A map to access the brain

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The Human Brain Project (HBP) began in 2013; it is a research project with an ultimate goal to be achieved within the next 8 years: to create IT simulation of the functioning of the human brain. A massive project made possible only by the billion euros financing granted by the European Commission in the context of the programme 'FET- Future and Emerging Technologies'.

Techno-sciences as an investment

The programme represents a sort of 'New Deal' for the new millennium: to advance scientific convergence in futuristic, therefore risky from an economic point of view, fields in order to come out with even more technological applications that can produce profits in both a social (that is to say control over society) and economic context.

The projects competing for this massive financing were six, one more fearsome than the other. They all had in common a techno-scientific convergence intended to develop new 'revolutionary' technological applications in the dystopia in which we are living. For example, the objective of one of the competing projects was to reconstruct all the biological processes of the human body virtually, so as to create a universally standardized model of a patient, which could be personalized by simply changing its anatomic, physiological and genetic characteristics[1]. Another delirious project aimed to gather as much data as possible about the condition of planet earth, so as to develop a simulator able to predict social evolution, 'detect and mitigate crises, identify opportunities in specific areas' and offer support to political, economic and social decision-making[2]. Of these projects two were the winners. One is nanotech research on graphene and the other, that's it, the beacon project of neuroscience: to recreate a biologically precise virtual brain.

These are decidedly ambitious projects but most importantly they are expensive, and the fact that an institution such as the European Commission has decided to offer billions of euros underlines at least two major points concerning research. The first is yet another demonstration that scientific research, rather than being in the service of the 'progress of humankind', is in the service of power. In fact, almost identical projects exist in China and the United States. The US version is called BRAIN Initiative (where Brain stands for Research through Advancing Innovative Neurotechnologies) and is also financed by DARPA, a research agency involved in military technologies. Even if the two projects are separate, they have promised each other mutual help; and even if the European project appears to be solely for 'civilian purposes', needless to say in modern society this distinction is simply an

[1] ITFoM, acronym for 'Information Technology Future of Medicine', www.flagera.eu

[2] Future ICT Knowledge Accelerator and Crisis-Relief System, www.futurict.eu

excuse. In modern society, where war is just one of the instruments used by the economy to extend the market, to be in the lead in the race to Hi-Tech development is important in the world scenario, even if it's not a directly military development. Secondly, and this is nothing new either, the symbiotic relationship between the economy and scientific research is clear. The European Commission's FET project makes it clear how the purpose of investing such an amount of money is not just to guarantee Europe with technological prominence in the field of neuroscience, but also to accelerate the transformation of the 'theoretical knowledge' revealed to scientists by bio and nanotechnology research into technological applications that can produce profit. It is clear then why the project involves plans for a private foundation (in Switzerland, where the project is based) in charge of exploiting the commercial opportunities that will emerge from HBP.

An out-of-the-head brain

The mastermind of the project is Henry Markram, a professor, director of the neural microcircuits laboratory at the Polytechnic of Lausanne (EPFL) and founder of the Brain Mind Institute. In 2005 EPFL bought the IBM super computer Blue Gene/L at a fair price and put it at Markram's disposal to begin research that had been swirling around in his head for a long time, the Blue Brain Project, i.e. the artificial reconstruction of a rat's cortical spine, and then the mapping of its neurons and connections inside the spine. But Markram's real dream is another, that of reconstructing bit by bit inside a computer nothing less than the human brain. To feed a new generation supercomputer (developed and installed by IBM drawing inspiration from the functioning of our brain) with the huge amount of information generated by the neurosciences in order to come to the creation of a machine that reproduces the human brain at every level, from single neurons to the most important cognitive functions. A titanic undertaking based on massive data gathering collected from hospitals and universities. The data will subsequently be filed and harmonized inside supercomputer BlueGene/Q Lemanicus, the new jewel put at Markram's disposal. In this way the Blue Brain Project takes a step forward and in 2012 it becomes the Human Brain Project, competing for and winning the FET financing.

At this stage the Human Brain Project becomes a European project, coordinated by the Federal Polytechnic of Lausanne and involving 112 institutes of research and universities, mainly in Europe, but also Canada, China, Argentina and the United States, to a total of 24 countries. Its headquarters, at first based at the Neuropolis camp in Lausanne with the financing of Canton Vaud and the watchmaking company Rolex, moved to Geneva a year ago, into a disused building owned

by pharmaceutical company Merck Serono and then purchased by entrepreneurs Ernesto Bertarelli and Hansjoerg Wyss, the former being the first managing director of Serono and the latter the founder of Synthes and the Wyss Centre for Bio and Neuro Engineering. Here the two men dream of creating a 'silicon valley' for biotechnologies as they are set to attract companies, businesses and start-ups to the campus that will host the HBP.

In this race to the brain, where Europe and the USA are pitting their prominence in neuroscience, Italy didn't want to miss the appointment, and several Italian 'giants' stand out in the list of the institutes involved in the super project.

First of all, because we're talking of supercomputers rather than brains in the human sense, Cineca is one of the participants, a consortium based in Casalecchio di Reno (and also in Milan and Rome) that comprises 70 universities from all over the country and offers its super calculators to the scientific community in the field of numerical simulation and scientific visualization. LENS (European Laboratory for Non-Linear Spectroscopy) based in Sesto Fiorentino and the University of Florence will be engaged in developing an optical tomographic instrument capable to reconstruct the entire net of the brain at a very detailed level. The University of Padua in collaboration with IRCCS Mondino will try to develop the first realistic model of the cerebellum, which will be integrated into the model of brain coming out of the Human Brain Project. And also the Computational Neuroscience Laboratory of Palermo, the Cognitive Sciences and Technologies Institute of Rome, the Polytechnic of Turin and the Sant'Anna of Pisa.

The Big Science

The Human Brain Project presents all the features of so-called 'Big Science': a research project which aims to gather and process countless data, requires a large staff, huge laboratories and expensive machines, and can only be realized through massive financing. These are conditions which any scientist would like to have for his/her research field, but which only materialize when the system identifies a priority (or urgency) in the development of a certain scientific sector. The birth of 'Big Science' is generally associated with the Manhattan project, i.e. the 1940's US project for the development of the atom bomb. At this time a change began in the relationship between science and society, whereby the government became the boss and patron of science thus generating a change in the scientific institution itself. In fact, up until then scientists had to know what to do with what they got in order to continue their research, and only few discoveries found real applications, whereas now research is being increasingly commissioned by governments, institutions, and more recently multinationals, now part of the oligarchy. No more

'craftsmen of science' but employees, hired scientists. In other words, a sort of process of scientific industrialization.

Obviously it is not by chance that in the aftermath of the first world war the sectors that benefited more from the new 'Big Science' were astronomy and physics, both being sectors strategic to the historical situation created by the cold war. In recent decades, on the contrary, the sectors that are mostly driven by this kind of research are the natural, and in particular life sciences. At the onset of the 'Big Science', the priority was the development of the missile and telecommunications industries, according to the needs of the moment; now, on the contrary, the need that science has to tackle is the very survival of the system. What is needed is the engineering of living things to face the consequences produced on human beings and nature by industrial society, and the search for new 'resources' to keep the industrial machine going and feeding the system. And while the Human Genome Project was an effort 'in great style' at identifying and mapping all the genes of the human genome (in relation to both their structures and their functions), at a time when genetic manipulation is no longer presented as a possibility but as a necessity, the Human Brain Project wants to understand the functioning of something that can be identified as the place of everything that defines our thoughts, emotions and memories.

Even if the usual litanies of 'basic research' and 'important contributions to medical research' (now appearing as a sort of enchanting ritual) accompany this research, considering the foreground of society of control, manipulation and exploitation, one can well guess how 'access to knowledge of the functioning of the brain' is only a euphemism for possibilities to open new doors to manipulating this organ. And while neurodegenerative diseases already concern a considerable part of the population and are constantly on the increase, the assertion that the only solution is for us to adapt to the harmful environment of industrial society (with drugs, genetic therapies, tissue regeneration) contains something perfidious and perverse. The development of the new technologies that can come out of this research is the core of the billionaire financing. And the reassurance that these technologies are to be used for civilian purposes is certainly not reassuring, if we imagine how an increased ability to decipher the human brain can play a 'revolutionary' role in the society of constraint that bio and nanotechnologies are allowing, as has been said at length elsewhere.

As always, the usual question is left unanswered: what are we to do with this information? What can we do against it? We are talking of yet one more field of scientific research among the thousands of despicable things that are being done in laboratories in half the world. Personally I think that the point of keeping an eye on the flood of news on 'miraculous discoveries', 'exceptional inventions' and 'new research with a thousand and more promises' is no more than the information they

contain, which is useful to understanding who, where and how scientific progress is being championed in 'our' cities. On the topic of what to do against it, instead, also discussing the subject with other comrades, a sensation has emerged that as we talk and talk about what 'they are doing' in laboratories, about new developments, etc. we risk becoming alienated in the immobility caused by facing things perceived as distant and inaccessible, occurring in universities or out-of-the-way laboratories, in the intrigue of a development that is almost untouchable, not at all linear and absolutely molecularized. But before us reality is already striking us with everything that, in the normality of everyday life, permits the functioning of the mega machine: infrastructures of transport, communication, the supply of energy resources, the first attempts at creating 'intelligent cities' with IT networks that allow their administration. It is important to look ahead, at what the techno-scientific system is preparing and the directions it want us to be dragged into. But the reality to be attacked in the struggle is the present one, the one that we are already experiencing.

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