

Chapter 2

The Scientific Revolution and Its Aftermath

ABSTRACT

Concept mapping during the latter years of the Reformation as represented by Peter Ramus, was basically a verbal affair. Although Ramus claimed to be a logician, his logical ideas, even in his time, were superficial at best. However, while Ramean logic may not have been very sophisticated, his concept diagrams were highly ambitious as philosophical and educational devices in that they claimed to be meta-cognitive, and general devices, to improve, what today would be called critical thinking. This chapter discusses how the ethos of the Scientific Revolution, the drive away from a qualitative universe to a quantitative one, driven by printing technology, changed the idea of meta-cognitive concept mapping to a very specialized area, the field of formal logic as evidenced by the work of Leonhard Euler, Lewis Carroll and John Venn.

INTRODUCTION

The Scientific Revolution was a pivotal period in Western history when a new paradigm, the Newtonian paradigm, the universal frame of reference that still rules today, replaced the old feudal, medieval Aristotelian paradigm. In the latter paradigm, the one in which Ramon Lull worked under, the universe was finite and a living organism where everything had its place as ruled by the natural law of the Great Chain of Being (Lovejoy, 2011). This dominant

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concept during the Middle Ages, the *Scala Naturae*, the “stair-way or ladder of nature,” is a concept originating with Plato, Aristotle, Plotinus, and Proclus and further developed during the Middle Ages, reaching its full early modern Neoplatonism during the Renaissance. The Chain of Being was a strict, religious hierarchical structure of all matter and life, believed to have been decreed by God. The chain starts from God and progresses downward to angels, demons, stars, moon, kings, princes, nobles, commoners, animals, trees, other plants, precious stones, precious metals, and other minerals (Tillyard, 2011). It was this Earth centered universe that Johanne Kepler, along with Copernicus (1473- 1543) and Galileo (1564-1642) sought to replace.

Conceptual maps of the type Ramon Lull promoted continued in Europe, but underground in the form of astrological maps, as the Church officially forbade the practice of astrology. These maps, however resurface during the Renaissance and may have been influential in shaping Johanne Kepler as one of the founders of the Scientific Revolution.

Johannes Kepler

Johannes Kepler (1571 –1630) was a German mathematician, astronomer, and astrologer and like the lesser known Petrus Ramus, a key figure in the 17th century scientific revolution. He is best known for his laws of planetary motion, still found in college texts on astronomy as these laws were pivotal for Isaac Newton’s theory of universal gravitation. Kepler was a mathematics teacher at a seminary school in Graz, Austria, where he became an associate of Prince Hans Ulrich von Eggenberg and later an assistant to the astronomer Tycho Brahe, from whom he obtain the empirical data needed to prove his planetary laws. Eventually he was the imperial mathematician to Emperor Rudolf II and his two successors Matthias and Ferdinand II, a mathematics teacher in Linz, Austria, and an adviser to General Wallenstein. Additionally, he studied optics, invented an improved version of the refracting telescope (the Keplerian telescope), and was mentioned in the telescopic discoveries of his contemporary Galileo Galilei, with whom he corresponded regularly (Casper, 1959)

Kepler lived in an era when astronomy and science astrology existed side by side and both regarded as sciences with the common language of geometry, which was also the scientific language of astrology. Kepler also incorporated religious arguments and reasoning into his astrological and astronomical work, motivated by the religious conviction and belief that God had created

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