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Intelligence, Still Artificial

by Tristan Fournier

At a time when artificial intelligence is the focus of growing public attention, the philosopher Catherine Malabou questions the increasingly porous boundaries between the human brain and the synthetic brain. In doing so she traces the development of the concept of intelligence.

Reviewed: Catherine Malabou, *Métamorphoses de l'intelligence. Que faire de leur cerveau bleu ?*, Paris, PUF, 2017, 184 pp., €15.

Catherine Malabou, professor at Kingston University's Centre for Modern European Philosophy, continues her previous investigations into the brain (2004) with an exploration of the "frontier-concept" of intelligence, which is presented as being "torn between its scientific characterisation as an innate, biologically determined gift, and its spiritual meaning in terms of comprehension and creation" (p. 10). This immersion into biological life and symbolic life leads the author to question the porosity of this frontier in the light of advances made in the field of artificial intelligence (AI). She builds her theory on the foundation established by the *Blue Brain Project* in particular, whence the book's subtitle: this internationally renowned scientific project originated in 2005 at the École Polytechnique Fédérale de Lausanne with the purpose of creating a synthetic brain. Can intelligence be defined? Where and how should AI be situated? What are the possible relations between living and non-living? Such are the questions that Catherine Malabou seeks to answer in this book.

Public interest in artificial intelligence

Malabou's book was published in a context of growing public interest in artificial intelligence. 2017 was marked by a number of major publicity coups that drew attention to the

technological progress made in the area: notable examples were AlphaGoZero and Todai, two AI programs capable respectively of beating the Go world champion and obtaining better results than 80% of candidates in the entrance exam for Tokyo University. Important scientific studies on the issues at stake were also published in 2017, such as *Le mythe de la singularité. Faut-il craindre l'intelligence artificielle ?* by Jean-Gabriel Ganascia, director of the ethical committee at the Centre national de la recherche scientifique (CNRS). Finally, a national regulatory policy was implemented in France: less than six months after the *France IA* report was submitted, the government commissioned the mathematician and La République En Marche MP, Cédric Villani, to design the nation's AI strategy with the aim of establishing a road map for the years ahead.

Rather than proposing a critical analysis of the ethical and political issues raised by technological advances in AI, the book instead seeks to reconcile two areas: "trying to defend the 'nature' or integrity of human beings against technological 'singularity' leads nowhere" (p. 12). Although the author states her interest in political resistance to AI, she clarifies that it "must in no way oppose the passionate exploration of the configurations of meanings opened up today by the unprecedented alliance between biology, philosophy and cybernetics" (p. 30).

The impossible task of defining intelligence

The introduction provides an opportunity to review the scientific basis of the concept of intelligence, which was the subject of a major disciplinary dispute between philosophers, psychologists, historians and biologists at the turn of the 19th century. This part of the book is highly detailed and pedagogical, both theoretically and institutionally. A general criticism is directed against psychology, which strove to measure intelligence (through the famous IQ tests, an early version of which originated in France in 1905) rather than endeavouring to explain what intelligence consisted of – particularly how it differed from reason. To support her criticism, the author first draws on the work of Bergson, who maintained that intelligence was primarily a capacity for adaptation, then goes on to make a detour via the work of Dewey and Piaget who, she tells us, were the only ones to have "put intelligence forward as a scientific problem, not a solution" (p. 24) and to have questioned the "balance" and "in-between nature" of intelligence: between logic and life for the former, and between means and ends for the latter. At this point, the epistemological profile of the concept begins to emerge.

The three chapters that follow and lend the book its structure correspond to the three major metamorphoses of intelligence as identified by the author. The first concerns the genetic destiny of intelligence, from its characterisation as a measurable entity (hence the creation of IQ tests) to the search for a possible intelligence gene (the Human Genome Project). The second shift is the transition from the genetic paradigm to the epigenetic paradigm that

occurred in the early 21st century; while the final metamorphosis, yet to come, corresponds to the "age of an intelligence that has become definitively automatic" (p. 29).

Intelligence and genetic destiny

The author focuses first on the links between intelligence and eugenics. Drawing on the work of Francis Galton, she shows how intelligence has become "one of the fundamental issues of eugenics and its priorities of elimination and purification" (p. 32). While Alfred Binet's research in experimental psychology focusing on measuring intelligence for the purpose of educating "abnormal or retarded" children could not have been directly connected to eugenics, the author invites us to consider its normative aim, with judgement taking precedence over observation. In this first metamorphosis, therefore, there was no theoretical conceptualisation, but a certain ideological power or consensus that formed around the idea that intelligence is transmitted through heredity. With the progressive construction of this "hereditarism," IQ tests became a biopolitical tool.

The second half of the 20th century saw the emergence of the idea that "it would be possible to modify the phenotypic characteristics of a given group or population through gene selection" (p. 53). The author shows that eugenic theories persisted, even in scientific literature (see, for example, Herrnstein & Murray, 1994). This period was also and above all marked by the futile search for the famous intelligence gene. The sequencing of the human genome, announced in April 2003, did not lead to a clarification of whether and to what extent genes shape behaviour.

From genetics to epigenetics

A second metamorphosis of intelligence is then described: the transition between the genetic and epigenetic paradigms. The author borrows from two great authors of the human and social sciences, Bourdieu and Piaget, in order to deconstruct the simplistic idea of the determinism of intelligence, make it more complex and, above all, show that the indetermination of intelligence and its plasticity could be "anticipated" well before epigenetics developed. In my view, this is one of the book's great strengths: the practical demonstration of the interest and need for an interdisciplinary dialogue, making it possible to address the paradigmatic shift in the life sciences from the perspective of studies in the human and social sciences.

First of all, the author discusses Bourdieu's definition of intelligence as "conditionability" – in other words, the "natural capacity to acquire non-natural capabilities"

(Bourdieu, 2003, p. 197). This definition, which relates to cerebral plasticity, i.e. "the potentiality of the neuronal architecture to be shaped by influences in environment, habit or education" (p. 80), leads her to conclude that "habitus is therefore both a biological and a social tool that seals the union of the body and the brain as the original site of intelligence" (p. 89).

Piaget, on the other hand, established a dialogue between biology and psychology and characterised intelligence as capacity and mobility, rather than as predestination (1967). He compared the development of intelligence to organic growth: while both strive to reach an equilibrium, the first is more complex because, unlike organs whose growth follows the biological life cycle, intelligence tends to develop towards a "mobile equilibrium," i.e. an "equilibrium that is sought continually because its temporal limit is indeterminate" (Piaget, 1967, p. 12).

Drawing from these two authors, Malabou strives not to herald the dawn of an age of "pure constructivism" but rather to show that just as there is no habitus without social determinism, there is no intellectual epigenesis without psycho-morphological determinism. The epigenetic development of the brain depends on the genetic envelope with which it is constantly interacting (p. 102).

The power of automatisms

The final metamorphosis of intelligence that is analysed is in fact yet to come. Here lies the core of the author's theory, based on a critique of her own earlier book (2004). In *Que faire de notre cerveau ?* "(What should we do with our brain?") Malabou traced a clear boundary between the human brain and the synthetic brain based on the fact that the former has a plasticity that is lacking in the latter. However, recent technological advances, particularly related to the Blue Brain Project and the development of synaptic chips enabling an AI system to access its source code and reprogram itself, are evidence of a certain level of plasticity in the synthetic brain. The boundaries have therefore become blurred.

Catherine Malabou goes even further. She invites us to move beyond the tension that exists between intelligence (seen as "natural" and associated with the human brain) and automatism (seen as artificial and associated with the synthetic brain). Automatism is related to involuntary movement as well as spontaneous movement. It is therefore a vehicle for "a dual combination of mechanical constraint and freedom" (p. 127). The author borrows largely from Dewey on this point, particularly to emphasise the necessary interaction between habit and intelligence: "Without habit, intelligence has no past. With intelligence, habit has no future" (p. 128). She thus shows how the automatism of intelligence consists of a "mechanism capable of interrupting its own routine" (the rigid repetition of its habits) without becoming anything

other than an automatism (an autonomous process)" (p.136-137). Given that intelligence functions through automatisms, automatism is not fundamentally artificial!

A debatable epistemological position

In this very stimulating work, the author openly distances herself from the issues raised by AI – as indicated by her use of the possessive pronoun "*leur*" ("their") in the book's subtitle – in order to devote herself to a philosophical analysis of what she calls "the metamorphoses of intelligence." It is nevertheless regrettable that she chose to take an epistemological stance which sometimes draws her away from critical thinking and gives the impression that she believes too easily in the promises of AI. Its advocates emphasise the therapeutic revolution that is underway (better understanding of the neurodegenerative processes inherent to diseases such as Alzheimer's, Parkinson's, etc.) and the possibility of improving daily life (saving time by freeing up house chores, combating occupational health risks, etc.), but these promises are dictated by a neo-liberal performance logic – which AI strengthens considerably – and involve high-profile ethical and political issues, some of which are common to transhumanism, such as the hyper-medicalisation of daily life or the confidentiality of personal data.

Similarly, the author sees epigenetics as an opportunity to invent oneself and take charge of one's own destiny; to glimpse the freedom that was previously prevented by genetics. Epigenetics, however, particularly environmental, also has a deterministic perspective, especially in its biomedical uses (Fournier & Poulain, 2017). It is understandable that such issues might have been sidelined in this investigation, but can one (scientifically) and should one (politically) give up contemplating them? In my view, the book's primary interest does not lie in this particular stance, which raises some questions, but rather in the immense amount of reading, analysis, discussion and interdisciplinary dialogue that has enabled the author to give a detailed pedagogical account of the past and future of the concept of intelligence.

Further reading

- Bourdieu, P. 2003 [1997], *Méditations pascaliennes*, Paris, Seuil.
- Fournier, T. & Poulain, J.-P. 2017, "La génomique nutritionnelle : (re) penser les liens alimentation-santé à l'articulation des sciences sociales, biomédicales et de la vie", *Natures Sciences Sociétés*, 25 (2) : 111-121.
- Herrnstein, R.J. & Murray, C. 1994, *The Bell Curve. Intelligence and Class Structure in American Life*, New York, Free Press.

- Ganascia, J.-G. 2017, *Le mythe de la singularité. Faut-il craindre l'intelligence artificielle ?*, Paris, Seuil.
- Malabou, C. 2004, *Que faire de notre cerveau ?*, Paris, Bayard.
- Piaget, J. 1967, *Biologie et connaissance. Essai sur les relations entre les régulations organiques et les processus cognitifs*, Paris, Gallimard.

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