I castelli di Yale online. ANNALI DI FILOSOFIA
Vol. XII, n. 2, 2024, pp. 5-27 – ISSN 2282-5460

The Imaginary of the Transplanted Organ

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Abstract. *Transplant medicine seems to illustrate well the gulf between a Cartesian conception of the body (a machine made of spare parts) and a phenomenological one (the body is the "vehicle of our being in the world", the seat of our experiences, suffering and valuations, the support on which our identity is built). Can we leave it at that, with the body irrevocably "bifurcated" in transplant medicine? This article answers in the negative. It demonstrates that the conception of the organ underlying transplant medicine is not Cartesian, but Aristotelian in origin, the organ being seen not as a separate part of a machine, but as an instrument (organon). However, viewing the organ as an instrument does not necessarily imply subscribing to the conception of an organ as a tool. Based on a commentary on Heidegger and Agamben, the article argues that there is a need to distinguish two separate meanings of the Greek concept of "organon". This distinction leads to a few practical suggestions for doctors, engineers and healthcare policy-makers.*

Keywords. Aristotelian, Cartesian, body, instrument, organ.

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I. Introduction

Organ transplantation is a field of medicine that illustrates particularly well the gulf between two opposing positions on the body. On the one hand, the body is viewed as an object reducible to what science says about it, made available for all kinds of medical and technical interventions. On the other, the body is our «own body» (*corps propre*), the «vehicle of our being in the world» (Merleau-Ponty), the seat of our experiences and affective investments, of our suffering and our valuations, the support on which our identity is built. Body-object versus body-subject. This gulf has widened even further with a greater use of technology in transplant medicine, to improve transplant outcomes or, increasingly, to take the place of traditional transplants. The shortage of organs for transplant is widely considered to be a serious problem warranting substantial research and investment aimed at establishing technological solutions. These solutions can involve increasing the number of grafts suitable for transplantation through the use of perfusion machines that optimize the preservation of organs between their removal from the donor and their transplant into the recipient, enabling their quality to be finely assessed and even improved. Alternatively, they can involve the development of artificial or bioartificial organs, extracorporeal or implantable, to replace the use of donor organs. The consequence is to make the body more technologized than ever before, confirming a long-held belief that transplant medicine and its associated technologies are destined to bring to its fullest expression the great divide of modernity, what the philosopher Alfred North Whitehead called the «bifurcation of nature», that is to say the irreconcilable duality between

> the nature apprehended in awareness and the nature which is the cause of awareness. The nature which is the fact apprehended in awareness holds within it the greenness of the trees, the song of the birds, the warmth of the sun, the hardness of the chairs, and the feel of the velvet. The nature which is the cause of awareness is the conjectured system of molecules and electrons which so affects the mind as to produce the awareness of apparent nature. (Whitehead 1920, 31).

The bifurcation of bodily nature reflects the opposition between the body as an object of technoscientific knowledge and practices, and the body by which a subject has feelings, experiences and awareness of the world around it.

Can we accept without question the perfunctory diagnosis, often made, that transplant medicine and its associated technologies are the culmination of the "bifurcation" of the body posited by Descartes? Does organ replacement medicine take us further towards the idea of the body-machine as opposed to the soul or spirit, whose representations, feelings and emotions are always liable to be revoked and disqualified? This would appear to be the case, in particular, for transplant patients, whose feelings and experiences are not only called into question, but also denigrated and devalued by positivist doctors who take an objectivist view of the body and its organs, considering them to be entirely analyzable in terms of structure and function – and who consequently consider that patients' psychic and emotional investments in them can only be spurious and unfounded. Such psychic and emotional investments are held to be purely imaginary, or even delusions in need of psychotherapeutic treatment.

Can we leave it at that, with the body irrevocably "bifurcated" in transplant medicine? This article answers in the negative.

At this point, we need to distinguish two possible meanings of "bifurcation" in relation to the body.

First, the term may allude to the rejection of claims by transplant recipients that they feel the donor's presence within them. Recipients of transplants may report having new tastes, new quirks, new dreams that connect them directly to the person (most often deceased) from whom their graft came – in short, they may report experiencing deep changes in their identity and personality (for a general overview, Carter et al. 2024). A well-documented case is that of Claire Silvia, who received a heart-lung transplant in 1988. In her 1997 book, she described the changes she experienced after transplantation:

> I had dreams and experienced changes that seemed to suggest that some aspects of my donor's spirit and personality now existed within me […] Sometimes I had the feeling that somebody else was in there with me, that in some intangible way, my sense of "I" had become a kind of "we". Although I couldn't always detect this extra presence, at times it almost felt as if a second soul were sharing my body. (Silvia 1997, 131).

She felt deep changes in her tastes, even starting to drink beer and eat nuggets (things that she never did before). She adopted new daily rhythms, becoming a night owl. She had a dream involving a young man named Tim and then, several months later, she identified via a newspaper article her very likely donor, whose name was also Tim.

These kinds of animistic claims to which transplant patients often give voice have been intensively documented by social scientists:

> Recipients […] defy the opposition of clinical professionals who work to dissuade them from identifying psychologically with their donors. In cases involving kidneys, for example, children may worry they will acquire the negative qualities of feared or estranged parent donors [...] The imagined traits of anonymous donors may also develop into elaborate embellishments on a recipient's personality and may affect body image […] Recipients of cadaver organs, like those with

> organs from living relatives, often express the sentiment that one can acquire the donor's emotional, moral, or physical characteristics. Such qualities can be elaborate and imaginative, especially when the donor was an anonymous stranger. Some patients live in fear of the independent or animate qualities of their new organs. Others more typically feel, for example, younger and stronger with a young man's lungs or more gentle with a woman's heart. One lighthearted response came from a fireman, who said, 'The guys I work with are always kidding around. They say, "Heh, Sam, you better watch out! You might just start peeing sitting down now that you have that lady's kidney!". So every day I assure them, nope, I'm still peeing standing up! (Sharp 1995, 365, 372).

> Despite the power of medical discourse working against animation of organs by patients and the flat rejection of the possibility of any transformation in subjectivity on the part of virtually all doctors, it is clear from numerous interviews carried out independently by Leslie Sharp (1995) and me that a large number of patients… undergo a profound change in subjectivity and report that they experience embodiment in a radically different way after a transplant. (Lock 2002, 1411).

Lock reports the case of Katherine White, who received a double transplant of liver and kidney and experienced some significant changes in her tastes:

> You know, I never liked cheese and stuff like that, and some people think I'm joking, but all of a sudden I couldn't stop eating Kraft slices – that was after the first kidney. This time around, the first thing I did was to eat chocolate. I have a craving for chocolate and now I eat some every day. It's driving me crazy because I'm not a chocolate fanatic. So maybe this person who gave me the liver was a chocoholic?! (Lock 2002, 1411).

> Some people think that the self continues to exist after death by virtue or means of parts of the tangible, personal body that are implanted in another body […] donor families relate to the prospect that the body or its organs can perpetuate the memory of the donor through the donation […] Transplantation enables the continuation of the donor's self-identity, whose body continues to exist through the organs transplanted into the body of another person. (Ben-David 2005, 101-102, 111-112).

«Recipients do in fact imagine a donor's identity in all sorts of ways and frequently integrate this unknown Other as an intrinsic part of their subjective sense of self» (Sharp 2006, 5).

> Despite the efforts of psychiatrists and surgeons to put forward a merely mechanistic understanding of the parts of the body involved in organ transplantation, many recipients believe that a connection is made between their selves and the other in their bodies […] Some recipients as well as the families of some donors have a strong wish for the continuity of a person by means of the donated organs. (Schicktanz & Wöhlke 2017, 115).

This animism has no place in contemporary medicine, and is most often dismissed by doctors, who see it as a pathological reaction, a post-transplant syndrome.

> Psychiatric and psychological specialists (including psychiatrists, psychiatric nurses, psychologists, and social workers) play crucial roles in defining the parameters of normative behavior following transplantation. They voice a common concern: it is pathological and thus unnatural when recipients identify with their donors. They alert other professionals to the psychological dangers of such identification, formulating guidelines on how to help recipients extinguish their delusions and build a healthier sense of self […] Such forms of transformed identity are considered pathological – and thus unnatural – and in extreme cases are labeled "psychotic reactions". (Sharp 1995, 359, 365).

> Within the highly medicalized realm of organ transfer […] talk of a multiple, disparate, or fragmented self is evidence of pathological thinking and requires therapeutic intervention… Transplant recipients who openly express the sense that another person dwells within them may well acquire medical labels that draw on monstrous imagery, such as "Frankenstein syndrome". (Sharp 2006, 23).

The animistic of transplant patients feeling is sometimes explained by the existence of a «cellular memory» – the cells of the organ retain traces of the donor's life (Pearsall et al 2002; Liester 2020). Though this idea is highly controversial, patient testimony seems to be acceptable only if it conforms to the requirements of modern "bifurcated" thinking in Whitehead's sense: on the one hand, there is the lived experience, the subjective representations of the transplanted person; on the other, the underlying physico-chemical (or biological) mechanisms that causally explain this experience. The "bifurcation" is between, on the one hand, the body and the organ as seen by science, and, on the other, the symbolic representations and imaginary content with which transplant patients endow them – representations and contents that vary according to the nature of the transplanted organ: the symbolic weight of the organ has a profound effect on the transformation of identity. «In our culture, each organ has an assortment of metaphors associated with it that leads to various patterned responses among transplant staff, recipients, and the latter's wide array of kin, friends, and acquaintance» (Sharp 1995, 372). «Different organs seem to be of different importance to the identity of the person» (Svenaeus 2012, 142).

The second meaning of the term "bifurcation" alludes to the gap between the conception of the body by transplant doctors and engineers – a machine made up of spare parts, replaceable at will – and the experience of patients who do not simply possess their body as a machine that must function and render them service, but who also are their body and must learn to live with their graft – which is far from simple for most. The "bifurcation" here is between having a body and being one's body, between the body as seen by science and medicine and the body as experienced in daily life, enabling (or failing to enable) transplant recipients to resume the life they enjoyed previously.

The philosophical and social science literature most often treats these two meanings of the "bifurcation" of the body separately. Some works draw on the animistic testimonies of transplant patients to conclude that although historically the development of transplant medicine rested on a theoretical framework based on the "bifurcation" of bodily nature («Treating the body as something that is merely biological and mechanical makes transplantation possible because it sanctions taking the body to pieces», Ben-David 2005, 107), today it is paradoxically the very success of transplant medicine that is weakening this theoretical framework and prompting a departure from it (Solhdju 2020, 143-144). Other studies focus more on the day-to-day experience of transplant patients, the difficulties they encounter (the side effects of immunosuppressive treatments; the onset of new diseases; the fear of chronic graft rejection), and the limitations on their life options: contrary to what is claimed in triumphalist discourse, transplantation does not enable transplant patients to return to their former lives, many of them remaining unable to find a job and having to live with disabilities. As the Swedish philosopher Fredrik Svenaeus observes,

> When the new kidney functions properly and is not rejected by the immune system, life after a transplant is not like life before the disease entered the stage. To suffer from a disease that destroys one's kidneys and to receive a new kidney means that life becomes prolonged and normalized, but it never means that life becomes quite normal (the way it was before the onset of the disease) because you are at constant risk of renewed kidney failure and other problems. This leads to a life that is very self-regulated as regards the relationship to one's own body. (Svenaeus 2012, 146).

Transplant patients often «[describe] how difficult they [find] the return to ordinary routines of family and social life. Some of them [suffer] from a variety of side effects from the drugs they [have] to take to inhibit rejection of the transplants; others [live] in constant fear of such a rejection» (Ben-David 2005, 6)

On the one hand, then, we have works that examine the spontaneous expressions of animism by transplant patients and how this animism affects how organs are conceived, and on the other, we have works that look at the "quality of life" of patients after transplantation. These two ensembles of works are not symmetrical: the first are anthropological in scope, emphasizing the need to redefine the very concept of "organ", while the latter are more ethical and political in scope, and are less concerned with re-elaborating the concept of the organ than with reactivating a non-objectivist conception of the body, in a phenomenological vein strongly inspired by Merleau-Ponty (the «own body», the lived body as opposed to the body-object, the *Leib* as opposed to the *Körper*), which leads us to assess the consequences of transplantation for people who have received a graft or whose organ has been replaced by an artificial device (such as a hemodialyzer). The two types of work do, however, have a feature in common, namely their rejection of the Cartesian conception of the body as a machine, and of the organ as a part of such a machine. Cartesianism is equally incompatible with any kind of credence that might be given to the animistic testimonies of transplant patients and with approaches that focus on their daily experience after transplantation.

The article begins by examining the animism that transplant patients will sometimes express unprompted, and the dismissal with which their accounts of their experience tend to be met. I argue against the idea that imaginary projections are only to be found on the side of transplant patients, while doctors and engineers may rightly claim to be perfectly objective. Rather, I aim to show that the imaginary can be found on both sides: "to each his own imaginary world", in short. On the side of doctors and engineers, an imaginary of the body-machine would seem to be particularly prevalent, and this needs to be examined more closely.

Next, the article takes a closer look at the part played by Cartesianism in the way people see transplantation. Do transplant physicians and engineers subscribe unanimously to the Cartesian conception of the body-machine? I answer this question in the negative, hypothesizing that the conception of the organ underlying transplantation medicine and organ replacement engineering is not Cartesian, but Aristotelian in origin, the organ being seen not as a separate part of a machine, but as an instrument. Thus, the article defends the counter-intuitive idea that transplantation medicine and its associated technologies, at the forefront of modern technoscientific medicine, benefit from being examined in the light of the premodern Greek concept of *organon*.

The article then examines an analogy sometimes drawn between an organ and an instrument whereby an instrument is equated with a craftsman's tool – this being the analogy used by Heidegger. A number of authors have since rejected this analogy of the organ seen as a tool. The reasons for their rejection are analyzed.

Finally, the article argues that viewing the organ as an instrument does not necessarily imply subscribing to the conception of an organ as a tool. Based on the Italian philosopher Giorgio Agamben's reading of Aristotle, there is a need to distinguish two separate meanings of the Greek concept of «instrument» (*organon*).

This distinction leads me to conclude with a few practical suggestions for doctors, engineers and healthcare policy-makers.

1. To each his own imaginary world

Holding firm to a "bifurcated" conception of the body, proponents of the objectivist approach describe the psychic elaborations around the transplanted organ as fantasies, or even delusions – in particular, they will tend to dismiss the testimonies of patients who feel, in one way or another, the presence of the donor within them (see the quotations and references above). They declare that the only "real" body is the body of science, the body of cellular, metabolic and organic functioning, and that everything else is merely subjective projection, the doubling of the "real" body by a fantasized body with no real foundation. They thus place what we might call the patchwork of assumptions and aspirations and mental images that inhabit one's inner world, or more succinctly "*the imaginary*" (as we shall continue to refer to it below) on one side of a divide, with the other side (the side of scientists, engineers and doctors) remaining immune to the imaginary's incursions.

Transplant medicine seems to fit in well with Simondon's analysis, in the late 1950s, of imagination and the imaginary in their respective relationships to technology (Simondon 2017). Let us first consider imagination. For Simondon, imagination plays a very important role in technological invention: it is what enables an inventor to anticipate the relationships that a machine that still exists only in the mind or on paper will have with its environment once it is built and operational. These relationships are two-way: on the one hand, there are the effects that the machine will have on its environment during operation; on the other, the consequences that these effects will in return have on the operation of the machine. Simondon terms «concretization» the process of invention that gives these effects a functional, technical value: by virtue of a feedback loop that is established, the effects of the machine's operation on its environment play an important, even decisive role in that operation. A functional synergy is established. "Abstract" engineering, as opposed to "concrete" engineering, consists in having each machine function performed by a dedicated structure. The "abstract" machine is the juxtaposition of parts that perform their functions separately, independently of each other. In the "concrete" machine, on the other hand, machine operation is not fragmented: there is functional interdependence between the different parts of the machine, and a unity of operation. Simondon speaks of a machine's self-regulation: through its operation, the machine produces and maintains the conditions for its own functioning. The inventor is first and foremost a living being who, as such, has a sense of self-regulation of their own behavior: imagination is the ability to project this sense of self-regulation into a representation of how the machine operates, bringing with it this idea of the recursive effects of operation on the operation itself.

The imaginary, on the other hand, is something that is misleading and mystifying when it is applied to technology. The imaginary is what fills the gap where there is a lack of true knowledge of technology, its nature and its operating principles. Understood in this way as false and groundless representations, the imaginary teaches us nothing, and provides no insights or information about the world we live in.

Such a dismissal of the imaginary could almost serve as a mantra for proponents of the objectivist approach to transplant medicine. But only "almost", because the history of artificial organ technologies makes it necessary to qualify the univocal evolution of these technologies towards "concretization": current approaches to organ replacement through the design of extracorporeal or implantable replacement devices clearly reflect a trend towards "concretization", insofar as many devices now being developed do not seek to reproduce organ functions via artificial processes (mechanical, electrical and chemical), but rather to recruit cells by providing environmental conditions such that they remain viable and functional *ex corpore* – precisely what Simondon called an «associated environment». However, other devices that have long been used in the clinic, such as hemodialyzers, remain based on what Simondon would term a purely artificial, "abstract" approach: detoxification, a

function of the kidney, has been isolated and is carried out by a machine that contains no cells but only inert elements. However, dialysis has been saving lives for decades: the technology may be "abstract", but it is no less effective. Dialysis is also useful for patients with acute liver failure who are awaiting a liver transplant: some devices help to eliminate certain toxins that the liver no longer eliminates itself (such as ammonia), by performing a kind of hepatic dialysis, even though the liver is a particularly complex organ performing a very large number of functions (over five hundred), some of which are not yet fully understood. In other words, these liver dialysis devices are also "abstract": they isolate one function of the liver – detoxification – from many others, and have it performed by extracorporeal machines without regard for the environment in which the hepatocytes (the functional cells of the liver) perform their innumerable functions. In short, organ replacement technologies actually used in clinical routine were designed using an "abstract" approach, while machines based on a "concretizing" approach are still under development (some at the clinical trial stage), with a number of thorny design issues that they raise yet to be overcome. The potential that Simondon saw in the concretizing imagination, which he deemed to be of greater relevance than abstract engineering approaches, is being realized only very slowly as regards organ replacement technologies.

On the other hand, Simondon's diatribe against the imaginary might be echoed practically word for word by transplant surgeons, many of whom would be unwilling to recognize any place for that imaginary, or for any kind of psychosocial significance that the patient might see in the graft and the grafted body. What is particularly rejected is the animist imaginary to which some transplant patients give voice. Some patients claim that the grafts allow "communication" from their donor, giving them access to elements of the donor's personality (Le Breton 1994; Morizot 2014; Solhdju 2020). Social science literature often mentions the rejection of these animistic claims by physicians who, on the contrary, will go to some lengths to disassociate the explanted organ from the person of the donor, to make it appear as a simple piece of organic matter, defined by its functions alone. The patient's imaginary, that is to say the sphere in which their feelings encompass a whole range of representations and symbols relating to organs, is simply disregarded. The word "symbol" here is to be understood in its etymological sense of *symbolon*, i.e., as Simondon reminds us, of the object broken into two halves that complement each other: each half, separated from the other, calls for its complement (Simondon 2014b). As the transplant patient may feel, the organ is the symbol of the person whose organ it was, of his or her personality, of his or her sensations; it beckons towards its missing complement. Patients who have received transplants and who report experiencing new, hitherto unknown emotions, or who report developing new tastes, are referred to psychologists, or even psychiatrists, for appropriate treatment. Something pathological is suspected.

Numerous works in the social sciences have challenged this duality of body-object and body-subject, which separates the body that is the object of technoscientific medicine (the "real" body) from the patient's "fantasized" body (see for instance Schweda & Schicktanz 2009). First of all, many of these works show that in reality there is no dissymmetry between the point of view of doctors and engineers on the one hand, and that of patients on the other. To each his own imaginary world, to each his own fantasies. In response to the disregard in which they are held, those sympathetic to a subjectivist approach denounce the brutal reductionism of the transplant professionals who see the body as a machine *partes extra partes* and the cadaver as a reserve of organs devoid of any value, and who deny the reality of patients' feelings. In the subjectivist view, the "real" body is the lived body, the so-called "own body" (*corps propre*), while the body-object of science is no more than a derivative construction that has historical roots (notably in the history of anatomical dissection) and whose obliviousness to the non-physical is an aberration – it too being steeped in the imaginary. Technoscientific medicine has its own imaginary world. As Merleau-Ponty

said about Nature – but this also applies to the body – «We cannot think Nature without taking account to ourselves that our idea of Nature is impregnated with artifice» (Merleau-Ponty 2003, 86). The anthropologist Lesley Sharp has proposed the concept of «moral thinking» to refer to the structuring role of the imaginary among engineers developing vascular assistance devices – an imaginary that rests on a mechanistic conception of the body and its organs, implying an erasure of the body in its suffering-body dimension. Sharp sees this "body-machine imaginary" as guiding engineers' design strategies, leading them, for example, to develop cardiac assistance systems based on their belief that the heart is only a pump (Sharp 2014) – which is certainly false, since the heart is also an endocrine organ, and far more complex than a pump. What is more, the field of organ replacement, regardless of what doctors and engineers who work in this field may say, is shrouded in an imaginary that revolves around ideas of human enhancement. This imaginary undeniably has played an integral role of the history of the field, as seen in pioneers such as Alexis Carrel, a eugenicist preoccupied with the prolongation of life (Carrel 1939; Friedman 2007). Transhumanists are today inspired by the achievements of transplant medicine, some even hoping that it may become possible to confer unprecedented functions on reconfigured, technologically advanced organs. As Sharp puts it, human enhancement seems to be the horizon of transplant medicine and its associated technologies (Sharp 2014). It should therefore be recognized that the imaginary is equally distributed among all the protagonists of transplantation. The imaginary is not confined to patients in thrall to an animism from another age, but is similarly present in physicians who are resolutely modern in their strict separation of facts and values, of the objective and the subjective, and who would draw a boundary between "naturalism" and the kinds of schemes of thinking and action that the anthropologist Philippe Descola has identified (animism being one of those schemes) (Descola 2014). The situation is more symmetrical than it might appear and, to parody Latour, the protagonists of organ transplantation «are not modern». Both sides find comfort in the unspoken premises of their own imaginary. And for both, it is the other's imaginary that distances them from reality. The other's imaginary is fallacious, the bearer of negative values.

However, the symmetry is not perfect: on the one hand, proponents of the objectivist approach (for concision, let us call them the "objectivists") reject the entire imaginary component of transplantation on the part of their opponents (the "subjectivists"), considering themselves to be free of any such imaginary, while the subjectivists willingly recognize the existence of an imaginary on both sides. They will nevertheless contrast their own "good" imaginary (individual and collective psychic elaborations around the transplanted organ that allow it to be appropriated and integrated into a reconstruction of identity) with the "bad" imaginary of the objectivists for whom the body is a machine and the detached organ tissue a "spare part", and who are thus indifferent to the values and symbolic dimension of the body and its parts.

This distinction between a "good" and a "bad" imaginary is open to debate. Subjectivists, rightly wanting to have the full legitimacy of patients' testimony and feelings recognized, are perhaps too quick to disqualify the objectivist perspective. They are undoubtedly right in their belief that what patients have to say about themselves, their experience and their situation, deserve the utmost attention – but might they not be wrong in their wholesale rejection of the objectivists' fragmentary conception of the body and the definition of an organ in terms of its structure and function? This objectivist, reductionist approach to the body surely cannot be completely wrong, given that in some cases it is successful in healing. As already pointed out, the dialysis machine, which is nothing more than an extracorporeal artificial kidney, a pure machine, saves lives. Who could possibly deny that? Organ transplant is unquestionably dependent on a conception of the body as comprising separate components, a conception reinforced in the past by the practices of dissection and

the anatomical knowledge thus gained, and the fact remains that the transplanting of organs is of immense service to patients, giving them back their life expectancy and – admittedly not always – their quality of life. The imaginary whereby the body is an assemblage of parts and the organ a spare part that can be relocated from one body into another cannot be dismissed as devoid of all value and foundation, because transplant medicine *works*, having become the reference therapy for patients with serious organ failure. This in no way detracts from the value of what transplant and dialysis patients have to say about their experiences. The fact that their feelings do not align with the imaginary of the desymbolized, technicized body does not imply that this objectivist imaginary is purely and simply mystifying: it has an indisputable operative value.

It is worth going back to Simondon, who himself went some way to bridging the gap between technique and the imaginary in emphasizing the extent to which the imaginary can positively (rather than negatively) influence and support technique. In his 1965-1966 lecture on *Imagination and Invention*, Simondon described not only the positive role of imagination as a faculty for anticipating self-regulation in machines, but also the positive role of images and the content they convey (Simondon 2014a). He identified three levels on which images help to shape our relationship with technologies: the cognitive level, the conative level, and the affective-emotional level. From a cognitive point of view, images have an epistemic function, for example by generating analogies (the body as a *partes extra partes* machine) that guide research and innovation, with undeniable success. From the conative point of view, most researchers and engineers working in the field of artificial organs will defend the social utility and even moral necessity of their work given a shortage of organs: the lengthening waiting lists for transplants and the fact that patients on these lists often die before they can receive one provide a moral argument for those developing alternative solutions. Organ shortage is a powerful incentive for action: researchers and engineers are sought after and often have little trouble obtaining funding. Finally, this field of engineering is rich in affective-emotional content, particularly the sort of content that can be conveyed in the form of "what if" thought experiments: what if we had artificial livers on the shelf tomorrow, capable of providing a transitional or even permanent solution for patients suffering from severe liver failure? One hepatologist, the coordinator of a project to develop simultaneously an implantable artificial liver, an extracorporeal artificial liver, and a liver on chip, has expressed his concerns about this prospect. His feeling is that there could be a serious danger in having such organs on the shelf, since some people without any strong medical need might be encouraged to seek to have an artificial liver implanted, on the grounds that their existing liver could be "tired", or damaged by an unhealthy lifestyle. A new, "high-performance" liver might appear an attractive prospect. Engineers like those interviewed by Sharp see artificial organs as devices whose bearers would ideally cease to be aware of them, organs that become "naturalized" – which, in the view of our hepatologist, could encourage even greater recourse to this type of device. But if we can "rejuvenate" our organs indefinitely in this way, what will become of our finitude and our relationship with our own mortality, both of which define our condition as human beings? As we can see, the imaginary, or rather, the imagination sharpened by the "what if?" question, gives significance as well as direction to scientific research and technological development.

Simondon's view can thus be stated as follows: there are images that provide epistemically valuable analogies (the body in pieces, the detachable, transposable organ), that set things in motion (organ shortage being a powerful incentive), and that elicit affective-emotional reactions to spur science and technology on. These images might sometimes prompt members of the professional community to raise philosophical concerns, but will rarely exhaust their capacity for reflection.

2. Transplant medicine and Cartesianism

For many commentators, transplant medicine is a thorough vindication of Descartes and his conception of the body *as a partes extra* partes machine. The body-machine is seen as being central to the imaginary (as defined above) of transplant surgeons and engineers of organ replacement (Leder 1992, 2002; Hacking 2005, 2006). This triumphant Cartesianism is in reality merely a washed-out, oversimplified Cartesianism, since Descartes actually had more subtle views on the body. Be that as it may, it is a commonly held view that we are now witnessing the victory of a conception of the body and its parts that came into being with Descartes, and that has now been operationalized by transplant surgeons and engineers.

However, the connection between transplantation and Cartesianism is open to debate. It is not self-evident, either historically or conceptually.

From a historical perspective, the cutting open of bodies to remove organs is reminiscent of the technique of dissection, whose role in the development of anatomical knowledge from the end of the 13th century, as well as in the emergence of a mechanistic (or rather, machinic), Cartesian conception of the body, is attested to by historians (Mandressi 2003). That said, other historians have convincingly argued that transplant medicine was born at the end of the 19th century in the context of the rise of experimental physiology (especially in Germany) (Schlich 2013), which certainly cannot be described as Cartesian. The perfusion of explanted organs, initially carried out to gain a better understanding of organ functions rather than for therapeutic purposes, was the work of German physiologists in the mid-19th century. Carl Eduard Loebell, a pupil of the famous German physiologist Carl Ludwig, reported in his thesis (in Latin, defended in 1849) the first experiment in perfusing a pig's kidney. Perfusion machines subsequently underwent sustained technological development in the second half of the 19th century, culminating in the development of sophisticated devices whose overall layout was already that of today's machines (including a pump and oxygenator). In short, the excorporation of organs, which acquire a kind of life of their own by being kept "alive" outside the body through perfusion, and organ transplant as a therapy at the frontier between medicine and experimental physiology, are techniques that most certainly did not develop under the patronage of Descartes and in virtue of his conception of the body-machine. Alexis Carrel, a pioneering physician and biologist in various areas of direct interest to transplant medicine (vascular surgery, cell culture, and perfusion machines – not to mention the fact that Carrel himself was a very active transplanter in the early 20th century), was no fan of the Cartesian conception of the body – quite the opposite, in fact (Carrel 1939). He was very clear about his adherence to Bergsonian philosophy and Bergson's idea of the living organism, the very antithesis of the assimilation of the body to a *partes extra partes* machine. Some quotes from his book *Man the Unknown* (*L'Homme, cet inconnu*) are unambiguous. Referring not only to Claude Bernard but also to Bergson, Carrel asks:

> Should an organ be defined by its histological elements or by the chemical substances it constantly fabricates? The kidneys appear to the anatomist as two distinct glands. From a physiological point of view, however, they are a single being […] An organ is not limited by its surface. It reaches as far as the substances it secretes […] Each gland extends, by means of its internal secretions, over the whole organism […] The spatial and temporal dimensions of each gland are, in fact, equal to those of the entire organism. An organ consists of its inner medium as much as of its anatomical elements. It is constituted both by specific cells and specific fluid or medium. And this fluid, this inner medium, greatly transcends the anatomical frontier […] In short, the body is an anatomical heterogeneity and a physiological homogeneity. It acts as if it were simple. But it

> shows us a complex structure. Such an antithesis is created by our mind. We always delight in picturing man as being constructed like one of our machines. (Carrel 1939, 105).

It is therefore clear that when we look back to the dawn of organ transplant medicine and its associated technologies, we do not find Descartes there.

In fact, there is a confusion between two quite distinct theoretical moves: on the one hand, we have the act of divorcing the subject from the object, the mind from the body – an undeniably Cartesian move, that may be said to characterize scientific and technological modernity, and that is found notably in 19th century experimental physiology. On the other hand, we have the more situated, contextual act of assimilating the organism to a classical *automaton* – a move effectively made by Descartes in his *Treatise on Man*, but abandoned in particular by the vitalists of the 18th century and the physiologists of the 19th. The fact that transplant physicians and engineers deny any reality to the animistic feelings of patients, and keep the subjective and objective strictly separate, in no way implies that they unanimously adhere to the Cartesian conception of the body-machine: these are two different things. If experimental physiology and its offshoot, transplantation medicine, have "bifurcated" the organ, it is not by assimilating it to a Cartesian *automaton*.

It is thus historically inaccurate to see Cartesianism – and an oversimplified Cartesianism, at that – and the body-*automaton* analogy as the underlying philosophy of transplant medicine. It is also conceptually inaccurate. Transplant medicine is often associated with postmodern, post-Cartesian conceptions of the body, such as Donna Haraway's concept of the "cyborg" – the cyborgian body undoes the beautiful unity of the organism as the total of its parts, and instead amalgamates organism and machine in cobbled-together arrangements of heterogeneous elements, protean assemblages that blur the boundaries between the organic and the technical (Haraway 2006). These bodies are hybrids, made up of devices (grafts) connected to other devices. This cyborgian conception of the organism is prefigured by Bergson and is a source of inspiration for Carrel. In *Creative Evolution* (*L'Évolution créatrice*) Bergson writes: «We may say that a higher organism is essentially a sensori-motor system installed on systems of digestion, circulation, secretion, etc., whose function it is to repair, cleanse and protect it» (Bergson 1944, 138). In higher organisms the nervous system is a device connected to other devices that serve it.

The testimony of philosopher Jean-Luc Nancy, a heart transplant recipient in the early 1990s who lived with his heart transplant for almost thirty years (and at the cost of serious medical complications), is also highly instructive. Nancy recounts his ordeal in L'*Intrus* (2002) but his conception of the body is mainly set out in *Corpus* (1992) – Nancy talks about an «excrit», composite body, which is neither inside nor outside, beyond any juxtaposition of machine and spirit or of a whole and its parts, but an open body whose law is intrusion – the continuous irruption of otherness, the impossibility of a resolution into his "own body" (*corps propre*). Here he is not talking about the cyborgian body, because cyborgian hybridity implies assimilation, a form of appropriation, fusion, the overcoming of intrusion; yet for Nancy intrusion cannot be circumvented, since it is the very nature of the body. The intruder that Nancy experiences is not primarily the heart transplant, but rather his own heart, which begins to malfunction and bursts in like a stranger, a trespasser. Before his illness there was no heart at all, and afterwards, there was something whose strangeness would not fade. «Something was detaching itself from me, or was coming up in me, there where nothing had been: nothing but the "proper" immersion in me of "myself" that had never identified itself as this body, even less as this heart, and that was suddenly concerned with and watching itself» (Nancy 2002, 4). In the early 2010s, Nancy had to have a hip replacement. After the operation he suffered a cardiac arrest and was fitted with a pacemaker. Two months later, the pacemaker was colonized by yeast and had to be removed and a new one fitted – in the meantime, the heart had to be perfused. The pacemaker

battery was implanted in his abdomen. Also implanted in Nancy's body was a subcutaneous injection chamber, put in place following Nancy's cancer. Nancy experiences his body «as more medicalized – or technicized – than ever, in modes that are at once mechanical, electrical and electronic, and finally chemical» (Nancy 2011, 50). Devices connected to devices, incessant intrusions. Thus, the body as revealed by transplant medicine is not the body-machine of Cartesian modernity: the transplanted body negates the dualisms of body and mind, the biological and the symbolic. The transplanted body is postmodern, cyborgian or «*excrit*».

Transplant medicine gives rise to what we might call a multiplicity of the body, in the sense of Annemarie Mol's *The Body Multiple* (2003): not a multiplicity OF bodies, not several bodies, nor several representations of the body or several ways of knowing it; there is a single body, my body, but a multiplicity of THIS body according to the contexts in which it is «enacted», i.e., produced in its reality as a body: the body of science, anatomy and physiology, in transplantation practices; the animistic body, blurring the boundary between self and non-self, "own" and otherness; the suffering body in the daily experience of transplant patients; the composite body, made up of organ-instruments connected to one another. There are no false images of the body as opposed to true images of the body, but instances of the body that are on the same level. Transplant medicine instantiates all these bodies, not just Descartes' body-machine.

3. From the organ as a "spare part" to the organ as an "instrument"

So, before his heart failure and the subsequent transplant, Nancy did not really have a body. We certainly have a body, our body, but this possession fades into the background and is forgotten in the day-to-day conduct of our lives, i.e., in all our activities where, with this body, we do something. What can I do with my body? I can, for example, climb mountains. For this I need equipment – an ice axe, carabiners, a harness, etc. – but I also need a body and a heart. All this fades away, is forgotten, when I am climbing the mountain. I simply do not think about it. The essential point in Nancy's depiction is that the heart is placed at the same level as ice axes and carabiners, that is to say it is seen as an instrument. Nancy puts forward a conception of the organ not as a piece of Cartesian machinery, defined by its structure and functions, but as an instrument that in some circumstances can become a bad instrument, a failing instrument that betrays.

Unexpectedly and surprisingly, Nancy finds Descartes here – not the Descartes of the *Treatise on Man* and of the body-machine, but the Descartes of the sixth *Metaphysical Meditation* and the analysis of the hydropic man who continually feels thirsty, even though, for him, drinking in excess is harmful, even fatal (Descartes 1999). Is God a deceiver, asks Descartes? He answers in the negative: God is not deceitful. He designed the human body in the best possible way, as an excellent instrument that most of the time performs its function perfectly. Unfortunately, sometimes, as a result of illness, this instrument will malfunction, it will betray me.

Nancy's formulation of his experience of transplantation therefore rests on an understanding of the organ as an instrument. The organ is comparable to an instrument, which brings us back to the old Greek word *organon*. In Ancient Greece this term was used to describe both a part of the body and an instrument, a craftsman's tool. Historically, it was Aristotle who systematized the use of the term *organon* – tool, or instrument – to designate body parts (Byl 1971). He thus established, for a long time to come, the close association between a body part and a given biological function.

At first glance, however, this return to the foreground of a conception of the organ as an instrument may come as a surprise. Even if to conceive an organ in this way were an

alternative to conceiving it as part of a Cartesian machine, it is hard to see a priori how this might help us better comprehend the animism voiced by transplant patients, or to better take into account their daily experience. Isn't that precisely how transplant doctors and engineers view the organ, that is to say as an instrument, a tool defined by the notions of structure and function? Doesn't the analogy between organ and instrument continue to require a "bifurcated" conception of body and organ (a conception by no means confined to Cartesianism)? The animistic perceptions and the difficulties experienced by transplant patients do not sit comfortably with a conception of the organ as an instrument. Quite the opposite: an "instrumentalist" conception of the body would appear to reinforce the objectivist position that considers organs solely from a functionalist point of view.

We should be grateful to Heidegger for pointing out the limits of the analogy between organs and instruments; more precisely, between organs and tools. In the metaphysics course he gave in the winter of 1929-1930, which addressed the question of life, Heidegger argued that contemporary biology and biotechnology had completely missed the essence of life, not because they had accepted the Cartesian assimilation of the organism to a machine, but because they had accepted the Aristotelian assimilation of the organ to a tool. Heidegger argued that the assimilation of organs to tools, and the organism to a complex of tools, is fallacious. The organ and the tool differ in terms of their respective relationships to the concept of utility: both the tool and the organ are "made for" and "serve" some purpose, i.e., they have a utility, but this "made for", this "service" has a completely different meaning in the two cases. What is the difference between the tool's "made for" and the organ's "made for"?

> The organ, the eye for example, serves for seeing. The pen, a piece of writing equipment, serves for writing. In both cases we have a serving for something […] but the pen is an independent being, something that is to hand for use by various different human beings. The eye, on the contrary, as an organ is never present at hand in this way. Rather, every living being can only ever see with its eyes […] Thus we can recognize an initial distinction by saying that the organ is an instrument which is incorporated into the user. (Heidegger 1995, 219).

The first difference between organ and tool is therefore topological: the tool is excorporated, detached from the body, it does not belong to the space of the body, whereas the organ is incorporated, non-detachable. This first, topological difference does not yet lead Heidegger to conclude that the organ has nothing in common with a tool. But he then takes his analysis a step further. «As equipment the pen is ready for writing, but it has no capacity (*Fähigkeit*) for writing. As a pen it is not capable (*fähig*) of writing. It is a matter of distinguishing readiness, as a particular kind of potentiality which we ascribe to equipment, from capacity […] The organ, we now claim, in each case has a capacity» (Heidegger 1995, 200-201). Heidegger thus points to a second difference between the tool and the organ, a more essential difference than the topological one: the tool is characterized by its independence from the use to which it is put, and from the user: once the tool ceases to be used, it does not disappear, and it remains what it is. It remains available, «ready for use» (*Fertigkeit*). When the craftsman has finished his work, he puts down his hammer, which ceases to be in use, but which does not cease to be a hammer. The organ, on the other hand, cannot be separated from use and the user, but is one with them: this is what defines Heidegger's concept of «aptitude» (*Fähigkeit*). Once the organ is no longer used, it ceases to be an organ.

The distinction between the concepts of *Fertigkeit* and *Fähigkeit* can be expressed in the Aristotelian distinction between «potentiality» (*dynamis*) and «actuality» (*entelecheia*). A thing is said to be "in potency" if it has not yet become what it is destined to be, by virtue of its internal dynamism – for example, the seed is not yet the plant, it is only the plant "in

potency": it will blossom into a plant "in act" if nothing stands in the way of its natural becoming. A thing is said to be "in act" when it has fully realized its nature. The process that leads from potentiality to actuality is «actualization» (*energeia*).

Aristotle attaches two different meanings to this terminology of potentiality and actuality: in the first sense, potentiality is the ability to *acquire the capacity* to do something, and actuality corresponds to an aptitude once acquired, such as playing the violin. Anyone can learn to play the violin, given time and effort, and is thus a violinist "in potency" who may then become a violinist "in act" through learning and practice (actualization in the first sense). In contrast, the second meaning attached to this terminology refers to a situation of either being or not being in the process of doing what one has the capacity to do. A violinist is someone who has the ability to play the violin, but will not always be engaged in doing so; a violinist who is writing or reading remains a violinist "in act" in the first sense of the term (possessing the ability to play the violin), but in its second sense is a violinist only "in potency", and not "in act" (since the ability is not currently being exercised). Here, actualization, that is to say becoming a violinist "in act" in the second sense of the term, involves picking up the violin and playing it.

So, in Aristotelian terms, that which exists in the mode of being of Heidegger's *Fertigkeit* (the tool) always remains actualized in Aristotle's first sense of the term, but may or may not be actualized in the second sense. The hammer that is no longer in use continues to be a hammer, continuing to actualize the power of hammering in the first sense of the term (i.e., in the sense that it still possesses this capacity to be used for hammering). However, a hammer that is not always in use will sometimes be a hammer "in potency" in the second sense of the term (not currently being used for hammering). On the other hand, that which exists in the mode of being of *Fähigkeit* (the organ) knows no distinction between potentiality and actuality, neither in the first nor in the second sense of these terms: the organ is always "in act", in that it both possesses a capacity (Aristotle's first meaning of the term), and is in the process of exercising it (the second meaning). For Heidegger, the organ that ceases to perform its function, unlike the hammer, does not revert from actuality to potentiality in the second sense of the term while at the same time remaining "in act" in the first sense of the term. The organ that ceases to perform its function simply ceases to be an organ. A heart that stops beating does not become a heart "in potency" in the second sense of the term. A heart that is not beating is no longer a heart at all.

The Italian philosopher Federico Leoni has shown that Heidegger's analysis is not so much a critique of Aristotle as a critique of just one of the two Aristotelian conceptions of the living body, resulting from the importation of the concept of *organon* into biology (Leoni 2008). On the one hand, the analogy between organ and tool causes the organ to be seen as an individualized thing, separated from the process that formed it, and defined by its function alone – from this point of view, the organ effectively has the same mode of existence as the tool, "at the disposal" of the living being for the accomplishment of its biological functions, as if there were a distance between the living being and its organs. On the other hand, Aristotle also sees the organ as being inseparable from the process that generates it, i.e., the process of life itself. To live is to give rise to the appendages that we call "organs" that are needed to maintain the vital process itself (metabolizing food, reproducing, etc.). According to this perspective, organs are not external to the vital process: they are not "available", separate and ready for use, like tools; they are immanent to the life process. As a result, an organ separated from the body ceases to be an organ. A severed hand, says Aristotle, is only a hand by homonymy.

Heidegger's metaphysics course examines this second Aristotelian conception of life – life as a continuous process – and contrasts it with the first – life as the functioning of the organism, i.e., as the functioning of a whole composed of distinct parts, each dedicated to the performance of a specific function.

To sum up, to equate organs (and the body) with tools in the same sense as those used by the craftsman is, in Heidegger's view, to take a wrong path. Admittedly, Heidegger's analysis does not address head-on the problem of the "bifurcation", in modern technoscientific medicine, between the objective and the subjective, between the biological and the psychic or existential; that is to say, it does not directly answer the question raised by a failure to acknowledge the lived experience of transplant patients. The question that Heidegger's analysis answers is a different one, namely the question of how best to consider the essence of biological life. That said, other authors have referred specifically to Heidegger's metaphysics course when they call into question the "bifurcated" framework of transplant medicine. Leoni, for example, dismisses both the objectivist approach to organs, which could potentially lead to seeing them as mere commodities, and the bioethical approach, which stresses that the moral dignity of the person also falls to the body (as stipulated in the second of the bioethics laws passed in France in 1994): but he sees these two perspectives as complementary. Either we adopt the objectivist, functionalist stance of doctors and engineers; or we see our body as an "own body", the seat of our existential experiences, in which case we do not simply have our body as a set of organs "at our disposal", but we are our body, which has no existence separate from the very process of our life; our "own body" does not exist for us as a compound of parts, and we do not have organs, strictly speaking. The two camps reason from a shared premise, namely that organs only make sense as things possessing an identity independent of the process that gave rise to them, as tools endowed with functions and separate from a subject with which they do not converge. Svenaeus takes a similar line. He, too, takes his cue from Heideggerian analysis, contrasting on the one hand the concept of organs as tools and on the other a phenomenological approach inspired by Merleau-Ponty that centers on the lived body. The body is not a "complex of tools" that I have in my possession; I am my body.

But what happens to the Heideggerian analysis in the specific case where an explanted organ falls out of use without ceasing to be an organ altogether? A severed hand is clearly no longer a hand by homonymy alone, since hands can be transplanted: the severed hand can once again become a hand in use. Having been removed, the organ ceases to be an organ in act and becomes an organ in potency in Aristotle's second sense of the term, but it remains in act in the first sense of the term "act", i.e., it remains functional, it continues to possess in act the capacity to perform certain functions – which is precisely what enables it to be transplanted into a recipient and thus to once again pass from a situation of potency to actuality in the second sense, i.e., in the sense of the organ's actual use. The reality today is that organs can have the characteristics of a tool: they can be detached, recycled, transposed, "ready to use", at the disposal of the transplant surgeon and the patient. Does this mean they cease to be organs? Certainly not, since they can be transplanted and once again confer "*Fähigkeit*", i.e., the transplant patient's ability to use his or her body and organs to live. Heidegger could not have imagined this. At the turn of the 1920s-1930s, by the time he was giving his metaphysics course, almost no-one was transplanting organs any more: the difficulties caused by graft rejection were proving too great an obstacle. Transplantation was a therapeutic failure. Heidegger considered that it was a failure not only for biological reasons, but also for philosophical ones, arguing that an organ can never pass through the mode of being of the tool "ready to use" and then become an organ again, and that no possible technique could achieve this end. The mode of being of the tool (*Fertigkeit*) and that of the organ (*Fähigkeit*) are mutually exclusive. We now know that he was wrong: an organ can be explanted and made "ready to use", i.e., become a Heideggerian tool, and then become an organ again after transplantation. Between the mode of being of the organ and that of the tool there can be transitions – from organ to tool, then from tool to organ. This means that the use of a tool and the use of an organ are no longer as mutually exclusive as Heidegger claimed. Rather than making this binary distinction between organ and tool,

we need to place the organ on a continuum between the mode of being of *Fertigkeit* and that of *Fähigkeit*. It can undertake a journey from one to the other and back again. In the case of the deceased donor, the organ is no longer in use; it can be removed and made available to a patient (ready to use); transplantation, if successful, restores the organ to the mode of being of *Fähigkeit*, the organ in use; the graft can be rejected, it falls back out of use, but it can be retransplanted into a new patient and become the organ in use again, and so on.

As it makes this journey from *Fertigkeit* to *Fähigkeit* and back again, we may remark that the organ loses an essential characteristic of what it has in both the *Fertigkeit* and *Fähigkeit* modes: namely, the property of being forgotten. The "ready-to-use" tool, when put to work, is forgotten, becomes inconspicuous: it is eclipsed by the task at hand. It only becomes an apparent, even insistent, object when the activity is interrupted, which can happen for a number of reasons, as Heidegger described: because the tool cannot be found, because it is defective, and so on. As for the organ, provided that it is healthy, it is "silent", according to Leriche's famous definition: health is life in the silence of the organs. As long as it functions properly, Nancy's heart does not appear, does not manifest itself: it only begins to exist as a heart when it starts to fail. And then, for Nancy, neither the graft nor the artificial organ let themselves be forgotten: their presence can even be so insistent as to occupy the whole mind. The American philosopher Drew Leder speaks of the «dys-appearance» of bodies and organs: they manifest themselves insistently in their very dysfunction (Leder 1990). The dialysis machine, which the patient with kidney failure needs to be hooked up to three times a week for several hours at a time, is neither like the Heideggerian tool nor like Leriche's organ: it imposes its obvious presence. A technologized organ of this kind, between tool and native organ, is neither the one nor the other.

4. The two meanings of the "organ-instrument"

The analysis by Heidegger and his successors thus leads to a critical assessment of transplant medicine and its associated technologies. These analyses are more accurate than those that focus on the supposed Cartesianism of doctors and engineers in the field. On the one hand, as we have seen, it is wrong to regard Descartes as the tutelary figure of organ replacement medicine. On the other hand, the Cartesian body-machine metaphor has its virtues. David Wagner, for example, sees this metaphor as a salutary alternative to the agricultural metaphor of «organ harvesting», much more distressing in his eyes (Wagner 2013). By contrast, the Aristotelian conception of the body as composed of functional parts is undeniably that of doctors and engineers. Like Heidegger, Leoni and Svenaeus see this analogy between organs and tools as an unsatisfactory way of conceiving life and the body – a false analogy that may help to explain why patients with grafts or who are reliant on technological devices face so many difficulties in their daily lives. These difficulties are due not only to technical imperfections or to our imperfect mastery of organ functions and their interdependencies, but they have deeper philosophical causes, linked to the assimilation of organs to "available-to" and "ready-to-use" tools.

However, in the light of these considerations drawn from Heideggerian analysis, what becomes of Nancy's testimony, which we have left in abeyance? What is to be made of his insistence on the significance of our realization, when organ failure and illness occur, that the body and the organ are instruments that can betray? And what are we to make of Descartes' analysis in the sixth *Metaphysical Meditation*, whereby the body is a well-constructed instrument, as perfect as possible, but which in illness can prove to be a faulty instrument and do its job badly? Some may be tempted to see in these metaphysical considerations a confirmation of modern "bifurcated" thinking: on the one hand, there is the

body-object, the body-instrument that can malfunction, and on the other, the subject who has this body-instrument "at their disposal", like a tool – a conception whose shortcomings have been pointed out by many, including Heidegger, Leoni and Svenaeus. However, Descartes is quite clear: I am not housed in my body like a pilot in his ship, i.e., I do not possess my body just as I might possess a tool that I could, if need be, discard in favor of another, as a craftsman may do with any of his tools. Descartes certainly introduces a conception of the body as an instrument, different from the concept of body-machine that he puts forward in his *Treatise on Man*, but this does not lead him to see the body as a tool of the same nature as a hammer or screwdriver. Unlike the craftsman, who keeps his tools at a distance, I have no distance from my own body-instrument: I am lodged within it. The same applies to Nancy. For him, discovering his body and his heart as faulty instruments does not mean discovering his body and his heart as tools.

In his metaphysics course, Heidegger did not link the notion of *Fähigkeit* to that of an instrument, because he considered an instrument and a tool to be equivalent. Descartes, however, in the *Sixth Meditation* (and also Nancy) conceives the body as an instrument of life that cannot be compared to a tool, since a tool, unlike our body-instrument, can always be replaced by another tool. Today, we certainly cannot replace our body-instrument, despite the claims of those delusional doctors who aspire to transplant heads onto bodies. On the other hand, it is possible today to change organ-instruments, and this involves these organs becoming tools ("ready to use"), and then, via transplantation, becoming instruments of life again, organs in use – although, in most cases, they do not become organs in their own right, that is to say forgotten by those to whom they belong. Beyond the false equivalence of organs with tools, Heideggerian *Fähigkeit* refers to the instrumentality of the body and the organs we use to live, with an instrument being seen as different from a tool.

If Heidegger had lived in our era of successful organ transplant and artificial organ engineering, he would probably have said, in view of the organ's new mode of being, now defined as a continuum between *Fähigkeit* and *Fertigkeit*, that transplanters and engineers should no longer regard themselves as representatives of *Fertigkeit* alone, i.e., of organ design in terms of structure and function. Today, an engineer designing an organ replacement device is mainly, if not exclusively, focused on these aspects of structure and function. A transplant physician, on the other hand, evaluates the success of a transplant in terms of the resumption of organic functions (albumin synthesis for the liver, urine production for the kidney, etc.). If Heidegger were here today, he would no doubt point out what these manufacturers of the instruments of life are failing to recognize, namely that the organ is defined not only by its structure-function pairing (*Fertigkeit*), but also by its use (*Fähigkeit*). Thus, an organ replacement device can function very well and be "ready to use" for patient care (*Fertigkeit*), while being a very poor instrument of use, i.e., a very poor instrument of life (*Fähigkeit*). This is the case with the dialysis machine: dialysis is now a mature technology that performs the kidney's function of filtering and detoxifying the blood very well. However, many patients experience it as a very poor instrument of life, given that their quality of life is no longer what it was: they can no longer do things that they used to do, they feel that their freedom is circumscribed, and so on. We may agree with Heidegger that the use we make of our bodies and organs should not be seen as a problem external to medicine and engineering, but that, on the contrary, doctors and engineers should treat the instrumentality of bodies, and not just their functionality, as a question of fundamental importance. An organ is not just a structure with functions; it is also, and above all, an instrument for living. This should be the primary concern of transplant doctors and engineers (Plough 1986; Fox & Swazey 1992).

The definition of the body as an instrument brings to mind Marcel Mauss's famous text entitled *Les techniques du corps* (*Techniques of the Body* – Mauss 1973). The instrumentalist

conception of the body presented in that text was not, however, devised by Mauss himself. It can be found in Descartes, as we have seen, and before that in Aristotle, for whom the use of the body became a philosophical question as Agamben has shown (Agamben 2016). The conception of the body as an instrument has consequently accompanied the history of philosophical reflection on the body. In his text, Mauss revisits this long tradition, somewhat overshadowed by the 17th century emphasis on the body as a machine. But Mauss's analysis is directly political. Mauss argues that the body is, on the one hand, the means by which society inculcates its norms into individuals, through a process that Mauss does not hesitate to call the training of bodies. But at the same time, it is the body that enables us to disengage from these inculcated norms and instead to adopt other norms, other ways of behaving and other ways of doing things. It is because my body is an instrument to me that society can interfere in the handling of this instrument and impose norms on it, while at the same time I can always reappropriate the instrument and learn to use it differently.

Aristotle, for his part, had addressed the question of the use of the body in relation to the master's use of the slave's body, which he possesses as if it were part of his own body. The slave is defined in *Politics* as *organon pro organon*, that is to say, an instrument for an instrument. Aristotle uses the same expression, *organon pro organon*, to designate the hand. The slave, exactly like the hand, is a part of the body. However, the slave is not just any kind of instrument: in Aristotelian terminology, he is not primarily an «instrument of production» (*organon poietikon*), even though he can of course engage in productive activities; he is in essence an «instrument of use» (*organon praktikon*). He serves for «use» (*chresis*) before «production» (*poiesis*). Transplant medicine and the engineering of artificial organs seem to have lost sight of this sense of the organ as an instrument of use, retaining only the sense of the *organon poietikon*. It is an incomplete view that has far-reaching consequences, since it prevents us from considering that the dimension of use, of *praktikon*, could be consubstantial with a certain category of instruments to which, precisely, our organs belong.

Aristotle's discussion of the use of the body and its parts is therefore framed by a reflection on the slave and the slave's status as an *organon praktikon*. In other words, he is concerned with the private, not the public domain. As Agamben points out, Aristotle for a long time considered the use of the body to fall outside the sphere of politics. Mauss's text is absolutely crucial in that it encourages us to make the use of the body as an instrument a fundamental political and ethical question – a question relating to subjection and the processes of subjectification – with a bearing that goes beyond the private.

This is perhaps the major challenge facing transplant medicine and its associated technologies today: to raise to the level of an ethical and political question of the utmost importance the use we can make of the life-enhancing instruments that this technologized medicine places at our disposal.

5. Concluding remarks

In conclusion, I would like to offer some practical suggestions aimed at doctors, engineers and healthcare policy-makers.

First, doctors and engineers need to rethink the way they view the organ: not as a structure with a function; but as an instrument of life. To put it bluntly, the hemodialyzer effectively detoxifies the blood and enables patients in chronic renal failure to live long lives, but it is not an organ, not even an artificial organ. It is a blood detoxification machine, and not an artificial kidney. Going back to definitions of antiquity, there is the difference between *organon poietikon* and *organon praktikon*: on the one hand, the organ is defined by its functions, which are most often, though not always, functions of production – this point of

view guides the physician and the engineer; on the other hand, the organ is defined as a field of possibilities for the person whose organ it is, and who makes use of it. In other words, we need to stop mistaking the means (restoring organ functions) for the end (enabling patients to regain satisfactory use of their bodies). Of course, you cannot have one without the other – a liver that fails to detoxify or to produce albumin certainly cannot be a good instrument for use. However, it is not enough for a liver to detoxify, to produce albumin and, more generally, to perform all of its functions, for it to be *de facto* a good "organ" in the sense of a good instrument of use in everyday life.

Making this distinction between *organon poietikon* and *organon praktikon* can, however, lead to a serious misunderstanding: does it entail reviving a conception of the organ that distinguishes between means and ends – the restoration of functions on the one hand and the use of the body on the other? After all, doctors and engineers might perfectly well accept a definition of the organ in terms of the purpose of its use in daily life, and this is what they in fact do in their readiness to agree that their interventions need to enable patients to regain a "quality of life", ideally the life that they enjoyed before they encountered organ failure and disease. This implies that their role involves restoring organ function, i.e., establishing conditions that will enable the organ to return to use. In the event of difficulties in living with their new "instrument", after the intervention of the doctor and engineer, the patient might then turn to other specialties, calling on other realms of expertise: those of the psychologist or social worker. Here, the various specialists are each confined to their own domain, and the "bifurcated" conception of the organ remains intact, with a distinction between the organ as a support for the biological functions necessary for life, and the organ as a support for a life plan, an existential instrument.

Against this return to a "bifurcated" definition of the organ, Heidegger's analysis has the great merit of making it clear that the dimension of use is an integral part of the biological definition of an organ, not external to it: there is no distinction of registers, but rather a continuum that goes from the organ as a provider of functions (*Fertigkeit*) to the organ in use (*Fähigkeit*), and back again. In other words, taking into account the dimension of organ use, and not only organ functions, is a responsibility that belongs to the doctor and engineer, and not only to those other professionals whose job is to help patients return to "normal life". If we do not follow Heidegger in assimilating the instrument to a craftsman's tool, it is possible to see in the concept of *Fähigkeit* a conception of the biological organ as an instrument: an instrument of use inseparable from the very process of its use, and not a tool detachable from the use made of it.

Thus, doctors and engineers are justified in considering the organ as an instrument; their mistake is to take too narrow a view of the notion of instrument. The transplanted graft is an instrument, and the artificial organ is an instrument, but they are instruments of use, not tools of production. There is undoubtedly a need to educate doctors and engineers (especially those in training) to broaden their conception of the organ-instrument.

My second suggestion concerns the expression "return to normal life", often used to describe the post-transplant period. The objective is that patients return to a "normal life", i.e., resume the activities they used to engage in, and more generally the most basic activities of daily life. This expression translates into everyday language the Heideggerian concept of *Fähigkeit*, in the sense of the use that each person can make of his or her organs-instruments, in the daily routine of life. This idea of a "return to normal life", i.e., to the life enjoyed before organ failure, seems consistent with the definition of the organ as a continuum between tool (*Fertigkeit*) and instrument of use (*Fähigkeit*). Continuum, however, does not mean continuity. If returning to "normal life" means transforming a tool (the graft or artificial organ designed by engineers) into an instrument of use, then this return implies invention, re-elaboration – in other words, it is not really a return to the starting point, to life as it was before. Patients have to reinvent a body and a use for their body; they have to

learn to inhabit a new field of possibilities. The dominant discourse remains centred on the notion of "substitution": a new organ or artificial device has been "substituted" for the failing organ, suggesting that this new organ or device will do exactly the same thing as the original one. Difficulties can arise, linked for example to immunosuppressive treatments, or to a stigmatization of transplant patients that prevents them returning to employment. However, these difficulties are seen as obstacles along a path which ultimately returns patients to lives identical to those they led previously. But this is not what happens in practice. Rather than "substituting", it is better to speak of "supplementing", in the sense that patients will have to deal with an organ-instrument that will not enable them to return to their previous lives in an identical way: they will have to reinvent themselves, to find new ways of living, new ways of using their bodies. Rather than invoking a "return to normal life", it is better to heed Georges Canguilhem's observation that after illness there is never a return to the starting point, but instead there is an adoption of new norms of life. What is "normal" for the patient is not to return to what he or she was before, but to reinvent a life in line with new possibilities for using the body.

My third suggestion concerns the regulation of organ replacement medicine as a field of research and innovation. At the end of his lecture on imagination and invention (Simondon 2017), Simondon argued that society needs regulation, but a different kind of regulation than regulation in the technical domain. To understand what is at stake here, we need to go back to the importance of cybernetics for Simondon (and for some of his contemporaries, notably Canguilhem). Norbert Wiener had, albeit very cautiously, considered how cybernetics might be harnessed in the government of societies. Could human societies be organized and governed on a cybernetic basis, via the principles of homeostasis and feedback? Simondon countered this suggestion, pointing to where cyberneticists were mistaken in this respect: not in their wish to transpose their science to society, but in their unwarranted faith in a certain type of technical being, the *automaton*, which served as their model for all self-regulating systems, including societies. For cyberneticists, the question was whether society could be considered a kind of *automaton*, with self-regulating mechanisms and homeostasis. Simondon's answer, like Canguilhem's, was no. However, Simondon also argued that a better understanding of cybernetics – not the science of *automata*, but the science of operations in being – should be able to provide general principles for the organization and government of societies. The psychosocial domain, like the other domains of being (the living domain and the technical domain), is also governed by operations. A general science of operations within being, or general cybernetics, or allagmatics in Simondon's terms, can thus have a political relevance, insofar as political and social problems are nothing other than problems concerning operations in a specific domain of being (here, the psychosocial domain).

Simondon's lecture on imagination and invention concludes with a decisive statement: human societies are shaped by affective-emotional processes that are in fact not operative in nature. Since these processes are not operations, they do not fall within the scope of a science of operations in being. Images play an essential role in the study of societies, precisely insofar as they provide access to this non-operational, affective-emotive stuff of which societies are made.

If we accept Simondon's premise, then the practices of transplant medicine and organ engineering that give rise to different "imaginaries" of the body – the body-machine, the animist body, the cyborgian body, the "*excrit*" body, the body-instrument – take us beyond simple problems of regulation when we attempt to address "body-political" issues. That is to say, transplant medicine and organ engineering raise questions that do not relate solely to the types of control that need to be placed on new scientific and technological developments. Regulation has become the motto of the politics of technoscience: science and tech-

nology must be regulated, framed by laws and standards of all kinds – in other words, procedures and legal-ethical operations must be established in order to contain technoscientific hubris. But the affective-emotional dimension of technoscience cannot be circumscribed by procedures. A doctor or an engineer can scrupulously respect procedures, established rules and professional ethics, but still ignore the feelings of patients and the question of how they will use their transplanted body. The ethics and politics of organ transplant cannot be limited to the implementation of control operations, but they call for a public expression of the body's "imaginaries" (and not just a private expression in the psychotherapist's office). There needs to be far greater awareness of the affective-emotional impact of having to live with someone else's organs, or with an artificial organ.

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