

DATABASE 4**SPONTANEOUS GREEK GENERATION****400BC - 0AD**

Aristotle (384-322 BC) was a student of Plato for 20 years. At that time he believed in the immortality of the soul, and single Divine Spirit. His later philosophy reduced the role of God to absentee landlord, diminished his belief in the immortality of the soul, and with it any idea of divine wisdom. Aristotle reasoned a Creator had given every living thing a built-in purpose which from its creation would direct the development of each individual or organ. His publication '**Physics**' specifically excludes chance as something which works for the good of the natural world. Aristotle abandoned any belief in knowledge being revealed from a Creator, and followed the view of Empedocles that knowledge can only be received through man's 5 senses. His views on the origin of life were explained in his books "*On the Parts of Animals*", "*On the Movements of Animals*", "*On the Origin of Animals*", and "*On Plants*". Aristotle believed animals originated only from animals similar to themselves, but life had always been able to arise from matter.

Aristotle benefited biological science in 2 enduring ways:

- (a) He tried to classify animals on the basis of their form or structure and lifestyle, and
- (b) He arranged his classification system as a scale of increasing degrees of perfection (from less perfect plants to more perfect mammals). Aristotle's 'scale of perfection' was not an arrangement of progress or evolution with time. He had no thought of one animal turning into another.

Aristotle taught that living things are produced by the union of a passive principle (matter), with an active principle (form) - this being the soul of living things which imparts organisation and movement to a body. Thus matter which is devoid of life, is enlivened by the aid of the energy of the soul. Aristotle taught that such a soul was already present in the primary elements of which living things are made. "Soul" was a **lesser** property of earth and a **greater** property of water, air and fire. Therefore the earth can produce lower forms such as plants, while water produces principally aquatic animals, birds and land animals. Aristotle believed that mosquitoes, fleas, flies and lice could arise from such things as wells, rivers, seas, left over wool or even vinegar dregs. Mice could be derived from moist soil. It was Aristotle's views on the **spontaneous generation** of living things, which endured to the 1600's and beyond.

Epicurus (341 - 270 BC) taught chance could only operate on a moving system, and that religious belief should be abandoned and replaced by evidence obtained through the 5 human senses. His followers regarded him as a saviour of man and his ethics schools lasted till the 4th Century AD. He taught that **no thing could be created out of nothing**, and **no thing can be reduced to nothing**, the universe consisted of an infinite number of kinds of changeless atoms which could be combined in an infinite number of ways. He believed animals arose from earth or manure through the influence of moist heat, sun and rain, and that the earth was the mother of plants, animals and man and was already endowed with the power of propagation. He also claimed that, like a real mother, earth tends to lose her powers of propagation with advancing age.

Lucretius (94-55 BC), a Roman poet wrote a poem "*On the Nature of Things*" based on the views of the ancient Greek writer **Epicurus**. Lucretius stated: "*Nothing can ever be created by divine power out of nothing...the theory that they (the gods) deliberately created the world in all its natural splendour for the sake of man... . This theory...with all its attendant fictions is sheer nonsense!*"

Lucretius went into detail on the formation of life from watery slime, and spent much time explaining the ascent of life from simple to complex. He went into great detail discussing the influence of environmental development of new adaptations. Finally, according to Lucretius, life developed as far as the early ancestors of man who were primitive creatures having a *'framework of bigger and solider bones fastened through their flesh to stout sinews'*."

These primal men-like creatures did not know how to use fire, speak or clothe themselves. They lived in bushes but through many generations of change the present human race emerged from these creatures! Lucretius taught that if the origin of things could be explained by natural means using chance and the laws of nature without the need for gods, people would cease to fear right and wrong, and would develop freely, doing and behaving as they desired.

CAUTION: Look back at Database 1 to remind yourself that Greeks traditionally believed the earth was a living thing (Ge was Mother earth) and therefore their ideas on the **spontaneous origin** of life did not imply it occurred by non living things turning into living things.

THINK IT THROUGH 4

4-1. How similar were Aristotle's views to the modern theory of evolution?

CHALLENGE QUESTIONS

4-2. If knowledge comes only from the senses, where did Aristotle's ideas of invisible principles such as soul and active and passive principles come from?

4-3. Consult a recent Encyclopaedia to discover what the modern Gaia theory is. Is it really new?

DATABASE 5**GREEK VS ROME****0AD - 1300AD _____**

Augustine (354-430 AD) was an African Christian church leader who claimed that because the Biblical record teaches God created by commanding the earth to bring forth plants (Genesis 1:11, 1:20), a residual of this creation force was still left in the earth. Augustine used this thought to reconcile the widespread Greek concept of spontaneous generation with the increasing acceptance of the Christian church. He reinforced Aristotle's teaching with his concept that just as the normal sequence of events was grape vines slowly producing grapes which are crushed to slowly produce wine - Christ (the Creator) however could make wine instantly from water as in the miracle at the marriage at Cana (John 2:1-11). His union of pagan Greek, and Roman Church teaching ensured the success of Aristotle's view of spontaneous generation as the dominant thought form of western Europe until the time of the Protestant Reformation and the commencement of the scientific age.

Thomas Aquinas (1225/6-1274) attempted to reconcile Aristotle's naturalism with Biblical supernaturalism. Aristotle's views were known in Europe from a few fragments passed down through the dark ages. Aristotle's reputation was that of a very wise man who was highly regarded by church leaders. When much more of Aristotle's writings entered Europe via the Turks, Aristotle turned out to be pagan to the point of embarrassment to church leaders. The Catholic scholar Aquinas attempted to resolve this dilemma. His solution was to remove apparent conflict by dividing **Truth** into two components - **revealed knowledge** (at a spiritual level), vs **natural knowledge** (at a physical level). Aquinas' views were originally rejected by the church but they persisted behind the scenes for 3 centuries until they met with acceptance at the Council of Trent (1545-1554). A further 3 centuries later (1879), Pope Leo XIII declared Aquinas' views eternally valid. Thomas Aquinas is famous for his work on the five Proofs of God, one of which deals with the evidence of creation based on the mechanical design and purpose seen in nature.

Roger Bacon (c 1220 - c 1292) was an English philosopher, scientist and educational reformer. Well versed in Aristotle, he lectured in the faculty of Arts, Paris. About 1247 he expended huge sums of money in the construction of instruments and tables, acquiring friendship of specialists and the collection of "secret" books. He was introduced to subjects such as mathematics, optics, alchemy and astronomy at Oxford University. In 1257 he entered the Order of Friars Minor. Bacon desired to formulate an encyclopedia of all known sciences, and his most positive contribution to knowledge was his insistence that fruitful lines of research and methods of experimental study be followed. Bacon dreamed of the time when sciences would have their rightful place in the curriculum at universities. The death of a supportive Pope Clements (4th November 1268) brought this dream to an end. Bacon was condemned to prison (1277-1279) by his fellow Franciscans because of his bitter attacks on theologians and scholars of the day, and his excess belief in alchemy and astrology. Bacon's philosophy was that of Aristotle.

THINK IT THROUGH 5

5-1. If revealed knowledge and natural knowledge were both about truth would they tell different stories?

5-2. Is Aquinas' way of dividing truth helpful?

5-3. What does Bacon's struggle tell us about the influence and role of theologians and philosophers on universities?

ADDITIONAL BIOGRAPHY 1-5

ARISTOTLE 384-322 BC was trained in Plato's academy. He became the most famous of Plato's pupils but left when Plato died. He travelled throughout the Greek world engaging in studies of Biology and Natural History. He then took the job of tutoring the Macedonian king's son (who became Alexander the Great) and founded a school of his own in Athens called the Lyceum where he built up a university collection of manuscripts which became the core of the great library at Alexandria. Following news of the death of Alexander the Great in Babylon, Aristotle left Athens fearing reaction and died the following year in his mother's home town Chalcis. His 150 volumes of lectures are a one man encyclopaedia of the knowledge of the time. He dissected over 50 species and described some 500 animals which he arranged in a hierarchy of living things. Aristotle's works reappeared in Europe via the Arab invasions in the 12th and 13th Century after which they became accepted as an almost divine authority. Aristotle rejected the idea of atoms, but accepted **Pythagoras'** (c 530 BC) idea of the roundness of the earth. It was acceptance of Aristotle's explanation of the earth's circular shape which kept the "globe" view alive until the days of Christopher Columbus.

AUGUSTINE 354-430 AD was Bishop of Hippo in Roman Africa from AD 396-430. After a long struggle with fleshly lust during which he made his most famous cry "give me chastity - but not yet!", he was converted under the influence of his Christian mother, Monica, and Bishop Ambrose. He wrote to Ambrose asking to be received as a convert and was baptised Easter 387. Augustine's later outstanding life made the town of Hippo famous and, along with Jerome from Bethlehem, he dominated the church. Both, however, ruled by their pen and did not leave their homelands. He was steeped in Latin literature. A large number of his letters and sermons have been preserved.

Thomas AQUINAS (1225 - 1274) was son of Count Aquino. He studied at the University of Naples, and came under the influence of the Catholic Dominicans. Despite violent family opposition, he was permitted to enter their ranks. He became adviser to Popes, especially Urban 4th, and Clement 3rd. During the latter part of his life he became an ambassador on behalf of the Catholic Church. He was canonised by Pope John 22nd in 1323. He was declared a Doctor of the Church by Pius 4th in 1567 which led to his nickname, Dr Angelicus. His main works in philosophy concern the division of truth into 'The Mysteries of Christian Faith, or Revealed Knowledge which is to be believed, because it helps even when it cannot be understood, versus acquired knowledge gained through the discovery of truths by human reason.'

DATABASE 6 THE NEXT SPONTANEOUS GENERATION

1300 - 1500 AD

Paracelsus (1493-1541 AD), a famous physician and alchemist, taught the theory of spontaneous generation and believed that some special law, which he called the ‘**Spirit of Life**’, was involved. He recorded his observations concerning the spontaneous generation of mice, frogs, eels, turtles from water, air, straw, decaying wood etc.

Before the 1600’s Paracelsus and many others had observed the following:

1. Living maggots appeared on rotting meat and later turned into flies.
2. Mice appeared anywhere wheat or grain bags were carelessly left.
3. When milk was left sitting in an open container for several days, living things were seen to appear in it.
4. Long, thin worms were often seen swimming in horse troughs after horses had dropped their hairs into the trough.
5. Living things often crawled out of the mud collected from a stream bed when it was left to sit for several days.
6. Worms emerged from soil after rain.
7. Bonfires at night produced sparks that looked like fire flies and disappeared into the night.

THINK IT THROUGH 6

Discuss and answer the following. Then write a summary of your discussion in the space provided below.

6-1. Do any things in DATABASE 6 still happen?

6-2. Which ones have you seen happen?

6-3. Are there any DATABASE 6 observations you don’t believe could happen? Explain why not.
