

References

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Malcolm Nicolson and John E.E. Fleming

Imaging and Imagining the Fetus: The Development of Obstetric Ultrasound, Baltimore, John Hopkins University Press, 2013, pp. 336

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Until fifty years ago, pregnancy could only be studied through its effects on the pregnant woman's body. Hidden from the medical gaze, the fetus was a part of a process, more than a specific subject with its own identity and rights. In the last fifty years, however, the fetus has acquired a social status of its own. In their book *Imaging and Imagining the Fetus*, Nicolson and Fleming investigate this changing perception of pregnancy by analysing the development and diffusion of the ultrasound scanner, as "both a major agent for and a potent symbol of the medicalization of childbirth" (3), retracing in a very detailed manner the complex interactions of social, medical, and technological conditions that led to the establishment of this new technology as a widely accepted medical instrument.

The book benefits from a multidisciplinary approach, thanks to the different backgrounds and perspectives of the two authors. Working side by side, Malcolm Nicolson, Director of the Centre for the History of Medicine at the University of Glasgow, and John E. E. Fleming, retired engineer who was part of a team working on the ultrasound scanner's prototypes, wrote a book that is both historically and technically accurate, making it a compelling account of how technological innovation is a winding and messy path, more than a straight line from one point to another. By investigating the original documentation as well as by re-enacting some of the experiments, Nicolson and Fleming manage to highlight the complex and sometimes fortuitous sequences of connections and coincidences that led to the diffusion and stabilization of the new technology.

Between the 1950s and the 1970s, experiments on the medical applications of ultrasound were ongoing, more or less independently, in different parts of the world. Nicolson and Fleming's work focuses on the British context and, more specifically, on the role of Ian Donald, Regius Professor of Midwifery at the University of Glasgow, and key figure in the development of the ultrasound scanner in the UK. The book is a rich ac-

count of the complex network of actors involved in the development of Donald's prototype of the ultrasound scanner, and includes references to similar experiments in Sweden, Japan and the US. Their work, however, risks focusing a little too heavily on the influence of Donald, as great care is dedicated to retracing his personal and professional life more than that of others involved in the development of the ultrasound.

In terms of its structure, the book can be divided into three main sections. In the first section, Nicolson and Fleming retrace the history of ultrasound from its early application for military purposes. Chapter 2 brings the reader to the origins of ultrasound echolocation, back to the first sonar (SOund Navigation And Ranging) that was employed by the Royal Navy in 1922 to detect enemy submarines and anti-submarine weapons. In peacetime, sonar became a common method to measure the depth of the sea. During the 1930s, the ultrasound found an application in industry to detect flaws in metal machinery parts. Investigators in different parts of the world also started researching possible clinical uses of the echolocation technique, thanks, in part, to the cheap electronic parts made available by the military surplus. At the same time, Ian Donald started his education at St. Thomas's Hospital Medical School, an institution that valued a holistic approach to illness, encouraging students to be moral guides as much as a doctors. Nicolson and Fleming analyse the influence that Donald's (Anglo-Catholic) religious and academic education had on his profession, with chapter 3 being a detailed account of the formative lessons, both moral and professional, that Donald received at St. Thomas, and of his early interest the clinical use of ultrasound.

In the second section, the authors painstakingly recount the several attempts made by Donald and his team to use the industrial flaw detector for medical investigation, from the A-scope to the first automatic scanner, and finally the Disonograph. Nicolson and Fleming reconstruct the series of fortunate events that allowed Donald to secure the academic and financial interest to pursue his project, and the valuable partnership he forged with Thomas Brown, an engineer at Kelvin and Hughes Ltd. Brown fixed and improved Donald's machine, but most importantly he convinced Donald, initially sceptical, to find a way to display the information collected with the ultrasound in a brightness-modulated form. With Brown's method, the pulse-echo signal was no longer producing a pattern of spikes, but rather a two-dimensional image. The images that Brown's prototype was able to produce, however, were very crude and hard to interpret. As the authors clearly explain, making sense of these pictures was difficult also because what was displayed was something completely novel; no one had ever looked at the abdomen that way before, and the pictorial reproductions of the organs in anatomy books were not helpful. Moreover, the body itself proved to be a challenging subject of study; apart from the individual differences between subjects, the conditions affecting the ultrasound echoes were many and hard to predict. With a precise account of the team's many attempts and failures in chap-

ters 5 and 6, Nicolson and Fleming convincingly prove their point, according to which “[t]he development of obstetric ultrasound [was] a particular sequence of complex interactions between physical entities (sound waves, piezoelectric crystals, potentiometers, and the like), the biological substrate of the human body, and human actors from a variety of backgrounds and with diverse skills and interests.” (8)

In chapter 7, they recall the last steps that led to the commercialisation of the final prototype of the Disonograph. An important move forward was possible thanks to Brown's development of an automatic scanner, which allowed him to produce consistent and comparable scans. As Nicolson and Fleming note, the automatising of the scanning process was instrumental to the diffusion of the scanner as a black-box. Brown's last prototype, a semi-automatic machine with a manual probe operated by the practitioner, could now be used by physicians with no understanding of engineering, and it quickly made its way to the market as a medical commodity.

The third and last section engages with the consequences of the incorporation of the ultrasound scanner into medical practice. Allowing the physician as well as the pregnant woman to see, for the first time in history, a fetus long before it was born, the ultrasound scanner had great impact on people's perception of both the fetus and the pregnancy. As Nicolson and Fleming argue, “the ultrasound scanner does not reveal the fetus directly or unproblematically” (267). The last three chapters are, indeed, an attempt to investigate what happened after the new technology became black-boxed. Aware that the stabilization of a technology is not the end of the story, the authors recount the controversies following the general acceptance of the ultrasound scanner as a valuable tool for clinical investigation. Clearly, most of the controversies revolve around changing perspectives on pregnancy. In order to make sense of the new social status gained by the fetus, Nicolson and Fleming adopt Donna Haraway's approach to human experience as technologically mediated (1991). The fetus comes to be a cyborg, accepted as a patient on its own through the mediation of a technology. This changing status of the fetus affected people's attitudes on abortion and, consequently, on a woman's right to terminate her pregnancy. The possibility of actually seeing the fetus had a huge impact on women's rights, casting a long shadow that is still evident fifty years later, as the ultrasound images of the fetus are still used as political tools by the pro-life movement against those who decide to terminate their pregnancy. On the other hand, as the authors recall, being able to detect fetal pathologies at a very early stage might foster abortion in case of malformations, a possibility that Donald considered morally repugnant.

Nicolson and Fleming's account of the ethical and social consequences of the diffusion of the ultrasound scanner is remarkable, yet they only partially succeed in problematizing them, as a close examination of the effects of the invention on women's agency is somehow missing. The au-

thors recall a few different, and sometimes opposite, positions on the medicalization of childbirth coming from feminist scholars; as explicitly stated, however, Nicolson and Fleming decided “not to interrupt the flow of the narrative with theoretical digressions or engagement with the work of other scholars” (7), and only briefly mention the controversies and conflicts following the changing attitude towards the fetus.

In conclusion, *Imaging and Imagining the Fetus* constitutes a valuable example of the messy path that leads to the emergence and stabilization of a new technology. Following Pickering's framing of research as a pattern of *modeling*, *resistance*, and *emergence* (1995), Nicolson and Fleming convincingly describe the complex entanglement of personal skills and interests, social and political context, technical and financial resources, as well as fortuitous encounters, fundamental for a technological innovation to be successful.

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Philippe Sormani

Respecifying Lab Ethnography: An Ethnomethodological Study of Experimental Physics, Farnham, Ashgate, 2014, pp. 278

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This book presents a laboratory study based on the conviction that laboratory studies have failed up to now to achieve their goal. According to the author, laboratory studies' failure is “the *failure to describe any particular discipline of the natural sciences in its constitutive practices*” (16). The very constructivist approach that has characterized lab studies from their beginning contributed to such failure, because it drove to interpret laboratory practices in terms of concepts alien to them. There arose the tendency to ignore any self-instruction in the enquired domain of research practice, and the interpretively analytic relevancies distanced themselves from the practically ordered ones. To avoid such trap, Sormani's study accomplishes a change in orientation lead by ethnomethodology. Its central concern is to recover the local production of social order in a physics