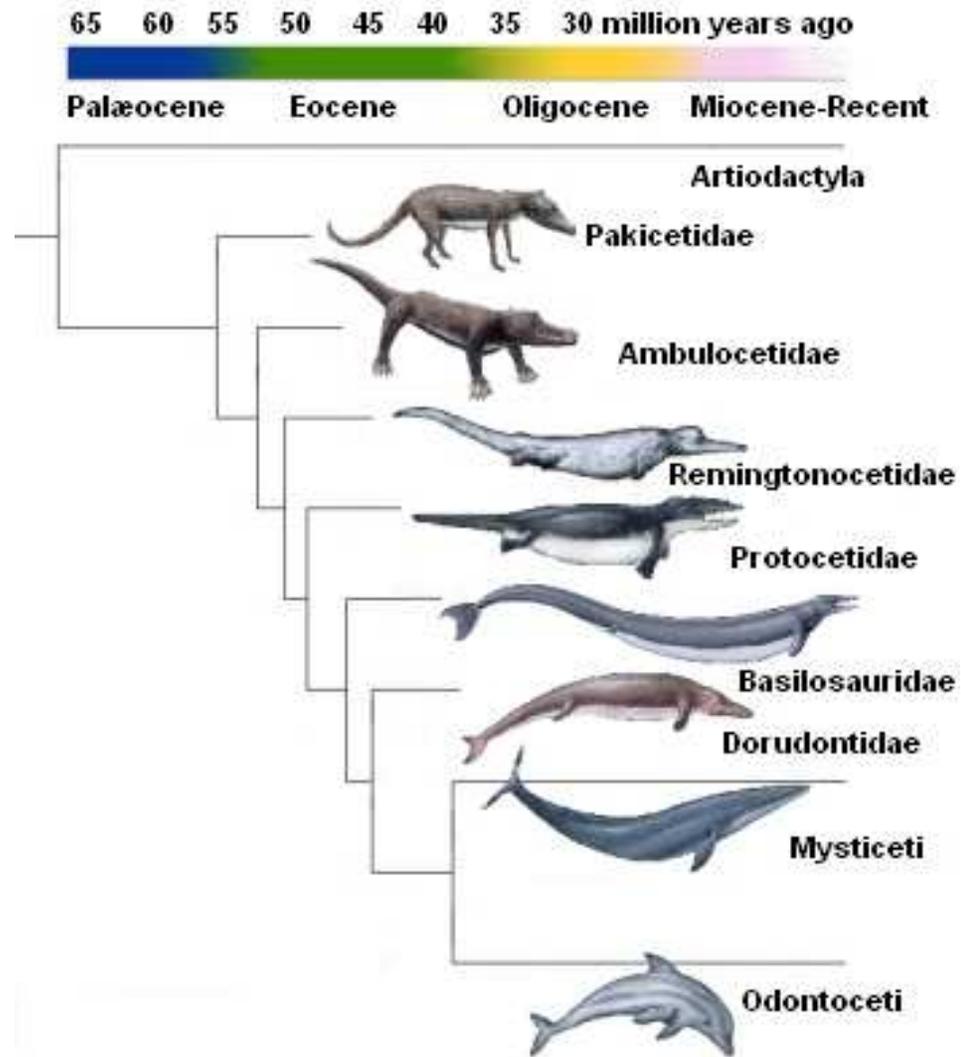
Sugar glider: SunCoast Sugar Gliders (customers)

Flying squirrel: North Carolina Wildlife Resources Commission

Moles: <http://www.daviddarling.info/encyclopedia/C/convergevol.html>

# The whale branch of the tree

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# Whales with hind legs

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Images: Philip Gingerich

# Microraptor



A feathered dinosaur

Q Li et al. *Science* 2012;335:1215-1219



So what should we make of evolution as Christians?

## Bottom line on evolution

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Theodosius Dobzhansky:

"Nothing in biology makes sense except in the light of evolution."

"Seen in the light of evolution, biology is, perhaps, intellectually the most satisfying and inspiring science. Without that light it becomes a pile of sundry facts some of them interesting or curious but making no meaningful picture as a whole."

"It is wrong to hold creation and evolution as mutually exclusive alternatives. I am a creationist *and an evolutionist*. . . Creation is not an event that happened in 4004 BC; it is a process that began some 10 billion years ago and is still under way."

## Evolution and the Bible

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Problem: the creation accounts do not sound like an old earth and evolution

But it can be consistent with Genesis

- Concordist reading: Genesis 1 describes in general and figurative terms the history of life.

See Dennis's talk (but add creation by evolution)

- Nonconcordist reading: Genesis 1 was teaching theology, not biology.

See Sarah's talk

## Theological issues

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- Much of creation was by natural mechanisms.

Why is this a problem?

- Suffering and death were not the result of human sin.  
(Applies to any old-earth view.)

## Theology of suffering and death

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### Possible responses

- Only spiritual death is a result of sin. Physical death need not be an evil.
- God gave creation freedom in how it develops – just as God gives humans the freedom to do evil.

Are these adequate?

# Reflections on natural evil: the Book of Job

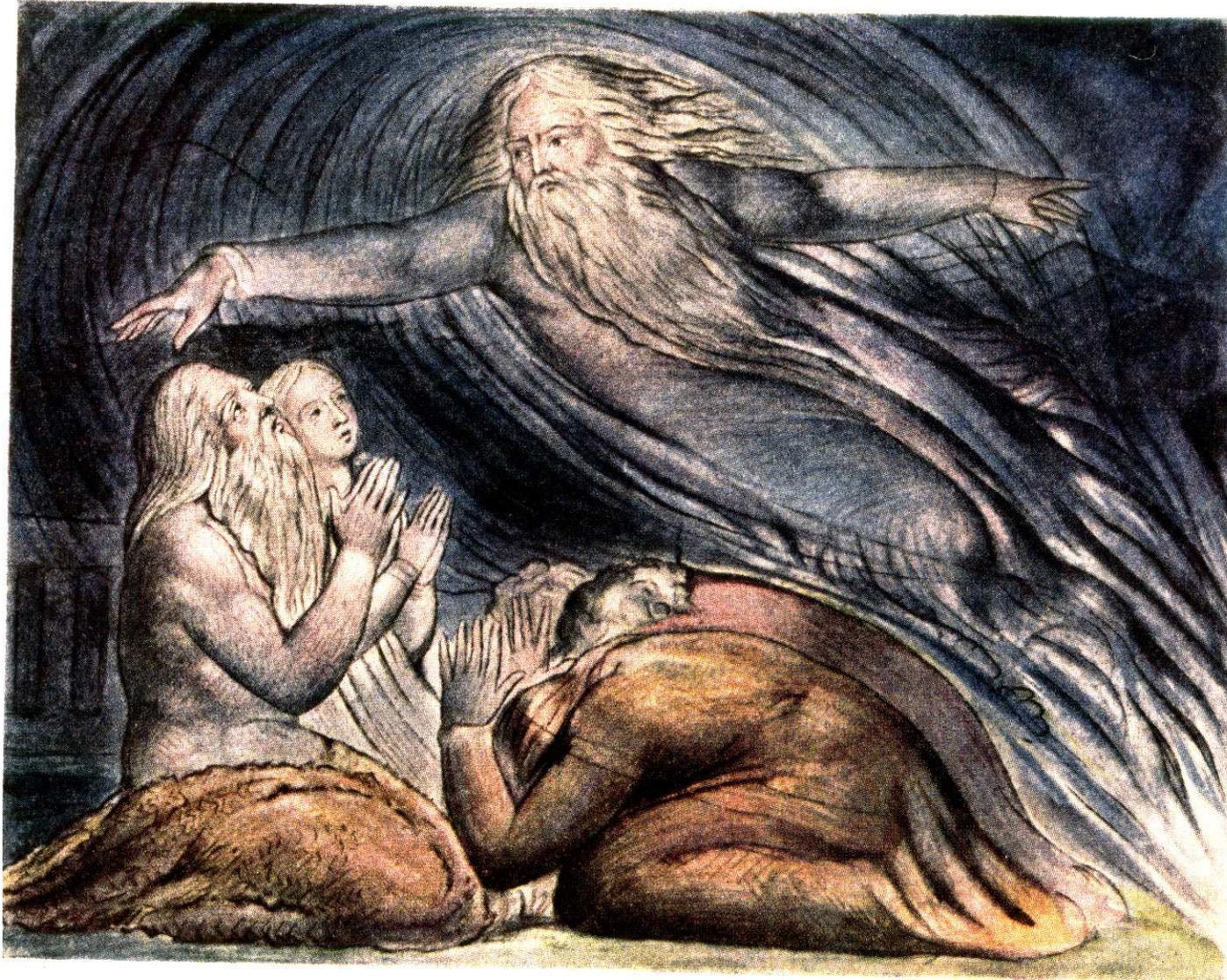
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Job's friends accuse him (William Blake)

## Reflections on natural evil: the Book of Job

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God answers Job out of the whirlwind (William Blake)

# Reflections on natural evil: the Cross

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Photo: Josée Holland Eclipse