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Introduction to the Analytics of Artifacts

Philosophy of technology has encountered an unexpected obstacle in its way. The domain, which constitutive task was to reflect on the sphere of technological products of humanity, now seems to acknowledge its area of research as closed, and directs its interests rather to the questions of a more general nature. Its proper field of examination, which is a technical object, a thing designed, constructed and made for a specific purpose, is being perceived as an justification for undertaking a wide array of neighbouring issues. There seems to be a silent assumtion that either everything on the topic has already beed said, or that it belongs to the domain of the engineering sciences. The plexus of various theoretical issues, coexisting on subsequent stages of a process which finds its end in the specific technlogical device is overlooked with an almost astounding facility. Surely, the range of theese issues is vast. It contains problems belonging to the cognitive, social and scientific areas. Scpecifically, the last of them is more than often restricted to the superficial statements about links between science and technology, completely ignoring the nature of this relation as well as its theoretical importance. This article will not attempt at overcoming all of the mentioned above deficiences. It adopts the objective of preliminary defining the research framework, and introduces typology associated with this topic.

The fundamental assumption of the perspective adopted hereby is a conviction that technical objects need to be conceived within the framework of the notion of artifact. The notion does not seem to be particulary popular in the philosophical thought. A significant contribution to the present examination can therefore be found even in the dictionary definitions of the word. They are summed up in the following statement: *artifact is an object made by a human being*. Upon having agreed on this ground, we will soon be compelled to provide a description that goes beyond this merely pragmatic meaning. The class of objects made by humans has namely such a wide range that remaining within its boundires will not suffice to grasp the issues requiring a more conceptual precision. The set of artifacts contains not only technical objects, but also that which are used to meet the basic needs, such as food. Furthermore, we could enumerate all kinds of cultural property, works of arts, as well as objects of ritual, commemorative, and cultural destinations. Also manual modification in the landscape belong to the general class of the objects made by humans. However, these objects will will not count as technical objects as long as we decide to withdraw from the very generic idea of technology that encapsules every action requiring knowledge of any productive technology. Let us then make the first distinction within the adopted array: a*rtifacts are divided into technical objects and non-technical objects*. Further specification rises already mentioned problems. It could probably be disputed whether a moument, an artifact of cultural meaning, is also a technical object, since it has been made with the use of knowledge of particular technology, a bronze casting in this case. Intuition suggesting that objects like monuments, food, or paintings are non-technical objects, whereas clocks, telephones, or transistors are undeniably technical objects, seem to be more than helpful in this case. It is supported by the belief that the set of technological artifacts can be characterised by the funcions present within the object by virtue of its own construction. A technological artifact not only fulfills a specific purpose, which is a property of each and very artifact of any kind, but fulfills a certain puprose without active participation of a human being.

The relation between science and technology becomes fully apparent in the act of taking

measurement. Every action directed at measuring any quantity will demand an adequate measuring device. These objects can have very simple instances, such as the measurement of distance, as well as extremly complex ones, such as the devices used to measure elementary particles. The difference between the ends of this continuum does not rely merely on the different stages of technological advancement. Or maybe rather: the difference between this stages will not become properly conceived as long, as theoretical sphere is not taken into account. The construction of advanced measuring devices requires referring to the already existing theories, as well as employing less advanced measuring devices. A particle accelerator relies on the measurement of distance in order to determine the distance, after which the examined phenomenon is recorded. The observation of this relation allows us to make further divisions within the notion of technological object. Let us define *accumulative technological object* as an artifact that assumes existence of, and relies on a given scientific theory. For example, a mercury thermometer assumes knowledge of thermal expansion, as well as of geometry in order to put a degree to which mercury expands into a defined graduation scale. Making a thermometer naturally requires wider knowledge, like that of processing glass. This is, however, an issue that does not belong to the accumulative character of artifacts and need to be conceived within the engineering sciences. The second kind of object will be a *non-accumulative technical object,* an artifact that is a product technological in nature, and fulfilling certain purposes in virtue of its own contruction, but not functioning as a repository of the previous theoretical knowledge, that is: not being used to take measurements of a higher level. This kinds of artifacts are most often engineering objects. They do not incur obligations to former theories. A drawbridge will fulfill its function independently of theory that is employed to explain how is it working, wheather will it be classical or relativistc mechanics, or even a view from before the formalisation of the relation of force and mass, as the bridges were in use even then.

At this point philosophy of technology reaches convergent points with philosophy of science. Particulary well pronounced is the issue of continuity of knowledge. This question was undertaken within the widely reported debate between cumulativism and anticumulativism. Due to a range and variety of the stances taken in the debate, full explanation of this issue goes beyond the framework of this article. It is however possible to indicate points that differentiate the proposal from the previous positions. The issue of continuity of knowledge was until now investigated mainly, if not exclusively, in the perspective of logical structure of science. Instead, *technical accumulativism* attempts at taking into account the acts of taking measurements as a sort of continuum of reverse dependancy. This concept can perhaps become fully exposed with the help of following example. Let us imagine that we arrange the measuring instruments of science in the rank order, from the simplest to the most complex ones. If by any reason we are unfortunate to loose the most advanced ones, we will be able to reconstruct them by using the previous devices. However, if we were to loose possibility of taking the base measurements, we would probably not be able to conduct research on the most demanding levels. What follows, is that we would not be able to rebuild our most complex measuring devices. Accumulative technical object is therefore an artifact that is is debt to the whole line of its predecessors, measuring devices that exemplified scientific theories on a specified stadium of the developement of science. This argument can also be presented in the modified version. If we were to find products of civilisation many times more advanced that our own, we would probably not be able to understand the purpose of at least some of the discovered devices, even if we would correctly identify them as technical objects. These highly specialised instruments could be in theoretical debt to the theories, which our science was not yet able to formulate. These devices would be an exemplification of the historical continuum of measurements of a greater range than that of our civilisation. The function of these objects would be incomprehensible to us not because of the stage of its constructional complexibility, as we would be able to dismantle them and still not know their true purpose, but because they would be an outcome of a more advanced scientific theory. For what takes place in the progress of science is *the transfer of measurement*. The physical quantities defined within the frames of the previous scientific theories, and measured with the use of instruments that were then constructed are not abandoned with the new scientific theory, but instead they are used to determine physical quantities on the

higher, and more general theoretical level. In the process of making technical objects an *original measurement unit* is preserved and transformed.

The foregoing examinations allow us to outline the issue of technical objects within the framework of the scietific method, as they take into account the fact of taking measurement. Surely, these examinations are of merely introductory nature. However, they make possible undertaking the issues relevant to the philosophy of science with regard to the sphere of interests of the philosophy of technology. The perspective presented hereby focuses on the fact of manufacturing a specific kind of technical objects, namely measuring devices, and leans towards the thesis that designing and producing of these kind of objects is already a scientific activity. These perspective also recognises the fact of at least partial independency of technical objects from the succesion of theories. It seems taht at least in some cases a measuring instrument preserves its validity, even if the theory on which its design was based, is replaced with another one.