

LEFT TO OUR OWN DEVICES

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At times it appears as if ‘artifacts’ are best described as ‘not nature’ – but even at that, the boundary begins to blur as we consider developments in areas such as genetics and biotechnology where biology and design begin to merge. The realm of artifacts has grown, and so have notions of what they are and could be. Our world is becoming ever more an artificial one, understood as ‘made by’ rather than ‘given to’ us. Research is no longer – if ever – about describing what is, but increasingly about exploring what could be – and in many cases therefore also what *will* be. And so, the subject of design, that of “the initiation of change in man-made things” as J. C. Jones [1992, p. 6] put it, has expanded – how could it not?

Seen from inside, the design space of man-made things has grown beyond our scale in all directions. We create things, such as molecules, in the laboratories that exist for such short time spans they are on the very threshold of existence. We create stuff that will be around for longer than we will exist, perhaps even as a species. And with miniaturisation of technology, we create things at a scale far smaller than we can relate to with our own senses. No wonder this expansion of the subject of design causes difficulties.

In what follows, I will speculate a bit about the ‘made’ part of the notion of ‘man-made things’, as this development seems to imply some changes also to how we may think of acts of design and use.

not nature

Whatever our ideas about the relation between the living and the artificial as such, it seems that our understanding of nature plays a certain role in the development of the artificial. In relation to design research, Herbert Simon considered biology as a role model for his envisioned sciences of the artificial, which among other things could be seen in his ideas about methods for scientific enquiry through optimisation, like how nature can be considered as evolving towards the purposeful and advantageous [Simon 1996]. In everyday practice, we might talk about the evolution of a concept or a design, or about structuring the design process in a way that includes several ‘generations’ of suggestions and sketches, where we select from each generation the ones most interesting to develop further. Another example is how the central role of functions in our understanding of technical objects have a certain resemblance to our way of understanding the living organism as composed of parts, e.g., organs, having certain functions [cf. Cummins 1975, Kroes 2001]. The roots to this comparison go rather deep in our history, as in the works of one our early ‘biologists’:

...if some tool, say an axe, were a natural body, its substance would be being an axe, and this would be its soul. And if this was separated from it, it would not continue

to be an axe ... if the eye was an animal, then sight would be its soul, ... And the eye is the matter of sight, so that when sight leaves it it is no longer an eye except homonymously, in the way of a stone or painted eye. [Aristotle, De Anima, pp. 158f]

life form

Considering this migration of ideas from biology – or rather, from our understanding of ‘living’ things – to our understanding of ‘man-made’ things (and back), there is one aspect of the living not yet explored to any significant extent in design: that of growth and becoming.

Of course, design to some extent deals with development over time, but our basic understanding seems typically centred on what *is*, what it is that designers create. Now, if the reason for thinking this way is because our materials used to be rather static in nature, it seems that digital technologies will challenge this view as the things we design no longer necessarily stay the way we left them.

Consider a typical personal computer as an example: though the device was made and set up by the manufacturer, over time the user fills it with new software, documents and other files, effectively making it into something of a ‘personal’ device. Does this mean that the act of designing the computer has been stretched out, and that to use it now also means to design it, as it is the user that, so to say, is the creator of its current form?

That there are layers of design and use is in itself not new: a craftsperson ‘uses’ her material to build, say, a bowl, that someone then ‘uses’ to make food, etc. But in this case the ‘form’ of the made thing, the bowl, remains and whereas the user interprets and perhaps redefines the ‘use’ of the bowl, we would hardly think that she alters its ‘form’. The personal computer, however, seems a bit different in this respect.

Perhaps one could object and point out that a user typically assembles already given pieces, e.g., readymade software, and that this is not really the same as designing the thing. But then again, a significant part of ‘designing’ a computer is assembly in the first place: hardware components are put together, code is being re-used as new applications are developed, etc. Just think of how object-oriented programming languages like Java with all its libraries work.

It seems hard to make a proper distinction between design and use on basis of vague notions of “originally created by X”, and if we try the assumption that ‘designer’ here means the one(s) responsible for a particular structure of parts, it seems that ‘to use’ will be rather similar to ‘to design’. Yet, intuitively, there seems to be a certain difference between using information technology and designing it, just as there seems to be a difference between designing a house and living in it, even though the latter includes furnishing it, modifying the interiors, repainting the exteriors, etc. Does such a distinction between design and use start to break down as we try to understand what happens to the form of an artifact capable of significant change during its life-span?

Perhaps we can think of use as a kind of cultivation. To use a computer is a bit like farming: one does not create the plants but grow them; one does not create the earth but take care of it.

Digging deeper in the dirt, we might return to the works of our early ‘biologist’, Aristotle. As it happens, form is not only a central notion in design, but in Aristotle’s philosophy as well. His distinction between form and matter may appear rather straightforward explaining the difference between the way something has been made and with what, in order to account for examples like how two bowls can both be made in copper but differ in form, or how two bowls may have the same form though made out of different materials. While this works well for static objects, it does not account for why certain things change, something rather central to the living. For instance, why

do acorns turn into oaks, and indeed why do acorns turn into oaks and not into hens for that matter?

Trying to explain change and growth, he somehow had to introduce 'causes', or mechanisms, for change. What is interesting, at least from our present point of view, is that he did so by expanding upon his conceptions of form and matter: "Thus matter and form regarded as factors in a process of change become potentiality and actuality (or potency and act)." [O'Connor, p. 51]. To (over-)simplify we may then say that through its matter and form, a given thing carries with it not only its current state but also a set of potential other states. Obviously, it is not the current explanatory powers of these ideas in biology that interests us, but the notion of form and matter as not only static features but as factors for change.

but let us cultivate our garden

According to notions of design as "the initiation of change in man-made things" [Jones 1992], design in general seems to be a lot about changing things. While that might be true of the objectives of design practice, typical notions of form and matter are in many ways similar to Aristotle's account of the static object. Consider the term 'man-made' – what does 'made' refer to here? That it was once made and then remains that way [cf. Jones 1988]?

Certainly, notions of design *processes* are very important, but typically such ideas relate to the practice of design and not so much to the actual form of the objects created. There is, of course, also the design of actual processes, but these are often accompanied by ideas such as that the 'what' we are designing is something like the 'user-experience' or a 'communication process'. In such cases, design seems to be turning away from the things themselves, and so when it comes to the actual artifacts designed to support these processes, notions of form are still rather static.

Still, this has some possibly interesting implications for how we think about 'form-giving'. Though it may be initially tempting to think of this expanded notion of form as a way of simulating the workings of the living, e.g., as done within studies of learning processes to design more 'intelligent systems', we need not think of it in such terms. Perhaps we can simply think of it as expansion of our current notions of 'form', as to include not only giving form to the existing but also the shaping of the possible, of what might become.

It seems rather strange to say that we give form to the possible, not necessarily knowing now precisely what it might be – yet, as the example of the personal computer above illustrates, we already deal with it in practice. Here, it seems we have created something that not only has a certain current form, but also a set of possible future forms. And as with acorns and eggs, a computer can not become *any thing*, though it certainly can become very many different things.

Looking towards more established areas of design, we can perhaps recognize this issue as when one talks about 'using' materials in design; although here it would be the material itself that defines the space of possible future forms through its characteristic properties. One can certainly do very many things with wood or ceramics, but one can not do *any thing*. Is this the way one should try to understand artifacts like the personal computer: is this like creating 'material' that someone else will 'use' to design their own thing?

A notion of form-giving as not only including the actual but also the potential is in many ways both trivial and rather intriguing - as is Aristotle's original distinction. Perhaps, it can help us discuss why there seems to be a difference between designing and using an artifact, as this, then, can be seen as setting up a space of possible future states on one hand, and then realising such states on the other.

Such notions of form, and thus also of form-giving, could therefore perhaps also be helpful in relation to our other concern, that of understanding how design and use seemingly are layers of acts relative to each other. For instance, we may think *we* ‘design’ a computational device that *they* will be ‘using’, but the people over here think we are ‘using’ *their* hardware components to build it. From one perspective what is being done is design, from another perspective it seems to be a matter of using something. We can not ‘do’ without ‘change’.

As it seems, it is not only the design space that has been stretched in all directions as a result of technology development in general and of digital technologies in particular, so have acts of design and use. And so in the end, we will all be truly left to our own devices.

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