The Rise of Science: Darwin and Creation

Dr Gareth Leyshon

Penmaenmawr –
Tuesday Session 2

What are SPECIES? How do they originate?

- Dogs have puppies. Cats have kittens. Like beget like.
- “Ooh, isn’t he like his mother” … children are particularly like their parents.
- Selective breeding can develop dogs, cats and crops – but getting the trait you want is a haphazard process.
- Xenophanes (6th C. BC) notes fish fossils far inland; and the Greeks knew from fossils that some species weren’t around any more.

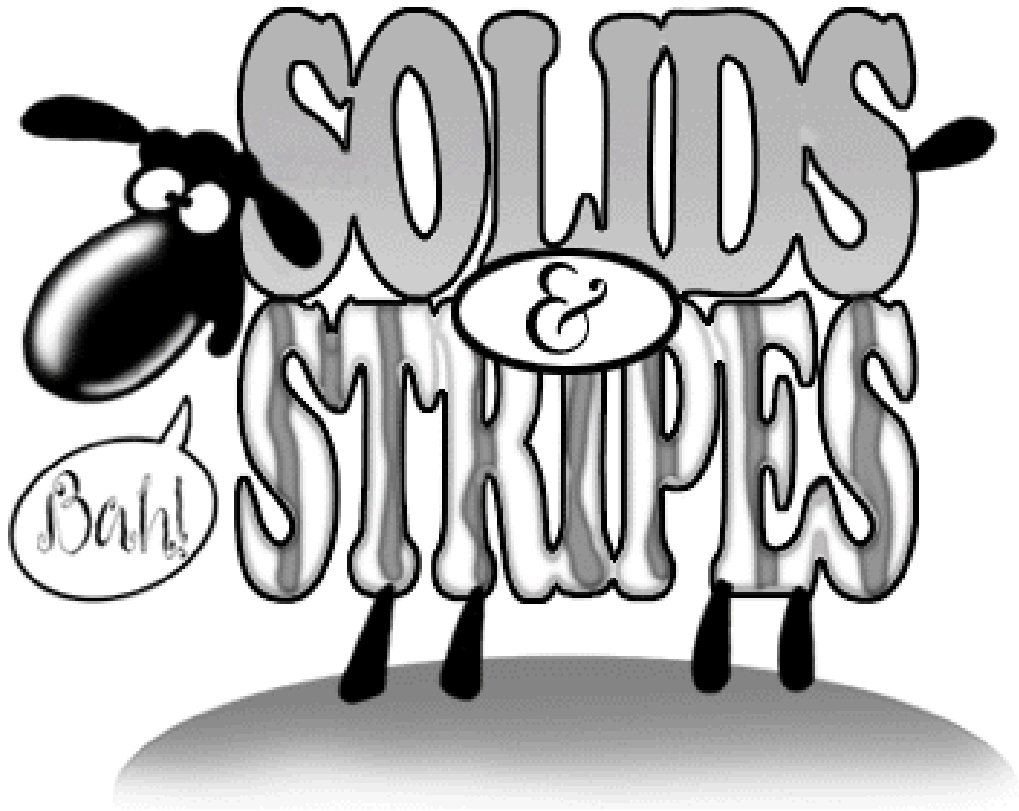
Remember Aristotle? (4th C. BC)

- Aristotle rejects "ideals" but thinks that we can say something about "all dogs" as a meaningful category.

- He also realised that whales were more closely related to humans and horses than to fish… different bone structures.

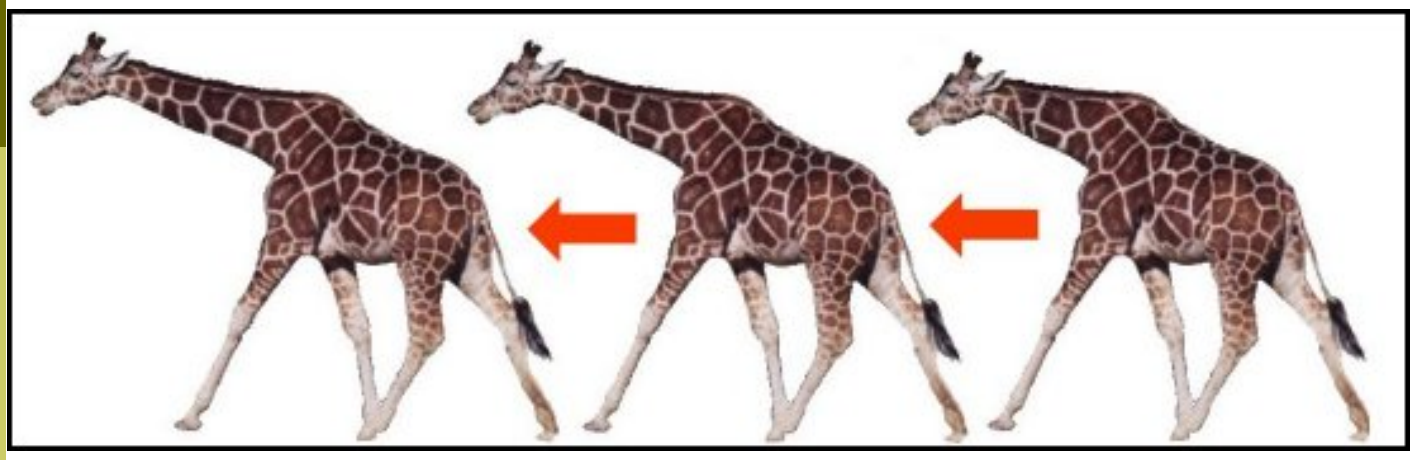
What gets passed on from one generation to the next?

- The Old Testament view: it's the environment where you were conceived (at least for Laban's flock, see Gen 30:39)



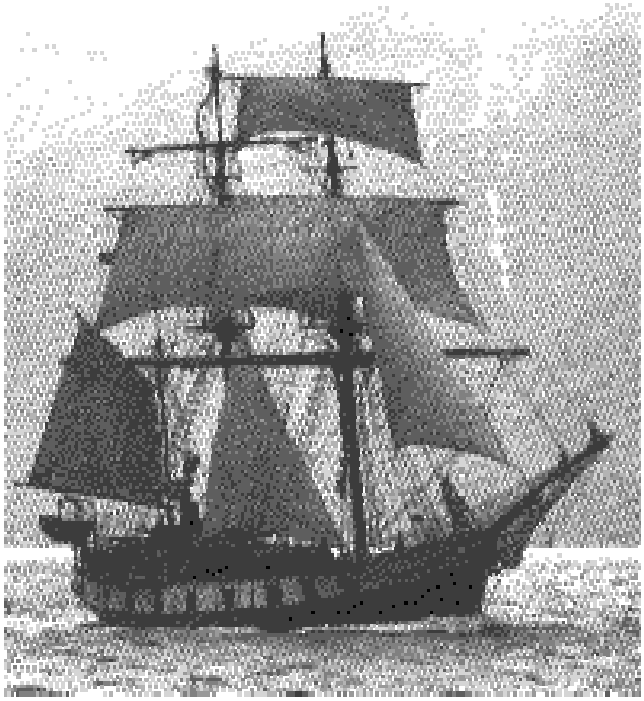
- Not true in general, though the sex of reptile eggs can depend on temperature.

What gets passed on from one generation to the next?



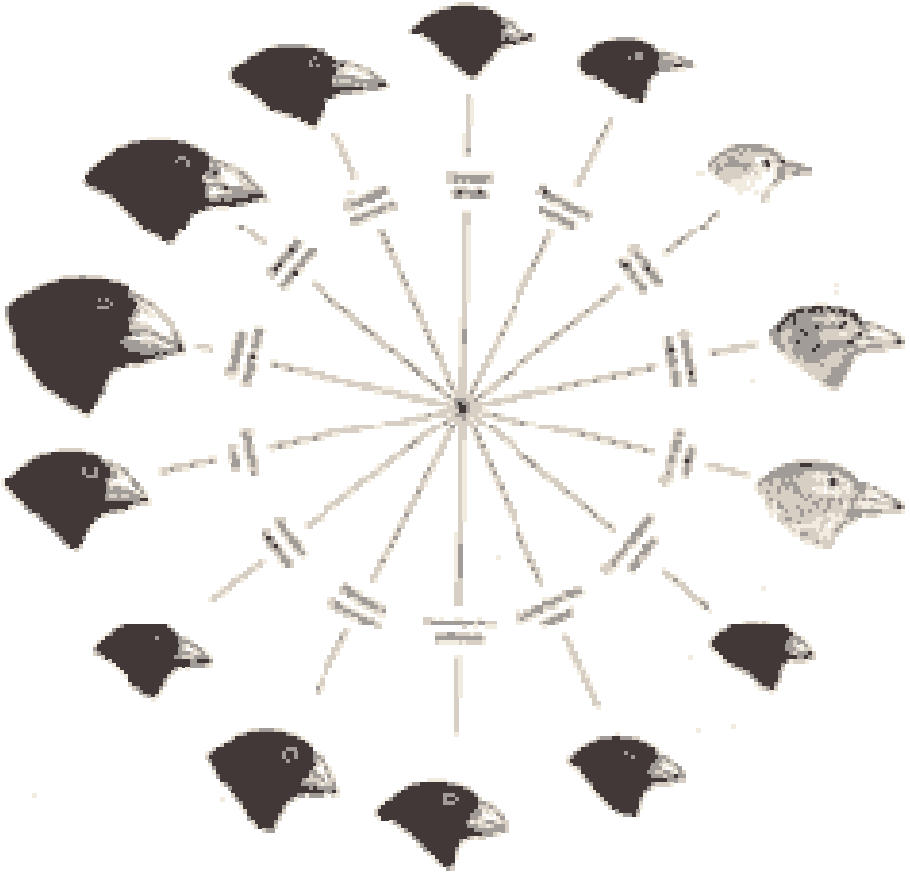
- Lamarck (1815) suggested that characteristics were “acquired” and passed on, e.g. giraffes stretching for leaves lengthened their necks so their offspring got longer necks.

Charles Darwin: Theory of Evolution by Natural Selection (1859)



- Darwin's big idea was that creatures each contain a "blueprint" at birth, and this blueprint is what is passed on to the next generation… as long as it equips the creature to survive long enough to breed!

Charles Darwin: Theory of Evolution by Natural Selection (1859)



Adaptive radiation of 14 species of Darwin's finches. *Figure from Grant, 1986.*

- If groups of animals are separated into different environments, they will be naturally selected for different characteristics – e.g. finches on the Galapagos islands.

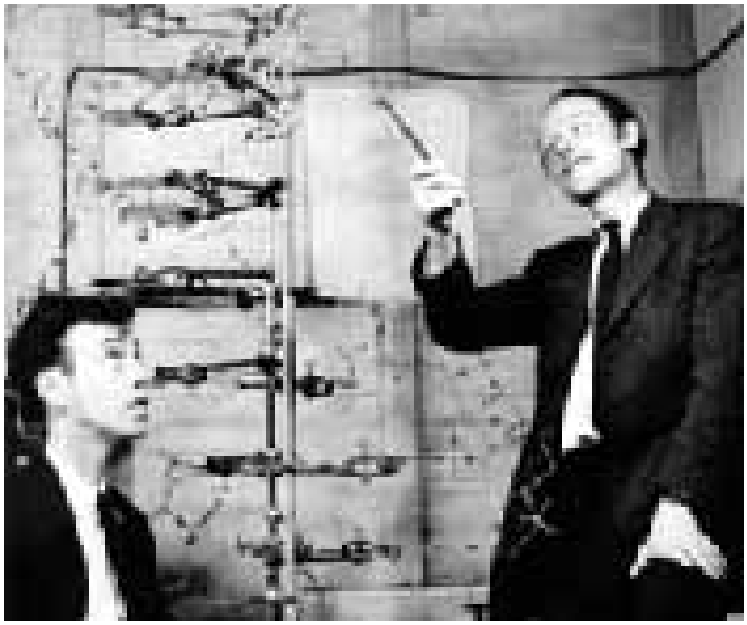
Charles Darwin: Theory of Evolution by Natural Selection (1859)

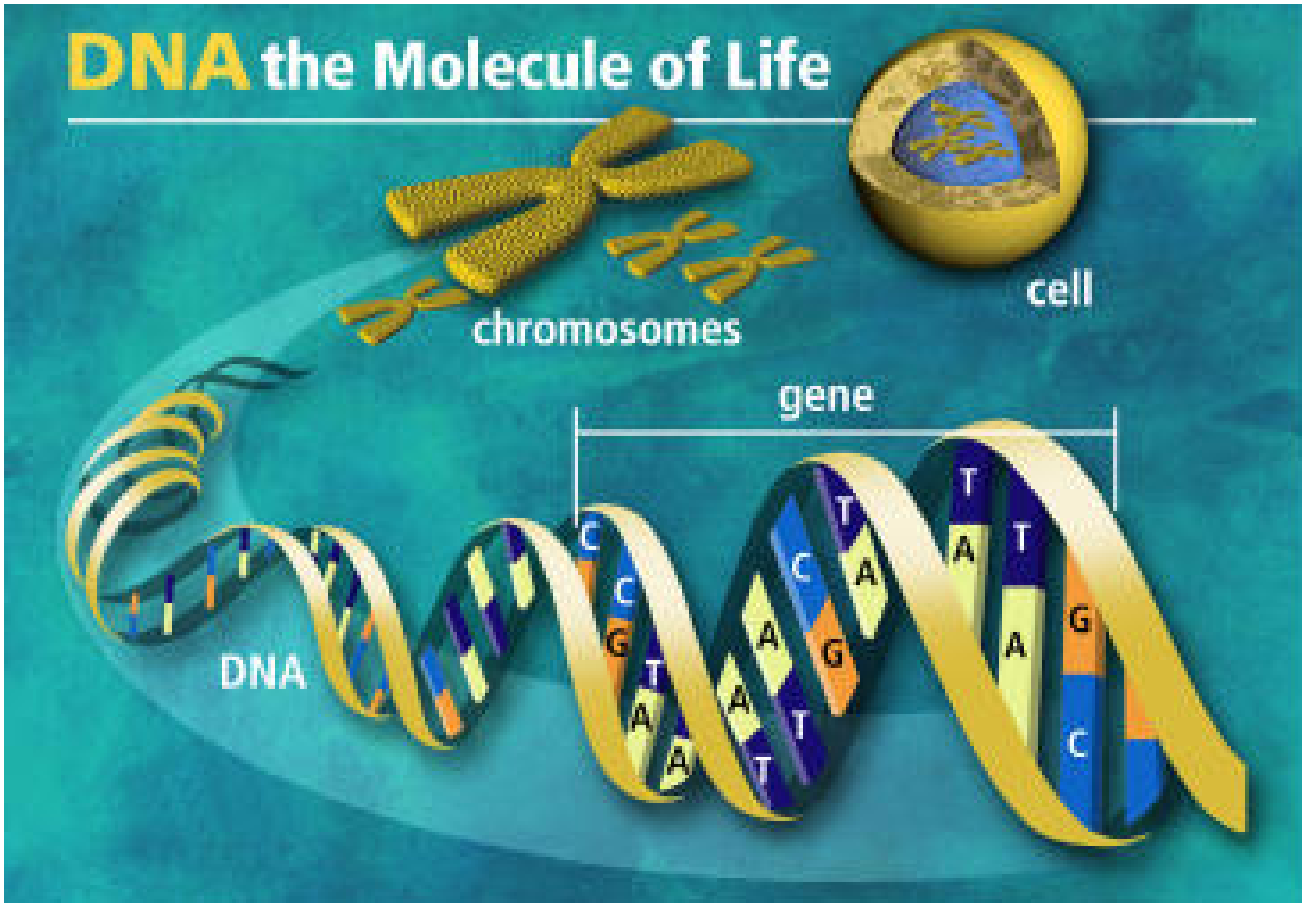
- NATURAL SELECTION – the blueprints which best fit the conditions are those which are *selected* naturally.
- Hence, (in 1869 edition), SURVIVAL OF THE FITTEST (not only the most athletic, but the most apt.)
- When groups of animals are physically separated and EVOLVE in different ways, they eventually becomes so different they cannot interbreed.
- This accounts for the ORIGIN OF NEW SPECIES.

Gregor Mendel: Understanding inheritance

- Finds that peas inherit a ‘blueprint’ from each parent, but some features only need one copy while others need both copies.
- Publishes results 1865.

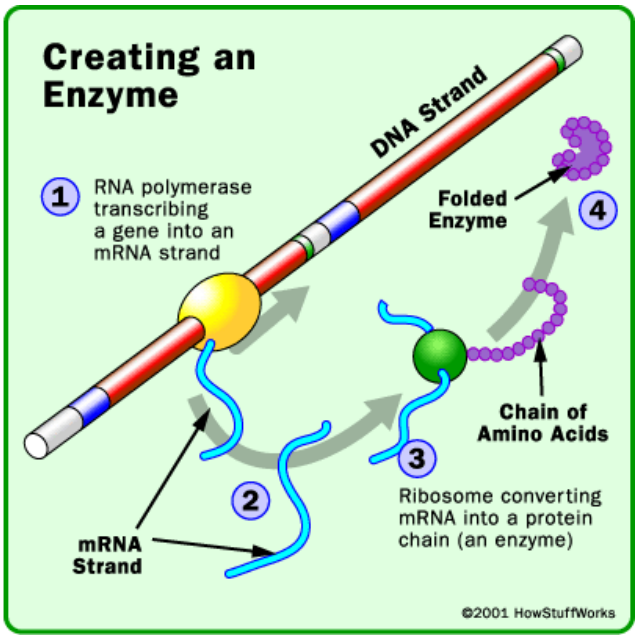
Watson and Crick (1953): The mechanism of inheritance



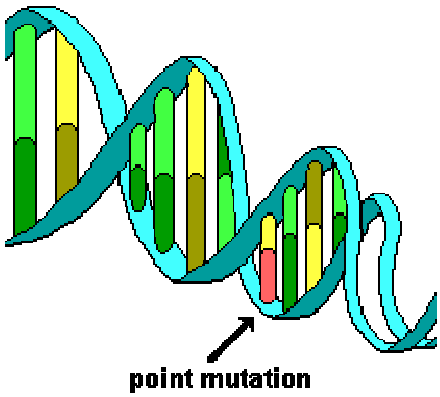


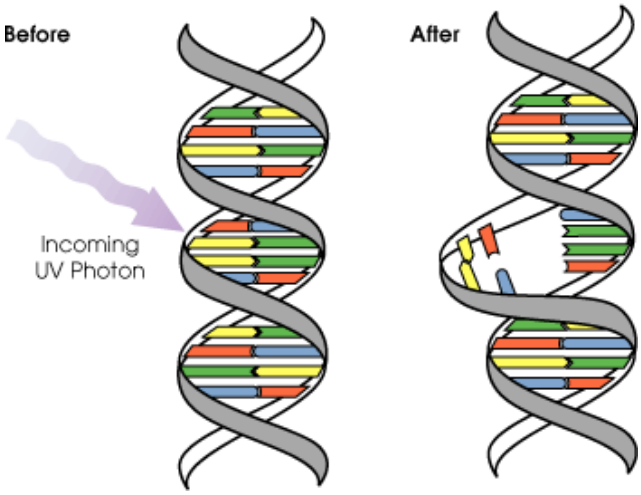
These 'blueprints' are genes. How do they work?

- Imagine a ticker-tape on which four letters can be printed: A, C T and G.
- ACCTTTAGGAGCCTAGACTGA…
- Each set of three letters codes for one of 20 chemicals (amino acids) or is a start/stop code.
- ACC / TTT / AGG / AGC / CTA / …
- Proteins are built out of the amino acids, to make muscle, skin, enzymes, etc. …



How do the blueprints change (mutate)?



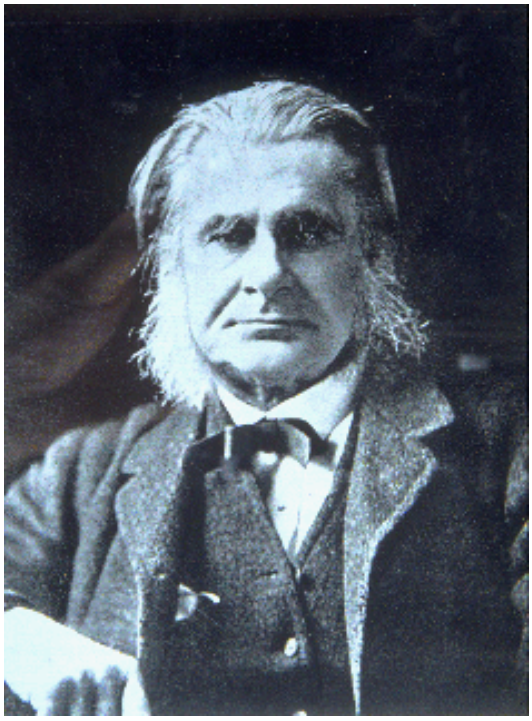


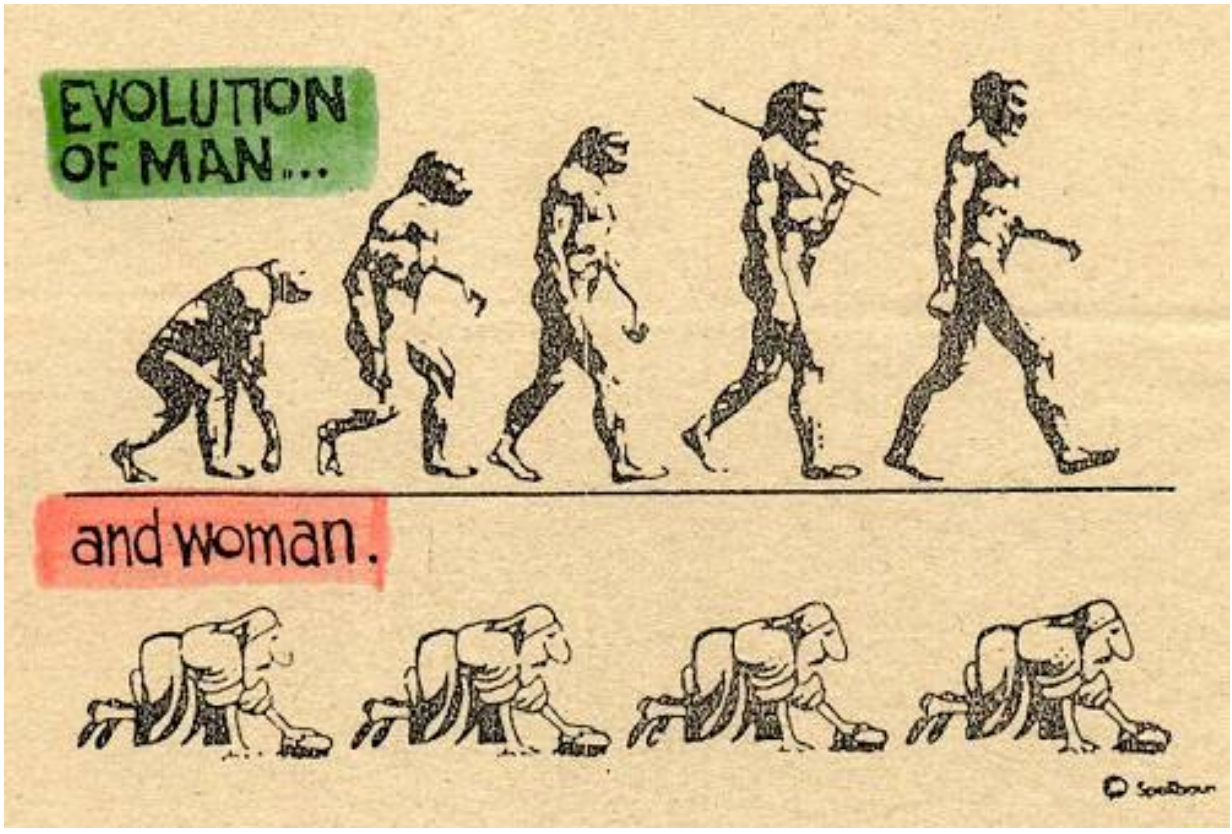
- The code can be changed by radiation or chemicals attacking one point of the ticker tape…
- Or whole segments can be sliced out or duplicated.
- These are MUTATIONS and sometimes result in fitter designs.

The state of 21st Century knowledge:

- The ‘blueprint’ is real. It’s encoded on DNA and we know how it works, and can even ‘engineer’ it for our own ends.
- Human beings have DNA blueprints.
- Mutations are real and evolution takes place before our eyes: witness the MRSA superbug!
- What constitutes a distinct SPECIES? Is it ability to interbreed? What if Great Danes and Chihuahuas were the only dogs on an island?

1860: Bishop Wilberforce debates with Thomas Huxley





Key Catholic Documents:

- 1950 - Pius XII,
- *Humani Generis*
- Genesis is inspired and is in some sense ‘historical’ but needs further research.
- Souls are ‘immediately’ created by God.
- The hypothesis that the human body evolved can be considered, cautiously, as long as it does not contradict doctrine.
- Every human being must be the descendent of ‘Adam’, the original sinner.

Key Catholic Documents:

- 1965 - Vatican II
- *Dei Verbum*
- Genesis teaches ‘without error’ the truth necessary for our salvation

- 1996 – John Paul II
- *Message to the Pontifical Academy of Sciences*
- Evolution is ‘more than a hypothesis’.
- The creation of the first human involves an ‘ontological discontinuity’ – something new exists, and is different from what went before.

The Problem of Polygenism:

- We are still required to believe that all humans evolve from a single ‘Adam’, who sinned in his relationship with God.
- Adam must have been the first hominid to receive a human soul – because he was the first to have a particular mutation?
- As this mutation spreads through the gene pool, so does Adam’s spiritual inheritance.
- So there is no biological problem with ‘original sin’ – as long as we are happy to have Adam mate with a soulless hominid!