

Foreword

Eleanor Criswell Hanna, Ed.D.

WHEN YOCHANAN RYWERANT asked me to publish his monograph, *Corollary Discharge. The Forgotten Link*, I was delighted and honored. The term corollary discharge first caught my attention in a lecture by Rywerant in the early 1990s. Later I read references to it in Vernon Brooks's *The Neural Basis of Motor Control*. The concept of corollary discharge, and the related term efference copy, have intrigued me over the years, but they have remained somewhat elusive as I pondered motor mechanisms and worked somatically with myself and others. In this monograph, Rywerant gives us a clear understanding of corollary discharge, a neural mechanism that is so important for our effective movements.

Rywerant begins with an introduction to corollary discharge. A history of the discovery of corollary discharge by H. L. Teuber, a neuroscientist from the Massachusetts Institute of Technology, Cambridge, Massachusetts, in the 1960s and the exploration of it by other neuroscientists follows. Rywerant discusses the use of the understanding of corollary discharge in Feldenkrais's relative conjugate movements (a function named by Rywerant). The role of corollary discharge in habitual and non-habitual patterns of action is discussed. Then these understandings are applied to everyday life. The boundaries of the self are explored from the perspective of corollary discharge. Next, the situation of impairment and rehabilitation with regard to corollary discharge is discussed. In his conclusion, Rywerant reconsiders how corollary discharge relates to the link between the mind and body.

What is corollary discharge? Corollary discharge is a discharge from the motor system to sensory systems regarding intended voluntary movement or postural change, "preparing those sensory systems for changes that will occur as a result of the intended movement" Because corollary discharge is unconscious, subliminal, or below the level of our awareness, it is valuable to be aware of what it is, why it is important, and how it enhances our function. Rywerant says, "The corollary discharge is the mechanism by which a nonhabitual pattern of action changes gradually into being more habitual"

Corollary discharge and efference copy are related concepts. Efference copy is a special case of corollary discharge. According to Webster's Ninth New Collegiate Dictionary, corollary refers to "something that incidentally or naturally accompanies or parallels" Discharge means "to relieve of a charge, load or burden" Efference is a term for information moving out from the central nervous system to cause muscle contractions or glandular secretions. Efference copy

is a copy of the expected sensations that may arise because of motor action. The copy is sent to the sensory cortex to prepare the organism to ignore self-generated sensations. Therefore, Rywerant says, "the consequences of the intended actions are already anticipated"

My sense of efference copy is that as a movement plan is created by the brain, information is sent to all parts of the body notifying it of what is to come and preventing interference with the activities. All too often we do not consider this necessity in our motor planning. Frequently, the person interferes with the very action he or she intends. This is very common in the unnecessary co-contractions that people frequently exhibit that interfere with ease of movement.

With the sense of corollary discharge expressed by Rywerant we can see the importance of developing the learned corollary discharge for skilled movement. The athlete or musician has a highly developed capacity for this. This is a huge area of un- tapped potential for all of us. In the various awareness-enhancing disciplines, such as the Feldenkrais Method, the person may be instructed to recover awareness of reafference or to decrease the prior editing effect of the efference copies. This deliberate allowing of awareness of the sensory feedback from one's own movements permits the person to remain aware of the results of his or her movements. This increases the complexity of the sensory experience and allows the person to appreciate more of the sensory world.

Rywerant brings his mastery of the field of mind-body education to bear in understanding a very present, but little understood aspect of neuromuscular function. It brings this sometimes subliminal aspect of our worlds to our conscious awareness both for the appreciation of the function and to begin to make more conscious use of it. The expansion of our awareness of corollary discharge has huge potential for enhancing motor functioning.

In writing this foreword, I have pondered corollary discharge again and again. Finally, with a thorough study of Rywerant's monograph, I understand the concept on a much deeper level. I have grown to appreciate the role of corollary discharge in our ongoing behaviors. The benefit of Rywerant's monograph is that it is brief, well written, and brilliant. That is the way Rywerant writes, as seen in his previous books *The Feldenkrais Method: Teaching by Handling* and *Acquiring the Feldenkrais Profession*. His writing style is well organized, comprehensive, and concise. He writes about what he knows. He was originally a physicist and a teacher of physics. He brings his knowledge of physics into his understanding of the body. He began studying with Feldenkrais in 1952 in the Awareness Through Movement classes in Tel-Aviv. Trained by Moshe Feldenkrais in Israel in the first professional training course, which began in 1969, he was one of the original Feldenkrais assistants. He worked side-by-side with Feldenkrais in the Feldenkrais Institute in Tel-Aviv with pupils from all over the world. He assisted Feldenkrais in the two training programs in the United States, San Francisco and Amherst. With Feldenkrais's death in 1984, Rywerant

began conducting professional training programs. Since his original training with Feldenkrais, he has practiced the Feldenkrais Method with thousands of pupils and conducted basic and advanced training programs around the world. Currently, his primary teaching of the Feldenkrais Method is advanced training programs in Israel and Switzerland.

May you enjoy the guidance of Yochanan Rywerant, a master teacher, as you explore the world of corollary discharge.