

Chapter 5: The evolution of life and the Biosphere:

The **Archean Era** ushered in some of the oldest single celled organisms on earth ca 3.5bya. They appear to have first evolved in the presence of water or in hot volcanic vents as Archaeobacteria and Eukaryotic organisms. This primordial bacteria eventually began to use sunlight as a source of energy in a process called Photosynthesis.

The **Proterozoic Era** allowed for more complex organisms. Photosynthesis used by organisms pumped vast amounts of oxygen into the air which began to transform the early atmosphere. Prokaryotes adapted to their new oxygen rich environment and were protected by the newly formed ozone layer. These changes could explain the appearance of distinctively new life-forms, known as Eukaryotes. It has been suggested that Eukaryotes evolved through the joining of different types of Prokaryotes and their genetic information in a process called symbiosis. Different types of Symbiosis include:

* **Parasitism:** Relationship in which one species benefits at the expense of another. Yet the

host must stay alive, at least for a time for that parasite to benefit

* **Commensalism:** Two species live together and one benefits while the other seems to

suffer no harm.

* **Mutualism:** Both species benefit from the relationship.

Sexual reproduction had accelerated evolutionary change, increasing amounts of free oxygen and the evolution of breathing made more energy available for more exotic and powerful forms of metabolism. Eukaryotic organisms began to combine into teams that eventually formed the first multicellular organisms. These changes can help to mark the “Cambrian Explosion”, the sudden proliferation of larger, more complex life forms.