

EMPEDOCLES AND NEUROSCIENCES

Stavros J. Baloyannis

Professor Emeritus, Aristotelian University, Institute for research on Alzheimer's disease, Thessaloniki, Greece

From the Era of Pre-Socratic philosophers, soul and mind have been the subject of continuous speculation, study, research and meditation. Empedocles may be considered as the most approximate to Neurosciences pre-Socratic philosopher. He was born in the city of Acragas (Agrigento) in Sicily in 492 BC, in the Era of the great Sicilian tyrants Hieron of Syracuse and Theron of Acragas. Empedocles was philosopher, physician and priest, mystic and prophet, poet of a high talent, brilliant orator, who attempted to associate religion, science, and politics. He was a man characterized by generosity and magnanimity. He has been adored by his compatriots, colleagues and the citizens of Acragas, as an exceptional person, very important, glorious, being beyond human mortality and temporality. Empedocles writings are mainly summarized in two poems, written in hexameter verse. One of them was entitled "On Nature" and the other "Purifications". During his life Empedocles searched for the pure and genuine knowledge and tried to find the answers of main philosophical questions and problems, which concern cosmogony, cosmology, ontology, anthropology, morality and ethics, human behavior and sociology. According to Empedocles there is not birth and death. There is only a connection or mixture and separation of four pure fundamental elements or "roots", which are the earth, the air, the fire and the water. Every time that the "roots" are connected together and interacted, create life. Their separation is equivalent to decay, disintegration and eventually to death. The main forces of universal value which provoke the mixture and the separations of the four fundamental elements are Love and Strife. These are the eternal powers which control mixing and fragmentation of all elements. The two powers exist and would exist for ever in a continuous opposition, exchanging and replacing each other in a round way, exercising a strong influence on the balance of the universe and the homeostasis of the human soul. The happiness and the exhilaration are attributed to Love, which is the omnipotent unifying force acting in balance and harmony. All the creation is based on the Love. Any endeavor for development of a harmonious, rational society, characterized by friendship, kindness and perfect collaboration is based on the Love. Empedocles claims that there was a stage in which Love dominated and all things were unified and intermingled into a Sphere, in the spirit of a cosmic harmony. Unfortunately, Strife has separated the elements in a later time, inducing mortality and decay. That was the beginning of cosmogony. Everything suffers from the contradiction between Love and Strife, which are the active forces controlling the cosmic cycle of continuous alterations. Without Love the man is a prisoner, enclosed in an unfamiliar hostile tunic of flesh, an exile from the territory of harmony, kindness and serenity. Empedocles described the Globe (Sphere or Sphaera) as a god-like entity, as a prototype stereoscopic image of the unity, globalization and harmony, of the completeness and self-sufficiency, according to Orphic concept of friendly collaboration of all ingredients, which are connected together with the strong links of Love, composing the "One". Empedocles claims that ontogenesis under the power of Love results in creation of perfect entities, bodies and faces, whereas under the influence of Strife malformations and congenital defects are created in humans, animals and plants. Empedocles underlines that the continuous controversy between Love and Strife troubles and trials the human soul and disturbs the thoughts and the emotions, inducing suffering. In the field of the biological sciences Empedocles' theory of the four "roots", which have an equal validity and importance, as the basic elements of creation, is of existential importance. In reality, based on the biological sciences, the harmonious coexistence of all Empedocles' "roots" is expressed nicely in the mitochondria of the cell, which are the most essential organelles for the living entities, the source of energy production and the main factor of cellular homeostasis, differentiation and continuity of the life. Empedocles' philosophy inserts in the depths of brain function, concerning emotion and behavior. It inserts in the limbic system, which is consisted of evolutionarily archaic brain structure closely associated with personality, morality, motivations, memory, emotions and human social behavior. Amygdala as anatomical structure is global like the "Spheros", which was described by Empedocles. Neuronal circuits of amygdala are particularly involved in emerging emotion and behavior with the coordinated activity of many cortical and subcortical structure of the brain, including the prefrontal area of the frontal cortex, areas of the temporal isocortex and the hippocampus. A vortex enters and occupies the human soul whenever the Strife dominates in the world. Then the interior harmony and the homeostatic equilibrium are lost and the motionless tranquility and serenity of the Being are extinguished. They are replaced, as a rule, by fear and anxiety, which are emerged from the amygdala under the influence of noxious exterior stimuli, which disturb the homeostatic balance and induce the anxiety, the instability, the fear, the threat and the existential insecurity. As long as the conflict between Love and Strife would last, the human being shall remain prisoner and captive of his own passions, unable to find the real root of his life, unable to establish the interior peace and harmony. In the field of the Neurosciences the fundamental feelings of Love and Strife are the two crucial poles of the extensive spectrum of the human emotions, playing an essential and decisive role in harmony of interior life and the behavior of the human being.