“Low-Grade Human Labor” and Computers: Discourses on Technological Unemployment in the Mid-20th Century

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Algorithms became available in a variety of environments with the advent of high-speed digital computers in the 1940s and the commercialization of programmable computers in the 1950s.

When digital computers were developed in the 1940s, there was much discussion among mathematicians and logicians familiar with them about what the new digital computers could do and how they would affect the work of mathematicians. This was connected to the fact that digital computers were built to perform calculations and computations that were too large and tedious for humans to handle. For example, Alan Turing stated in his “Lecture to the London Mathematical Society Feb. 20 1947” that good “mathematicians will be needed in order to do the preliminary research on the problems, putting them into a form for computation”, while “stereotyped” tasks, such as card punching, would be easily replaced by machines.

Discussions about “automation” began in the United States in the 1950s. This was triggered by the incorporation of control devices and later computers into production lines, i.e., the beginning of general-purpose use of computers, including commercial use, beyond the scope of numerical computation work. The term “automation” became widely known with John Diebold's article in 1952.

The argument of factory automation and labor, and thus technological unemployment, in the 1950s is well-known for Norbert Wiener’s book The Human Use of Human Beings. In several works, including this book, Wiener discussed how the introduction of computers and feedback control devices into various locations could transform labor and how this could affect human economic life and culture. About mathematics, Wiener noted in his unpublished paper that “mathematicians who can make adequate use of [machines’] great capacities” would perform “marvelous tasks” using computers, and that in the future “logical computing laboratories” will develop, where experts will “use the machine as an extension of their brains”. He added, “[t]he machine as an adjuvant and supplement to human activity will unquestionably be of great value and importance in the future in all ranges of human activity” . According to Wiener, “low-grade human labor” was the “cement” that kept the human society together, but once it was gone, “other

motives, other employment of leisure, and other human valuations" would be needed as the new cement.

This Wiener's argument could be understood in relation to the issues addressed by John Maynard Keynes in "Economic Possibilities for Our Grandchildren" (1930) and partially discussed in Bertrand Russell's "In Praise of Idleness" (1932). Weiner was taught by Russell in the 1910s, and Russel referred to Weiner's book in a 1952 essay, in which he went further in his conclusions about the consequences for society of technological unemployment and the reduction of labor. Russell said the development of "mechanical brains" would take the place of factory labor and human decision-making, and the labor movement would inevitably end as working hours got limited. Russell stated that "our whole ethical system" based on the idea that "people ought to be useful and should show their usefulness by work" would collapse.

More than 80 years later, has the working environment concerning computing changed dramatically? In the 20th century, it might be said that the substitution of labor as described by Turing, Wiener, and Russell was only partially realized due to the limitations of computer performance. On the other hand, however, "low-grade" computational labor has not necessarily been replaced by machines in the 21st century. Instead, previous studies have shown that still it has been carried out by people in weaker positions, for example, women and people in developing countries. The process of mechanization and automation over computation and control over the past century needs to be re-examined historically.