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Source: *Paragraph*, November 2012, Vol. 35, No. 3 (November 2012), pp. 355-372

Published by: Edinburgh University Press

Stable URL: <https://www.jstor.org/stable/43263846>

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***Bricoleur* and *Bricolage*: From Metaphor to Universal Concept**

CHRISTOPHER JOHNSON

Abstract:

Lévi-Strauss's concept of *bricolage*, first formulated in *La Pensée sauvage* (*The Savage Mind*) in 1962, was originally presented as an analogy for how mythical thought works, selecting the fragments or left-overs of previous cultural formations and re-deploying them in new combinations. Significantly, from its source in structural anthropology, the concept has travelled in two directions, towards both the sciences (molecular biology and evolutionary theory) and the humanities (art criticism and critical theory). The aim of this article is to return to Lévi-Strauss's original formulation of *bricolage* in order to explore the ways in which this technical metaphor transcends its status as simply a metaphor and becomes something like a universal concept. As the key opposition between the *bricoleur* and the engineer demonstrates, *bricolage* is also an ideological construct which carries with it a set of suppositions about the nature of science and technology in the post-war world. Looking at the wider scientific imaginary which informs this vision—in particular, Lévi-Strauss's representation of nuclear science—the article concludes by arguing for a more comprehensive understanding of the concept of *bricolage* as applicable not simply to traditional or residual forms of human activity, but also to the practice—and indeed the essence—of modern scientific and technological development.

Keywords: *bricoleur*, *bricolage*, Lévi-Strauss, molecular biology, nuclear science, science and technology, structuralism

Mon père, qui était un grand bricoleur, inventait toutes sortes
de petits métiers.

(My father, who was a great improviser, would come up
with all sorts of little projects.)¹

Paragraph 35.3 (2012): 355–372

DOI: 10.3366/para.2012.0064

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Since its original formulation in Claude Lévi-Strauss's *The Savage Mind* (*La Pensée sauvage*) in 1962, the concept of *bricolage* has followed a peculiar trajectory through the history of ideas.² This French word has been assimilated into English usage in a number of distinct areas or disciplines in the humanities and sciences. In art criticism, for example, *bricolage* has come to mean the 'Construction or (esp. literary or artistic) creation from a diverse range of materials or sources. Hence: an object or concept so created; a miscellaneous collection, often (in *Art*) of found objects'.³ This first assimilation of *bricolage* is a predictable one, if one remembers that Lévi-Strauss's original definition uses examples from modern art (brute or naïve art, the Surrealist notion of 'hasard objectif') and the history of art (a commentary on Clouet's painting of Elisabeth of Austria) to illustrate how *bricolage* works. Less predictable, and more surprising, is the assimilation of *bricolage* into scientific discourse, more precisely into the language of evolutionary biology, in order to describe the process of evolution not as a product of design—the unfolding of a predetermined plan or template—but rather as the makeshift adaptation of existing structures and functions to new ends. The originator of this particular use of *bricolage* was the French biologist François Jacob, Lévi-Strauss's colleague at the Collège de France, who published a landmark article in 1977 on evolution as 'tinkering'.⁴

The aim of this article is not to investigate the different interdisciplinary appropriations of *bricolage*—this would need to be the object of a separate study. However, what these appropriations demonstrate is the status of *bricolage* as a kind of universal concept, applicable beyond its original instance of enunciation in *The Savage Mind*, and therefore the importance of returning to this text in order properly to understand the generative potential of the concept. Paradoxically, for the humanities such a return may have been partially blocked by Jacques Derrida's critique of *bricolage*, which has frequently acted as the prism through which the concept has been identified and understood.⁵ Derrida's critical focus in his early texts on the discourse of the human sciences, and notably that of structuralism, has arguably biased our reception of *bricolage* towards the field of the discursive. Despite the claims of the human sciences, exemplified in structuralism, to have transcended the traditional preoccupations of philosophy, Derrida argued that the discourse of the human sciences itself can be described as a form of *bricolage*, working as it does with the residua of concepts inherited from the history of metaphysics. This reading of *bricolage* has been an influential one, but one result of its

focus on discourse has been that what might be termed the 'operative' dimension of the concept has been left to one side. The intention of this article is to reexamine the original formulation of *bricolage* as a *technical metaphor*, and through this, to clarify the more general question of the treatment of science and technology in Lévi-Strauss's work.

The passage on *bricolage* occurs towards the end of the first chapter of *The Savage Mind*, 'The Science of the Concrete'. In this chapter, mobilizing an extensive corpus of secondary literature on non-Western systems of classification, the author argues for the relative autonomy of these representations in relation to their instantiations in the material world, describing them as a 'science of the concrete' or 'logic of the sensible'. The argument is a traditionally relativist one, to the extent that it questions the Western characterization of the pre-logical nature of 'savage thought' and its subordination to the immediate satisfaction of material needs. The complexity of the systems of classification of plants and animals one finds in indigenous cultures is not related in a simple and direct manner to the technical exploitation of these life forms for the purposes of material subsistence. This argument for the abstract and 'extensible' nature of savage thought is strategically opposed to what Lévi-Strauss considers to be the materialist-reductionist attitude of the functionalist school of anthropology (Malinowski, Radcliffe-Brown), which perpetuates the stereotype of 'primitive' cultures as possessing a more utilitarian attitude towards knowledge by virtue of their closer proximity to the world of natural needs. The composite portrait of the 'savage mind' that emerges from the opening pages of the book is therefore an intellectualist one: though different in kind, in their capacity for abstract and systematic thinking indigenous systems of classification are in no way inferior to modern science (SM, 8–13). The argument here is that while the 'science of the concrete' found in non-western societies does not penetrate behind phenomena in the same way as modern science, from the Neolithic period onwards it has followed a track parallel to that of the exact and natural sciences, and if the technical achievements of the Neolithic (pottery, weaving, agriculture, the domestication of animals) are taken into account, can be seen to represent the bedrock of our own civilization (16).

The passage in which the essential features of *bricolage* are defined covers a sequence of six or seven pages (16–22). *Bricolage* itself is presented as a survival of ancestral ways of thinking and doing which persists in certain everyday practices of our modern industrial

civilization, and it is used as a metaphor for how mythical thought works:

There still exists among ourselves an activity which on the technical plane gives us quite a good understanding of what a science we prefer to call 'prior' rather than 'primitive', could have been on the plane of speculation. This is what is commonly called 'bricolage' in French. (...) in our own time the 'bricoleur' is still someone who works with his hands and uses devious means [*des moyens détournés*, indirect or roundabout means] compared to those of a craftsman [*homme de l'art*]. The characteristic feature of mythical thought is that it expresses itself by means of a heterogeneous repertoire [*un répertoire dont la composition est hétéroclite*] which, even if extensive, is nevertheless limited. It has to use this repertoire, however, whatever the task in hand because it has nothing else at its disposal [*rien d'autre sous la main*, nothing else to hand]. Mythical thought is therefore a kind of intellectual 'bricolage'—which explains the relation which can be perceived between the two. (SM, 16–17; PS, 26)

At the simplest level, *bricolage* is therefore a technical metaphor for a cognitive and creative process: the composition and generation of mythical discourse. However, the use of this metaphor is an overdetermined one, both in the opening definition and in the subsequent development of the conceptual field of *bricolage*, in particular in relation to the questions it raises about the nature of science and technology. In this sense, *bricolage* could be said to transcend its use as a metaphor applied to myth, to become something like a universal concept. Taking its cue from Lévi-Strauss's own modulation in the passage between *bricolage* and *bricoleur*, the following analysis will look at first, *bricolage* as an activity and second, the *bricoleur* as agent.

When considered as an activity, the first thing that can be said of *bricolage* is that it is *combinatorial* in nature. This is consistent with Lévi-Strauss's conceptualization of myth since at least 'The Structural Study of Myth' (1955), where by analogy with the minimal units of structural linguistic analysis—phonemes, morphemes, etc.—he identifies 'mythemes' as the 'gross constitutive units' of myth, speculating that the underlying logic of their combination is that of the binary opposition.⁶ While the term 'mytheme' is not used in this passage, it is clear that the elements or materials that are mobilized for the activity of *bricolage*—like atoms and molecules in the realm of physics, or phonemes and morphemes in realm of linguistics—are subject to a process of combination and recombination. But whereas the elementary units of physics or linguistics might possess a certain

stability and uniformity, the elements of *bricolage* are ‘heterogeneous’, a rather neutral translation of the French term *hétéroclite*, which carries the stronger sense of disparate, ill-assorted, sundry, etc. In fact, a few pages later Lévi-Strauss uses the lexical singularities of English (biographically his ‘second’ language) in order to express the uneven and residual character of the elements of *bricolage*:

Now, the characteristic feature of mythical thought, as of ‘bricolage’ on the practical plane, is that it builds up structured sets, not directly with other structured sets, but by using the remains and debris of events: in French ‘des bribes et des morceaux’, or odds and ends in English, fossilized evidence of the history of an individual or a society. (*SM*, 21–2)⁷

结构性

To pursue the physical and linguistic analogies, if atoms (or phonemes selected from the sound continuum) are substitutable, then higher-level molecular constructs (or words) have a density and history, a three- or four-dimensionality, which makes a directly modular combination more problematic. It is as if their oddness, their unevenness, their *stereospecificity*, precluded a universal fit, requiring a contingent process of trial and error, the oblique integration of disparate parts, in order for the object of *bricolage* to come into being. Along the axis of time *bricolage*, as Lévi-Strauss conceptualizes it, is in effect a process of destruction—or de-construction—and recombination.⁸ As Boas, quoted by Lévi-Strauss, says a propos of myth: ‘It would seem that mythological worlds have been built up, only to be shattered again, and that new worlds were built from the fragments’ (21).⁹ One could therefore speak of the *fractal geometry of bricolage*, which in this particular configuration bears an uncanny resemblance to Freud’s description of the dream-work in *The Interpretation of Dreams*:

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The different portions [*Stücke*] of this complicated structure stand, of course, in the most manifold logical relations to one another. (...) When the whole mass of these dream-thoughts is brought under the pressure of the dream-work, and its elements [*Stücke*] are turned about, broken into fragments and jammed together [*gedreht, zerbröckelt und zusammengeschoben*]—almost like pack-ice—the question arises of what happens to the logical connections which have hitherto formed its framework.¹⁰

Freud’s striking metaphor of pack-ice describes a process of deconstruction and reconstruction, or *reassignment*, in which the elements of the ‘complicated structure’ of the dream-thoughts are broken up and forced into new relationships under the organizing

principle of the dream-work. As with Lévi-Strauss's *bricolage*, these elements retain a certain historical density subsequent to the process of recombination: they are not indifferently interchangeable units but, to paraphrase Lévi-Strauss, 'fossilized evidence of the history of an individual'.

As was suggested earlier, Lévi-Strauss's exposition of *bricolage* modulates between *bricolage* as an activity and the *bricoleur* as agent. The sequencing of this modulation is not indifferent: Lévi-Strauss begins with *bricolage* as an activity or process. If one considers the object of the analogy of *bricolage*, 'primitive' or mythical thought, then it is clear that this must be the case. For structural anthropology pattern and process, structure and system always precede and condition individual cognition and action. As Lévi-Strauss will state a few years later in the introduction to *The Raw and the Cooked* (1964), 'I therefore claim to show, not how men think (*pensent*) in myths, but how myths operate (*se pensent*) in men's minds without their being aware of the fact.'¹¹ Similarly, it could be argued that it is *bricolage* which thinks, or operates, through the *bricoleur*, rather than the reverse — as we shall see, (s)he is never entirely in command of his or her means of production.

If the *bricoleur* as human agent is secondary to *bricolage* — mythical thought is a statistical reality before it is an act of individual creation — it remains the case that the characterization of the *bricoleur* in *The Savage Mind* is central to understanding more exactly how Lévi-Strauss views the role of science and technology in the modern world. But who, or what, exactly is the *bricoleur*? He or she is not, it seems, exactly coincident with the contemporary definition of 'handyman' or 'handywoman', 'DIY man' or 'DIY enthusiast'.¹² This is probably why, as is the case with *bricolage*, Lévi-Strauss's English translator prefers to leave the term in its French form, as a kind of 'untranslatable'.¹³ This translation choice — or, more precisely, avoidance of choice — in its turn requires explanation, and is therefore supported by a translator's note which highlights the uncertainty or instability of the *bricoleur* as a social category: 'The "bricoleur" has no precise equivalent in English. He is a man who undertakes odd jobs and is a Jack of all trades or a kind of professional do-it-yourself man, but, as the text makes clear, he is of a different standing from, for instance, the English "odd job man" or handyman.' (SM, 17) The translator retains the foreign term *bricoleur* as a marker of cultural difference, suggesting that the social categories in question are not entirely equivalent in English and French.¹⁴ However, it is more probably the case that the terms *bricoleur* and *bricolage* are already being used in a derived sense in

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the original French text, their meaning biased towards the making of things rather than the more everyday sense of **utilitarian** maintenance. What the translator's note does bring out quite clearly is something that is linguistically embedded but not openly articulated in the French text, that is, the gender of the *bricoleur*, who is unquestionably a man. In this respect, it could be said that the question concerning technology is always most predominantly a masculine one. Moreover, this man is (in English) a **handyman**, a **term which resonates laterally with a leitmotif of the French text, i.e., the fact that the *bricoleur* is 'someone who works with his hands' (*celui qui œuvre de ses mains*), who uses 'odds and ends' because there is quite literally nothing else to hand (*rien d'autre sous la main*).** One can see here that there is an ideology of *bricolage*, and—despite the distinction Lévi-Strauss draws in his opening definition between the *bricoleur* and the craftsman (*l'homme de l'art*)—**its intellectual kinship with Heidegger's depiction of manual labour in *Being and Time* and his other writings on technology.**¹⁵ The *bricoleur* occupies a specific environment, that of the workshop; he works individually on individual objects (it is difficult to imagine the product of *bricolage* as a replicable object); he works with tools rather than machines, and his materials are **ready-to-hand**, taken from his immediate environment.

This ideological dimension of *bricolage* is most clearly articulated in the opposition Lévi-Strauss goes on to make between the *bricoleur* and the engineer. As he makes clear, the metaphor of *bricolage* is more than a metaphor; it is not simply an analogy for myth, but also allows us to better understand the distinction between Western scientific knowledge and the 'science of the concrete', as it has been explored in the opening sequence of the book:

The analogy is worth pursuing since it helps us to see the real relations between the two types of scientific knowledge we have distinguished. The '*bricoleur*' is adept at performing a large number of diverse tasks; but, unlike the engineer, he does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project. His universe of instruments is closed and the rules of his game are always to make do with 'whatever is at hand' (*les 'moyens du bord'*), that is to say with a set of tools and materials which is always finite and is also heterogeneous because what it contains bears no relation to the current project, or indeed to any particular project, but is the contingent result of all the occasions there have been to renew or enrich the stock or to maintain it with the remains of previous constructions or destructions. The set of the '*bricoleur*'s means cannot therefore be defined in terms of a project (which would presuppose besides, that, as in the case of the engineer, there were, at least

in theory, as many sets of tools and materials or ‘instrumental sets’, as there are different kinds of projects). It is to be defined only by its potential use (...) because the elements are collected or retained on the principle that ‘they may always come in handy’ (*ça peut toujours servir*). Such elements are specialized up to a point (*à demi particularisés*) (...) but not enough for each of them to have only one definite and determinate use. (SM, 17–18; PS, 27)

The introduction of the figure of the engineer serves here mainly as a counterpoint, in order to bring out more clearly the nature of the *bricoleur* and his mode of operation. The engineer himself (again gendered) remains a rather shadowy presence in the text. He is obviously a generic type, representing what Lévi-Strauss understands to be the predominant mode of operation of applied science in the mid-twentieth century. This is what might be termed projective science, which starts from an abstracted and theoretical knowledge of the material world, and a project—or programme—for its transformation.¹⁶ This will mean ideally (‘at least in theory’) that there will be a potentially infinite diversification of the means of production, specialized tools and dedicated materials for each and every category of manufactured object. In contrast to the *bricoleur*, the ‘universe of instruments’ of the engineer could be said to be open and infinitely extensible. The practical knowledge of projective science is not constrained by its history: it is able to invent its future without reference to its instrumental past. The practical knowledge of the *bricoleur*, on the other hand, could be said to be reactive or retrospective: it is defined less by the sense of a project than by the sedimented potential of the finite—and disparate—set of ‘tools and materials’ that he has accumulated over time. These elements are, so to speak, multivalent, that is, they retain a certain determinate use value, but because of their abstraction from their original functional context there is a degree of manoeuvre, or play, in their redeployment: they are overdetermined in their history but underdetermined as to their potential use.

The project of the *bricoleur*, if there is one, is therefore enabled but also constrained by the historical density of the elements with which he works. This double movement of projection-retrospection is perfectly captured in Lévi-Strauss’s subsequent description of the *bricoleur* at work in his virtual workshop:

Consider him at work and excited by his project. His first practical step is retrospective.¹⁷ He has to turn back to an already existent set made up of tools and materials, to consider or reconsider what it contains and, finally and above

all, to engage in a sort of dialogue with it and, before choosing between them, to index the possible answers which the whole set can offer to his problem. He interrogates all the heterogeneous objects [*objets hétéroclites*] of which his treasury is composed to discover what each of them could 'signify' and so contribute to the definition of a set which has yet to materialize but which will ultimately differ from the instrumental set only in the internal disposition of its parts. (SM, 18)

One can see here, following Derrida, the extent to which Lévi-Strauss's own discourse on *bricolage* is itself, both lexically and conceptually, a form of *bricolage*. While the fundamental metaphor is technical ('tools and materials'), Lévi-Strauss's conceptualization of the process of selection and combination of the elements of *bricolage* is informational, drawing from the lexical field of information theory. This operates as a kind of metaphor within a metaphor, in which the linguistic-informational model Lévi-Strauss had previously used to characterize myth seems in turn to contaminate the technical metaphor of *bricolage*.¹⁸ In information theory, the concept of information corresponds not to the everyday definition of meaning, but to the set of possible alternative messages in a given communication situation. In a simple communication system, a message is selected out of a set of possible messages, coded and transmitted through a channel to its destination, where it is decoded.¹⁹ Similarly here, in his attempt to realize his project or reach his destination, the *bricoleur* has to work (or play) within the parameters, and therefore possibilities, of a finite set or closed system. His 'dialogue' with his tools and materials is a restricted one. While the project of the engineer could be said to operate in a direct line from conception to realization, that of the *bricoleur*, constrained by his means of production, follows an indirect route which will necessarily deviate from his initial intention, the result of which 'will always be a compromise between the structure of the instrumental set and that of the project. Once it materializes the project will therefore inevitably be at a remove [*décalé*] from the initial aim' (21).

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The distinction between the *bricoleur* and the engineer is of course an idealized one, and Lévi-Strauss himself is aware of the artificial nature of the opposition. As Derrida will remark, the figure of the engineer is a 'myth' invented by the *bricoleur*, a theological vision of absolute and immaculate creation.²⁰ Lévi-Strauss concedes that like the *bricoleur*, the 'means, power and knowledge' of the engineer are also limited, and that he too must come to terms with the 'resistance' of the natural world and the limitations of the 'material means at his disposal'. His

‘dialogue’ with nature is never a purely direct one, and is also in its own way mediated through a historically situated state of development of human culture (19). This retraction, and collapsing, of the distinction between *bricoleur* and engineer can be read, classically, as an example of the self-deconstructing nature of Lévi-Strauss’s discourse on myth and *bricolage* as a metaphor for myth. However, equally interesting here is the manner in which Lévi-Strauss attempts to maintain the distinction, which is by shifting it to another level of generality, beyond that of the particular projects of the *bricoleur* or engineer to that of their essential projects, which from this perspective, at least, remain divergent ones:

The difference is therefore less absolute than it might appear. It remains a real one, however, in that the engineer is always trying to make his way out of and go beyond [*au-delà*] the constraints imposed by a particular state of civilization while the ‘bricoleur’ by inclination or necessity [*de gré ou de force*] always remains within them [*en deçà*]. (SM, 19)

The equivocal status of the *bricoleur*’s behaviour—he does what he does through ‘inclination or necessity’, that is, he is constrained by his particular material universe but also *prefers* to remain within it—brings us back to the question of the ideology of *bricolage*. The idealized figures of the *bricoleur* and the engineer represent two ways of being in the world and (materially) dealing with the world, and from the point of view of the anthropologist the value of their practical knowledge is in principle a relative one: ‘it is important not to make the mistake of thinking that these are two stages or phases in the evolution of knowledge. Both approaches are equally valid.’ (SM, 22). However, there is equally and inevitably an affective preference, on the part of the anthropologist, for the *bricoleur*, and a symmetrical concern with the ‘state of civilization’ as it has developed in the Western industrial world in the middle of the twentieth century. As mentioned above, the ‘engineer’ remains a somewhat shadowy figure in this passage: he is described generically as the scientist (*savant, homme de science*) but is also, under the same category, assimilated with the physicist (20). In order to understand more fully the subtext of these modulations between scientist, engineer and physicist, it is necessary briefly to widen the context beyond *The Savage Mind* and consider another key text of the same period.

Conversations with Claude Lévi-Strauss (1961) is a transcription of a series of radio interviews with Georges Charbonnier broadcast by Radiodiffusion-Télévision Française (France 3) in October, November and December 1959.²¹ During these interviews Lévi-Strauss is

encouraged to extend the field of speculation beyond his own specialized knowledge as an anthropologist, to speak as a specialist but also to pronounce on wider issues such as the relationship between individual and society in the production of culture, and the development of Western art—for example, in surrealism, cubism, abstract painting, classical and contemporary music. In these passages, one can observe Lévi-Strauss using the more open, dialogical space of the interview in order to explore territory that he would not normally be able to explore in his more narrowly specialized texts—thematically, a number of these passages seem to prepare and prefigure what he will say about art in the more speculative sequences of *The Savage Mind*.²² However, in Charbonnier's opening comments, which frame the interviews, the question of art is part of a wider question concerning specialization in contemporary society, and the 'divorce', as Charbonnier puts it, between the public and specialists, whether those specialists be producers of culture or producers of scientific knowledge. It is the scientist, he claims, who evokes the greatest fear and suspicion in the public, since his or her specialized knowledge seems increasingly to carry with it unprecedented power, a power now even greater than that of politicians. This apprehension vis-à-vis the power of the scientist is accompanied by scepticism concerning his or her intentions:

We used to have doubts about the moral sense of politicians, but that problem has ceased to interest us. What we have doubts about now is the scientist's moral conscience. We criticize the scientist for pursuing research which may lead to destructive ends. We criticize him for having succeeded in making pure research coincide with the potential destruction of humanity. In short, for having ensured the advancement of physics through the creation of the atom bomb. We criticize the physicist for having found an alibi, an indestructible alibi, in knowledge. (CLS, 10)

Atomic science is paradigmatic of the will to knowledge compromised by the will to power and the destructive ends to which that knowledge is put. For Charbonnier, art has been our traditional place of refuge from the encroachments of reductionist science, the final repository of human experience and human values. The so-called 'human' sciences—designated here as prehistory, archaeology and ethnology—have traditionally been closer to this kind of knowledge than to physics, which poses the 'greater threat' (12).

Charbonnier's comments on contemporary science, and notably his identification of the scientist with nuclear physics, are replicated and confirmed by Lévi-Strauss himself later on in their discussion,

when he asserts that ‘of course, nowadays “scientist” means “atomic physicist”’, adding the relativistic qualification that the ambivalent feelings of the public towards these individuals (fear and repulsion combined with reverence and admiration) is not unlike the attitudes expressed in traditional societies towards, for example, the social caste of blacksmiths (46). If the agent of contemporary science, exemplarily the nuclear scientist, is the subject of moral suspicion — with his or her hyper-specialized knowledge goes the power to make (and unmake) a world — then paradoxically the activity of modern science itself seems to diminish the agency of the agent through its creation of an unmediated relationship with the forces of nature:

What you have defined there is a characteristic feature not so much of the aesthetic activity of modern man as of his scientific and technical activities. All the great creations of modern science bring man into increasingly direct contact [*en prise directe*] with nature, adapt him to it [*l'accordent à la nature*] and turn him into a kind of instrument or agent for the demonstration of the great natural laws; some such laws, which have no observable manifestation in given nature, have disclosed their existence [*se dévoilent*] through the works of man, as is the case with the use of nuclear power for either peaceable or war-like purposes. . . (CLS, 141–2)²³

What Lévi-Strauss is defining here is not simply the application of ‘pure’ science to practical ends—for example the application of theoretical physics to nuclear technology—but a state of civilization in which increasingly it is the made world, ‘a world completely invaded by culture and the products of culture’ (137) which becomes the agent of knowledge, through its capacity to reveal a nature which the human subject alone is unable to access. This particular state of civilization, which Lévi-Strauss elsewhere describes as ‘machine civilization’ (*la civilisation mécanique*), liberates the human subject through an unmediated and unlimited access to the forces of nature, but also, as we see here, brings with it the subordination of the human to an integrally manufactured world. What Lévi-Strauss explores in the series of interviews with Charbonnier are the alternative modes of interaction with the world (art, the material culture of traditional societies) where there is a disparity, as Lévi-Strauss puts it, ‘between the technical means at the artist’s disposal and the resistance of the materials he has to master’, which means that (s)he is never able to reproduce an object in its entirety, only to ‘signify’ it (60). Whereas the science of machine civilization can be said to have broken the resistance of nature—spectacularly so in the extreme case of nuclear science—in the manual and material culture of the societies studied

by anthropologists, and residually, the artistic culture of our own, 'the artist is never completely in control of his materials and technical processes' (108).

Returning now to *The Savage Mind* and the passage on *bricolage*, the ideological dimension of Lévi-Strauss's staging of the two protagonists, *bricoleur* and engineer, becomes somewhat clearer. When correlated with the figure of the nuclear scientist in the *Conversations with Claude Lévi-Strauss*, the 'project' of the engineer-scientist depicted in *The Savage Mind* becomes a Promethean one: his goal is always to move beyond (*au-delà*) the particular constraints of the natural and material world in order to achieve a total mastery of them. This predominantly conceptual mode of operation is indifferent to the contingent (substitutable) tools and materials that are constructed to achieve its ends. Its tendency is always towards the opening (*ouverture*) of the 'set' (*ensemble*) of the elements (tools and materials) it works with. By contrast, the science of the *bricoleur* is Epimethean: as a 'science of the concrete' it chooses—or is obliged—to work within (*en deçà*) the closed set of elements which are already to hand, and to deal, aporetically, with the resistances inherent in these elements. If the engineer works with concepts which 'aim to be wholly transparent with respect to reality', the *bricoleur* works with signs which retain a degree of human depth (*une certaine épaisseur d'humanité*) (SM, 19–20; PS, 30).²⁴

The problem with Promethean science is that its project of total control—the direct interfacing of humanity with nature—carries with it the risk, and ultimate danger, of a loss of control, a geopolitical virtuality which hovers in the background of Lévi-Strauss's references to science and technology in the 1950s and 1960s. In this sense, the texts we have been considering are entirely symptomatic of the anxieties of their time. The *bricoleur*, on the other hand, may be a marginal figure, and *bricolage* a 'survival' of older practices which are now tolerated only as hobbies or pastimes in modern industrial societies (32–3), but his function in Lévi-Strauss's text is clearly a didactic one. The marginality of the *bricoleur* is also his singularity: he works alone and independently of the institutionalized division of labour which defines the modern scientist or engineer, the kind of 'big science' without which nuclear technology or the space programme would have been impossible.²⁵ The economy of *bricolage* is one of 'make do and mend', based on the recycling of extant materials which retain their historical and human depth; the activity of the *bricoleur* is an embodied, manual activity, in which he 'may

not ever complete his purpose [*projet*] but he always puts something of himself into it' (21).²⁶ In this respect, Lévi-Strauss's opposition between *bricoleur* and engineer replicates in microcosm the wider distinction he makes, in *Race and History*, between 'stationary' and 'cumulative' cultures or, in the interviews with Charbonnier, between 'cold' and 'hot' societies. In these texts, it is argued that traditional (stationary or cold) societies, which lack the defining technology of writing, experience history differently from literate (cumulative or hot) societies, which are able to capitalize on scientific knowledge and technological development, leading to their exponential—and destructive—growth.²⁷ The Sartrean version of 'dialectical' history, which Lévi-Strauss will go on to criticize in the final chapter of *The Savage Mind*, is precisely defined by this sense of forward momentum, or 'project', whereas 'peoples without writing', as depicted in *Tristes tropiques*, are 'incapable of remembering the past beyond the narrow margin of individual memory, [and] seem bound to remain imprisoned in a fluctuating history which will always lack both a beginning and any lasting awareness of an aim [*la conscience durable d'un projet*]'.²⁸

To conclude, we have seen that Lévi-Strauss's exposition of *bricolage* is an overdetermined one, serving both the local epistemological argument of *The Savage Mind* (*bricolage* as a metaphor for how mythical thought works) and a wider, ideological agenda (the figure of the *bricoleur* as emblematic of the divergence between traditional and modern scientific modes of thinking and doing). However, if we accept that, in Lévi-Strauss's own words, the difference between the *bricoleur* and the scientist-engineer is 'less absolute than it might appear', then this perhaps allows us finally to appreciate more fully the value of *bricolage* as a universal concept. Beyond its situated context in *The Savage Mind*, what Lévi-Strauss's description of the *bricoleur* encourages us to reflect upon is whether the process of *bricolage* is not in fact intrinsic to the history of technology, or more precisely, whether this history does not operate essentially between the twin poles of design (project) and *bricolage*. Such a history would include the technologies of advanced industrial societies as well as those of traditional societies, and would extend to the prehistory as well as the origins of technology. Beyond its paradoxical function as a technical metaphor applied to the cognitive realm of myth, what *bricolage* as a universal concept teaches us is that the evolution of technology is always a two-way (retroactive, feedback) process of projection and retrospection, thought and action, abstraction and application. This process or principle is structurally no different to that

of (natural) evolution itself. As Lévi-Strauss comments in an article on François Jacob's book *The Possible and the Actual*, published some twenty years after *The Savage Mind*: 'nature doesn't act according to a transcendent principle of sufficient reason, externally regulating the conflict between logic and experience, rather it works between these two extremes, in an ad hoc fashion [*travaillant de bric et de broc*]'.²⁹ Jacob's definition of the nature of evolution is precisely that it is a process of *bricolage*, the constant re-use of the old in order to make the new. Curiously, Lévi-Strauss's commentary on Jacob does not refer to his own text, *The Savage Mind*, as the source of this metaphor. Whether the omission is intentional, a matter of etiquette, or whether it is simply an oversight, it is as if the concept of *bricolage*, disassembled and detached from its original context in *The Savage Mind*, has indeed assumed a life of its own.

NOTES

- 1 Claude Lévi-Strauss and Didier Eribon, *De près et de loin* (Paris: Plon, 1988), 12; *Conversations with Claude Lévi-Strauss*, translated by Paula Wissing (Chicago: University of Chicago Press, 1991), 5.
- 2 Claude Lévi-Strauss, *The Savage Mind* (Oxford: Oxford University Press, 1996). Page references in the text follow the abbreviation *SM*. Where translation issues are relevant, references are added for *La Pensée sauvage* (Paris: Plon, 1962) and follow the abbreviation *PS*.
- 3 *Oxford English Dictionary Online* (<http://www.oed.com>).
- 4 'Evolution and Tinkering', *Science* 196 (1977), 1161–6. Jacob returns to the metaphor of evolution as *bricolage* in *The Possible and the Actual* (New York: Pantheon Books, 1982), 33–4. On Jacob's use of *bricolage*, see Christopher Johnson, 'Biotechnologies', in *Glossolalia: Key Words in Critical Theory*, edited by Julian Wolfreys (Edinburgh: Edinburgh University Press, 2003), 23–33 (26–8). For a biologist's perspective on *bricolage*, see Adam S. Wilkins, 'Between "Design" and "Bricolage": Genetic Networks, Levels of Selection, and Adaptive Evolution', *Proceedings of the National Academy of Sciences* 104 (May 2007), 8590–6.
- 5 Jacques Derrida, 'Structure, Sign and Play in the Discourse of the Human Sciences' in *Writing and Difference*, translated by Alan Bass (London: Routledge, 2001), 351–70 (360–1). Frédéric Keck makes a similar evaluation in the recent Pléiade edition of Lévi-Strauss's works. While recognizing the force and rigour of Derrida's analysis of *The Savage Mind* in 'Structure, Sign and Play', Keck notes that the particularities of the reception of this analysis

- in the United States has resulted in a somewhat limited appreciation of Lévi-Strauss's thought. See Claude Lévi-Strauss, *Œuvres*, edited by Vincent Debaene, Frédéric Keck, Marie Mauzé and Martin Rueff (Paris: Gallimard, 2008), 1797–8. See also *Keck's readings of bricolage in Lévi-Strauss et la pensée sauvage* (Paris: Presses Universitaires de France, 2004), 48–52 and 'Remarques sur la notion de bricolage chez Claude Lévi-Strauss' in *Des mondes bricolés? Arts et sciences à l'épreuve de la notion de bricolage*, edited by Françoise Odin and Christian Thuderoz (Lausanne-Lyon: Presses Polytechniques et Universitaires Romandes, 2010), 53–60.
- 6 Claude Lévi-Strauss, *Structural Anthropology*, translated by Claire Jacobson and Brooke Grundfest Schoepf (Harmondsworth: Penguin, 1977), 210–16.
 - 7 In the translated text this reference to the French seems arbitrary, but becomes clearer if one returns to the sequencing of the original text: "“odds and ends”, dirait l'anglais, ou, en français, des bribes et des morceaux' (*PS*, 32).
 - 8 While the etymology would be a false one, the implicit double articulation of the word *bricolage* in French (*bri-colage*) invites the subliminal identification of a process of breakage (*bri-*, *briser*, etc.) and subsequent sticking back together of the fragments (*collage*).
 - 9 At the beginning of the second chapter of *The Savage Mind*, 'The Logic of Totemic Classifications', Lévi-Strauss uses the metaphor of the kaleidoscope to describe this process of fragmentation and rearrangement (36).
 - 10 Sigmund Freud, *The Interpretation of Dreams*, edited by Angela Richards, translated by James Strachey (London: Penguin, 1991), 422. Derrida quotes this passage in 'Freud and the Scene of Writing' as an illustration of what he terms the 'machinery' of the dream-system (*Writing and Difference*, 273).
 - 11 Claude Lévi-Strauss, *The Raw and the Cooked*, translated by John and Doreen Weightman (New York/Evanston: Harper and Row, 1969), 12.
 - 12 These are the translations given in the Oxford Hachette and Collins Robert standard bilingual dictionaries.
 - 13 Barbara Cassin defines the 'untranslatable' as follows: 'untranslatable in no way implies that the terms in question (...) have not or cannot be translated — the untranslatable is rather that which one never stops (not) translating'. See *Vocabulaire européen des philosophies: Dictionnaire des intraduisibles*, edited by Barbara Cassin (Paris: Seuil, 2004), xvii.
 - 14 It is interesting to note that the German translator of *La Pensée sauvage* has no problem in finding a suitable equivalent for *bricoleur*, which is rendered as *Bastler*, while *bricolage* is translated as *Bastelei*. See Lévi-Strauss, *Das Wilde Denken*, translated by Hans Naumann (Frankfurt: Suhrkamp Verlag, 1968), 29.
 - 15 On Heidegger's romanticization of hand-tools and handiwork, see Don Ihde, *Heidegger's Technologies: Postphenomenological Perspectives* (New York: Fordham University Press, 2010), 18, 20, 51, 76–9.

- 16 Lévi-Strauss alludes to the Cartesian distinction between primary and secondary qualities when he suggests that “‘Bricolage’ also works with “secondary qualities”, i.e., “second hand”’ (SM, 22).
- 17 In the original French this combined movement of projection-retrospection is more effectively captured in a single sentence, which turns on the concessive *pourtant*: ‘Regardons-le à l’œuvre: excité par son projet [*spurred on by his project*], sa première démarche pratique est pourtant [*however*] rétrospective’ (PS, 28).
- 18 Lévi-Strauss refers explicitly to information theory on the following page: ‘Information Theory shows that it is possible, and often useful, to reduce the physicists’ approaches to a sort of dialogue with nature’ (SM, 19). On the role of information theory and cybernetics in Lévi-Strauss’s conceptualization of myth, see Christopher Johnson, *Claude Lévi-Strauss: The Formative Years* (Cambridge: Cambridge University Press, 1993), 92–103.
- 19 Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1959), 99–100. A few pages later, Lévi-Strauss writes that ‘Both the scientist and “bricoleur” might therefore be said to be constantly on the look out for “messages”’ (SM, 20).
- 20 *Writing and Difference*, 360–1. See also *Of Grammatology*, translated by Gayatri Chakravorty Spivak (Baltimore/London: Johns Hopkins University Press, 1996), 138–40.
- 21 Georges Charbonnier, *Conversations with Claude Lévi-Strauss* (1961), translated by John and Doreen Weightman (London: Jonathan Cape, 1969). Page references in the text follow the abbreviation CLS.
- 22 In *The Savage Mind*, art is accorded a transitional status in relation to traditional and modern science: ‘art lies half-way between scientific knowledge and mythical or magical thought’ (22). For a wide-ranging analysis of Lévi-Strauss’s thinking on art and aesthetics, see Boris Wiseman, *Lévi-Strauss, Anthropology and Aesthetics* (Cambridge: Cambridge University Press, 2007).
- 23 A similar argument is made with reference to Rousseau and the Neolithic in *Tristes tropiques* (1955): ‘In that mythic age [the Neolithic], man was no freer than he is today; but only his humanness made him a slave. Since his control over nature remained very limited, he was protected — and to some extent released from bondage — by a cushioning of dreams. As these dreams were gradually transformed into knowledge, man’s power increased and became a great source of pride; but this power, which gears us, as it were, to the universe [*nous mettant « en prise directe » sur l’univers*], is surely little more than our subjective awareness of a progressive welding together of humanity and the physical universe, whose great deterministic laws, instead of remaining remote and awe-inspiring, now use thought itself as an intermediary medium and are colonizing us on behalf of a silent world of which we have become

- the agents.' See Lévi-Strauss, *Tristes tropiques*, translated by John and Doreen Weightman (New York: Penguin, 1992), 391; *Tristes tropiques* (Paris: Plon, 1955), 468–9.
- 24 The dialectic between 'Promethean' and 'Epimethean' science is an important theme of Bernard Stiegler's *Technics and Time 1. The Fault of Epimetheus* (1993), translated by Richard Beardsworth and George Collins (Stanford: Stanford University Press, 1998), 185–203.
 - 25 The classic statement on this aspect of post-war science and technology is Alvin Martin Weinberg's *Reflections on Big Science* (Cambridge: MIT Press, 1967).
 - 26 As this sentence suggests, the problem with the Epimethean science of *bricolage* is that the *bricoleur's* attachment to the 'odds and ends' that make up his 'instrumental set', based on the principle that 'they may always come in handy', could be seen from another perspective—for example, that of the engineer—as the potentially infinite accumulation of junk, in which the ultimate use-value of the *bricoleur's* 'treasury' in relation to its size and complexity tends rapidly towards zero. The danger here is that the *bricoleur*, dedicated to a solipsistic deconstruction and reconstruction of parts, will never be able to clear out his workshop.
 - 27 For a more detailed analysis of *Race and History* (1952) and Lévi-Strauss's views on technological development, see Johnson, *Claude Lévi-Strauss*, 109–33.
 - 28 *Tristes tropiques*, 298; 253. Keck suggests that Lévi-Strauss's use of the term 'project' in the passage on *bricolage* is an implicit reference to Sartre (Lévi-Strauss, 48), and argues that the opposition between *bricoleur* and engineer—and indeed the entire demonstration of *The Savage Mind*—is primarily constructed as a critique of Sartre's philosophy of history ('Remarques sur la notion de bricolage', 54). While Keck is right to indicate the importance of Lévi-Strauss's critique of Sartre in *The Savage Mind*, this is probably too narrow a reading of the passage on *bricolage*. As has been argued in this article, the opposition between *bricoleur* and engineer is part of a wider preoccupation in Lévi-Strauss's work with the relationship between science and technology, dating back to *Race and History* and other key texts of the 1950s.
 - 29 Claude Lévi-Strauss, 'La biologie, science exemplaire' [*Le Nouvel Observateur* 1981] in *Levi-Strauss par Lévi Strauss*, special number of *Le Nouvel Observateur* 74 (November–December 2009), 48–51 (50). The phrase *de bric et de broc*, with its obvious phonetic resonance with *bricolage*, could also be translated as 'any old how', 'with bits and pieces' (Oxford Hachette Dictionary).

***Bricoleur* and *Bricolage*: From Metaphor to Universal Concept**

CHRISTOPHER JOHNSON

Abstract:

Lévi-Strauss's concept of *bricolage*, first formulated in *La Pensée sauvage* (*The Savage Mind*) in 1962, was originally presented as an analogy for how mythical thought works, selecting the fragments or left-overs of previous cultural formations and re-deploying them in new combinations. Significantly, from its source in structural anthropology, the concept has travelled in two directions, towards both the sciences (molecular biology and evolutionary theory) and the humanities (art criticism and critical theory). The aim of this article is to return to Lévi-Strauss's original formulation of *bricolage* in order to explore the ways in which this technical metaphor transcends its status as simply a metaphor and becomes something like a universal concept. As the key opposition between the *bricoleur* and the engineer demonstrates, *bricolage* is also an ideological construct which carries with it a set of suppositions about the nature of science and technology in the post-war world. Looking at the wider scientific imaginary which informs this vision—in particular, Lévi-Strauss's representation of nuclear science—the article concludes by arguing for a more comprehensive understanding of the concept of *bricolage* as applicable not simply to traditional or residual forms of human activity, but also to the practice—and indeed the essence—of modern scientific and technological development.

Keywords: *bricoleur*, *bricolage*, Lévi-Strauss, molecular biology, nuclear science, science and technology, structuralism

Mon père, qui était un grand bricoleur, inventait toutes sortes
de petits métiers.

(My father, who was a great improviser, would come up
with all sorts of little projects.)¹

Paragraph 35.3 (2012): 355–372

DOI: 10.3366/para.2012.0064

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Since its original formulation in Claude Lévi-Strauss's *The Savage Mind* (*La Pensée sauvage*) in 1962, the concept of *bricolage* has followed a peculiar trajectory through the history of ideas.² This French word has been assimilated into English usage in a number of distinct areas or disciplines in the humanities and sciences. In art criticism, for example, *bricolage* has come to mean the 'Construction or (esp. literary or artistic) creation from a diverse range of materials or sources. Hence: an object or concept so created; a miscellaneous collection, often (in *Art*) of found objects'.³ This first assimilation of *bricolage* is a predictable one, if one remembers that Lévi-Strauss's original definition uses examples from modern art (brute or naïve art, the Surrealist notion of 'hasard objectif') and the history of art (a commentary on Clouet's painting of Elisabeth of Austria) to illustrate how *bricolage* works. Less predictable, and more surprising, is the assimilation of *bricolage* into scientific discourse, more precisely into the language of evolutionary biology, in order to describe the process of evolution not as a product of design—the unfolding of a predetermined plan or template—but rather as the makeshift adaptation of existing structures and functions to new ends. The originator of this particular use of *bricolage* was the French biologist François Jacob, Lévi-Strauss's colleague at the Collège de France, who published a landmark article in 1977 on evolution as 'tinkering'.⁴

The aim of this article is not to investigate the different interdisciplinary appropriations of *bricolage*—this would need to be the object of a separate study. However, what these appropriations demonstrate is the status of *bricolage* as a kind of universal concept, applicable beyond its original instance of enunciation in *The Savage Mind*, and therefore the importance of returning to this text in order properly to understand the generative potential of the concept. Paradoxically, for the humanities such a return may have been partially blocked by Jacques Derrida's critique of *bricolage*, which has frequently acted as the prism through which the concept has been identified and understood.⁵ Derrida's critical focus in his early texts on the discourse of the human sciences, and notably that of structuralism, has arguably biased our reception of *bricolage* towards the field of the discursive. Despite the claims of the human sciences, exemplified in structuralism, to have transcended the traditional preoccupations of philosophy, Derrida argued that the discourse of the human sciences itself can be described as a form of *bricolage*, working as it does with the residua of concepts inherited from the history of metaphysics. This reading of *bricolage* has been an influential one, but one result of its

focus on discourse has been that what might be termed the 'operative' dimension of the concept has been left to one side. The intention of this article is to reexamine the original formulation of *bricolage* as a *technical metaphor*, and through this, to clarify the more general question of the treatment of science and technology in Lévi-Strauss's work.

The passage on *bricolage* occurs towards the end of the first chapter of *The Savage Mind*, 'The Science of the Concrete'. In this chapter, mobilizing an extensive corpus of secondary literature on non-Western systems of classification, the author argues for the relative autonomy of these representations in relation to their instantiations in the material world, describing them as a 'science of the concrete' or 'logic of the sensible'. The argument is a traditionally relativist one, to the extent that it questions the Western characterization of the pre-logical nature of 'savage thought' and its subordination to the immediate satisfaction of material needs. The complexity of the systems of classification of plants and animals one finds in indigenous cultures is not related in a simple and direct manner to the technical exploitation of these life forms for the purposes of material subsistence. This argument for the abstract and 'extensible' nature of savage thought is strategically opposed to what Lévi-Strauss considers to be the materialist-reductionist attitude of the functionalist school of anthropology (Malinowski, Radcliffe-Brown), which perpetuates the stereotype of 'primitive' cultures as possessing a more utilitarian attitude towards knowledge by virtue of their closer proximity to the world of natural needs. The composite portrait of the 'savage mind' that emerges from the opening pages of the book is therefore an intellectualist one: though different in kind, in their capacity for abstract and systematic thinking indigenous systems of classification are in no way inferior to modern science (SM, 8–13). The argument here is that while the 'science of the concrete' found in non-western societies does not penetrate behind phenomena in the same way as modern science, from the Neolithic period onwards it has followed a track parallel to that of the exact and natural sciences, and if the technical achievements of the Neolithic (pottery, weaving, agriculture, the domestication of animals) are taken into account, can be seen to represent the bedrock of our own civilization (16).

The passage in which the essential features of *bricolage* are defined covers a sequence of six or seven pages (16–22). *Bricolage* itself is presented as a survival of ancestral ways of thinking and doing which persists in certain everyday practices of our modern industrial

civilization, and it is used as a metaphor for how mythical thought works:

There still exists among ourselves an activity which on the technical plane gives us quite a good understanding of what a science we prefer to call 'prior' rather than 'primitive', could have been on the plane of speculation. This is what is commonly called 'bricolage' in French. (...) in our own time the 'bricoleur' is still someone who works with his hands and uses devious means [*des moyens détournés*, indirect or roundabout means] compared to those of a craftsman [*homme de l'art*]. The characteristic feature of mythical thought is that it expresses itself by means of a heterogeneous repertoire [*un répertoire dont la composition est hétéroclite*] which, even if extensive, is nevertheless limited. It has to use this repertoire, however, whatever the task in hand because it has nothing else at its disposal [*rien d'autre sous la main*, nothing else to hand]. Mythical thought is therefore a kind of intellectual 'bricolage' — which explains the relation which can be perceived between the two. (SM, 16–17; PS, 26)

At the simplest level, *bricolage* is therefore a technical metaphor for a cognitive and creative process: the composition and generation of mythical discourse. However, the use of this metaphor is an overdetermined one, both in the opening definition and in the subsequent development of the conceptual field of *bricolage*, in particular in relation to the questions it raises about the nature of science and technology. In this sense, *bricolage* could be said to transcend its use as a metaphor applied to myth, to become something like a universal concept. Taking its cue from Lévi-Strauss's own modulation in the passage between *bricolage* and *bricoleur*, the following analysis will look at first, *bricolage* as an activity and second, the *bricoleur* as agent.

When considered as an activity, the first thing that can be said of *bricolage* is that it is *combinatorial* in nature. This is consistent with Lévi-Strauss's conceptualization of myth since at least 'The Structural Study of Myth' (1955), where by analogy with the minimal units of structural linguistic analysis — phonemes, morphemes, etc. — he identifies 'mythemes' as the 'gross constitutive units' of myth, speculating that the underlying logic of their combination is that of the binary opposition.⁶ While the term 'mytheme' is not used in this passage, it is clear that the elements or materials that are mobilized for the activity of *bricolage* — like atoms and molecules in the realm of physics, or phonemes and morphemes in realm of linguistics — are subject to a process of combination and recombination. But whereas the elementary units of physics or linguistics might possess a certain

stability and uniformity, the elements of *bricolage* are ‘heterogeneous’, a rather neutral translation of the French term *hétéroclite*, which carries the stronger sense of disparate, ill-assorted, sundry, etc. In fact, a few pages later Lévi-Strauss uses the lexical singularities of English (biographically his ‘second’ language) in order to express the uneven and residual character of the elements of *bricolage*:

Now, the characteristic feature of mythical thought, as of ‘bricolage’ on the practical plane, is that it builds up structured sets, not directly with other structured sets, but by using the remains and debris of events: in French ‘des bribes et des morceaux’, or odds and ends in English, fossilized evidence of the history of an individual or a society. (*SM*, 21–2)⁷

结构性

To pursue the physical and linguistic analogies, if atoms (or phonemes selected from the sound continuum) are substitutable, then higher-level molecular constructs (or words) have a density and history, a three- or four-dimensionality, which makes a directly modular combination more problematic. It is as if their oddness, their unevenness, their *stereospecificity*, precluded a universal fit, requiring a contingent process of trial and error, the oblique integration of disparate parts, in order for the object of *bricolage* to come into being. Along the axis of time *bricolage*, as Lévi-Strauss conceptualizes it, is in effect a process of destruction—or de-construction—and recombination.⁸ As Boas, quoted by Lévi-Strauss, says a propos of myth: ‘It would seem that mythological worlds have been built up, only to be shattered again, and that new worlds were built from the fragments’ (21).⁹ One could therefore speak of the *fractal geometry of bricolage*, which in this particular configuration bears an uncanny resemblance to Freud’s description of the dream-work in *The Interpretation of Dreams*:

偶然性

The different portions [*Stücke*] of this complicated structure stand, of course, in the most manifold logical relations to one another. (...) When the whole mass of these dream-thoughts is brought under the pressure of the dream-work, and its elements [*Stücke*] are turned about, broken into fragments and jammed together [*gedreht, zerbröckelt und zusammengeschoben*]—almost like pack-ice—the question arises of what happens to the logical connections which have hitherto formed its framework.¹⁰

Freud’s striking metaphor of pack-ice describes a process of deconstruction and reconstruction, or *reassignment*, in which the elements of the ‘complicated structure’ of the dream-thoughts are broken up and forced into new relationships under the organizing

principle of the dream-work. As with Lévi-Strauss's *bricolage*, these elements retain a certain historical density subsequent to the process of recombination: they are not indifferently interchangeable units but, to paraphrase Lévi-Strauss, 'fossilized evidence of the history of an individual'.

As was suggested earlier, Lévi-Strauss's exposition of *bricolage* modulates between *bricolage* as an activity and the *bricoleur* as agent. The sequencing of this modulation is not indifferent: Lévi-Strauss begins with *bricolage* as an activity or process. If one considers the object of the analogy of *bricolage*, 'primitive' or mythical thought, then it is clear that this must be the case. For structural anthropology pattern and process, structure and system always precede and condition individual cognition and action. As Lévi-Strauss will state a few years later in the introduction to *The Raw and the Cooked* (1964), 'I therefore claim to show, not how men think (*pensent*) in myths, but how myths operate (*se pensent*) in men's minds without their being aware of the fact.'¹¹ Similarly, it could be argued that it is *bricolage* which thinks, or operates, through the *bricoleur*, rather than the reverse — as we shall see, (s)he is never entirely in command of his or her means of production.

If the *bricoleur* as human agent is secondary to *bricolage* — mythical thought is a statistical reality before it is an act of individual creation — it remains the case that the characterization of the *bricoleur* in *The Savage Mind* is central to understanding more exactly how Lévi-Strauss views the role of science and technology in the modern world. But who, or what, exactly is the *bricoleur*? He or she is not, it seems, exactly coincident with the contemporary definition of 'handyman' or 'handywoman', 'DIY man' or 'DIY enthusiast'.¹² This is probably why, as is the case with *bricolage*, Lévi-Strauss's English translator prefers to leave the term in its French form, as a kind of 'untranslatable'.¹³ This translation choice — or, more precisely, avoidance of choice — in its turn requires explanation, and is therefore supported by a translator's note which highlights the uncertainty or instability of the *bricoleur* as a social category: 'The "bricoleur" has no precise equivalent in English. He is a man who undertakes odd jobs and is a Jack of all trades or a kind of professional do-it-yourself man, but, as the text makes clear, he is of a different standing from, for instance, the English "odd job man" or handyman.' (SM, 17) The translator retains the foreign term *bricoleur* as a marker of cultural difference, suggesting that the social categories in question are not entirely equivalent in English and French.¹⁴ However, it is more probably the case that the terms *bricoleur* and *bricolage* are already being used in a derived sense in

结构主义

关于
bricoleur
的解释

the original French text, their meaning biased towards the making of things rather than the more everyday sense of **utilitarian** maintenance. What the translator's note does bring out quite clearly is something that is linguistically embedded but not openly articulated in the French text, that is, the gender of the *bricoleur*, who is unquestionably a man. In this respect, it could be said that the question concerning technology is always most predominantly a masculine one. Moreover, this man is (in English) a **handyman**, a **term which resonates laterally with a leitmotif of the French text, i.e., the fact that the *bricoleur* is 'someone who works with his hands' (*celui qui œuvre de ses mains*), who uses 'odds and ends' because there is quite literally nothing else to hand (*rien d'autre sous la main*).** One can see here that there is an ideology of *bricolage*, and—despite the distinction Lévi-Strauss draws in his opening definition between the *bricoleur* and the craftsman (*l'homme de l'art*)—**its intellectual kinship with Heidegger's depiction of manual labour in *Being and Time* and his other writings on technology.**¹⁵ The *bricoleur* occupies a specific environment, that of the workshop; he works individually on individual objects (it is difficult to imagine the product of *bricolage* as a replicable object); he works with tools rather than machines, and his materials are **ready-to-hand**, taken from his immediate environment.

This ideological dimension of *bricolage* is most clearly articulated in the opposition Lévi-Strauss goes on to make between the *bricoleur* and the engineer. As he makes clear, the metaphor of *bricolage* is more than a metaphor; it is not simply an analogy for myth, but also allows us to better understand the distinction between Western scientific knowledge and the 'science of the concrete', as it has been explored in the opening sequence of the book:

The analogy is worth pursuing since it helps us to see the real relations between the two types of scientific knowledge we have distinguished. The '*bricoleur*' is adept at performing a large number of diverse tasks; but, unlike the engineer, he does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project. His universe of instruments is closed and the rules of his game are always to make do with 'whatever is at hand' (*les 'moyens du bord'*), that is to say with a set of tools and materials which is always finite and is also heterogeneous because what it contains bears no relation to the current project, or indeed to any particular project, but is the contingent result of all the occasions there have been to renew or enrich the stock or to maintain it with the remains of previous constructions or destructions. The set of the '*bricoleur*'s means cannot therefore be defined in terms of a project (which would presuppose besides, that, as in the case of the engineer, there were, at least

in theory, as many sets of tools and materials or ‘instrumental sets’, as there are different kinds of projects). It is to be defined only by its potential use (...) because the elements are collected or retained on the principle that ‘they may always come in handy’ (*ça peut toujours servir*). Such elements are specialized up to a point (*à demi particularisés*) (...) but not enough for each of them to have only one definite and determinate use. (SM, 17–18; PS, 27)

The introduction of the figure of the engineer serves here mainly as a counterpoint, in order to bring out more clearly the nature of the *bricoleur* and his mode of operation. The engineer himself (again gendered) remains a rather shadowy presence in the text. He is obviously a generic type, representing what Lévi-Strauss understands to be the predominant mode of operation of applied science in the mid-twentieth century. This is what might be termed projective science, which starts from an abstracted and theoretical knowledge of the material world, and a project—or programme—for its transformation.¹⁶ This will mean ideally (‘at least in theory’) that there will be a potentially infinite diversification of the means of production, specialized tools and dedicated materials for each and every category of manufactured object. In contrast to the *bricoleur*, the ‘universe of instruments’ of the engineer could be said to be open and infinitely extensible. The practical knowledge of projective science is not constrained by its history: it is able to invent its future without reference to its instrumental past. The practical knowledge of the *bricoleur*, on the other hand, could be said to be reactive or retrospective: it is defined less by the sense of a project than by the sedimented potential of the finite—and disparate—set of ‘tools and materials’ that he has accumulated over time. These elements are, so to speak, multivalent, that is, they retain a certain determinate use value, but because of their abstraction from their original functional context there is a degree of manoeuvre, or play, in their redeployment: they are overdetermined in their history but underdetermined as to their potential use.

The project of the *bricoleur*, if there is one, is therefore enabled but also constrained by the historical density of the elements with which he works. This double movement of projection-retrospection is perfectly captured in Lévi-Strauss’s subsequent description of the *bricoleur* at work in his virtual workshop:

Consider him at work and excited by his project. His first practical step is retrospective.¹⁷ He has to turn back to an already existent set made up of tools and materials, to consider or reconsider what it contains and, finally and above

all, to engage in a sort of dialogue with it and, before choosing between them, to index the possible answers which the whole set can offer to his problem. He interrogates all the heterogeneous objects [*objets hétéroclites*] of which his treasury is composed to discover what each of them could 'signify' and so contribute to the definition of a set which has yet to materialize but which will ultimately differ from the instrumental set only in the internal disposition of its parts. (SM, 18)

One can see here, following Derrida, the extent to which Lévi-Strauss's own discourse on *bricolage* is itself, both lexically and conceptually, a form of *bricolage*. While the fundamental metaphor is technical ('tools and materials'), Lévi-Strauss's conceptualization of the process of selection and combination of the elements of *bricolage* is informational, drawing from the lexical field of information theory. This operates as a kind of metaphor within a metaphor, in which the linguistic-informational model Lévi-Strauss had previously used to characterize myth seems in turn to contaminate the technical metaphor of *bricolage*.¹⁸ In information theory, the concept of information corresponds not to the everyday definition of meaning, but to the set of possible alternative messages in a given communication situation. In a simple communication system, a message is selected out of a set of possible messages, coded and transmitted through a channel to its destination, where it is decoded.¹⁹ Similarly here, in his attempt to realize his project or reach his destination, the *bricoleur* has to work (or play) within the parameters, and therefore possibilities, of a finite set or closed system. His 'dialogue' with his tools and materials is a restricted one. While the project of the engineer could be said to operate in a direct line from conception to realization, that of the *bricoleur*, constrained by his means of production, follows an indirect route which will necessarily deviate from his initial intention, the result of which 'will always be a compromise between the structure of the instrumental set and that of the project. Once it materializes the project will therefore inevitably be at a remove [*décalé*] from the initial aim' (21).

结构主义

The distinction between the *bricoleur* and the engineer is of course an idealized one, and Lévi-Strauss himself is aware of the artificial nature of the opposition. As Derrida will remark, the figure of the engineer is a 'myth' invented by the *bricoleur*, a theological vision of absolute and immaculate creation.²⁰ Lévi-Strauss concedes that like the *bricoleur*, the 'means, power and knowledge' of the engineer are also limited, and that he too must come to terms with the 'resistance' of the natural world and the limitations of the 'material means at his disposal'. His

'dialogue' with nature is never a purely direct one, and is also in its own way mediated through a historically situated state of development of human culture (19). This retraction, and collapsing, of the distinction between *bricoleur* and engineer can be read, classically, as an example of the self-deconstructing nature of Lévi-Strauss's discourse on myth and *bricolage* as a metaphor for myth. However, equally interesting here is the manner in which Lévi-Strauss attempts to maintain the distinction, which is by shifting it to another level of generality, beyond that of the particular projects of the *bricoleur* or engineer to that of their essential projects, which from this perspective, at least, remain divergent ones:

The difference is therefore less absolute than it might appear. It remains a real one, however, in that the engineer is always trying to make his way out of and go beyond [*au-delà*] the constraints imposed by a particular state of civilization while the 'bricoleur' by inclination or necessity [*de gré ou de force*] always remains within them [*en deçà*]. (SM, 19)

The equivocal status of the *bricoleur's* behaviour—he does what he does through 'inclination or necessity', that is, he is constrained by his particular material universe but also *prefers* to remain within it—brings us back to the question of the ideology of *bricolage*. The idealized figures of the *bricoleur* and the engineer represent two ways of being in the world and (materially) dealing with the world, and from the point of view of the anthropologist the value of their practical knowledge is in principle a relative one: 'it is important not to make the mistake of thinking that these are two stages or phases in the evolution of knowledge. Both approaches are equally valid.' (SM, 22). However, there is equally and inevitably an affective preference, on the part of the anthropologist, for the *bricoleur*, and a symmetrical concern with the 'state of civilization' as it has developed in the Western industrial world in the middle of the twentieth century. As mentioned above, the 'engineer' remains a somewhat shadowy figure in this passage: he is described generically as the scientist (*savant, homme de science*) but is also, under the same category, assimilated with the physicist (20). In order to understand more fully the subtext of these modulations between scientist, engineer and physicist, it is necessary briefly to widen the context beyond *The Savage Mind* and consider another key text of the same period.

Conversations with Claude Lévi-Strauss (1961) is a transcription of a series of radio interviews with Georges Charbonnier broadcast by Radiodiffusion-Télévision Française (France 3) in October, November and December 1959.²¹ During these interviews Lévi-Strauss is

encouraged to extend the field of speculation beyond his own specialized knowledge as an anthropologist, to speak as a specialist but also to pronounce on wider issues such as the relationship between individual and society in the production of culture, and the development of Western art—for example, in surrealism, cubism, abstract painting, classical and contemporary music. In these passages, one can observe Lévi-Strauss using the more open, dialogical space of the interview in order to explore territory that he would not normally be able to explore in his more narrowly specialized texts—thematically, a number of these passages seem to prepare and prefigure what he will say about art in the more speculative sequences of *The Savage Mind*.²² However, in Charbonnier's opening comments, which frame the interviews, the question of art is part of a wider question concerning specialization in contemporary society, and the 'divorce', as Charbonnier puts it, between the public and specialists, whether those specialists be producers of culture or producers of scientific knowledge. It is the scientist, he claims, who evokes the greatest fear and suspicion in the public, since his or her specialized knowledge seems increasingly to carry with it unprecedented power, a power now even greater than that of politicians. This apprehension vis-à-vis the power of the scientist is accompanied by scepticism concerning his or her intentions:

We used to have doubts about the moral sense of politicians, but that problem has ceased to interest us. What we have doubts about now is the scientist's moral conscience. We criticize the scientist for pursuing research which may lead to destructive ends. We criticize him for having succeeded in making pure research coincide with the potential destruction of humanity. In short, for having ensured the advancement of physics through the creation of the atom bomb. We criticize the physicist for having found an alibi, an indestructible alibi, in knowledge. (CLS, 10)

Atomic science is paradigmatic of the will to knowledge compromised by the will to power and the destructive ends to which that knowledge is put. For Charbonnier, art has been our traditional place of refuge from the encroachments of reductionist science, the final repository of human experience and human values. The so-called 'human' sciences—designated here as prehistory, archaeology and ethnology—have traditionally been closer to this kind of knowledge than to physics, which poses the 'greater threat' (12).

Charbonnier's comments on contemporary science, and notably his identification of the scientist with nuclear physics, are replicated and confirmed by Lévi-Strauss himself later on in their discussion,

when he asserts that ‘of course, nowadays “scientist” means “atomic physicist”’, adding the relativistic qualification that the ambivalent feelings of the public towards these individuals (fear and repulsion combined with reverence and admiration) is not unlike the attitudes expressed in traditional societies towards, for example, the social caste of blacksmiths (46). If the agent of contemporary science, exemplarily the nuclear scientist, is the subject of moral suspicion — with his or her hyper-specialized knowledge goes the power to make (and unmake) a world — then paradoxically the activity of modern science itself seems to diminish the agency of the agent through its creation of an unmediated relationship with the forces of nature:

What you have defined there is a characteristic feature not so much of the aesthetic activity of modern man as of his scientific and technical activities. All the great creations of modern science bring man into increasingly direct contact [*en prise directe*] with nature, adapt him to it [*l'accordent à la nature*] and turn him into a kind of instrument or agent for the demonstration of the great natural laws; some such laws, which have no observable manifestation in given nature, have disclosed their existence [*se dévoilent*] through the works of man, as is the case with the use of nuclear power for either peaceable or war-like purposes. . . (CLS, 141–2)²³

What Lévi-Strauss is defining here is not simply the application of ‘pure’ science to practical ends—for example the application of theoretical physics to nuclear technology—but a state of civilization in which increasingly it is the made world, ‘a world completely invaded by culture and the products of culture’ (137) which becomes the agent of knowledge, through its capacity to reveal a nature which the human subject alone is unable to access. This particular state of civilization, which Lévi-Strauss elsewhere describes as ‘machine civilization’ (*la civilisation mécanique*), liberates the human subject through an unmediated and unlimited access to the forces of nature, but also, as we see here, brings with it the subordination of the human to an integrally manufactured world. What Lévi-Strauss explores in the series of interviews with Charbonnier are the alternative modes of interaction with the world (art, the material culture of traditional societies) where there is a disparity, as Lévi-Strauss puts it, ‘between the technical means at the artist’s disposal and the resistance of the materials he has to master’, which means that (s)he is never able to reproduce an object in its entirety, only to ‘signify’ it (60). Whereas the science of machine civilization can be said to have broken the resistance of nature—spectacularly so in the extreme case of nuclear science—in the manual and material culture of the societies studied

by anthropologists, and residually, the artistic culture of our own, 'the artist is never completely in control of his materials and technical processes' (108).

Returning now to *The Savage Mind* and the passage on *bricolage*, the ideological dimension of Lévi-Strauss's staging of the two protagonists, *bricoleur* and engineer, becomes somewhat clearer. When correlated with the figure of the nuclear scientist in the *Conversations with Claude Lévi-Strauss*, the 'project' of the engineer-scientist depicted in *The Savage Mind* becomes a Promethean one: his goal is always to move beyond (*au-delà*) the particular constraints of the natural and material world in order to achieve a total mastery of them. This predominantly conceptual mode of operation is indifferent to the contingent (substitutable) tools and materials that are constructed to achieve its ends. Its tendency is always towards the opening (*ouverture*) of the 'set' (*ensemble*) of the elements (tools and materials) it works with. By contrast, the science of the *bricoleur* is Epimethean: as a 'science of the concrete' it chooses—or is obliged—to work within (*en deçà*) the closed set of elements which are already to hand, and to deal, aporetically, with the resistances inherent in these elements. If the engineer works with concepts which 'aim to be wholly transparent with respect to reality', the *bricoleur* works with signs which retain a degree of human depth (*une certaine épaisseur d'humanité*) (SM, 19–20; PS, 30).²⁴

The problem with Promethean science is that its project of total control—the direct interfacing of humanity with nature—carries with it the risk, and ultimate danger, of a loss of control, a geopolitical virtuality which hovers in the background of Lévi-Strauss's references to science and technology in the 1950s and 1960s. In this sense, the texts we have been considering are entirely symptomatic of the anxieties of their time. The *bricoleur*, on the other hand, may be a marginal figure, and *bricolage* a 'survival' of older practices which are now tolerated only as hobbies or pastimes in modern industrial societies (32–3), but his function in Lévi-Strauss's text is clearly a didactic one. The marginality of the *bricoleur* is also his singularity: he works alone and independently of the institutionalized division of labour which defines the modern scientist or engineer, the kind of 'big science' without which nuclear technology or the space programme would have been impossible.²⁵ The economy of *bricolage* is one of 'make do and mend', based on the recycling of extant materials which retain their historical and human depth; the activity of the *bricoleur* is an embodied, manual activity, in which he 'may

not ever complete his purpose [*projet*] but he always puts something of himself into it' (21).²⁶ In this respect, Lévi-Strauss's opposition between *bricoleur* and engineer replicates in microcosm the wider distinction he makes, in *Race and History*, between 'stationary' and 'cumulative' cultures or, in the interviews with Charbonnier, between 'cold' and 'hot' societies. In these texts, it is argued that traditional (stationary or cold) societies, which lack the defining technology of writing, experience history differently from literate (cumulative or hot) societies, which are able to capitalize on scientific knowledge and technological development, leading to their exponential—and destructive—growth.²⁷ The Sartrean version of 'dialectical' history, which Lévi-Strauss will go on to criticize in the final chapter of *The Savage Mind*, is precisely defined by this sense of forward momentum, or 'project', whereas 'peoples without writing', as depicted in *Tristes tropiques*, are 'incapable of remembering the past beyond the narrow margin of individual memory, [and] seem bound to remain imprisoned in a fluctuating history which will always lack both a beginning and any lasting awareness of an aim [*la conscience durable d'un projet*]'.²⁸

To conclude, we have seen that Lévi-Strauss's exposition of *bricolage* is an overdetermined one, serving both the local epistemological argument of *The Savage Mind* (*bricolage* as a metaphor for how mythical thought works) and a wider, ideological agenda (the figure of the *bricoleur* as emblematic of the divergence between traditional and modern scientific modes of thinking and doing). However, if we accept that, in Lévi-Strauss's own words, the difference between the *bricoleur* and the scientist-engineer is 'less absolute than it might appear', then this perhaps allows us finally to appreciate more fully the value of *bricolage* as a universal concept. Beyond its situated context in *The Savage Mind*, what Lévi-Strauss's description of the *bricoleur* encourages us to reflect upon is whether the process of *bricolage* is not in fact intrinsic to the history of technology, or more precisely, whether this history does not operate essentially between the twin poles of design (project) and *bricolage*. Such a history would include the technologies of advanced industrial societies as well as those of traditional societies, and would extend to the prehistory as well as the origins of technology. Beyond its paradoxical function as a technical metaphor applied to the cognitive realm of myth, what *bricolage* as a universal concept teaches us is that the evolution of technology is always a two-way (retroactive, feedback) process of projection and retrospection, thought and action, abstraction and application. This process or principle is structurally no different to that

of (natural) evolution itself. As Lévi-Strauss comments in an article on François Jacob's book *The Possible and the Actual*, published some twenty years after *The Savage Mind*: 'nature doesn't act according to a transcendent principle of sufficient reason, externally regulating the conflict between logic and experience, rather it works between these two extremes, in an ad hoc fashion [*travaillant de bric et de broc*]'.²⁹ Jacob's definition of the nature of evolution is precisely that it is a process of *bricolage*, the constant re-use of the old in order to make the new. Curiously, Lévi-Strauss's commentary on Jacob does not refer to his own text, *The Savage Mind*, as the source of this metaphor. Whether the omission is intentional, a matter of etiquette, or whether it is simply an oversight, it is as if the concept of *bricolage*, disassembled and detached from its original context in *The Savage Mind*, has indeed assumed a life of its own.

NOTES

- 1 Claude Lévi-Strauss and Didier Eribon, *De près et de loin* (Paris: Plon, 1988), 12; *Conversations with Claude Lévi-Strauss*, translated by Paula Wissing (Chicago: University of Chicago Press, 1991), 5.
- 2 Claude Lévi-Strauss, *The Savage Mind* (Oxford: Oxford University Press, 1996). Page references in the text follow the abbreviation *SM*. Where translation issues are relevant, references are added for *La Pensée sauvage* (Paris: Plon, 1962) and follow the abbreviation *PS*.
- 3 *Oxford English Dictionary Online* (<http://www.oed.com>).
- 4 'Evolution and Tinkering', *Science* 196 (1977), 1161–6). Jacob returns to the metaphor of evolution as *bricolage* in *The Possible and the Actual* (New York: Pantheon Books, 1982), 33–4. On Jacob's use of *bricolage*, see Christopher Johnson, 'Biotechnologies', in *Glossolalia: Key Words in Critical Theory*, edited by Julian Wolfreys (Edinburgh: Edinburgh University Press, 2003), 23–33 (26–8). For a biologist's perspective on *bricolage*, see Adam S. Wilkins, 'Between "Design" and "Bricolage": Genetic Networks, Levels of Selection, and Adaptive Evolution', *Proceedings of the National Academy of Sciences* 104 (May 2007), 8590–6.
- 5 Jacques Derrida, 'Structure, Sign and Play in the Discourse of the Human Sciences' in *Writing and Difference*, translated by Alan Bass (London: Routledge, 2001), 351–70 (360–1). Frédéric Keck makes a similar evaluation in the recent Pléiade edition of Lévi-Strauss's works. While recognizing the force and rigour of Derrida's analysis of *The Savage Mind* in 'Structure, Sign and Play', Keck notes that the particularities of the reception of this analysis

- in the United States has resulted in a somewhat limited appreciation of Lévi-Strauss's thought. See Claude Lévi-Strauss, *Œuvres*, edited by Vincent Debaene, Frédéric Keck, Marie Mauzé and Martin Rueff (Paris: Gallimard, 2008), 1797–8. See also *Keck's readings of bricolage in Lévi-Strauss et la pensée sauvage* (Paris: Presses Universitaires de France, 2004), 48–52 and 'Remarques sur la notion de bricolage chez Claude Lévi-Strauss' in *Des mondes bricolés? Arts et sciences à l'épreuve de la notion de bricolage*, edited by Françoise Odin and Christian Thuderoz (Lausanne-Lyon: Presses Polytechniques et Universitaires Romandes, 2010), 53–60.
- 6 Claude Lévi-Strauss, *Structural Anthropology*, translated by Claire Jacobson and Brooke Grundfest Schoepf (Harmondsworth: Penguin, 1977), 210–16.
 - 7 In the translated text this reference to the French seems arbitrary, but becomes clearer if one returns to the sequencing of the original text: "“odds and ends”, dirait l'anglais, ou, en français, des bribes et des morceaux' (*PS*, 32).
 - 8 While the etymology would be a false one, the implicit double articulation of the word *bricolage* in French (*bri-colage*) invites the subliminal identification of a process of breakage (*bri-*, *briser*, etc.) and subsequent sticking back together of the fragments (*collage*).
 - 9 At the beginning of the second chapter of *The Savage Mind*, 'The Logic of Totemic Classifications', Lévi-Strauss uses the metaphor of the kaleidoscope to describe this process of fragmentation and rearrangement (36).
 - 10 Sigmund Freud, *The Interpretation of Dreams*, edited by Angela Richards, translated by James Strachey (London: Penguin, 1991), 422. Derrida quotes this passage in 'Freud and the Scene of Writing' as an illustration of what he terms the 'machinery' of the dream-system (*Writing and Difference*, 273).
 - 11 Claude Lévi-Strauss, *The Raw and the Cooked*, translated by John and Doreen Weightman (New York/Evanston: Harper and Row, 1969), 12.
 - 12 These are the translations given in the Oxford Hachette and Collins Robert standard bilingual dictionaries.
 - 13 Barbara Cassin defines the 'untranslatable' as follows: 'untranslatable in no way implies that the terms in question (...) have not or cannot be translated — the untranslatable is rather that which one never stops (not) translating'. See *Vocabulaire européen des philosophies: Dictionnaire des intraduisibles*, edited by Barbara Cassin (Paris: Seuil, 2004), xvii.
 - 14 It is interesting to note that the German translator of *La Pensée sauvage* has no problem in finding a suitable equivalent for *bricoleur*, which is rendered as *Bastler*, while *bricolage* is translated as *Bastelei*. See Lévi-Strauss, *Das Wilde Denken*, translated by Hans Naumann (Frankfurt: Suhrkamp Verlag, 1968), 29.
 - 15 On Heidegger's romanticization of hand-tools and handiwork, see Don Ihde, *Heidegger's Technologies: Postphenomenological Perspectives* (New York: Fordham University Press, 2010), 18, 20, 51, 76–9.

- 16 Lévi-Strauss alludes to the Cartesian distinction between primary and secondary qualities when he suggests that “‘Bricolage’ also works with “secondary qualities”, i.e., “second hand”’ (SM, 22).
- 17 In the original French this combined movement of projection-retrospection is more effectively captured in a single sentence, which turns on the concessive *pourtant*: ‘Regardons-le à l’œuvre: excité par son projet [*spurred on by his project*], sa première démarche pratique est pourtant [*however*] rétrospective’ (PS, 28).
- 18 Lévi-Strauss refers explicitly to information theory on the following page: ‘Information Theory shows that it is possible, and often useful, to reduce the physicists’ approaches to a sort of dialogue with nature’ (SM, 19). On the role of information theory and cybernetics in Lévi-Strauss’s conceptualization of myth, see Christopher Johnson, *Claude Lévi-Strauss: The Formative Years* (Cambridge: Cambridge University Press, 1993), 92–103.
- 19 Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1959), 99–100. A few pages later, Lévi-Strauss writes that ‘Both the scientist and “bricoleur” might therefore be said to be constantly on the look out for “messages”’ (SM, 20).
- 20 *Writing and Difference*, 360–1. See also *Of Grammatology*, translated by Gayatri Chakravorty Spivak (Baltimore/London: Johns Hopkins University Press, 1996), 138–40.
- 21 Georges Charbonnier, *Conversations with Claude Lévi-Strauss* (1961), translated by John and Doreen Weightman (London: Jonathan Cape, 1969). Page references in the text follow the abbreviation *CLS*.
- 22 In *The Savage Mind*, art is accorded a transitional status in relation to traditional and modern science: ‘art lies half-way between scientific knowledge and mythical or magical thought’ (22). For a wide-ranging analysis of Lévi-Strauss’s thinking on art and aesthetics, see Boris Wiseman, *Lévi-Strauss, Anthropology and Aesthetics* (Cambridge: Cambridge University Press, 2007).
- 23 A similar argument is made with reference to Rousseau and the Neolithic in *Tristes tropiques* (1955): ‘In that mythic age [the Neolithic], man was no freer than he is today; but only his humanness made him a slave. Since his control over nature remained very limited, he was protected — and to some extent released from bondage — by a cushioning of dreams. As these dreams were gradually transformed into knowledge, man’s power increased and became a great source of pride; but this power, which gears us, as it were, to the universe [*nous mettant « en prise directe » sur l’univers*], is surely little more than our subjective awareness of a progressive welding together of humanity and the physical universe, whose great deterministic laws, instead of remaining remote and awe-inspiring, now use thought itself as an intermediary medium and are colonizing us on behalf of a silent world of which we have become

- the agents.' See Lévi-Strauss, *Tristes tropiques*, translated by John and Doreen Weightman (New York: Penguin, 1992), 391; *Tristes tropiques* (Paris: Plon, 1955), 468–9.
- 24 The dialectic between 'Promethean' and 'Epimethean' science is an important theme of Bernard Stiegler's *Technics and Time 1. The Fault of Epimetheus* (1993), translated by Richard Beardsworth and George Collins (Stanford: Stanford University Press, 1998), 185–203.
 - 25 The classic statement on this aspect of post-war science and technology is Alvin Martin Weinberg's *Reflections on Big Science* (Cambridge: MIT Press, 1967).
 - 26 As this sentence suggests, the problem with the Epimethean science of *bricolage* is that the *bricoleur's* attachment to the 'odds and ends' that make up his 'instrumental set', based on the principle that 'they may always come in handy', could be seen from another perspective—for example, that of the engineer—as the potentially infinite accumulation of junk, in which the ultimate use-value of the *bricoleur's* 'treasury' in relation to its size and complexity tends rapidly towards zero. The danger here is that the *bricoleur*, dedicated to a solipsistic deconstruction and reconstruction of parts, will never be able to clear out his workshop.
 - 27 For a more detailed analysis of *Race and History* (1952) and Lévi-Strauss's views on technological development, see Johnson, *Claude Lévi-Strauss*, 109–33.
 - 28 *Tristes tropiques*, 298; 253. Keck suggests that Lévi-Strauss's use of the term 'project' in the passage on *bricolage* is an implicit reference to Sartre (Lévi-Strauss, 48), and argues that the opposition between *bricoleur* and engineer—and indeed the entire demonstration of *The Savage Mind*—is primarily constructed as a critique of Sartre's philosophy of history ('Remarques sur la notion de bricolage', 54). While Keck is right to indicate the importance of Lévi-Strauss's critique of Sartre in *The Savage Mind*, this is probably too narrow a reading of the passage on *bricolage*. As has been argued in this article, the opposition between *bricoleur* and engineer is part of a wider preoccupation in Lévi-Strauss's work with the relationship between science and technology, dating back to *Race and History* and other key texts of the 1950s.
 - 29 Claude Lévi-Strauss, 'La biologie, science exemplaire' [*Le Nouvel Observateur* 1981] in *Levi-Strauss par Lévi Strauss*, special number of *Le Nouvel Observateur* 74 (November–December 2009), 48–51 (50). The phrase *de bric et de broc*, with its obvious phonetic resonance with *bricolage*, could also be translated as 'any old how', 'with bits and pieces' (Oxford Hachette Dictionary).