Design, Assemblage and Functionality

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By providing a concrete philosophy of artefacts as always being linked to the social, Gilles Deleuze and Félix Guattari's concept of 'assemblage' offers the opportunity of capturing the specificity of design: design does not consider the mere utility of objects but how they fit into a sociotechnical assemblage and participate in its maintenance. The aim of this paper is to show that design is not simply interested in the mere interface between the object and the subject-user, but in the insertion of this item in a dwelling environment. In other words, in design, and according to Deleuze and Guattari, the object is always *in assemblage*. I will then show that the object, still inserted in a sociotechnical ensemble, is defined by the actual relationships it marks in its assemblage, thereby causing a redefinition of its functionality.

Design and Assemblage

Design should not be thought of as an aesthetic supplement to the technical object but rather as a shift in the way in which the artefact is viewed. To understand the specificity of design, one must not focus too closely on objects described as 'design' today (objects morphologically identifiable by a particular material and colourful sketch). Design cannot be defined by showing a chair by Eero Saarinen or Charles and Ray Eames, but rather the differences that animate it above and beyond craftsmanship and the simple technical production series of industrial premises should be taken into account. Classical history of industrial design, such as Nikolaus Pevsner can recapitulate it, is not interesting to identify an absolute historical origin of design but to understand what constitutes the emergence of this discipline: by identifying architecture and design, in *The Sources of Modern Architecture and Design*, Pevsner points to the fact that any artefact is related to the issue of dwelling (Pevsner 1968). We do not only dwell amongst houses, but also amongst pens, tables, roads or clothes. As Reyner Banham and François Dallegret later stated: '*a home is not a house*' (Banham and Dallegret 1965). Any artefact can materialize a home.

Design differs from other conventional technical production because it no longer perceives the object as the realization of a simple utility or a simple beauty for individual use but is interested in the way objects create a dwelling technical and social environment. For example, William Morris, who spearheaded the Arts and Crafts movement in the late nineteenth and was a key figure of British socialism, redefines a dwelling environment from an interrogation of its material conditions, with particular focus on the social organization of technical production networks. Morris is interested in the status of the workers as they are embedded in their environment of production. Therefore, the objects produced by Morris & Co are thought as polarizing this environment. According to Morris, an artefact as mundane as a *Sussex* chair produced by Morris & Co between 1870 and 1890 is primarily the avatar of a production assembly (both craft and industrial). From this follows his theory of ornamentation: ornament is not primarily thought of as an aesthetic effect, but as a task endowed with dignity for the worker because it requires expertise. Ornamental forms are not justified solely by their decorative aspects, but especially by the recognition they bring to the labour of the operator. Pleasure of making rather pleasure of consuming (Morris 1901: 22).

This vision of emancipation of the labour of the worker, however, should not obscure the specificity of the approach: design does not focus primarily on objects but on a dwelling environment which then materializes in the form of objects. For Morris, producing a chair involves also producing the production system by which the chair is made possible. The Arts and Crafts Movement, taking its inspiration from the guilds of the Middle Ages, placed the operation of design within the project of a community of labour, thereby defining its material conditions. Design does not *first* seek to produce beautiful or rational objects: it does not focus primarily on objects but on a dwelling environment which *then* materializes as objects.[1]

The purpose of design is not limited to a gross and passive materiality, closed on itself, but is rather characterizable, following Deleuze and Guattari, as an *object in 'assemblage'*. According to them, assemblage describes the space of an operation between different heterogeneous elements that define and transform each other (bodies, objects, languages, laws, and so on): 'An assemblage is precisely this increase in the dimensions of a multiplicity that necessarily changes in nature as it expands its connections' (Deleuze and Guattari 1987: 8). Assemblage focuses on the primacy of the relations prior to the formation of individuals. To think of objects as they perform in a

dwelling environment is to think of the *assembling* effects of *assembled* objects. In order to incorporate this dual motion of the object into the environment and of the collection into the object, one should consider the difference between a weapon and a tool as described by Leroi-Gourhan in his analysis of prehistoric percussion implements (Leroi-Gourhan 1971: 174–190), as well as Deleuze and Guattari's comments on this in *A Thousand Plateaus* (Deleuze and Guattari 1987: 395). Admittedly, they can distinguish a *weapon* from a *tool* in terms of their use (destruction as opposed to production), but this category cannot fully account for 'a general convertibility between the two groups' (Ibid.). 'For ages on end agricultural implements and weapons of war must have remained identical' (Ibid.). What is important in distinguishing between a weapon and a tool is the assemblage in which each operates, an assemblage determined by the formation of power of the social machine. We must understand the formation of power associated with a particular weapon or tool in order to designate it as such. However, in the absence of intrinsic distinctive properties, weapons and tools cannot easily be distinguished extrinsically: 'They have internal (and not intrinsic) characteristics relating to the respective assemblages with which they are associated' (Deleuze and Guattari 1987: 398), or, we may add, the assemblages with which they could be associated. Tools and weapons are both consequences and residues of formations of power in which they occur, and also support and consolidate the formations of power in which they operate. This is why they are said to be *assembled* and *assembling*: the context is no longer a fixed piece of data but continues to be transformed and consolidated by these very elements. The tool implies the organization of work, while the weapon implies hunting or war, but, such organization also implies these objects. The object is *assembled* because it differs (weapon or tool) depending on the assemblage (warlike or agricultural); but the object is also *assembling* because the weapon consolidates the warlike assemblage, in the same way that the tool consolidates the agricultural assemblage. The latter point reveals an object's capacity to transform the context, or rather to participate as part of a sociotechnical system in the co-creation of functional regimes that determine it, as well as the transformation of this sociotechnical field by these very practices. Therefore, technical reality cannot be said to differ depending on the 'context' in which it appears, but rather, given that it is always in assemblage, *technical reality is the context* (constantly changing). When considered from the point of view of their effects, technical machines cannot be dissociated from the social organizations that they enable and that condition them:

That is why technical machines are not an economic category, and always refer back to a socius or a social machine that is quite distinct from these machines, and that conditions this reproduction. A technical machine is therefore not a cause but merely an index of a general form of social production: thus there are manual machines and primitive societies, hydraulic machines and "Asiatic" forms of society, industrial machines and capitalism. (Deleuze and Guattari 1977: 32)

We never deal directly with a technical machine, but always with an assemblage involving a social machine. Furthermore, the interlacing between the two always involves a certain '*co-functioning*: it is a symbiosis, a "sympathy"' (Deleuze and Parnet 1987: 69).

Deleuze and Guattari will then extend the reflexions of Gilbert Simondon on technical objects (Simondon 1989) to the sociotechnical machine. Simondon defines a process of 'concretization' of the technical object by its synergistic tendency towards greater internal consistency: 'The technical being evolves by convergence and by adaption to itself; it is unified from within according to a principle of internal resonance' (Simondon 1989: 20). According to Simondon, the various components of an 'abstract' technical object are treated independently and then juxtaposed with each other. They do not work in synergy. By solving its functional antagonism, the object becomes the site of an auto-correlation of its structure; it becomes concretized:

> The object causes and conditions itself in its operation and in the feed-back effect of its operation upon utilization. The technical object, the issue of an abstract work of organization of sub-sets, is the theatre of a number of relationships of reciprocal causalty (Simondon 1989: 27).

According to Deleuze and Guattari, this concrete stage of an object that is physicochemically self-correlated to its milieu corresponds to the abstract stage of a sociotechnical apprehension of the object. Thus, in *Anti-Oedipus*, the Simondonian process of concretization moves away from technical function towards the functioning of socius-related institutions. Deleuze and Guattari therefore describe the 'concretization' of the State in its becoming-capitalist (with explicit reference to Simondon):

> As a machine it no longer determines a social system; it is itself determined by the social system into which it is incorporated in the exercise of its functions. In brief, it does not cease being artificial, but it becomes concrete, it "tends to concretization" while subordinating itself to the dominant forces. The existence of an analogous evolution has been demonstrated for the technical machine, when it ceases to be an abstract unity or intellectual system reigning over separate subaggregates to become a relation that is subordinated to a field of forces operating as a concrete physical system. (Deleuze and Guattari 1977: 221)

The State is concretized inasmuch as it is both a social and technical

machine itself. Therefore, the right point of view for analysing technical efficiency lies in the relationships between the artefact and the collective.

The object still has traits not limited to its material properties but which bind it to a set in which it operates. The productivity of the object – in the literal sense of what it 'produces' – is not limited to its function of use, but resonates across the very assemblage. The object does not work just in a utilitarian way: functionality must be expanded so as to extend to all the effects it generates in and on a dwelling environment, thereby affecting the ways of inhabiting this environment. Thinking of artefacts in symbiosis with the socius, design redefines the notion of functionality of the object and thus transforms the classical theories of the function of artefacts as they appeared in Larry Wright (1973) and Robert Cummins (1975) and in their contemporary commentators (Houkes and Vermaas 2010). These authors attempt to define an analytical concept of 'function' to explain functional statements particularly in the fields of technology. We will try to show how the opening of functionality in the field of design disrupts the very opportunity to forge such a unified concept.

Classical Theories of Function: Beyond a 'Hard Problem' of Functionality

The classic understanding of artefacts' functionality is maintained in a dualism. There are two incompatible ways to think functionality: either from the physicochemical functioning of the object, which defines its *technical function*; or from its *function of use* (Kroes and Meijers 2006: 1). The *technical function* corresponds to the causal role of an element of the artefact with regard to its overall functioning, and the *function of use* describes the purpose of the action that the object enables. For instance, the technical function of a refrigerator compressor is to increase the pressure of the refrigerant – the technical functions of the different elements define the technical functioning of the refrigerator (compression and expansion system of a refrigerant). This object's function of use, on the other hand, is to slow down the spoilage process, which reflects a strictly human concern. One function is physicochemical in nature, while the other is teleological.

Function theory differs depending on whether one focuses on the technical function or the function of use. Wright (1973) and Cummins's (1975) theories represent the two poles of understanding of the functionality of the object. Wright formulated an etiological theory of function that refers to the theory of evolution by natural selection: the

function of an artefact is the effect for which it has been selected. A refrigerator is socially reproduced because it keeps food fresh. Therefore, the etiological theory sheds light on the concept of the function of use of technical objects. It distinguishes between prescribed use and misuse based on an objective principle of selection.[2] Conversely, Cummins develops a systemic theory of the causal role of the function. This theory defines the function of an element by its causal role in an ensemble. Function is not understood in reference to a prior history, but develops its meaning in the current state of a system: if X is said to have a function F, this means that X plays a 'causal role' in the system that contains it and helps to create an effect in this set (Cummins 1975: 762). This theory perfectly characterizes what we have referred to as the 'technical functions' of an artefact, namely the actions of the various technical elements of an object that update its overall functioning.

The current problem of these philosophers is the search for a ground of conciliation for these two definitions of the concept of function (causal and etiological). The problem of conciliating these two functional areas was recently the subject of a research programme entitled 'The Dual Nature of Technical Artefacts' conducted at the Delft University of Technology (Kroes and Meijers 2006: 1). Based on the opposition between etiological and systemic theories, the researchers in this programme placed this dual functional nature within the artefact itself. The description of a technical artefact may require two different conceptualizations at once because such an artefact is both a *physical object* (a wire is made of tungsten and has a length of 15mm) and *an object that is designed and produced for an end purpose* (a tungsten wire is produced for its electroluminescence). The object then becomes the site of a functional bias between an organized material and purposes at work in human gestures and intentions. Function appears in the object as a crystallized tension between two heterogeneous fields. If the overall aim of this research programme is to develop a coherent conceptual framework in the description of technical artefacts, it generates a dualism within the object. Houkes and Meijers even raise the hypothesis of a 'hard problem' in the philosophy of artefacts, much like the one encountered in the philosophy of mind[3] (Houkes and Meijers 2006: 119). This 'hard problem' formulated the idea that physical and teleological functions do not correspond, without involving the idea of an arbitrary relationship between these levels (Ibid.). On the one hand, a same function of use can be achieved from different physical structures (underdetermination of the material basis as regards the uses that it enables); on the other, a same material basis offers several possible uses

(underdetermination from the standpoint of the end purpose). Simondon, in *On the Mode of Existence of Technical Objects* (Simondon 1989), had already mentioned the non-correlation between what he calls the technical functioning and the use of the object:

> We can get the same result from very different functionings and structures: steam-engines, petrol-engines, turbines, and engines powered by springs or weights are all engines; yet, for all that, there is a more apt analogy between a spring-engine and a bow or cross-bow than between the former and a steam-engine […] Usage brings together heterogeneous structures and functions in genres and species which get their meaning from the relationships between their particular functions and another function, that of the human being in action. (Simondon 1989: 19)

To understand this issue, we must return to its historical origins. This dualism between technical functioning and function of use is consolidated in the industrial organization at the end of the nineteenth century by decentering the technical efficiency of the human body as operator. In a traditional craft society, the technical function is tied to the human being. A tool can only bring about true coherent functioning when coupled to the body of a human being, who in turn provides a flow of energy and information for conducting the technical operation. In this gesture, technical function and function of use are intimately linked by the body of the craftsman: the craftsman's own body proceeds technically while using. On the other hand, in the industrial era, the machine takes the place of the operator's body:

> Human being has played the role of technical individual to the extent that he looks on the machine-as-technical-individual as if it were a human being and occupying the position of a human being, whereas in actual fact it was the human being who provisionally took the place of the machine before real technical individuals could be made. (Simondon 1989: 81)

Industrial production decouples technical function – location of the machine – and function of use – location of the human body. The industrial machine no longer appears with its indissoluble link with the human body. The industrial object detaches itself from the corporeal halo, no longer appearing as an extension of the arm. Technical function and function of use appear in their heterogeneity.

However, the thought of Simondon does not seek to oppose these two types of functionality in a rigid dualism, but to understand their singularity and their modes of relationship. The problem of such a dualism and such functional fracture within the object is that it limits the life of the object to the simple interface with users, while the design is interested in all functional resonances of the object in assemblage, that is to say, in all its effects on the dwelling environment that it consolidates

and affects. Design then accounts for a proliferation of functions. The term 'proliferation' comes from Deleuze and Guattari who use it to describe how an individual in a metastable situation with respect to its assemblage comes to be transformed by transforming the very assemblage:

> The development of the stratum into epistrata and parastrata occurs not through simple inductions but through *transductions* that account for the amplification of the resonance between the molecular and the molar, independently of order of magnitude; for the functional efficacy of the interior substances, independently of distance; and for the possibility of a proliferation. (Deleuze and Guattari 1987: 60)

This concept of proliferation is inspired by Simondonian thought. At the outset, it is, in the words of Deleuze when referring to Gilbert Simondon, the process of crystal individuation, a step-by-step formation around a germ in a rich solution of potential (Deleuze and Guattari 1987: 50). Proliferation reflects an operation of *transduction*, a process in which two or more incommensurable orders of reality resonate to become commensurate through the emergence of a dimension that connects them:

> Transduction occurs when there is activity, both structural and functional, which begins at a centre of the being and extends itself in various directions from this center, as if multiple dimensions of being were expanding around this centre. Transduction is the correlative appearance of dimensions and structures in a being of preindividual tension, that is to say in a being that is more than unity and more than identity, and that has not yet dephased itself into multiple dimensions. (Simondon 2005: 33)

The artefact, in relation to a sociotechnical assemblage, proliferates its functional meanings correlatively with respect to the relations that it establishes in this set. The concept of functional proliferation allows us to consider an effectiveness of the object that extends beyond its mere *utility*. It deploys a functional stratification of the object, acting on both the user and the various stakeholders of the object (manufacturers, dealers, repairmen, observers and so on), as well as all the elements with which it interacts (social organizations and relations, living beings, natural environment, identity, gender and so on). The term 'proliferation' is interesting also because it is the word used by Houkes and Vermaas, philosophers of 'The Dual Nature of Technical Artefacts', to describe the danger that hovers over any 'good' theory of function, whereby 'good' is synonymous with analytical categorical criteria (Houkes and Vermaas 2010: 388). According to them, a theory that allows an indefinite multiplication of functions would show weakness due to the lack of a precise definition of its purpose. But this proliferation, of

which design offers a glimpse, seems to be on the contrary constitutive of functionality and the way in which an object works and is worked in its insertion into an assemblage. Positioning oneself in this proliferation means no longer opposing the functional regimes seeking a principle of homogeneity, but making use of their heterogeneity (such as physical, social and economic effects) to understand how an assemblage takes on a consistency. To affirm the *functionality* of an object is to assert that it can always introduce new functions and produce new effects in sociotechnical systems.

Design and Functional Proliferation

To investigate the ways in which design makes an impact in this discussion, it is worth analysing the various regimes of functionality of a particular example, Raymond Loewy's *Coldspot* refrigerator from 1935.

In Loewy's design, the object is no longer the product of a technical function, nor the product of a use prescribed by this operation; it is understood as a generator of the dwelling environment. Its function is no longer confined to its material envelope, but expands within the sociotechnical assemblage in which it takes place. The *Coldspot* refrigerator has been produced from an overall business strategy viewpoint, incorporating planned design refinements within an annual release cycle in a bid to encourage consumers to replace their current refrigerator at a time of economic recession (Lidwell and Manacsa 2009: 50–51). This attempt at enticement was achieved through the improvement of certain characteristics (ease of maintenance, user safety) as well as the development of an aesthetic and symbolic function of the object that redefines the role of its formal envelope. Loewy even admitted to having designed certain elements for facilitating the door opening action not only to increase the practicality of the artefact but also to provide a powerful advertising pitch, thereby creating a marketing and advertising function of the object:

> Another improvement was the "feather touch" latch. This latch was designed so that a housewife with both hands full could still open the refrigerator by pressing slightly on a long bar with her elbow. In addition, it was connected by remote control to a small foot-operated pedal close to the floor. All these features combined made perfect advertising material for the copy boys and supplied the salesmen with great sales-talk features. (Loewy 1951: 128)

This attempt was duly rewarded by its commercial success: *Coldspot* sales increased from 60 000 in 1935 to 275 000 units in 1937 (Loewy 1951: 146–147).

The functionality of the object is not limited to use and technical

efficiency, it includes all the effects the object generates: an advertising function through the show of the opening and closing of the refrigerator, but also an aesthetic function entrusted to seduce the consumer by its plastic forms. In this sense, Loewy identifies the objects he created with the movie stars created by Hollywood:

> Furthermore, it can be argued that Miss Grable's skin is really not a shield as such but a functional unit that serves the definite purpose of generating beauty, and therefore is desirable in itself. This shield, or housing, reminds me of a conversation I had, years ago, when streamlining was news. (Loewy 1951: 220)

The object works in different ways depending on the extent of the different affects it generates. The functionality of the object is no longer limited to the use phase but can incorporate other phases from the artefact life cycle as, in this example, phases of distribution and promotion. Moreover, the aesthetic function of such a streamlined object extends the purely visual effects of the object in a network of forms offering a unit style. *Coldspot* refrigerators weaved a network of formal referrals with various other streamlined artefacts – for example, Henry Dreyfuss's *Model 150* vacuum cleaners (1935) or Robert Heller's *Airflow* fans (1937) – to define the aesthetic unity of a new mode of consumption. The generation of this design language consolidated a political and cultural function too, via the expression 'The American Way of Life' (which would become popularized during the Cold War). This amounted to a reversal of the use value by means of a symbolic value subject to fluctuations in fashion, reinforcing what is known as the '*planned obsolescence*' of artefacts.[4]

The object is no longer just an item opposite the subject/user. The life and sense of an object is not confined to its use. Loewy's design is a powerful example, not for understanding the capitalist evolution of industrial design, but for apprehending the operation behind it. The object is no longer a mere object of use; its activity extends before and beyond the utilization phase to encompass a multitude of stakeholders who become involved throughout its life cycle. The design of the *Coldspot* refrigerator includes a financial function for the Sears Roebuck Company, an advertising function for the seller, an aesthetic function for the ordinary beholder and an economic function for the whole nation. Loewy places a lot of emphasis on the patriotic feature of industrial objects:

> And remember that for each man employed at the plant, there are three in the field: salesmen, advertising men, maintenance men, traffic and transportation fellows, warehousers and accountants, dispatchers and repair crews, electricians, statisticians, engineers, draftsmen, etc. That's another sixty thousand. If you add to

that another two hundred and fifty thousand for dependents, you get a true picture. More than three hundred and twenty thousand people whose life is directly affected by the success or failure of what you put on paper (Loewy 1951: 156).

Of course, before Loewy, all objects already possessed such effects, but the latter had yet to be designed as *functions* and were only technical production externalities. Design explicitly incorporates the systemic effects of the object within its specifications, acknowledging them as real functions. Thus, American Streamline design has established the difference between *products*, which are artefacts that are only perceived in a purely technical and functionalist approach, and *goods*, which are manufactured with the aim of being traded and sold before being used. The concepts of 'business strategy' and 'brand identity' were therefore unheard-of before the 1940s (Loewy 1951: 125). Therefore, the function of a consumer good involves both end users and company investors, with the latter developing widespread marketing, advertising and styling activities prior to the engineering phase.

For another example of functional proliferation we can look at eco-design since the 1970s, which has included the minimization of environmental impact as a function of objects in their manufacture, use and recycling. By defining a heterogeneous multiplicity of functional regimes, design can therefore help us out of the 'hard problem' of the function. The concern is no longer to reconcile technical function and function of use within a unified theory, but instead to multiply the functional ruptures centred on the object. The aim is not to build a 'drawbridge' (Vermaas and Houkes 2006: 6) between different functional regimes but to assume a position in the rupture itself, to multiply breaks. The object is no longer the site of functional unity. It works in different ways in the dwelling environment that constitutes it and that it constitutes, as we have seen with the Coldspot example. This enterprise sets itself apart from the analytic philosophy of artefacts in that it does not focus as much on functional *allocation* (what *is* the function of this artefact?) as it does on the *creation* of new functions (designer's point of view: what *will be* the function of this artefact?). Deleuze and Guattari thus urge us to beware of dualisms by plotting a transversal path: 'The only way to get outside the dualisms is to be-between, to pass between, the intermezzo' (Deleuze and Guattari 1987: 277). What is meant by 'to pass between' when considering the functions of objects?

Functionality can not be expressed in the opposition of two functional regimes replaying both conventional poles of subject (use) and object (technical functioning). The *object in assemblage* must be understood as a potential functional creation, manifesting invention of

new functional fields: technical, aesthetic, emotional, economic, mental, political, etc. To 'pass between' would then consist in demultiplying the functional regimes whose design is the operator. To position oneself 'between' does not mean unifying the differences but considering their coexistence. While contemporary theories of function (Houkes and Vermaas 2010) seek to bring into consonance the two functional regimes of the object, design displays a certain specificity: the object does not only function in a technical and utilitarian way, but also works aesthetically, symbolically, socially, politically, and so on. The aim is no longer to overcome ruptures but to multiply them.

The functionality of the object must be understood as a multiplicity of functional regimes working by rupture or synergy, changing as socius changes. Houkes, Vermaas and Meijers do indeed begin to elucidate such a multiplicity, demonstrating that the object synthesizes both a physical effect and an intended effect by supporting a purpose through use. Thus, these theories highlight two functional strata that should not be understood as being on opposing ends, but rather as plural and heterogeneous manifestations of the effects produced by the object itself. However, these two functional regimes are only the premises of a series that aims to apprehend the object as a functional stratification, functionality being the transversal path of such a heterogenesis. Positioning oneself within functional proliferation, for the philosopher, implies that one must stop thinking in dualistic terms by asking whether the functions are assigned to the object or by a human being, and position oneself in the middle instead, that is to say between the object and its environment, in its assemblage, in the relationship of recurrent causality linking, in the middle, subjects and objects.

A question arises over the specific position of the designer working from the very forces of the assemblage. Indeed, given the proliferation of functional effects prevents a complete mastery of design by the designer, what is their role in such a process?

Position of the designer in this functional proliferation

The designer recognizes new fields of action for the object and assigns a functional reality but cannot control the outcome of this operation. For example, while Streamline design makes the artefact into a fashion item with a planned obsolescence, the designer does not have control over the environmental effects correlating to the efficiency of the object with regard to failure or replacement (an ecological issue). If control of these externalities does not appear at first sight in the power of designers, it is from these externalities that they invest the new

features of the object. Studying the object in assemblage, the designer focuses more on the multiplicities of functional opportunities than on the stabilised functions of the object. Design creates an object that cannot be reduced to its technical function because it includes, by functional proliferation, the capacity to transform the socius via this function. The relationships between the object and its assemblage are imperceptible at first, and then consolidate to form functions that are recognized as such by designers. To study an object with a view to grasping the meaning of its functionality is first and foremost to understand the object as being inseparable from its social organization. The object cannot be studied in isolation but must always be viewed through the relationships it establishes with its physical environment, the individuals organized with and by it, and the social organization that produces it and that underlies it (recurrent causality between the object and its assemblage).

To define design, Raymond Loewy, in *Never Leave Well Enough Alone*, considers a couple of Rube Goldberg's machines (Loewy 1951: 250). To Loewy, the famous cartoonist from New York was a 'poor industrial designer', and he took it upon himself to revisit two of Goldberg's machines, the 'Dishwasher' and the 'Self-Sharpening Razor Blade', to explain the operation of design. Here is how the 'Self-Sharpening Razor Blade' works: a gust of wind blows open a door and pulls a string attached to a hammer, which explodes a cap and wakes a sleeping cockroach that falls into a pail of water; the water splashes onto a washboard, causing a bar of soap to slide down, thereby releasing some goldfish; a hungry seagull swoops down on them, pulling on a string that starts the motor for sharpening the blade. One would expect Loewy to have revisited these bizarre and heterogeneous elements in a logical manner to create an opaque, smooth, streamlined and automated box, but in actual fact he did nothing of the sort. Admittedly, Loewy did integrate all the machinic elements into a synergistic whole, but his design did not do away with the cockroaches, washboard or seagull. Furthermore, it incorporated an additional patriotic dimension that was not found in the 1951 edition but shown later in the French 1963 edition, namely a tape recorder that automatically plays the national anthem when the blade is set in motion. The designer does not decide on the assemblage, but merely organizes the overflowing functionality combining what Bruno Latour calls a network of humans and non-humans (Latour 2005: 72). It is no coincidence that Deleuze and Guattari included two of Goldberg machines in the appendix to the French edition of *Anti-Oedipus* to complement their description of

desiring machines (Deleuze and Guattari 1972: 464–465). The function is primarily a break-based function that generates effects on different planes. Although design is a process that seeks to grasp the *object in assemblage*, this does not mean that it is a design *of* the assemblage because assemblage consolidation starts off imperceptibly and is unanticipated. The designer does not know what will happen, but he/she knows that something will happen. He/she places sociotechnical assemblage in this hesitation: between the desire for control and expectation.

Leaving the emerging sociotechnical process, the designer operates in this hesitation. He/she develops a specific viewpoint on the subject by extending technical efficiency to its social consequences, but the impossibility of anticipation due to the multiplicity of the forces involved defines their work as a social experiment. The designer, highlighting the different functional regimes of the object shows the artefact as producing unanticipatable effects. The figure of the designer differs from the image of the demiurge artisan, master of shaped material: their work is defined by the grasping of sociotechnical effects from ever new, unpredictable associations. If the activity of the designer is experimental, this experiment in the sociotechnical field would not own the designer him/herself, but the designed object transforming the dwelling environment and consolidating these transformations. It is not the designer who experiments, but the artefact which experiments with itself in connection with its assemblage.

This experimental dimension related to the life of the object in assemblage is attached to the possibility of a dysfunction always associated with the very functionality of the object. Dysfunction is the unexpected event that questions the stability of the functional regime. If dysfunction stops such a regime, it is not external to the functional itself. If Sears Roebuck uses Loewy to redesign their refrigerators, it is precisely because of the failure of the firm's economic function during economic recession following the 1929 crash. The aesthetic, symbolic and advertising regimes created by Loewy therefore arose from an economic dysfunction of the object, just as eco-design was born of environmental dysfunctions related to overconsumption and renewed obsolescence of objects integrated in fashion cycles. Dysfunction, far from being the negation of any functionality, is an explicit part of the sociotechnical sphere: it demonstrates the end of a functional regime and the emergence of a new functioning regime for the object. It is the index of new sociotechnical affects not yet perceptible as such.

Functionality appears to be *what we cannot escape*: while dysfunction

may cause a function to cease, it does not necessarily mark the interruption of functionality. To dysfunction is to always redefine the relationship between different functional regimes; dysfunction calls for another way of functioning. The rupture of a functional regime does not leave the object in a powerless presence but suggests certain capacities and associated effects that were hitherto concealed. Functionality acts as a 'noise' surrounding the object, making way for new effects upon the cessation of an effect that is recognized as a function. An object cannot stop functioning or entering effective and affective relationships of transformation because it is always 'in assemblage'. In *Anti-Oedipus*, when Deleuze and Guattari initially assume that 'technical machines obviously work only if they are not out of order; they ordinarily stop working not because they break down but because they wear out' (Deleuze and Guattari 1977: 31), it is only because they are imagining an abstract technical artefact that is separate from its assemblage and isolated in a physicochemical bubble. More precisely, dysfunction is not in the *crossing* – crossing from one regime to another still involves functioning, moving from one function to another – but in the permanent *superposition* of different regimes: the object is used while already operating as an aesthetic object that serves no purpose, or as recyclable raw material. The interaction between the various capacities of the object is the starting point for understanding what we call its functionality: functionality is always functioning and dysfunctioning at once, layering everything the object *can do* in an assemblage.

Conclusion

Deleuze and Guattari's concepts of 'assemblage' and 'proliferation' allow us to think the operation proper to design: to grasp an object always related to a dwelling environment that defines this object and is defined by it. The object appears as a functional node consolidating a sociotechnical assemblage. The object is not only designed as a simple passive material envelope for paths to intentions and human needs, but is thought of as being cross linked, organized in a dwelling environment thereby affecting forms of life inhabiting this environment. Thus, as being always in relationship with other objects and subjects in its assemblage, the designed object blurs the distinction between subject and object.

Although the classic examples like the Arts and Craft's *Sussex* chair or Raymond Loewy's *Coldspot* may appear to be old and outdated compared to contemporary high-technology products, they do nonetheless reveal something fundamental about our time: design

reflects a sociotechnical transformation of our ways of life. One major concern of this work was therefore not to relegate such old industrial design productions to a mere 'history of styles', but instead to draw on these examples to identify the underlying operations. The concept of assemblage enables functionality to traverse material and ideal sets, psychical and social sets. The functionality of an object is always multiple following the different relationships of the object in its assemblage. A functional regime then appears as a 'refraining' (*ritournellisation*) (Guattari 1995: 16) of technical functionality, manifesting itself as an 'attractor' in the chaos of functionality. It is what maintains the unity of the object in its usage, compulsively repeating the same physicochemical effect or purpose of use. To assign a function is to assert the existence of a *stable* connection, whose stability cannot be explained physically but historically. Functionality characterizes the consolidation of this heterogenesis and design is directly concerned with this symbiosis, for better or for worse.

References

Banham, R and Dallegret, F. (1965), 'A Home Is Not a House', *Art in America*, 2, 70–79.

Baudrillard, J. (1981), *For a Critique of the Political Economy of the Sign*, trans. Charles Levin, St. Louis: Telos Press.

Cummins, R. (1975), 'Functional Analysis', *Journal of Philosophy*, 72: 20, 741–765.

Deleuze, G. (1994), *Difference and Repetition*, trans. Paul Patton, London: Athlone Press.

Deleuze, G. (1990), *The Logic of Sense*, trans. M. Lester and C. Stivale, New York: Columbia University Press.

Deleuze, G. and Guattari, F. (1972), *L'Anti-Œdipe, Capitalisme et schizophrénie 1*, Paris: Éditions de Minuit.

Deleuze, G. and Guattari, F. (1977), *Anti-Oedipus: Capitalism and Schizophrenia*, trans. Robert Hurley, Mark Seem and Helen R. Lane, Minneapolis: University of Minnesota Press, 1983.

Deleuze, G. and Guattari, F. (1987), *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi, Minneapolis: University of Minnesota Press.

Deleuze, G. and Guattari, F. (1994), *What is Philosophy?* trans. Hugh Tomlinson and Graham Burchell, New York: Columbia University Press.

Deleuze, G. and Parnet, C. (1987), *Dialogues*, trans. Hugh Tomlinson and Barbara Habberjam, London: Athlone Press.

Guattari, F. (1995), *Chaosmosis: An Ethico-Aesthetic Paradigm*, trans. P. Baines and J. Pefanis, Indianapolis: Indiana University Press.

Houkes, W. and Meijers, A. (2006), 'The Ontology of Artefacts: the Hard Problem', *Studies in History and Philosophy of Science*, 37: 1, 118–131.

Houkes, W. and Vermaas P. (2006), 'Technical Functions: a Drawbridge Between the Intentional and Structural Natures of Technical Artefacts', *Studies in History and Philosophy of Science*, 37: 1, 5–18.

Houkes, W. and Vermaas P. (2010), 'Théorie des fonctions techniques: combinaisons sophistiquées de trois archétypes', in Gayon, J. and de Ricqlès, A. (eds), *Les fonctions : des organismes aux artefacts*, Paris: PUF « Science, histoire et société », 381–404.

Kroes, P. and Meijers, A. (2006), 'The Dual Nature of Technical Artefacts', *Studies in History and Philosophy of Science*, 37: 1, 1–4.

Krohs, U. and Kroes, P. (eds) (2009), *Functions in Biological and Artificial Worlds. Comparative Philosophical Perspectives*, Cambridge: MIT Press.

Latour, B. (2005), *Reassembling the Social. An Introduction to Actor-Network-Theory*, New York: Oxford University Press.

Leroi-Gourhan, A. (1971), *L'homme et la matière*, Paris: Albin Michel.

Leroi-Gourhan, A. (1973), *Milieu et techniques*, Paris: Albin Michel.

Leroi-Gourhan, A. (1993), *Gesture and Speech*, trans. Anna Bostock Berger, Cambridge: MIT Press.

Lidwell, W. and Manacsa, G. (2009), *Deconstructing Product Design: Exploring the Form, Function, Usability, Sustainability, and Commercial Success of 100 Amazing Products*, Beverly: Rockport Publishers.

Loewy, R. (1951), *Never Leave Well Enough Alone*, New York: Simon and Schuster.

Loewy, R. (1990), *La laideur se vend mal*, Paris: TEL Gallimard.

Millikan, R. (1984), *Language, Thought, and Other Biological Categories*, Cambridge: MIT Press.

Morris, W. (1901), *Art and its Producers, and the Arts and Crafts of Today: Two Adresses Delivered Before the National Association for the Advancement of Art*, London: Longman & Co.

Neander, K. (1991), 'Functions as Selected Effects: The Conceptual Analyst's Defense', *Philosophy of Science*, 58: 2, 168–184.

Pevsner, N. (1968), *The Sources of Modern Architecture and Design*, London: Thames and Hudson.

Preston, B. (1998), 'Why is a Wing Like a Spoon? A Pluralist Theory of Function', *The Journal of Philosophy*, 95: 5, 215– 254.

Simondon, G. (1989), *Du mode d'existence des objets techniques*, Paris: Aubier.

Simondon, G. (2005), *L'individuation à la lumière des notions de formes et d'information*, Grenoble: Jérôme Millon.

Simondon, G. (2005), *L'invention dans les techniques. Cours et conférences*, Paris: Seuil.

Simondon, G. (1961), 'Psychosociologie de la technicité', *Bulletin de l'École pratique de psychologie et de pédagogie de Lyon*, 3, 197–238.

Wright, L. (1973), 'Functions', *Philosophical Review*, 82: 2, 139–168.

1   This utopian understanding of design is still valid when design becomes an integrated instrument of capitalism because its interest in social sculpture clearly resonates with a capitalist organization seeking to rationalize social relations and their compatibility with the requirements of the market. The capitalist integration of the design object is precisely due to the interest in the social insertion of this item (Baudrillard 1981: 186).

2   Wright's theory is clarified and defended by Millikan (1984) and Neander (1991). While Millikan and Neander only briefly mention a possible application of the etiological theory to artefacts, Beth Preston rigorously defines the function of use of artefacts by modifying the etiological theories to apply them in biology as well as technology. See Preston (1998).

3   According to the expression introduced by David Chalmers, the 'hard problem' of consciousness, in philosophy of mind, characterizes the impossibility to establish a strict correlation between the activity of neuronal processes and the subjective and phenomenal experience of consciousness.

4   The term 'planned obsolescence' comes from a chapter published by Bernard London in 1932 during the New Deal, entitled 'Ending the Depression Through Planned Obsolescence,' from his book *The New Prosperity*. He made the observation that, as a result of the economic crisis, Americans were no longer in the habit of getting rid of their possessions before they were completely worn out, and that they were determined to keep their goods for much longer periods than predicted by statisticians, thus going against the 'law of obsolescence'.