Paterson Mark (2021) *How we Became Sensorimotor. Movement, Measurement, Sensation*. University of Minnesota Press: Minneapolis, MN. 320 pages.ISBN 978-1-5179-1000-6

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"From my doctoral thesis onwards, I have been interested in historicizing the senses," writes Mark Paterson author of *How we became Sensorimotor. Movement, Measurement, Sensation* (2021) on his website. The sociologist and associate professor at University of Pittsburgh is currently working on human-robot interaction design as part of a fellowship in Edinburgh, where he explores "past efforts and future directions for more inclusive tactile and gesture-based interactions between diverse human users and physical robots". He has published numerous articles in humanities and social science journals and several monographs including *The Senses of Touch* (2007) and *Seeing with the Hands* (2016). In his most recent book, he now addresses the question of how scientists came to better understand and conceptualise the inner senses and mobility of the human body. Unfortunately, he loses himself in historic detail rather than outlining the topicality of his research in relation to 21st century robotics and neuro science.

So, what makes a body move and how were its miraculous inner movement brought to light? To explore this question, Paterson offers an impressively broad overview of historic scientific discourses in the fields of medicine, physiology and psychophysics. Each of his six chapters "focuses upon a particular thematic related to bodily sensation, including the 'muscle sense', pain, fatigue, balance, proprioception, and the philosophical uptake of the physiological concept of 'motricity'" (p. 2). As outlined in the introduction (p. 15), the historical focus is on the "generative" period 1833 to 1945, when new scientific concepts and approaches emerged in parallel with new experimental approaches and innovative techniques. With the aim to understand and map hidden somatic sensations and reflexes inside the body, new methods and instruments were primarily applied in lab studies—on the legs of frogs and dogs, decerebrated cats and other vertebrates and even on the brains of conscious epilepsy patients. However, there was more to this neuro experimentalism. As Paterson outlines, scientific curiosity also raised interest outside the laboratories and beyond science. Around 1900, sensorimotor inquiries involved transdisciplinary exchange between scientists and artists that resulted in "strange drawings of distorted human anatomy" known as homunculi (p. 63, quoting Griggs, 1988: 105) and cutting-edge chronophotography of running horses (Chapter 4, p. 159) proving that in full gallop all four hooves are, for a moment, simultaneously in the air. Around the same time, art historians and architects discussed the nature of 'haptic' and 'optic' perception in light of new insights into the oculomotor interplay of eyes and ears, today known as the vestibular-ocular reflex (VOR, Chapter 3). Basic research on the sensorimotor human body also found new application fields – contemporaneously, in factories where graphical methods were used to record the workers' movements and optimize tiresome workflows (Chapter 5 on fatigue), and today in the form of neuroprosthetic systems. These allow people with amputations to not only use their artificial limbs, but also regain a sensation of touch through their protheses. Yet, these exciting developments are only mentioned

as a teaser in the introduction of the book and only superficially interlinked with the historical analysis of the book.

Paterson further highlights "the numerous transverse movements and points of connection between academic fields and the artistic world during this period… to focus on a unique sensory modality in formation, tracking scientific pieces of the bigger epistemic picture." (p. 17). He is thus not just telling a story of scientific discoveries and transdisciplinary uptakes. Instead, his archival work and references to historians of science tackle underlying conceptual work of identifying, categorizing, distinguishing and naming sensations and their motoric implications. Inspired by "a Foucauldian archaeology of physiological perception", Paterson's aim is to reveal "a form of medico-scientific discourse and praxis that identifies, measures, and tracks hitherto underexamined sensations within the body by means of increasingly sophisticated equipment, at first in the laboratory and then in the field." (p. 16) From the perspective of science and technology studies (STS), this project of revealing the sociotechnical construction of the sensorimotor body has a great appeal.

Unfortunately, Paterson's account of the emerging epistemic picture is often buried under too much, too sparsely contextualised information. Arguments and analyses too often recede behind mere descriptions of historical publications and the naming of key figures – without offering deeper insights into their experimental practice. What blurs the picture even more is the curious dramaturgy of the text. Rather than telling his histories of concepts in a chronological order, the author likes to jump back and forth between the centuries, historical and contemporary scientific contributions. He also tends to announce and hint at key arguments several times before actually elaborating them. Such foreshadowing can be a stylistic device to create suspense in readers. For me, it evoked a strenuous sense of repetition to a point where I experienced some of the sensations discussed in the text – primarily fatigue – albeit not in a somatic, but rather cognitive way. My feeling is that a more diligent editing could have remedied these shortcomings.

Nevertheless, I think that the book offers readers with an interest in STS informative starting points for multi-disciplinary explorations into body-environment interactions, technoscientific conceptualisations, generalisations and (graphic) inscription as well as a deeper understanding of historical representations of our complex affects and motility. In particular, Paterson's rich account of scientific insights into complex reflexes and "proprioception" (Chapter 1) and "abstract" and "concrete" movements (Chapter 6) offers food for thought and may even nudge practice theorists to conceptualise sociomaterial interactions and habituated practices in more-than-social-scientific ways. Moreover, the fascinating account of early 20th century homunculi drawings raises fascinating questions regarding the performative power of pictorial, even imaginative scientific representations and translations (cf. Coopmans et al., 2014). As Paterson outlines, homunculi map sensorimotor neural relations by projecting limbs, facial organs and genitals onto illustrations of brain hemispheres. Situated at the boundaries between science and imagination, they constitute strangely semi-artistic, scientifically contested inscriptions that nevertheless gained popularity and scientific relevance to the present day, as Paterson suggests. One might wonder whether homunculi were so appealing not despite, but because of their grotesque, maybe speculative style.

Finally, several chapters allude to scientific controversies that seem worthy subjects for more in-depth explorations into the social construction of the sensorimotor human body. To give only two examples, chapter 2 outlines the scientific debate over the nature of pain in relation to touch. Paterson problematises the measurement of these subjectively experienced neural processes through the still relevant construct of the 'just noticeable difference' (JND) and its potential to "tip the whole organism from perception to action" (p. 110). In chapter 4, he then raises the more art-related question of whether perception should be conceptualised as haptic and kinaesthetic, rather than static retinal and just aesthetic, as suggested by the modernist architect Le Corbusier.

To conclude, *How we Became Sensorimotor* is not an easy read and from my STS-inspired

perspective, it did not fully answer its question in the title. Nevertheless, the book offers numerous and inspiring insights for STS inquiries into the sensorimotor conditions of body-environment relationships, sociomaterial interactions and embodied affects. The book also provides several thought provoking clues for further explorations into how physiological, medial and psychophysical insights affected architectural and art historical discourses (Chapter 3) and how sensorimotor evidence influenced research in the humanities and social sciences in the 19th and early 20th century beyond phenomenological research (Chapter 6). Last but not least, Paterson seems intrigued by innovative experimental settings and sociomaterial technoscientific inscription devices. There lies a great potential for exploring some of his rich archival material through the lens of STS.

References

Coopmans C, Vertesi J, Lynch M E and Woolgar S (eds) *Representation in scientific practice revisited.* Cambridge, MA: MIT Press.

Griggs R A (1988) Who is Mrs. Cantlie and why are they doing those terrible things to her homunculi? *Teaching of Psychology* 15(2): 105-106.

Paterson M (2021) Sensation. Available at: http://www.sensory-motor.com/ (accessed 27.4.2023).