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Humans transcending biology: Epistemology of artifacts

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Humans are unique among animals in their capacity to make up artifacts. Artifacts are material embodiments of beliefs, and also of the achieved human knowledge, serving to ease human life. Any human culture is characterized by its epistemic quotient, which expresses the ratio of knowledge and beliefs the culture consists of. Along with a specific pool of memes, a specific pool of artifacts is another determinant of the specificity of a culture. But artifacts are also tools enabling the acquisition of new knowledge. Science is generating, and in turns dependent upon, a specific category of artifacts, scientific instruments. They circumscribe the epistemic horizon of scientific inquiry, delimitating the nature of questions that can be posed meaningfully by science. They may be considered as human exosomatic and now ever more exomental organs and dubbed epistemic machines. Evolution of scientific instruments may, to a large extent, exhibit autonomous dynamics, independent of intentions of human actors. There is a recursive feedback between scientific instruments and evolving research, a tight coupling between the character of the instruments and the character of scientific hypotheses. The best example nowadays is provided by molecular biology: automatic sequencers of DNA and nucleic acid and protein microchips generate huge quantities of new data, but also, at the same time, define and demarcate research problems. There are the available research techniques that are promoting imaginative speculations to the status of scientific hypotheses. In this sense, most revolutions in science may have been primarily brought about by new techniques, made possible by novel types of instruments, rather than by independent radically novel ideas.