Michael Adas, Machines as Measure of Men. Science, Technology, and Ideologies of Western Dominance, Ithaca, NY, Cornell University Press, 1989, 456 pages

Revisiting the classics is always a difficult task, as there are very few works that do not show signs of wear and tear caused by time. In this case, and although *Machines as Measure of Men. Science, Technology, and Ideologies of Western Dominance* by Michael Adas was republished in 2015 with a preface in which the author repositions himself and his work in the face of contemporary issues, we are dealing with a text that is 33 years old.

When *Machines as Measure of Men* was first published, back in 1989, it was truly groundbreaking. Although it followed in the historiographical footsteps of Daniel Headrick's *Tools of Empire* (1981) it addressed an epistemological layer of the building of European empires that had long remained invisible, that is the very essence of the concept of progress. Adas' thesis in this book is now well known and opened the door to a whole new lineage of studies on technology and imperialism: that scientific and technological knowledge was the Western-centric indicators of human worth. *Machines as Measure of Men* uses the *longue durée* approach – it covers five centuries (16th to 20th centuries) – to trace the impact of science and technology in shaping the way Europe perceived and built its own version of non-European societies. It is this epistemological stand in which scientific and technological progress equals the laws of history themselves that justifies the concept of *civilizing mission* as the core ideology of Europe's dominion.

Science and technology, both as an *episteme* and as a *praxis*, were thus critical to *domesticate* and to exploit imperial mind and landscapes and the cornerstone of the civilizational scale featuring *European superiority* versus different gradations of inferiority in other societies. Western knowledge was based on precise observation and measurement, allowing Europeans both to act and transform nature and to measure men and societies.

Of course, even back in 1989 there were some controversial approaches to some of the topics of Adas' book, such as, for example, the concept of racism or the interpretation of Karl Marx's texts on slavery that

have been already pointed out by a significant number of reappraisals. Today, in 2022, it is not possible to read *Machines as Measure of Men* without framing it by the enormous amount of scholarship that has been discussed and sedimented in the realm of history and of history of science and technology. Surely, we will find further points of criticism, but, on the other hand, the fact that we are still able to bring Adas' text to the debate shows its value as a canonical work to understand the complex fabric of contemporary society. In other words, even if the conclusions pointed out by Adas raise some doubts, the information and arguments put forward by the author continue to be relevant for current research.

Which are the main axes for a fruitful dialogue with *Machines as Measure of Men*? In my opinion, I would bring to the table the centers/peripheries framework, which I have been discussing and tunning for about 25 years now. In 1999 a group of researchers, mainly from Southern Europe (Portugal, Spain and Greece) created STEP (Science and Technology in the European Periphery), a network which aimed at challenging the traditional narratives on science and technology by historicizing the notion of *European Periphery*, reinforcing the concept of co-construction of moving (in time and space) centers and peripheries, and bringing to the forefront the perspective of active receivers often dismissed from global accounts based on a simplistic and static divide between the active center and the passive periphery. By putting forward a conceptual and methodological alternative based on the trilogy appropriation, circulation, and innovation, local idiosyncrasies are analyzed in their natural ecology and not in terms of net efficiency, thus looking at actors and institutions' strategies as choices and not as unavoidable decisions (Gavroglu et al., 2008; Diogo et al., 2016; Diogo and Simões, 2023).

STEP's framework for European peripheries was easily translated to imperial and colonial contexts, particularly by later exploring deeply Antonio Gramsci's concept of hegemony. The use of Gramsci's concepts as a tool to reveal and analyze power asymmetries was already in use in the 1980s, by the hand of the Subaltern Group, led by Ranajit Guha, that used the term *subaltern* to account for all groups that whether because of race, class, gender, sexual orientation, ethnicity, or religion were considered inferior. The Subaltern Studies Group's agenda called for a new narrative of the history of India and South Asia, built on the strategies designed by subalterns (that is, those who were not part either of the colonizer or the colonized elites) to initiate political and social change.

Going beyond the concept of subalternity, STEP*ers* who continued to work on the concepts of centers and peripheries adopted Gramsci's concept of cultural hegemony to analyze the role technology plays in interactions both within Europe and between Europe and the rest of the world. We believe that at the core of the process of *creating* European hegemony is the transformation of the role of technology from a *techne* (its *natural* realm) to an *episteme*, a worldview that is still quite prevalent. This *episteme* is based on the Baconian, Cartesian, and Kantian idea of progress, i.e., controlling and dominating nature through technology to achieve an improved stage of development and growth which is at the heart of the global capitalist process (Diogo et al., 2017; Diogo et al., 2020). In this context, the concept of hegemony allows historians to dissect the ways the ruling-class worldview misrepresents the social, political, and economic *status quo* as natural, inevitable, and perpetual social conditions that benefit every social class in every part of the world, rather than as artificial social constructs that benefit only a small ruling class.

Furthermore, this agenda of co-construction of centers and peripheries within a global order framed by capitalism proposes a "shift from the point of view of what has been transmitted to the view of how what was received has been appropriated." (Gavroglu et al., 2008, p. 154). It is a process of both collaborative and/or confrontational relationship with the centers. Authors such as David Edgerton, with his concept of creole technologies (Edgerton, 2007), and Dipesh Chakrabarty' idea of provincializing Europe (Chakrabarty, 2000) have precisely stressed these world dynamics and entanglements; in the same line, within the *Making Europe* project and book series, the volume on *Europeans Globalizing. Mapping, Exploiting, Exchanging* (Diogo and Laak, 2016), emphasized the role of Europe's culture of technology, supported by the concepts of progress and economic growth, as the main mediator (and judge) between Europeans and non-Europeans since 1850, while making a point of how Europe was also transformed by the global movement of people, goods, and knowledge.

If we look at Adas' *Machines as Measure of Men* from the 2022 standpoint, it obviously lacks these concepts: it adopts what we could name as a *soft* diffusionist framework for understanding the transmission of European science and technology to *non-Western* peoples and gives little voice to non-Western and indigenous critical perspectives. Also, most of the authors used by Adas are from European centers, particularly Great-Britain

and France, leaving behind countries that held extensive and last-longing empires even during the New Imperialism era, such as Portugal. This rather distorted gaze on the European imperial powers obscures the conflicts and tensions among empires which often mirror the center-periphery asymmetries in Europe.

An example of how this *blindness* may wrongly shape the view of Europe as a monolithic actor are Rafael Bordalo Pinheiro's cartoons on the British Ultimatum to Portugal, following a dispute on the building of two conflicting railways: Cecil Rhodes' Cairo to Cape railway, supported by the British Crown, and the Portuguese Coast to Coast railway (from the West coast of Angola to the East coast of Mozambique, enforcing the so-called Pink Map, a continuous strip under Portuguese rule between the two African coasts). One of the most paradigmatic examples is Bordalo Pinheiro's cartoon to respond to the British *Punch*'s cartoons in which Portugal was presented as an inferior country and portrayed as a monkey, a mindless primate, doing foolish things, in this case spilling ink on the map of Africa, on the strip from Angola to Mozambique, and ending with the morals "Monkeys should not play with maps, even when they are Portuguese; if they do, they risk to be spanked by their owners".

This episode of a longer *cartoon war* illustrates how complex and multilayered are relationships among countries, empires, and colonies on a global scale, particularly when dealing with the longue durée. The ideology of Western superiority and paternalism was at the core of the imperial fabric, but it was by no means exclusive to it, encompassing other actors with less power in the global network.

The vitality and relevance of Michael Adas' *Machines as Measure of Men* lies precisely on its ability to foster a subsequent wave of research and scholarship that complement, opposes, and questions Adas' views. The vigor of a book, its ability to be a classic, a canonical text, is characterized by being able to spark debate, not just when it is published, but decades later. Of course, there are some shortcomings; of course, some topics are currently addressed differently with new theoretical frameworks and conceptual tools; of course, today's research interests are directed towards different problems; but *Machines as Measure of Men* remains a mandatory reading for students and scholars interested in technology, progress, and imperial and colonial issues for what it gives and because of what it forces the reader to give back in the form of reflection, questioning and debate.

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