Alan Turing's Manchester



by Jonathon Swinton

INFANG PUBLISHING, 200 PP., 2019, £15.00, ISBN: 9780993178924

REVIEWED BY C. T. J. DODSON

his is a delightful book, enjoyable for anyone with an interest in science or Manchester or its university. The title precisely captures the subject matter, namely what Turing would have experienced through his window from abstract academia on his arrival in 1948. It describes the scientific-academic-social environment in Manchester during the 1940s and 1950s, when the University of Manchester was drawing talent, which included Turing, away from the Oxford-London-Cambridge triangle. This trend occurred despite the city's blackened aspects and foggy atmosphere, but in one sense because of those features, since they had led to the development of the engineering innovations and financial security that began to be invested in the university. The book is written by a mathematician, with expertise in Turing's Fibonacci strategy for morphogenesis. He is well able to describe the intricacies of developmental tensions among the disciplines of mathematics, computing, engineering, biology, and philosophy at a time of great intellectual upheaval and expansion in those areas, during which Manchester began leading the world in computing, having already led the world in physics with Rutherford's splitting of the atom.

After Turing's successful war service at GCHQ Bletchley Park as a codebreaker, he had an unsuccessful stint at the National Physical Laboratory (NPL) in Teddington, West London, which was then competing with the Universities of Cambridge and Manchester to build the first computer ahead of the Americans. No doubt somewhat disillusioned by the failure of the NPL project, Turing returned to his fellowship at King's College, Cambridge, which also provided a relaxed social environment for discreet homosexual relations. One of his earlier mathematics lecturers at Cambridge was Max Newman, who also worked at Bletchley Park, and who in 1945 was recruited to Manchester by Patrick Blackett, a professor of physics. Blackett had been a student of Rutherford's who had moved from Manchester to Cambridge. Newman had been greatly impressed by Turing's original paper describing the logical structure of a computer, which we now refer to as a Turing machine, and he recruited Turing in 1948. As early as 1936 at Bletchley, Newman had devised two innovations: internal data storage and automatic decision-making; the implementation of this with the assistance of the engineer Tommy Flowers led to the world's first programmable computer, the Colossus. With a large grant, Newman was tasked with developing a new computer at Manchester, and he managed to bring with him the parts for two Colossi, no doubt all this with approval at a high governmental level.

Max's wife, Lyn, played a significant part in welcoming mathematicians to Manchester and in communicating the developments of the computer in her writings, having previously been a London literary journalist and an associate of Virginia and Leonard Woolf. She was bemused by the lofty and disinterested mathematicians, who seemed to have detached themselves from normal life to do something "appallingly boring." Lyn contributed letters to the Times, including one describing the difficulties faced by the wives of academics. Patrick Blackett's wife, Constanza, like her husband a socialist, was known for having house parties where "English was a rare language," there being so many central European refugee scientists in Manchesterwhich had been less subject to bombing attacks than London. Constanza invited all of the staff of the Physics Department, including the cleaners, to a 1948 party celebrating her husband's award of the Nobel Prize in Physics for cosmic ray detection. Patrick and Constanza "shone in a dreary world."

Douglas Hartree, working in physics with Professor Freddie Williams, had already devised a mechanical computer, and a production model was built locally by Metropolitan Vickers. This was called a Differential Analyser, though technically it was the opposite, an analog integral synthesizer for solving differential equations. Williams and his assistant Tom Kilburn built a circuit that could store one bit; through Williams, Ferranti was provided with a large grant to develop a new computer. Turing was engaged to help users exploit the new machine. Newman hired for him two assistants, Cicely Popplewell and Audrey Bates, both having graduated in mathematics but to whom Turing was unsupportive; they were happier when he worked at home rather than in their shared office. However, they made significant contributions to the project. The only female professor in postwar Manchester was the philosopher Dorothy Emmet, from 1947. Twenty-six years would pass before another woman was appointed.

In October 1949, Emmet chaired a seminar in the Philosophy Department entitled "Can machines think?" This attracted logicians to try to develop machines that they believed could be made to think. Also present were Polanyi, Newman, and the brain surgeon Geoffrey Jefferson, who disagreed with Turing that a machine could be made to think. Turing responded to Jefferson's question of how a machine would cope with a contradiction by stating that it would backtrack until it found the error. Jefferson pointed out that that was not how humans thought, and when Turing claimed it was exactly how mathematicians thought, there was heard a murmur but is a mathematician human? Turing's view was that the computer could use previous calculations and proceed by trial and error, making it clear that he had no intention of trying to make it *think* like a human. In this respect he was already much closer to modern machine learning and artificial intelligence. In 1952, Polanyi facilitated a guest lecture series in Manchester by Jean Piaget, who was then the world's leading authority on human intellectual development. Turing attended, and the following year he produced what we now call the Turing test. Imagine teleprinter contact with a remote person or machine, and the test whether the machine could think should be replaced by asking whether the machine could be distinguished from the person solely from the teleprinter output.

Lodging from 1948 in the village of Hale, close to the Newmans and to the chemist Michael Polanyi, Turing became a friend of both families. Pursuing his interest in running, he joined the Salford Harriers. He continued his relationship with Neville Johnson in Cambridge, which would have been made more convenient to pursue when in 1950 he bought a house in Wilmslow. However, by then that relationship was coming to an end, and Turing investigated the opportunities in Manchester; his first impression was "the low standard of male physique." There was a "small homosexual set" centered on the university, the BBC, and the Manchester Guardian, but Turing did not associate with it according to his biographer Andrew Hodges. As Hodges pointed out in his comments on the Manchester scene, "for the the young, in particular, without means or private space, homosexual desire meant street space."

In December 1951, Turing had completed his paper on morphogenesis and after Christmas shopping had encountered the young man Arnold Murray, for whom he bought lunch and subsequently invited back to his house the following week. In February 1952, Turing's house was burglarized, it turned out later by a friend of Murray's, and subsequent to Turing reporting it to the Wilmslow police, the investigation revealed that he and Murray had a physical relationship. Turing's attitude during the investigation seemed one of ignorance of the serious legal and social consequences that could follow. Newman, previously unaware of Turing's homosexuality, staunchly supported him at the subsequent trial as a character witness. Turing received a negotiated sentence of medical treatment, which in due course took the form of a slow-release estrogen implant. Initially, Turing treated this lightly, being of the view that the alternative, psychotherapy, for him was useless. He visited the Newmans in Cambridge during the spring of 1954, and in June, learning of Turing's death, Lyn Newman wrote warmly about him and his "rare form of genius," at a loss to explain what seemed a sudden impulse for him to take poison.

This very readable book has excellently organized and detailed annotations and many illustrations, including photographs of the principal characters, and a short authoritative appendix summarizing for nonspecialists Turing's approach to biomathematics and morphogenesis. I recommend it without reservation.

OPEN ACCESS

This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons. org/licenses/by/4.0/.

C. T. J. Dodson School of Mathematics University of Manchester Manchester M13 9PL UK e-mail: ctdodson@manchester.ac.uk

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.