HAND-MIND COORDINATION
The Hand: How It Use Shapes the Brain, Language, and Human Culture
Frank I. Wilson

In 1833 Sir Charles Bell published his Bridgewater Treatise, The Hand, Its Mechanism and Vital Endowments as Executing Design. This was followed nearly a century later by Frederick Wood Jones’s The Principles of Anatomy as Seen in the Hand (1928). Both wrote eloquently of the human hand, its phylogenetic development, its intimate dependence upon the brain, and, more philosophically, of its role in making man unique and superior among vertebrates. The writings of Bell and Wood Jones point out the changes in cortical representation (Hughlings Jackson’s term) in phylogenetic progress and the increase in conscious movements over reflex action. The hand has a large share of cortical representation, as you will remember from the homunculus. Higher animals moving from quadrupedal dependence to bipedal upright stance have the forelimbs liber- rated, and thus their end piece, the hand, became the great testing member of the body.

Now, less than a century after Wood Jones’s publication, Frank Wilson has published an excellent expansion and supplement to Bell and Wood Jones in his book, The Hand: How It Use Shapes the Brain, Language, and Human Culture. It is a fifteen-chapter book with a comprehensive bibliography and appendix and an epilogue that is a call to action for educators.

Wilson extols the hand under central nervous system control for its ability to carry out both gross, rough, heavy tasks, as well as delicate, fine, light touch tasks of micro precision. The anatomical engineering and architecture principles that allow infinite adaptability of man’s hand are obviously useless without the precise coordinated control by the brain and nervous system of the more than sixty muscles involved in upper limb movement. This highly complex central control depends heavily upon feedback through muscle, tendon, and joint sense coupled with touch sensitivity from the skin’s specialized sense organs. This and/or information exchange emphasizes the connection of brain and hand. Wilson makes the case for the connection being a two-way one, with each terminal affecting development and refinement of the other. He describes the hand as a cognitive organ, comfort to a surgeon who in today’s lexicon is not considered to be in one of the so-called “cognitive” specialties. Wilson points out that the most effective technique in educational development is that of uniting body and mind. He sees the hand as representing the body in this context. He contends that attempts to develop intellectually using mind alone (as for example in pure computer learning) cannot hope to match “hands on” (literally) experience as part of a program of education.

Dr. Wilson, in his position as director of the Peter F. Oost-Vald Health Program for Performing Artists at the University of California School of Medicine in San Francisco, has had considerable experience in analyzing and treating hand problems in musicians. He expands by citing work such as that of Pletkin and his theory of “secondary biotics,” which Wilson describes as “novel behavior or adaptive strategies invented to meet unique environmental situations as pre- sented by the particular environment encountered by each individual.” The adaptability of man’s hand and, further still, the repetitively practiced, brain-recorded, unique adaptation for unique manipulation by various experts are cited by Wilson. His personal experience with a German marionette- tist, a juggler, a surgeon, musicians, a mountain climber, and a magician constitute interesting examples of an individual with curiosity and ideas often implemented through his hands. The interesting achievements are gained through molding of hand and brain and this may be the key to a fulfilling and successful life.

Dr. Wilson makes the case for the importance of the hand in language development. He quotes Harlan Lane, a psychologist, who upon observing sign language stated that “it meant that the brain had the capacity for language, and if you can put it through the rought, you put it through the hands.” Is he then that, as Fox put it, in relation to development, “movement and sensation together become the antecedent of meaning.” The book addresses right- and left-handedness, the importance of fourth and fifth carpalometacarpal motion, thumb mobility, upper limb range of motion, and psychosocial influences in disabled hand function. He defines these attributes as elements unique to man. The numerous topics discussed are beyond what a brief review can describe and are best experienced by reading this landmark treatise.

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Correction:


Figure 5. Legend: Plag of relationship between caseepidemic at Number 40, Broad Street, and the pump. From Cholera Inquiry Committee, St James Parish. Report on the cholera outbreak in the parish of St. James, Westminster, during the autumn of 1854. London: J. Churchill; 1855.