‘ON THE ORIGIN OF MOVEMENT’. HISTORY

Introduction; historical aspects

The purpose of science is to understand reality through explanations. The characteristic (though not the only) method of criticism used in science, is experimental testing. An experimental test is an experiment whose outcome, may falsify one or more of a set of rival theories.

(David Deutsch, 2000)

Rademaker’s experimental work concentrated largely on posture, muscle tone and movement. He cited Aristotle’s statement that “to be ignorant of motion is to be ignorant of nature”. Gaining knowledge of nature—and in particular on the origin of movement—was the goal he set himself in this experiments. His conclusions could be distilled to yield his philosophy of science.

The triangle of movement

The movement of a living organism is more than the mechanical displacement of an object. Rademaker’s experimental work led him to a number of new insights into the origin of movement and motor development that can be encapsulated in what we may call the “triangle of movement” (see figure), which represents the relationship between the three basic criteria (in the literal sense of the Greek word κρίτεριον = cornerstone): movement, posture and muscle tone.

The basic idea of creating the concept of movement and separating its into its component constituents was developed by Rademaker in his monography Das Stehen (1931).¹ The idea of representing the

¹ Translated into English and edited by the American physiologist D. Denny-Brown almost fifty years later (1980) under the title The physiology of Standing.
relation between these constituents in graphical form comes from the present author.

This diagram is based on a number of considerations, which we will develop further in the historical review given separately in the first part of this chapter. In the second part, we will sketch the development of Rademaker’s experimental work and the insights he derived from it. Finally, we will discuss Rademaker’s ideas about “cybernetic physiology”. Recent electromyographic data promise to provide the basis for a mathematical analysis of posture, movement and muscle tone that has not yet been fully realized. It is the objective of a proposed research project.

8.1. Rademaker’s Axioms and Postulates

I. The inseparability of movement and posture.
Movement can be seen as the sum of a series of postures. Of course, such movement in a living organism is necessarily subject to sensory guidance, a multivariate condition in which different types of sensory stimuli elicit their own particular type of motor response. In a normal