Constituting aesthetics and utility: Copyright, patent and the purification of knowledge objects in an art and science collaboration

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Utilizing ethnographic material collected through conversations with artists and scientists who were engaged in an institutionally supported, collaborative research scheme, this paper aims to sketch the persistent organizing power of narratives that positioned *the world* on the one hand as an external reality, ontologically independent of the perceiver prior to action, and on the other, as a social reality which all perceivers are party to creating. The former, foundational to the self-descriptions of scientific and engineering participants on the scheme, is examined in relation to a concomitant logic apparent in patent law. The latter, foundational to the participants' understanding of art, is contextualized with reference to copyright law. I investigate how, in coming together to collaborate, these artists and scientists reiterated and reconstituted images of themselves as working with one or the other kind of reality. Further, I show how that division came to structure the emergence of different kinds of persons defined through their association with the different outcomes and registers for the effect of their endeavors, appropriate to the two kinds of reality.

Keywords: Inventive person, knowledge production, purification, copyright, patent, interdisciplinary collaboration

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We think that neither simile not metaphor belong in an instruction manual for engineering practice.
J. R. S. Whittle and H. A. Barnett, *Drosophila melanogaster: Enthusiast's manual* (2004)

When a fruit fly geneticist working in collaboration with a visual artist produces a "Fruitfly Enthusiast's Manual" (Whittle and Barnett 2004) as the outcome of a period of funded research, one might be tempted to question the value of working in the interstitial spaces between established and institutionalized knowledge practices.[1] The manual, modeled on home mechanic's manuals for automobile owners, describes and demonstrates aspects of fruit fly genetics to the end of establishing how "a fruitfly lover" would go about modification and improvement

1 As an anthropologist employed as "Evaluator" of the Scheme which funded the collaboration this was exactly the question I was to ask.

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to "get the best out of their insect" (ibid.: 1).[2] The book's origin, in a joke between the artist and scientist ("If you could design your perfect fruitfly, what would it look like?") and its form highlight aspects of current contexts of knowledge production and the purification of knowledge-objects which those contexts demand. Ethnographic materials collected (mainly through interviews) around the book's production offer an entry into how these contexts effect the emergence of certain forms of person. Preoccupations with individual investments in created knowledge-objects—and the mediation of those concerns through specific logics of ownership—participated in situated developments of the notion of the person and of disciplinary distinctions.

Questions about value (in this case, "What is the worth of this output of publicly funded collaborative work across disciplinary divides?") [3] are often questions about utility, or about aesthetics. That is, such questions invoke contexts of reception by their very phrasing (see Ferran et al. 2006). One reason this manual is arresting (and funny) is because of the deliberate blurring of that distinction (between utility and aesthetics). As many commentators locate the source of the effect of jokes in the confusion of categories they instantiate, how they lead us down one track only to show us we are really on another (e.g., Douglas 1975), it might be worth considering why it is that this manual is most readily perceived as an elaborate joke.[4]

I take this question as a route into discussing the contexts for the emergence of inventive persons and things that intellectual property laws—the law of copyright and the law of patent—provide. More specifically, it allows us to investigate the assumptions and expectations that the contrast between those two approaches to the ownership of knowledge reveals as aspects of a social form in which the art/science distinction makes (partial) sense. Patent and copyright laws demand a certain purification of knowledge-objects,[5] and thus participate in the structuring of relations from which complex social personas emerge. On the one hand, truth, and following from truth, utility, is privileged, while on the other, artifice and subjectivity are central.

If it is the apparent contingency of distinctions between entities which one can engineer as a scientist, and those one can engineer as a home mechanic or create as an artist that make the fruit fly manual humorous (contingency pointed out by

2 *Drosophila melanogaster* is the species of fruit fly favored by geneticists for experimentation.

3 One of several outcomes, in fact (see http://www.lifesci.sussex.ac.uk/metamorphosis/).

4 There is, of course, no reason why such jokes may not be valuable in all sorts of ways. In fact, it is exactly the revelation of various kinds of conceptual and institutional structures influencing knowledge-making that is both the source of the humor, *and* the source of the demand that the work be taken seriously.

5 By this I refer to the need to prove certain criteria in order to be granted ownership of knowledge under Intellectual Property laws. That requirement is to *purify* or cleanse the knowledge object of elements that would undermine the claim. Novelty must be apparent in both copyright and patent claims, for example, while function or utility is paramount in patent. I am informed by Latour's description of the purification of the categories of science and politics under "modernity" as itself an ideologically driven process with material effects (1993: 10–12).

the humorous approach) then how are those contingent distinctions made concrete in institutional and personal practice? How do they become the basis of action? This article is entitled "Constituting aesthetics and utility" because *despite* the recognition of contingency, the ambiguity and artificial nature of the disciplinary divide between art and science that the fruit fly manual embodies, it was that divide that was reconstituted and reaffirmed in what the participants said about their collaborative efforts. Despite sometimes seeming surprised by their own affirmation of science's objectivity for example, it is the very force of the interlinked and mutually reinforcing categories and distinctions of aesthetics and utility/art and science/subjectivity and objectivity that I try to capture here. My question then is to see whether it is possible to trace, through the analysis of specific contemporary ethnographic data, connections between concepts of utility, aesthetics, patent, copyright, and the emergence of inventive persons in relation to knowledge-objects. My method is not historical, but analytic, examining assumptions informing and effects eventuating from (ethnographically) apparent conceptual and social positions.

Utilizing ethnographic material collected among artists and scientists engaged in institutionally supported collaborative research, I sketch the effects for them of operating within a context that by default, as it were, has *the world* on the one hand as an external reality, ontologically independent of the perceiver prior to action, and on the other, as a social reality that all perceivers are party to creating. The former, as evidenced in their statements, was seen as foundational to scientific and engineering practice. Here it is examined in relation to patents. The latter, again in their statements, foundational to western art, is examined in relation to copyright. I investigate how imagining they were working on one or the other kind of reality *defined in opposition to each other* came to structure the emergence of different kinds of person through their association with the outcomes of their approaches and endeavors (and see Leach 2011).

The term artifice is doubly complex in the process I report upon. First, my informants acknowledged artifice to be central to both art and science. The purification process, whereby objects come to stand for themselves while still, in subtle and different ways, indexing their author (Latour 1987; Gell 1998; Leach 2006), is very different in each case. Each apparently requires the explicit exclusion of the other. But then they refract again when described in these (indigenous) terms. The opening section of the article addresses this difference, leading into a discussion of the possibilities for the emergence of different kinds of self/person in each mode of action drawn from the particular experiences of the participants in the collaborations I observed. Second, and in a kind of native acknowledgement of the poverty of an ideological insistence on conventional narratives around science, no one person was purely *artist* or *scientist*. A second process of purification occurred though institutional structures in which persons became defined as exclusively one or the other for the purposes of their institutional position. Yet persons, being more than their institutional definition, replicated and played out within themselves wider institutionalized distinctions. Thus the scientists often undertook artistic endeavors, but did so outside their working life. Artists drew upon their understandings of the given and natural world in making their works. I come to describe this by drawing on an idea of Marilyn Strathern's, that of "merographic relations" (1992: 72–73). The second half of the article describes this process and thus the social effects of distinctions between aesthetic value and utility value, as

instantiated by the law, on the generation of the person and claims to value in the collaborations I observed.

I opened by describing a brilliant and provocative outcome from one of the art-science collaborations I observed, one that confounds the conventional distinctions between artifice and utility upon which the division of copyright and patent rely. However, what seems to emerge from the ethnographic material below is that art and science are clearly understood to have distinct foci that inflect their outcomes. One is real and given, the other is real and constructed (Wagner 1975, 1977). This distinction forms part of the background and the context for the two kinds of law. These laws, and the practices surrounding them are part of a self-reinforcing feedback mechanism in which persons and their (partially) defining knowledge-objects emerge.

The scheme, and the grounds of collaboration

The research upon which this paper is based was undertaken as part of a scheme to bring artists and scientists together to pursue common research aims, and to document the process through an anthropological study. In 2003, the United Kingdom Arts & Humanities Research Board and Arts Council England (through their Interdisciplinary Arts Department) established an "Arts and Science Research Fellowships Scheme" with the aim to support collaborative research in arts and sciences. In this article I refer to *the Scheme* as shorthand for this initiative.[6] As the application information related, a report published by the Council for Science and Technology on the arts and humanities in relation to science and technology concluded that "the greatest challenges for UK society . . . are all ones in which the arts and humanities and science and technology need each other.... In the circumstances of modern society and the modern global economy, the concept of a distinct frontier between science and the arts and humanities is anachronistic . . . the relationships between the arts and humanities and science and technology need to be strengthened further. . . . Many of the most exciting areas of research lie between and across the boundaries of the traditionally defined disciplines" (Council for Science and Technology, 2001). The Arts and Science Research Fellowship Scheme aimed "to support collaborative research specifically between the fields of the creative and performing arts and science and engineering which is likely to have a wider impact within the subject communities and beyond, as well as providing opportunities for individual researchers within the arts to work alongside those working in a scientific context. It also seeks to explore wider questions about whether and how art and science can mutually inform each other."

The distinction between the disciplines, then, was clearly given, if at the same time questioned and resisted by those sponsoring the Scheme. There were distinct realms of practice and action for these people where perhaps there should not be. Yet the notion of a relationship between the two suggests that their categorical

6 Throughout I will be drawing upon observations made during fieldwork with collaborators on this scheme. I choose a slightly unusual method of incorporating their opinions and understandings: that of unattributed quotation to go alongside and support my analysis. Thus, any unattributed quotes should be understood to be statements made by participants. The rubric of my research was to treat the Scheme as a whole and draw conclusions from the interactions that make something of the wider context, and its effects upon the collaborations, apparent.

separation was also accepted as inevitable. The material introducing the Scheme, as well as statements made by participants, demonstrated the perception that these approaches should be alternatives within the same set of practices. "Can questions posed by scientists be posed by artists to achieve results in another medium?" was how one of the authors of the Fruitfly Enthusiasts Manual (*Drosophila melanogaster*) put it. The fertile interface between practices, then, was seen to rest on some commonality, and some inherent difference. I discuss both in what follows.

I suggest as a starting point that the commonality was made possible by a very contemporary notion of *knowledge* as those intangible objects which can be externalized from their producers, and which appear to carry their value despite this abstraction (see Leach 2012). This makes a clear link with intellectual property law, which rests on these very premises. That is, by describing the outcomes of scientific research, and of artistic practice as knowledge production, equivalence was implied. That in turn prompted questions about how to combine them, which kind is most useful or most valuable, etc., in a resource constrained environment. This move meant that focus was shifted from the *relations of creation and the persons themselves*, to the objects produced, as that which contains value (a common enough assumption in a commodity economy). In this commodity economy, claims to knowledge are made and knowledge is valued through the mechanisms of intellectual property. Aspects of the production process are referred to as evidence to determine ownership of the object. The production process itself is not an object that could be owned, and thus is not valued in the same way. So we have intangible objects that are abstracted from their producers, and yet seem to carry their value despite this abstraction. The different kinds of connection a maker has to the object produced appear extrinsic to its existence. Who owns the object is a retrospective reconstruction, as it were, of the processes of production. Differences in the processes of making were put down to the requirements of different kinds of subject matter, and to the location of the potential effects of the object. These overlap, and thus purification of both object and producer were required at different moments in each process. The process of knowledge creation does not occur in a vacuum but in the context of claims over the value of knowledge and of its ownership in wider society.

Some examples of collaborations and outcomes

The Scheme took place between 2003 and 2006, and was a joint venture between Arts Council England and the Arts and Humanities Research Board (which became a research council in its own right during this period). Sixteen different collaborations were sponsored, with the majority being undertaken by visual or sound artists together with scientists ranging from those developing new materials and polymers to particle physicists, geneticists or animal behavior specialists. Despite the range of sciences and the differences that a change of scale of analysis would highlight between the different collaborations, in this particular instance I focus on regularities that emerged from ethnographic study. This approach is taken for two reasons. First, I am more concerned with linking the outcomes of emergent personhood and objects to the wider context of assumptions behind intellectual property law than I am with investigating the different ways particular scientific practices determine different kinds of persona. Second, the ethnography undertaken was based on short periods of semistructured interviews with the

participants and the organization of various events in which they all communicated about their experiences and expectations. The material, then, is not a detailed ethnography of the everyday practices of the participants—a logistical challenge indeed with sixteen simultaneously occurring projects—but is based on interviews, discussions, and demonstrations of work. I therefore limit my claims to what an analysis of the narratives and outcomes revealed about the process for the participants. I take three very brief examples to give the reader a concrete sense of the projects and collaborations.

"Mindscape" was a project that brought together a visual artist working with new media technologies with a senior neuroscientist and his extensive research group who map the passage of neurons and the dispersal of gas in brain tissue. The artist worked with the scientists and various technicians within the lab (software engineers, experts in visual imaging, etc.) to produce a large sound and image installation of the brain at work. It was projected over several large screens, with clever audio (recordings of squelchy noises from mouse brains) synchronized to the amount of activity that was visible at each point in a cycle of brain activity. It was installed in a church hall in the center of a city. People were encouraged to record their responses to the installation by writing thoughts and notes in a book.

"The Extremities of Perception" brought a successful novelist together with a particle physicist to examine pattern and scale in human knowledge and understanding through noting the similarity between the smallest (particle physics) and the largest (astronomical observation) scales of observation available to contemporary science. Through many intense and clearly energizing and enjoyable discussions, and through observing simple experiments demonstrating the wave particle/duality for example, the novelist was prompted to produce a dictionary of scientific terms, referring to the patterning of rich and mysterious revelations in particle physics. While the physicist emphasized both the reality and the limits of what could be revealed through scientific techniques involving telescope images on the one hand, and particle accelerators on the other, the novelist put the trajectories of discovery back into a human scale, as it were, by locating the characters and describing the contexts in which certain kinds of pattern recognition was plausible or possible.

"Metamorphosis and Design," the collaboration from which *Drosophila melanogaster Enthusiast's Manual* emerged, focused on the genetic science of fruit fly and cuttlefish morphology. It featured a visual artist who had previously worked with other biologists to produce art works based on growing biological cultures, and wallpaper prints of enlarged images of growing or diseased cells. In the collaboration sponsored under the Scheme, as well as the fruit fly manual, the project also resulted in a series of composite photographs of scientists engaged in fruit fly genetics. In a playful representation of how science achieves objectivity, the artist morphed images of several faces into one image, relating this to a previous era in which scientific effort to capture nature through artistic representation was focused on standardized and pure forms so they could be successfully studied and classified. The scientists understood the reference to previous science, and were entertained by the composite pictures.

Science and technology studies have repeatedly revealed the ways that narratives told about science and the actual practices within labs tend to be markedly different. My contribution is not of that nature. It does, however, deal with an aspect of the difference between narrative and practice in the following sense: In a

context that was deliberately and explicitly established to question the rigid divide between art and science, and to try and make messy (as it were) their separation, familiar narratives emerged *as if* they were generated by the interactions themselves. The puzzle of this reiteration requires an approach that examines how the distinctions that these conventional understandings are based upon are constituted as relational entities in themselves within the very differentiation of persons and disciplines.

I am going to suggest then that there was not merely a repetition of conventional narratives about science as an endeavor to represent the external world, but that this was in some way demanded and precipitated by the collaboration with artists *who entered the collaborations in search of material from that external world*. My first example above demonstrates exactly this approach, one in which an artist wanted to know how the brain works in order to make an artistic and engaging experience out of its representation for viewers. Even where the subject of the artwork was the messiness or constructed nature of scientific fact (as in my third example above), the artist, when narrating her involvement with the scientists, explicitly talked about the subjective nature of art as opposed to the rigorous and objective approach of science.

The subject matter of art and of science

There is assumed to be a clear reason for the separation of disciplines, evident even in the statement of the Council for Science and Technology cited above. Art and science have a different focus in the understanding of my informants. They have different subject matter as well as different approaches. As Hayden has written, "until the early 1980s, the consequential yet always malleable distinction between discovery and innovation was in part grounded on the bracketing off of nature as already existing and, thus, not a (human) invention" (2003: 25). John Law has observed that scientists assume that a thing like a habitat or ecosystem is a real entity found in nature. It has a particular out-there-ness, which lends it singularity (Law 2007: 600). A physicist associated with the Scheme said things that showed he concurred with this: "We [scientists] are unveiling bits of nature," as he put it. His collaborator (a novelist) told me, "[My collaborating physicist] holds the idea that there is an objective reality we come along and discover, [whereas] I think that truth depends on there being language there to know it." This distinction between what is existent and discoverable in the world (that which science addresses) and the (inter)subjectivity of the human, which was often presented as a challenge to the scientist (that scientists were subjective, too) was a constant—sometimes productive—tension in many of the collaborations. Another enthusiastic scientist described the main difficulty he had faced while negotiating an artistic outcome with the artist he had accepted into his laboratory. This difficulty centered on accuracy in representing the scientific facts. For him, the issue was particularly pertinent because his enthusiasm for participation in the Scheme had been based on his desire to communicate the fascination and wonder of science. This required communication of its findings accurately. "The artist may be seeking to allow an audience to interpret and question. Science as communication requires a more direct pedagogical approach," as he put it. In another partnership, the artist confessed to me, "I don't understand everything by any means. This made me worried at first (very worried), but then I realized that I am an artist, I don't have to

understand everything. Different perspective is allowed. Misunderstanding allows me [a] different perspective."

These quotations, and the contrasts they refer to, point to the operational understanding that the scientists brought to the Scheme. They connect us to the fascinating role that perceptions of subjectivity and objectivity have in the making of these different kinds of knowledge, a subject of recent consideration in the history and philosophy of science where Daston and Galison (2007) have written illuminatingly of the important interplay of objectivity, subjectivity, and techniques of self. Shapin (2008) focuses on personal and impersonal "virtue" in scientists' self-descriptions. The scientists on the Scheme repeatedly said that they are forced to deal with what they find, not what they would like to find, or what they construct. There was no denial that constructions were central to the knowledge-making practice of science: most fundamentally, the constructions of large-scale institutions that made investigation possible. Yet these, in contrast to other social constructions (the institution of the university as opposed to the lab itself, for example)[7] were instruments, practical tools for revealing the world (see Daston and Galison 2007: 121). The mechanics of institutionalized large-scale scientific investigation was a point of note for the collaborators, one commenting that the change in scale of scientific investigation at the end of the nineteenth century was significant for the distinction in the disciplines. It was no longer possible to be a "home enthusiast."[8] The institutional demands were just too great. This meant that science was no longer something one could undertake without that structure, and thus was "not something anyone can own, but something professionals do to you." The structures of science were seen as necessary and transparent because they reveal more of the reality that is the world than would be possible without these instruments, but there are consequences for their personhood in relation to the process and outcomes.

The fact that science had became such a large-scale operation meant that a division of labor was necessary for the participants, and no one person could encompass, in themselves, all the expertise necessary for scientific discovery ("Science requires collaboration, we help each other with time and materials without calculation."). And that, in turn, helped to foster a perception of the objectivity of the enterprise. For the scientists I talked to, it was an explicit part of the understandings that the results of investigations did not depend upon the context, or the person of the investigator. The world beyond any single perceiver is their subject matter. Many people could be tasked to perform operations revealing different elements of that matter, and these could be combined because the operations of the scientists are all upon the *same* matter.

This was clearly not the case for the artists involved, whose synthesis of experience was seen as internal. That is, if a coherent picture is achieved by the scientists because of the unity of the reality external to themselves upon which they work (unity in external reality), the artwork's coherence (if it demonstrates such a thing—

7 See below for a discussion of an instance of a senior scientist bemoaning the fact he was no longer able to undertake the scientific investigation he loved because his very seniority demanded that he apply for and administer grants, manage staff, work on university committees, etc.

8 This comment was from another participant: not the author of the fruit fly manual.

if it had meaning and effect) was in the connections that the artist was able to make internal to themselves as a perceiving and thinking subject, and then *express* in the work of art. The continuity is an expression of internal creativity, not external reality, and thus was not of the same type as that which the scientists investigated. As another informant put it, "I characterized art as being concerned with individualism and self-expression while science is driven mostly by curiosity about the world." In addition to the distinction between internal and external, it was also possible to discern a notion of a social reality that artists can comment upon, and a physical reality that must be described accurately by scientists.

One could see, then, a consistent construction of a difference: a difference that is found in the combination of different subject matter and of the approach deemed suitable to that subject matter. Here I have aimed to highlight the insistence by these people upon, and an institutionalized constitution of, an external world (Latour 1999, 2004), existent as a reality beyond any particular perceiver, as the subject matter for science. The corollary is subjective-interpretive connection as the subject matter for art, an *internal* rather than *external* focus (whatever the actual subject of the art work may be). Both have value (the Scheme's very existence insists on this). Yet the constitution of their differing value, and how that value ought to be connected to the person of its producer, had its foundation in these distinctions.

Comment on social world overlapped for all participants. That is, works of art as opposed to the facts of science were contestable in a way that facts about the external world were not. One of the visual artists told me, "If I look at science and I don't understand it, I don't doubt the quality of the science. If I look at art and don't understand it, I do doubt the quality of the artist. [There is a] tendency to trust the objectivity of science." (Note well that in this statement, the quality of abstract knowledge [science] is contrasted not with the quality of an abstracted process of creation [art] but with the person of the artist.) This contrast was one that pervaded the distinctions relevant to art and science collaboration. I return below to the implications that making each kind of knowledge-object has for personhood. But my current purpose is to elaborate why it is that for the scientists involved in these collaborations, their opinions about art were seen as relevant, whereas the artists' opinions about the quality and veracity of science was not given credence. I suggest that there may be (at least) two reasons for this difference.

First, there was a clear agreement that making art is subjective.[9] As one artist participant said, "Science is based on the idea of objectivity. Subjectivity [is] central for art. This does not mean that art necessarily has to be limited to personal expression. But it does mean it [art] does not relate to the idea of objectivity in the same way. Art is more about intersubjectivity. That is good for us, it gives us more freedom. But it also means we are taken a lot less seriously."

As an analytic aside here, much earlier debates around aesthetics and judgment reveal that there are real difficulties in taking a philosophical position that claims

9 I want it to be very clear in this text that although many of the opinions and understandings expressed, and which I draw upon, are stereotypes, I understand these not to be necessarily stereotypes that participants brought to the collaborations, and then merely had reinforced. The fact they arose in the context of the collaboration, and were articulated as they were, shows the context itself, and the interactions it demanded, tended to elicit, anew, these positions.

art, or the aesthetic experience it offers, is wholly subjective (see Pluhar 1997). Logically such a position implies no intersubjective communication about the experience of art is possible. There can be no point in discussing the experience as there is no way of knowing if one's interlocutor is talking about the same thing at all. If all perceptions are wholly subjective, there is no logical reason why anyone's experience or understanding has anything to do with anyone else's.

Notice that this is not quite what was happening for the participants, though. It is clear from the statements that we have already encountered that scientists often engage with (particularly visual) artists because of the possibilities for communication of science which art offers. Then there is the above distinction between personal expression and intersubjectivity. This takes us somewhere nearer to a classic Kantian position on aesthetics. That position understands aesthetic experience as a special category of experience, described by the shorthand description *subjective universalism*. While no *knowledge* of art is possible, as Kant would have it, being faced by an artwork is a special kind of experience because although one is aware of one's subjectivity in the experience, nevertheless, in these particular instances of perception there is also an expectation, even a demand, that others must be sharing similar experiences of the object. Hence the label subjective universalism. It is that which makes discussion of the object possible—and thus criticism relevant—for Kant. No absolute knowledge is possible (one cannot ever know what another's experience *really* is). Kant contrasted this subjective universalism as a peculiar quality of aesthetic experience (de Bolla 2002) with the absolute universalism which logic allows, much as the participants in the Scheme did several centuries later. Thus, there is something one can call knowledge. It is just not what art objects offer. This description fits readily with the perceptions of participants in the Scheme and helps to clarify the distinctions I observed between objective reality revealed by science and an intersubjective reality made possible by art.

It was apparent that the creations of the artist were seen as *intersubjective* constructions. A co-construction of subjects, usually commenting upon intersubjectively constituted events and experiences, which, much like institutions as human constructions, may not be optimal solutions to instrumental ends. The commentary and understandings offered by art are not instrumental. Other people have other opinions. Art as knowledge production in this context, then, was about subjective interpretation that may be shared, but not in the same way that science as knowledge of the external verifiable reality is shared. Art was not only unverifiable, it was fundamentally contestable because the qualification for making judgments about it is being a human subject with *opinions*. The artist's comment above reveals this very clearly.

I made a heuristic link to the philosophy of aesthetics of Kant above as I think it allows a clarity in understanding the position that I discerned among these informants. I am *not* asserting that all informants are Kantians or neo-Kantians. I am suggesting that Kant's struggle with the separation of subject and object was analogous to the logic of scientific collaborators who insisted that they were in a position to make judgments about art because of their very humanity, whereas artists were not in the same position to make judgments about science's *accuracy* or *utility* as such.

Artists were seen, however, to be suitable commentators upon the social institutions of scientific practice, and the uses made of the knowledge that science

offers, but that comment was upon the social uses of external reality, not the reality of that external world itself. Institutional practices made for specific perceptions of the objective and the subjective which flowed seamlessly into notions of what was appropriate for a subjective agent to comment upon (the constructions of the social world as a political or moral commentator) and what was not an appropriate subject of this agent's commentary (real facts and how they are arrived at).

It is here that the observation of a *merographic relation* assists us. In outlining her use of the term (as a description, not a theory), Marilyn Strathern defines merographic as "a partial analogy," in which "one thing differs from another insofar as it belongs to or is part of something else." Domains appear to be linked by being at one and the same time similar and dissimilar. "What makes the similarities is the effort to 'see' connections; what makes the dissimilarities is the 'recognition' of difference. . . . [W]hat looks as though it is connected to one fact can also be connected to another" (1992: 72). Both elements and domains appear sometimes as whole entities, sometimes encompassing other domains or as parts of other entities or domains.

The scientist was understood as both scientist and as social being. As the latter, he could make judgments about art. In fact, as we shall see, the qualification for being an artist understood by many of the scientists was just that. One artist related how she had put a lot of determined work into disavowing her scientific collaborators of the opinion that there was no training or expertise in art, for example. What was agreed, however, was that art-making is an intersubjective construction on the basis of subjective perceptions of the world. That subjectivity is acknowledged to be *social* to a greater or lesser degree, and thus is a construction of both subject matter and emergent object.

When it came to judgments about value, there was seen to be utility value in what science discovers as objective facts about the world. Because science *reveals reality* and allows interventions in that reality, utility was paramount. As another participant explained, "Both scientists and artists want to poke around and discover things. Both want to construct and deconstruct. Both tend to be unconventional. The differences lie in tropes of openness and closed-ness, and of whether [they] want to open up or close things down." Science made for a closed system, where perceiver was ideologically or conceptually *singular*. That very singularity allowed purpose, and highlighted the multiplicity of elements of the external world: *that it was the labor of the scientists to show causal connections between*. Singularity then was constituted in contrast to the multiplicity of possible facts externally available.

The artist, however, was conceptually multiple. They *made* connections, revealing the complexity of created, subjective, connections, and thus did not provide a basis for action but rather for reflection, or perhaps, for political action based on that reflection upon the social world. Their interventions, the interventions of their knowledge objects, were social, subjective, (possibly suboptimal) interventions. As one artist expressed it, "[One has a] personal relationship to a work of art. Don't have interpretation of a work of science in the same way. Maybe down to form and function. People value function. [They are] [n]ot sure what art is for." The value in art was thus cast in terms of self-expression and culture making, not as potential utility. The scientist, embodying a merographic relation, contained within himself or herself the possibility for making something that encompasses his or her work *as* scientist by commenting upon the findings of science in an aesthetic or political register (Daston and Galison 2007). But that aspect of their person must be absent,

purified, from the process of making scientific knowledge objects. The artist, analogously, makes no claim to utility (and copyright claims, to which I come below, take no explicit account of such factors), yet kinds of action are possible based on their object production, and thus art may have social or political utility. Utility, then, is itself merographically linked into domains of action and effect.

These apparent distinctions in specific ethnographic material are thrown into relief in two ways by patent and copyright law. First, there is a corresponding emphasis on utility in one form of claim, and to subjective creativity in the other. Second, statements issued by the US patent office regarding the realm where aesthetics may overlap with utility demonstrate the cultural work necessary to maintain such a stance. That is because the distinctions, too, are merographic or even fractal in their composition (see Wagner 1991).

Utility and aesthetics as distinctions in patent and copyright

Utility value and aesthetic value are distinctions that form the basis for different claims made for ownership over human creations under patent and copyright law. Let me elaborate on how the connection appears in the light of the material above through discussing (in brief) the premises of those two laws, and what must be proved in each case.

Above, I discerned a position held by participants in the Scheme, which equated to the perception that one is partly an artist by the very nature of existing as a social being. Copyright law rests on a version of this logic. That is, one should have rights over one's expressions, whatever their value to others, merely because one has externalized them. One has copyright in any original expression that one gives material form, as a right, held by citizens of a state that has in place a law of copyright. Thus, "[i]n the hands of lawyers the application [of copyright] is rather technical, the definition of creativity one that can be applied almost automatically, as in the supposition that the author of a work is the one who creates it (brings it into existence)" (Strathern 2010, drawing on Barron 1998). Debates over the position of the author as creative genius (Jaszi and Woodmansee 2003), and indeed, whether it is creativity as such which is recognized by the law (the subject of Barron 1998), are subsumed in practice by the principle that original expression automatically gives one rights over one's creation. Now this is not the case with patents where the claimant has to make a claim, and that claim must be supported by a demonstration of utility. The United States Patent and Trademark Office has it thus:

> The claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (2006: 4).[10]

10 See Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966); In re Fisher, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993).

Now in both patent and copyright, the claim is over something that lies beyond the person of the inventor. Claims and laws supporting them are necessary because of the abstraction of the created object from the person (subject) who brought it into existence. However, in the case of patent, this claim is dependent upon the demonstration of its operation in the external sphere of objects and facts. Operation is demonstrable. Annex iii of the 2006 US Patent and Trademark Office guidelines state that the correct focus for patent examiners is "the practical application and the result that is achieved" rather than "how the invention is implemented" (44). The "real world" connection (not that brought into being by the law) is apparent in the function that making those particular novel connections between existent elements allows. There is a contrast between these externally observable operations and the operations of created entities that, because they do not have an operation (utility) in the world external to the person, are instead considered (to retain the same vocabulary) as operations that occur *internally* to the person of the producer, as it were, in the moment of creation. That is where their effectiveness is made apparent. In the case of copyright, the externalization of a series of connections as an existent form merely allows the law to determine precedence, and thus originality. That is the reason material form must be available for copyright to be granted, not so that function can be proven.

Demonstrating utility is demonstrating something which links people through the reality of the external, objective world, not through the operations of particular subjective internal operations within the person of the creator, which may or may not have effects on others. This interpretation is supported by passages in the USPTO guidelines, in particular. For example, "music, literature, art, photographs and mere arrangements or compilations of facts or data, without any functional interrelationship are not a process, machine, manufacture or composition of matter" and are thus not eligible for a patent. Connections in the external world cannot be claimed as creations in the same way as copyright is claimed because the space in which the operation occurs and the material that operates are common to all. Objectivity then is an assumption of (and made possible by) certain processes of creation.

The fact that external elements of the world are given (given by God [see Sarnoff n.d.], although now we just say, given, meaning existent) and therefore belong in common to humanity is a very familiar position (from Locke 1946). One cannot claim those things without adding labor to them. They are the common heritage of mankind. In contemporary culture, this means improvements to what is given are already operations in the space that is common to all and given *as such*. This is where one can trace an element of objectivity. But that objectivity, as articulated in patent law, is demonstrated by function. They are real operations when they function, and thus the person is at that moment operating not as creator, but as laborer of a kind, making (new) connections between existent things. "If all the steps of a claimed process can be carried out in the human mind, examiners must determine whether the claimed process produces a useful, tangible, and concrete result, i.e., apply the practical application test set forth in State Street" (USPTO 2006: annex iii 47). The value of those connections is apparent in the external world as functions.

In art, again there is no *sui generis* creation (the province of God, or the given) but a reworking of existing elements that form a common heritage of cultural creations rather than natural phenomena (see Leach 2004: 160–62). But because

the elements are combined internally (in the mind of the author) prior to being externalized, and have their effects on the minds of others rather than on the material world, the value here is not so obviously a recombination with tangible effect but resembles more an act of creation itself. Novelty alone is enough in this case. The person is a subjective cultural being who creates internally and thereby adds to the world of human artifice or creation (culture). Through their labor they add to culture. Because the subject matter of that labor—the material upon which they operate—is itself held internally and is artificial, its worth cannot be determined by reference to what it does in the external world beyond human intersubjective interpretation.

The justification for ownership claims in both patent and copyright must in the end include the Lockian logic of property, but the focus of the work that creates property, whether on an existent external world or on a cultural world (of human artifice and history) makes all the difference to how the claim can be made. Modes for making claims purify the concepts/expressions, but that shifts complexity and the merographic nature of the relation to inside the person themselves.

Utility, aesthetics, and the constitution of the person

At the start of one collaboration, a senior scientist claimed he had "just been curious" to see what would eventuate. As the application process progressed, he came to see it as a chance for him to engage his own personal desire to communicate science more widely. The process became an explicit opportunity to practice something outside his normal competence ("I am writing a public understanding of science book about the brain, so I am very happy to talk to people about this [the science].") Another (younger scientist) said, "It would be great if my Mum understood what I do." The engagement was "very exciting" for all the scientists; one scientist focused on it as a change from the "mundane" working life of a senior scientist. "I am happy to be interrupted. It makes my life and job much more interesting." Another said it was a way of reinjecting enthusiasm into his practice. ("It has been a source of intellectual stimulation and fascination. I have hugely enjoyed working with [the artist].") In the context of the field research on the Scheme, it struck me time and again how complex the motivations and inspirations for participation were. These often revolved around extensions of personal interest beyond the limits of the particular disciplinary structure in which scientists (in particular) were embedded. The scientists all had interests outside science; many were artists as well, some had interests in the popular communication of science, and so forth. These were significant factors that inspired their participation.

Institutional factors were significant here. One scientist bemoaned how successful scientists get further and further away from bench science. He felt he was "becoming less and less creative in [his] scientific practice" as administration of labs and grants took over. Here we see a theme from the first section reemerging: the description of institutions as problematic manifestations of human artifice. Another area in which scientists saw value in the art and science collaborations was at the level of their institutional persona, and the objectives of their institutions. One said that, while "I'm not getting to know more about the brain from the project," it was an opportunity to get "professional brownie points" as a member of the university. Several established academic scientists complained that the press and external relations offices in their universities had almost wholly missed the

trick with these collaborations. Such innovative projects were, they insisted, an opportunity to "publicize cutting edge and exciting work" which would "draw in good graduate students" and offer opportunities to "develop new curricula," thus developing the strategic goal of institutionalizing interdisciplinary practice. Disappointment showed dissatisfaction with institutions as suboptimal and unfocused human creations. Although necessary for contemporary academic science (see Shapin 2008), institutions themselves were not focused instruments for investigation. The complaint, however, took force from the juxtaposition of their own valuable personal developmental experiences in the collaborations with their institution's inability to broaden this experience into value for others.

A high proportion of the scientists involved in the Scheme were artists in their spare time. That is, they made artwork; some even had gallery displays. It was clear that this aspect was seen as external to their everyday institutional persona, although for many that contrast was one that they hoped to overcome through the work on the Scheme. Why should this have been an explicit motivation? Put simply, these scientists said that it had become difficult to see themselves reflected in the outputs they produced as scientists. This was an aspect of the distinctions we have already seen between artifice as creation, and the process of revealing the given. The artists were concerned with the integrity and aesthetic quality of their output because these things reflected back directly on their internal, personal quality—unique creativity—which was definitional of the self and its labors in a way that the discovery of a scientific truth just could not be.

One way in which the scientists I observed constituted themselves as distinct and individual persons was to describe their interests, such as those exemplified by their willingness to participate in the Scheme, as an adjunct to the actual potential utility of their work, but a vital one for their satisfaction and sense of fulfillment. Indeed, in his opening chapter of *The Scientific Life,* Shapin (2008) describes how the motivation for scientists of a previous era was one of interest and calling, whereas the institutionalization of investigation threatened to make science just a version of wage labor by the early twentieth century. This effect then spurred other developments in the relation of the self to science during the last century, perhaps culminating in the desire to make the creative self appear through participation in art projects.[11]

We see then an effort to point to *internal* capacities, be those for creativity, or for labor; as these can be made to reflect/define the person. The fact that the process and logic of claims in law fits so closely with this description of making the self appear can be no coincidence. Whether by producing works that are not *objective* (not discoverable by anybody; reflecting their unique subjectivity) as artists, or as the creation of a genius mind, or even through narratives of labor and coincidental—even lucky—revelation (e.g., Watson 1968), expressions of a unique internal self (not necessarily self-authored) were brought into being alongside the objective and nonpersonal knowledge-objects of science. Becoming a successful professional was another version of this. Put simply, the scientists did not make a

11 Shapin comments that scientists working outside academia have, since the 1970s, been able to recapture more of a sense of themselves through the "play" and "fun" of working within start-up companies and corporations focused on realizing technological inventions.

sense of self based on the description of the world they produced, as such. They could make a self based *on the narrative of what led to that description*, or ancillary institutional actions. In this vein, as one scientist expressed it, being on the Scheme was "of great benefit to me personally."

Pursuing the contrast, an artist described how she resisted any responsibility to communicate science as a reason for her interest in the collaboration, saying, "I want to make work which stands up in its own right." An appeal to utility was explicitly rejected. There was a complaint in another collaboration that the artist was "very focused on the project," and that this was "not necessarily good in a multi-dimensional, multidisciplinary context." It was the focus on creation that was deemed "unreasonable" and that was seen to be an aspect of the artist and the way they worked, as a *type* of person. They were thought to be blinded to the demands and difficulties that they left in their wake because of an exclusive focus on the desire for an aesthetically acceptable output. On a creative level this also seemed to contrast with the modes of working in science. Aesthetic considerations took precedence over accuracy (to some extent).

What I describe here, then, are how variations upon a multiple self (purified in its appearance for certain purposes of institutional definition) were expanded for claims made to personhood in less specialized contexts. The self came into being through what it produced. In patent law, it is the clause of inventive step that allows space for the person to appear in the claim. We have already seen an explicit statement that the process of coming to (realize) an invention is irrelevant to the patent office. Equally, we have seen the same with copyright claims. Nevertheless, it would be to miss the fundamental dynamic of the system to infer that each instance of studied ignorance or disinterest arises from the same reasoning. There is thus a merographic or mutually refractive moment here. In patentable objects one has an aspect of the person claimed as central to the object produced through a Lockian emphasis on labor, rather than creativity. In copyright labor is also crucial, but it is the fact of creation that results from labor, not the laboring itself, which makes the claim viable. The proliferation of narratives of discovery in science mirrors the very impetus to be involved in art and science collaborations. These narratives define the self though this laboring. It is not enough to have the discovery itself, as being objective and external; it does not index its producer as a unique person. It is thus unlike the artwork. Because the reference of the scientific fact is the world itself, it cannot be definitional as an extension of the person of the producer (Gell 1998, see also Leach 2007).

The fact that some discoveries are deemed unsuitable for patent because of their fundamental nature (e.g., gravity or Einstein's proposed mass-energy equivalence $E=mc^2$), and that many scientific discoveries are in fact linked to the person that discovered them through name (e.g., Kreutzfeld-Jakob's disease) suggests that as Biagioli has elaborated (2003), reward in science comes through reputation rather than property rights. We might then determine a threefold distinction here. First, there are scientific discoveries that may be associated with the discoverer, but are not patentable. The claim in relation to these is an epistemological one: a truth claim. Second, there are inventions or technological creations that are patentable (and have a different connection to the inventor, as in a property claim). This is linked to the first distinction through the realization of a practical application, as it demonstrates truth in action, as it were. Third, there are works of art that are copyrightable as expression. These works are not making any

kind of truth claim or demonstrations of that truth in action. Hence, the subjective or intersubjective register of their effects. The effects are in other persons, not the external objective world.[12]

The contrast examined in this section can be stated simply: scientists on the Scheme said that they could only be partly fulfilled as persons by their work in science. Artists did not appear to have the same operational understanding about their work. They did however have a merographic, or partially overlapping one: the person of the creator can only in part constitute the work of art. The distinction here builds upon those I have already addressed. That is, *neither artist nor scientist* can draw on internal resources alone in the constitution of their object. Each add labor to existing resources and recombine them (Leach 2004: 152), one as an internal operation, the other as an external operation. But as the artists drew in external resources and transformed them internally, the output seemed definitional of their creative self (ibid.: 162; 2007: 108). Scientists' labor was focused in its operation in connecting things external and independent of them. These creations could not index their author in the same way for exactly that reason. The creative self thus had to be demonstrated in other expressions of internal creativity. These ranged from elaborate discourses of heroic labor through moments of genius to a mission to communicate scientific understandings, or even, participation in experimental collaborations with artists. The artists were much more instrumental in a sense. The interactions give them material with which to make art, and thus realize their creative selves as persons within a profession, not a persona beyond the profession.

These distinctions of how the subject matter of art and science were conceived, outlined above, were further enforced through the law's insistence that rights in an expression are automatic, contestable only on the grounds of prior art. In contrast, there are expressions of certain scientific formulae which may be original as expressions (because they apparently index creative agency on the part of the author), but which nevertheless cannot be claimed through the law of patent, however much utility they engender. "Like replication in the realm of copyright and written work, the mere discovery of existing ideas does not, ostensibly, merit the label of innovation, nor the reward of temporary monopoly" (Hayden 2003: 24). Again, this is explicitly because of their status as existent in the external world prior to being identified. The US patent guidelines state, "There is no other recognized exceptions to eligible subject matter other than laws of nature, natural phenomena, and abstract ideas" (USPTO 2006: 45).[13] Now this means that when

12 I thank an anonymous *HAU* reviewer for helping to clarify this division.

13 As Justice Breyer, dissenting argued,

> The relevant principle of law "[e]xclude[s] from patent protection . . . laws of nature, natural phenomena, and abstract ideas." *Daimond v. Diehr,* 450 U.S. 175, 185, 101S.Ct 1048, 67 L.Ed.2d 155 (1981). The principle finds its roots in both English and American law. . . . The Principle means that Einstein could not have "patent[ed] his celebrated law that $E=mc^2$; nor could Newton have patented the law of gravity." . . . The justification for the principle does not lie in any claim that the "laws of nature" are obvious, or that their discovery is easy, or that they are not useful... Rather the reason for the exclusion is that sometimes *too much* patent protection can impede "rather than

claims are made involving such objects, the labor involved in their discovery has to be presented in a different way either to artists' descriptions of their labor in creation (the existence of a form demonstrates the labor required for the claim to stand) or to the descriptions one has to produce for a patent to be granted. *Purification* occurs at the level of the person in this process as well as at the level of the claimed object.

Conclusion

This has *not* been a paper about what science is, or what art is, nor is it a paper detailing what all artists think, or what all scientists think. I have pursued an exploration, through particular ethnography, of the way distinctions between art-as-knowledge-making and science-as-knowledge-making reflected and refracted other pertinent distinctions in the contemporary construction of knowledge and its value. I reported upon specific fieldwork, and thus on the words, attitudes, actions, and opinions of particular people. Those were people who were practicing scientists and artists, engaged in a Scheme that brought different disciplinary actors together for novel and experimental collaborations. The attitudes and statements, as reported and analyzed here, were elicited by and in that context. Distinctions between the sciences and the arts were live and pertinent issues for the participants.

I focused on the triad of creation, claims to ownership, and how the person is constituted in terms of internal/external :: subjective/objective :: expressive/functional in the context of this art and science collaboration. I contrasted notions of value that arise from perceptions of utility, and those that arise from a notion of an aesthetic or affecting form. Scientists often had opinions or inputs into artists' products and outputs, but the idea that artists would criticize or direct research processes and results in science was much harder to find evidence of. Why should this be? The argument here has been based on observing the gestation and location of different kinds of output. The artist was making culture, which we all do. This made judgment of the usefulness of the work contestable. The scientists were involved in a highly technical revelation of what is not artifice, but is constituted as real in the social process of its emergence, and the claims that were possible in relation to such revelation, whether those were legal or personal.

Artists' *outputs* remained associated much more closely with them but results were uncoupled from the scientist, and thus copying and replication were viewed very differently in each case. Art and science clearly emerge from all this as reliant on different focuses in making knowledge. One focusses on the real and given, the other on the real and constructed. This has profound implications, as context, for the mode in which claims could be made over knowledge-objects. It in turn gave

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promote the Progress of Science and Useful Arts," the constitutional objective of patent and copyright protection U.S. Const., Art. 1 β 8. cl. 8.

And more generally,

Thus the Court has recognized that "[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are . . . the basic tools of scientific and technological work." *Gottschalk v. Benson,* 409 U.S. 63, 67, 93 S. Ct. 253, 34 L.Ed.2d 273 (1972). It has treated fundamental scientific principles as "part of the storehouse of knowledge" and manifestations of laws of nature as "free to all men and reserved exclusively to none." *Funk Bros., supra,* at 130.

shape to the possibilities for the emergence of value and personhood. The Scheme, then, revealed a particular instance of the wider organizing force that particular constructions of aesthetics and utility have. "Objectivity and subjectivity are expressions of a particular historical predicament, not merely a rephrasing of some eternal complementarity between a mind and the world," as Daston and Galison remind us (2007: 379). I have looked, then, at the effects of these social institutions and conceptual relations, how they gave a shape to the emergence of persons who make claims to intangible creations, and to knowledge.

The fruit fly enthusiast's manual, *Drosophila melanogaster*, offered a recognition of the ambiguous space generated by the interaction between artist and scientist. Quite consciously the authors showed that science practice is not always so straightforwardly about the real world and utility, and art practice about artifice and construction. But playing with these distinctions and institutionalized definitions in the way that they did was a comment upon how they are reproduced in the very interaction itself. Rather like an anthropological commentator, in fact, they highlighted how, "the processes by which language and being, the signifier and the signified, the literal and the figurative, the sensible and the intelligible, [are] reciprocally determined," thus holding open the reality and possibility of each (Vivieros de Castro 2010: 144–45). The tongue-in-cheek admonition that stands as epigraph to this article (taken from the introduction to Whittle and Barnett's book) demonstrates this intention and its—probably necessarily—humorous realization rather succinctly. Returning briefly to the *value* in *Drosophila melanogaster: Enthusiast's manual* about which I was so rude in the introduction, I hope that I have described one very clearly. The Scheme established a space for reflection and consideration of existing (and past) practices that have been significant in the constitution of institutional structures, disciplines, laws, and the persons who are appropriate to operate within them.

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Constituer l'esthétique et l'utilité. Droit d'auteur, brevet, et la purification des objets de connaissance dans une collaboration entre art et science

Résumé : À partir de matériaux ethnographiques recueillis au cours de conversations avec des artistes et des scientifiques qui collaborèrent dans le cadre d'un projet de recherche soutenu institutionnellement, cet article vise à esquisser la puissance d'organisation persistante des récits qui positionnent *le monde* comme une réalité extérieure (ontologiquement indépendante de l'observateur avant toute action) d'une part, et comme une réalité sociale que tout observateur contribue à créer d'autre part. Le premier type, au fondement des auto-descriptions des scientifiques ingénieurs participant au projet, est examiné en rapport à une logique concomitante du droit des brevets. Le second type, au fondement de la compréhension de l'art par les participants, est contextualisé en référence au droit d'auteur. J'examine comment, en se réunissant pour collaborer, ces artistes et scientifiques ont réitéré et reconstitué des images d'eux-mêmes comme travaillant avec l'un ou l'autre type de réalité. En outre, je montre comment cette division en vient à structurer l'émergence de différents types de personnes définies par leur association avec les résultats et les registres qui découlent de leurs efforts, relatifs aux deux types de réalité.

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