Animalism and The Persistence of Human Organisms[1]

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Introduction

The poster for the Spindel conference for which the talk on which this paper is based was prepared announces: "According to "animalism," our fundamental nature is given not by our psychological capacities, but by our biological constitution: we are primates (*Homo sapiens*), and like all organisms, we persist just in case we continue living." I certainly have no doubts that we are animals, primates, etc., and that our persistence amounts to the continuation of our living. So this does seem a good place to begin an account of personal identity.

Coming to this topic from the philosophy of biology rather than from an immersion in recent debates over personal identity, however, this description raises several questions. First, what is a fundamental nature? Clearly what is intended is the fundamental nature of a species (ours), but much work in philosophy of biology has suggested that species exhibit no such thing. Does this matter? Second, what is an organism? This may seem a strange question: at least, to paraphrase Justice Potter Stewart, surely we know one when we see it? I shall suggest that things are more complicated, and that this may present some

[1] I am grateful to the organizing committee for the Spindel conference, and especially Stephan Blatti, for providing me with the opportunity to consider these issues. Thanks to various attendees at the conference for discussion of the ideas, and to Ann-Sophie Barwich for very helpful comments on an earlier draft. The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013) / ERC grant agreement n° 324186.

qualifications, at least, to the animalist view summarized above. And finally, even if we know what an organism is, do we know what it is for it to persist, to continue living?

This paper will address the above questions from the perspective of contemporary biology and philosophy of biology. I shall argue that while it is a very good idea to think about humans as animals, which of course they are, successful development of this idea requires that we avoid a variety of common but misguided ideas about animals. A particular hazard is that many common views of life reflect the projection of ideas derived from a very unusual organism, *Homo Sapiens*, onto life generally. More productive will be to attempt to rethink ourselves in the light of a more general understanding of life that draws on the best contemporary biological science. Doing so, I shall argue, gives some surprising insights into the question of personal identity.

Biological Natures

The account of animalism quoted above implies that we persist as long as we maintain the same 'fundamental nature' provided by our 'biological constitution'. 'Fundamental nature' sounds like a synonym for 'essence', a concept that has been widely criticized in the philosophy of biology (Hull 1965; Dupré 1993). Perhaps we shouldn't worry too much about this, or about what makes some features of an organism 'fundamental', and content ourselves with a broad description of the organism. However, without some identification of fundamentality we are in danger of disturbing an intuition that surely is part of

the motivation for animalism, that something biological is more fundamental than the psychological capacities on which rival accounts of personal identity are based. After all, having a range of psychological capacities is as much a characteristic of members of *Homo sapiens* as is having four limbs or opposable thumbs.

We should begin by distinguishing some different concepts of biological natures. One idea suggested by the above quote is that each human individual has a nature determined by its membership of its particular species. This, in turn, suggests an appeal to the idea of species as natural kinds grounded in a particular (species-)essence, and survival as depending on the individual continuing to realize this essence. But this, unfortunately, is exactly the conception of biological essences that has been so widely rejected by philosophers. One very simple reason for this rejection is that it is difficult to understand how a species defined by some essential property could gradually evolve into a different species, presumably defined by some new and distinct essential property. Though the question of how species *should* be understood continues to provoke lively debate (Wilson 1999), an essentialist answer that would also answer the question what constitutes the essential property of an individual human, the property that suffices for the continued existence of that human, looks distinctly implausible.

An alternative to the approach just considered is to move directly to the individual essence, the property or properties of the individual that must be maintained if the individual is to survive, and look to biology for an account of

this property. This strategy would simply sidestep problems with the essence of a species. This concept of a biological essence, however, proves equally problematic. A human organism has enormously different properties at different times over its lengthy lifespan, and the matter of which it is composed is constantly being recycled and replaced. Why should 'biological' properties, whatever these may be, be given priority over psychological (or any other) properties in determining the identity of the individual? The assumption that they should sounds suspiciously like a dogmatic reductionism; its motivation, at any rate, is problematic.

Both the essentialist approaches I have just considered are rooted in a metaphysics of substances, things of particular kinds. Within this framework basic questions arise as to what kinds of things there are, and what makes things members of a particular kind. An answer to the latter question should then tell us what it is for a thing of a particular kind to persist: it will continue to exhibit the properties that make it a thing of the kind it is. From this perspective animalism, as sketched in the introductory quotation, seems a natural position. However, the attempt to develop such an account immediately runs into problems. The way forward, I believe, is to recognize that an organism, human or otherwise is not a thing, or substance, at all, but a process. What we are looking for are not the constant properties that determine the persistence of a substance, but the activities that sustain an individual process. My objective in this paper, then, is to explore the prospects for a processual animalism. Later in this paper I shall say something more about what processes are, but to motivate this move I must first say a bit more about organisms.

Organisms

It is widely supposed that organisms fall into two kinds. On the one hand are single-celled organisms—bacteria, protists, yeasts, etc.—that reproduce by fission. Here the organism is just the cell. Though by far the majority of organisms fall into this category, since the topic here is humans my main concern will be with the second kind, multi-cellular organisms. These—animals, plants, and some fungi—are complex entities in which the cells are functionally differentiated in different parts of the whole organism. Nevertheless, these entities are often conceived as originating from a unique founder cell, a zygote or spore. Because of this origin, all the descendant cells that make up the multicellular organism are assumed to share the same genome, which, therefore, is often assumed to constitute the individual essence of the organism (cf. Kripke 1980, 112-3). I call this conception of the organism a multicellular differentiated cell lineage (MDCL) (Dupré 2012, ch. 13).

One problem with the MDCL is that it is not true that all multicellular organisms reproduce this way. Many plants reproduce vegetatively, for example from rhizomes (e.g. nettles), runners (e.g. strawberries) or rooting branches (e.g. brambles). Some starfish reproduce by shedding an arm, which gradually grows into a complete star. In these cases there is no founder cell to initiate a new MDCL. It is not uncommon here to bite the bullet, and insist that plants that grow from rhizomes, runners, starfish arms, etc., are not really new plants, but parts of the parent plant. This move is often codified in the distinction between genets,

which include all the vegetative descendants of the originating plant, and ramets, what superficially looks like an individual plant but may strictly speaking be only part of a larger genet. I don't wish to object to the introduction of the technical term 'genet' but note only that for the more common sense purposes of the present discussion, organisms to which this distinction can be applied are typically ramets not genets.

It is true that humans restrict themselves to more familiar modes of reproduction, though strictly speaking homozygotic, or "identical", twins should be seen as two ramets but a single genet. But at any rate there are other reasons why the concept of a human organism as a lineage of cells deriving from an originating founder cell (gamete) is problematic. There is more to a human than the MDCL. Noting the various reasons why it is not true that all the cells in a human share the same genome will point to a more adequate conception of the organism, human or otherwise[2].

We should begin by interrogating the 'same' in same genome. What is generally intended is to refer to the sequence of nucleotides in the nuclear DNA, which does indeed remain more or less content throughout development and cell differentiation. But as well as there being a lot more to a cell than DNA, there is a lot more to DNA than sequence. Given that the length of DNA in a human cell is about 2 metres, and the diameter of a human cell is typically of the order of 20 micrometres, it is no surprise that the DNA is elaborately folded, or 'condensed'. And the exact conformation of this more or less condensed DNA is constantly

[2] The following points are discussed in more detail in Dupré 2012, Chs. 7 and 13.

changing, in ways that are critical to its behavior. Only a small proportion of the DNA is exposed to the transcription machinery in any cell, and the differences in this respect account for the difference of gene expression in different cells. As well as changing its physical structure in the process of development and cell-type differentiation, the structure is affected by influences from the environment, broadly construed to include everything from the cellular chemical milieu to social interactions. These changes are the subject of the rapidly expanding science of epigenetics (see Riddihough and Zahn 2010, and papers cited therein). In short, then, even cells that have the same DNA in terms of nucleotide sequence may contain DNA with functionally very different properties.

And this is only the beginning of the ways in which different cells in the same human body contain different genomes. An unknown number of people are actually chimeras, meaning that they developed not from one genome but two, which merged early in development, resulting in an organism different parts of which contain quite distinct genomes. It is not known how common this phenomenon is, as investigation would require analyzing genomes from many different parts of the same body in large numbers of people, something that has not, as far as I know been attempted. It is known that such cases exist, from very rare instances when genetic tests appear to have show that a woman was not the mother of her child, as the genome in the cells from which her DNA was tested is different from that which formed the ovum that gave rise to her child (Yu 2002). More familiar is the chimerism that comes about artificially from transplantation medicine, including blood transfusion.

But more relevant than any of this is the fact that humans are, like all or almost all other complex organisms, massively symbiotic. In addition to the cells standardly considered as human, a human body contains trillions of microbial cells—bacteria, archaea, and fungi (Xu and Gordon 2003). The largest concentration of these is in the gut, but they also live on the surface of the skin and in all other body cavities. In fact these microbial symbionts outnumber human cells by about ten to one, and contain over 98% of the genes in the human body. It has become increasingly clear that these microbes are not, as was once assumed, merely passengers who had found congenial habitats in the interstices of the human body, but essential contributors to the well-being of the human system. Elsewhere I have argued that, while there may be theoretical contexts in which the human is best treated as no more than an MDCL, as an individual interacting with the wider environment the symbiotic whole including the microbial symbionts is the more appropriate concept (Dupré 2010, Ch. 11).

The point to which all these examples lead is that distinguishing individuals within functioning biological systems composed of multiple intertwined lineages of cells is far from trivial, and may be done in different ways. It is very probably universally true of multicellular organisms that they thrive only in interaction with large numbers of symbiotic microbes. Most plants require elaborate communities of fungi and bacteria to modulate the interaction between their roots and the surrounding nutrient environment. And microbes themselves do not generally live isolated lives, but form parts of complex microbial systems, such as biofilms, often involving many different cell types. In fact the majority of microbes in, for instance, the human gut, are themselves combined into such

biofilms, perhaps constituting a further kind of individual in addition to the individual microbial cells and the encompassing human. This deep interdependence between cells involved in quite distinct lineages provides serious difficulties in deciding the boundaries of the individual.

Consider an especially complex community, the leafcutter ant. Like many ant species, these organisms include a variety of castes, such as the large soldier ants, which defend the colony against invaders, and of course the queen. Specialized ants cut up leaves and transport them to the nest, where a different caste of ants chews them up and takes them to a special area of the colony where a fungus is cultivated that provides food for the colony. The digestion of the leaves first requires the attention of communities of bacteria that predigest the leaves, and a range of other bacteria are required to protect the whole system from hostile organisms, most notably a fungus that over time tends to take over the fungus gardens and ultimately destroy the colony. A further set of chambers is reserved for waste products from the gardens, the proper treatment of which is also important for maintaining the health of the system. In a system such as this there are many entities that have plausible claims to be individuals. To common sense an individual ant is an organism, though it has frequently been proposed that the whole colony of ants form a single superorganism. Is the fungal colony a further individual organism? Is it also, or alternatively, a part of the larger colony (its stomach)? And so on.

I don't propose to offer an answer to these questions here[3]. My main point is just that the question, what is an individual organism, far from being answered by an appeal to biology, is shown by current science to be extremely difficult. What we find in the living world are deeply interconnected and interdependent processes, and distinguishing individuals within these complex systems is difficult, can often be done in multiple ways, and may be counterintuitive. A second point, recalling the positive theme of this paper, is that the best way of understanding these multiply intertwined cell lineages is in terms of a hierarchy of *processes*. A human life is a developmental process, and the many constituent lineages that contribute to its continuation are themselves processes. The set of such processes will change during the life cycle, but the coherence of the process nevertheless provides a fairly robust kind of unity, though other such unities can be found within the hierarchy.

Humans

The reader may be disappointed or relieved to hear at this point that I don't think the question whether symbiotic microbes are part of a human individual is of deep and immediate importance to the question of personal identity. The understanding of living systems as a hierarchy of intertwined processes is

[3] One possible approach is in terms of a broad concept of the immune system. Thomas Pradeu (20xx) develops this idea, and shows that immune systems of various kinds are pervasive throughout the living world. Such an account endorses the inclusion of most symbiotic bacteria as part of the human organisms, as these are recognized as 'self' by the immune system. This account does not, however, exclude the possibility of a nested hierarchy of individuals.

relevant rather from the other direction: Homo sapiens is a profoundly social organism; human individuals are complexly and multiply interconnected, and form multiple higher level individuals. The important moral from the biological—or animalist—view of the person is that the centrality of the *individual* person that is so central to the longstanding philosophical debate about personal identity is not as obvious as it usually seems. In fact, I believe, its obviousness rather reflects the individualism that is so central to Western thought in the last few centuries, and most importantly the application of this individualism to a more or less reductive view of the social. Methodological individualism, for instance, counsels us to treat social entities as entirely intelligible as the sum of their individual human parts. Many internal objections have been raised against this position, though it still informs most of economics and a good deal of other social theory. My point here is that such individualism gains no support from reflection on human biology.

Perhaps the simplest place to start thinking about the limits of human individuality is with human reproduction. It is common to think of a human life as beginning at the point of conception, the merger of a human sperm and egg. It is certainly correct to say that this event may sometimes initiate a human life cycle, and that all human life cycles are initiated by such an event (or occasionally by two such events). But the identification of a necessary condition of the appearance of a new entity is hardly the same thing as identifying the beginning of the entity. Compare this view of the origin of a human life with the suggestion that the signing off on a planning application, or perhaps the laying of

the first stone, may initiate the existence of a building; the career of the building would more plausibly be dated from the completion of the construction.

A different perspective on human reproduction is to treat the event of fertilization as initiating a very gradual process of fission. The fetus, from this point of view, is the part of the mother's body where this fissioning process is taking place. In the same way, various events in the cell, such as genome duplication, are directed towards cell division. But one is not tempted to think that the duplicate chromosomes are part of a different, yet to be formed, cell. In many cases of cell division it is plausible to date the origin of the new cell to the separation of the two cell membranes. The human case is actually less clear-cut. Whereas in the case of the cell the daughter cell may constitute a fully independent entity, for example in the case of a free-living, or planktonic, bacterium, this is certainly not the case for the birth of the infant. The latter is entirely dependent on the mother and very gradually becomes independently viable over a long period of time. In parallel with the various entities that can be distinguished in the ant colony, it seems perfectly plausible to consider the mother/infant dyad as continuing to be a single biological system. Note that both parts of the system substantially affect the behavior and physiology of the other. So parallel to the intertwining of processes I described in the case of the ant colony, we may see here the very gradual separation of a process into two, with no determinate point at which this separation is complete.

If this reading of the case of birth is legitimate, it becomes more plausible to suggest that humans may be parts of a variety of other higher-level entities.

Humans are, after all—and this is the point that the centrality of individualism in so much recent thought almost inevitably tends to obscure—profoundly social creatures. Despite considerable antipathy to the idea in the last quarter of the twentieth century, it is increasingly accepted that selection of higher-level entities (social groups (Sober and Wilson 1998) and even of multispecies communities (Dupré 2012, ch. 12)) is likely to be an important evolutionary process. But it is anyhow not clear why the ontological significance of social groups should depend on sometimes quite arcane questions about evolution. When we are discussing personal identity it is natural to think that membership in a family, a firm, a sports team, or a university may be important aspects of a person's identity. This may seem like no more than a play on the word 'identity'; but there is a real philosophical issue. Should we think of these social entities as no more than the ontological sum of their parts (members), or rather as real entities that may causally influence their members (Elder-Vass 2011)? This, or the more general question of so-called downward causation, is an issue that has been much discussed by philosophers of social science and others, and I cannot pretend to resolve it here (but see Campbell 1974; Andersen et al. 2000). At the very least, however, the possible reality of social entities should not be dismissed on the basis of a questionable interpretation of evolution. Even though to us—conscious human 'individuals'—the centrality of the individual perspective may be inescapable, it is worth reflecting that from the point of view of, say, an alien xenobiologist, a perspective more like that which we adopt towards the leafcutter ants may be more useful.

It is at any rate clear that many of the most distinctive properties of humans, for example linguistic capacity or the tendency to accord with social norms, are properties that are only conceivable as pertaining to individuals as parts of larger collectives. It is again no doubt possible to suppose that such higher-level properties are in turn reducible to the aggregated properties of individuals and their relations. But like many such reductive projects, success in its actual implementation has been meager, and philosophical justification for the attempt is at best controversial.

In summary, then, the human individual is a process composed of multiple biological subprocesses, and dependent on its participation in multiple social processes for its most distinctive properties. This is not meant to imply that the traditional notion of the human individual is indefensible, only that the attempt to ground the individual in biology tends to problematize rather than clarify the concept. A natural conclusion to draw from the layered complexity of biological systems, including our own, is that the distinguishing of individuals, rather than being something unproblematically provided by nature, is something we do to serve particular practical or theoretical purposes. It is not hard to locate the relevant concerns in the philosophical tradition of discussion of personal identity. Prominent among such concerns are questions of individual rights and responsibilities that are central to the social order. More controversially, it might be argued that our interest in the criteria of individuation for persons reflects, at least in part, the uniquely individualist social and political ideology that has characterized Western society for the last few centuries.

Processes

I have claimed that biological entities, including ourselves, are better understood as processes than as enduring substances. It is incumbent on me now to say a little more about how this distinction should be understood[4]. The contrast between substance- and process-based metaphysics is of course an ancient one, tracing back to pre-Socratic thinkers such as Parmenides and Democritus on the one hand, and Heraclitus on the other. It is often assumed that the scientific revolutions of the seventeenth century marked, among other things, a decisive victory for Parmenidean atomism, and hence substance metaphysics. In light of this it is somewhat ironic that quantum mechanics, field theories, and much of contemporary physics, seems far more naturally understood as processual. The issue should not, at any rate, be taken as closed.

The main point that I want to stress about processes here is that a process depends for its existence on change. Whereas change presents a familiar problem for substance metaphysics, namely that of determining which changes are consistent with the persistence of the substance, for a process change is essential for its persistence. Compare a mountain and a whirlpool. It may in fact be the case that all kinds of microphysical processes are necessary for the stability of a mountain, and the mountain itself may be a phase in various geological or tectonic processes. Still, it seems imaginable that a mountain might continue in perfect stasis for a period of time without ceasing to exist. Indeed

[4] The dominant figure in recent revivals of process metaphysics is Whitehead (e.g. 1929). Rather more accessible recent discussions include Rescher (1996) and Seibt (2013).

complete stasis is the ideal form of persistence for a substance. For a whirlpool, on the other hand, stasis immediately implies non-existence: if the parts stop moving the whole process falls apart.

It is important to distinguish stasis from stability. Whirlpools can be very stable. The red spot on Jupiter, a very active storm twice the size of our planet, has existed for at least the last two hundred years and very likely much longer. The circulation of gases within this process are stabilized by flanking jet streams, themselves part of larger dynamic meteorological systems. More to the point, biological systems are stabilized to varying degrees by internal metabolic processes, and by interactions of various kinds with their wider environments. Stasis for an organism implies death. This stabilization is quite different from the stability of a mountain or a table, where stability results simply form the lack of any processes or forces that tend to disrupt the arrangement of parts.

Of course, since as I have noted biological systems should strictly be understood as life cycles rather than as any particular stage of the life cycle, what is stabilized is in fact itself a process that occurs on a much longer time scale. From the perspective of typical human time scales some such life cycles provide, nonetheless, a very stable appearance. Some trees live for thousands of years, and though their continuation is sustained by metabolic processes at vastly more rapid time scales than those of their life cycles, the overall system maintains a very stable state. Indeed, one of the reasons for questioning the analogy between organisms and machines implicit in the recent fashion for mechanism is

that the stability provided by such processes is orders of magnitude greater than that generated by any mechanistic technology with which we are familiar.

The question of time scales is a particularly important one for understanding biological process. I have mentioned the interaction between contiguous processes exemplified by the omnipresence of symbiosis, but there is also a hierarchy of processes at different time scales that make up living systems. Many metabolic processes necessary for the maintenance of life last small fractions of seconds. Cell divisions take place over hours. And the directional (as opposed to circular, as for many metabolic processes) process that constitutes development lasts for the lifespan of the organism. The fact that relative to the time scale of a particular process processes at much longer time scales can be treated as unchanging is what makes a substance ontology or a mechanistic framework adequate for many purposes. Whether or not they should ultimately be seen as processes themselves, the atoms that are rearranged during metabolic processes may, form the point of view of the latter, be treated as unchanging things. So also may be the more obviously processual structural features of the cell within which these metabolic processes are constrained. Even if a mountain is ultimately part of a tectonic process, it is certainly safe (in most cases!) to treat it as a thing as one walks up it. A process ontology has no difficulty in accounting for the usefulness of thinking in substance terms. There are, however, obvious dangers of forgetting the particular context relative to which a particular entity can be treated as a stable thing.

Human Processes and Personal Identity[5]

I do not propose to offer here any general answer to the question what constitutes the identity of a process over time. I suspect that there is no such general answer, and that given the entanglement at least of living processes any local answer will be dependent of the interests we have in distinguishing a particular process. In many cases we can apply familiar strategies for tracking the identities of substances since, as just noted, many processes are highly stable within a time frame of interest. The medium-sized dry good in our homes remain pretty much unchanging over the periods of years during which they share our lives. For guests at a cocktail party macroscopic features of other guests are sufficiently stable that problems of identity over time are hardly pressing.

However, questions of personal identity are generally considered over time scales of a lifetime, and here things become more difficult. Traditional approaches to the identity of substances over time address the problem of

[5] One prominent sceptic about personal identity over time has explicitly denied that there is any benefit to be gained from treating persons as processes rather than enduring things:
"Any claim to the effect that a mental self is best thought of as a process rather than an object can be countered by saying that there is no sense in which a mental self is a process in which a rock is not also and equally a process." (Strawson, 1997).
Since I am sympathetic to a fully processual ontology I am inclined to think that rocks may indeed be (very slow) processes. But a processual ontology will need to distinguish very different kinds of process, a point that makes the above remark a simple non sequitur. A human, unlike a rock, is an element in a hierarchy of complexly interconnected processes. It is also possible to adopt a mixed ontology in which there are both objects and processes, in which case the premise of the argument is false.

identity through change: what qualitative changes to an entity are consistent with its still remaining numerically the same entity. Answers to such questions generally suppose that there is some feature or features of the entity in question that remains constant and the persistence of which determines the continued existence of the entity. Such a feature is of course notoriously difficult to find for persons since if we suppose that a fifty year old, say, is the same person as a five year old who existed forty-five years ago it is very difficult to find any interesting common features. It has sometimes been supposed that a biological feature such as genome sequence might do the job, but for various reasons discussed above this is an unsatisfactory answer. In fact standard answers to the question of personal identity do not seek a common feature, but a set of relations between temporal parts of the supposedly enduring entity. These are generally either spatio-temporal relations, of continuity, or psychological relations, such as overlapping memories.

Before returning to these standard answers I shall briefly consider more generally the persistence of living processes. In contrast to the general problem noted above about the persistence of individual substances through change, the persistence of processes through change in one sense is not a problem at all. Persisting through change is just what processes do: to understand a process is to understand what it does (how it changes) to maintain its identity over time. The problem is rather that, as described above, life consists of multiple deeply intertwined processes, and it is often difficult to decide which process we are interested in the persistence of. This indeed is a central source of the pluralism that has been so prominent in recent philosophy of biology (Dupré 2012, Chs. 4-

5). Distinguishing some subset of the evolving and ecologically intertwined processes that we think of as interacting organisms as a species can be done in various ways for various reasons (Dupré 2002; Ereshefsky 1992); and similarly with the multiple processes that motivate the distinction of some part of the genome as a gene, or some part of the processes that constitute a living system as an organism.

These concerns relate to the ontological significance of individuating a particular process; they do not suggest that there is any difficulty in such individuation. So the human cell lineage is a perfectly well-defined process, and one that perhaps quite sufficiently serves most of the purposes for which we individuate persons[6]. The problem is only why, given the multiple processes that are involved in the career of a person—physiological, psychological, social—we should settle on this one. And to answer this we must be clear about why we are interested in distinguishing persons.

There are numerous familiar answers to the preceding question. Socially, personal identity is an essential background to issues concerning responsibility, rights and duties, praise and blame, etc. We punish criminals or exact debts because we believe that the people who committed the crimes or incurred the debts are the same as those we now punish or charge. Relations of love,

[6] Though note that this does not work for all organisms, due to the prevalence of asexual and vegetative methods of reproduction. It is of limited value for individuating plants, for instance. See Clarke 2012 for a discussion of how this might be done. And monozygotic twins present a problem, though perhaps one that can be solved quite simply by tracking the processes from a little way past their inception. Clarke 2013 presents an illuminating general account of the individuation of organisms that addresses many of these issues.

friendship, or enmity are based in part on beliefs about past interactions with the same people we now feel the relevant emotions towards. All of these commonplace aspects of human 'reactive attitudes' (Strawson 1962) presuppose that individual humans have some continued existence through time.

This is all, I hope, pretty much common sense. The debate between theories that ground personal identity in something material (spatio-temporal continuity; animalism) and Lockean theories that look for some kind of psychological continuity can be seen in the following way: while the latter focus on the reasons why we want to trace persons over time, the former address the practical ways that we do so. From the processual biological perspective I have outlined, the problem with the materialist answers to the question of personal identity is with the assumption that there is some objective answer to be sought in the material world as to what persisting entities there are that answer to our conception of a human person. Given this assumption it is just a fortunate contingent fact that these persisting entities answer to the purposes for which we individuate persons. The problem with the Lockean perspective is not just that the psychological properties it stresses are ontologically dependent on underlying material processes, though they are, but also that there is no reason to suppose that there are any psychological processes that have the persistence we require to track a person over the time scales that are generally required of this concept. The two perspectives are reconciled if we see the latter as providing the motivation for the concept of personal identity, and the former as providing the means by which it is applied.

The price of this reconciliation is the acknowledgement that there is no unequivocal material reality that objectively determines the existence of individual persons. A fortiori, this is not to be found in a better understanding of biology. However, I see this as a price well worth paying and indeed a gain rather than a loss. The recognition that there is no unique answer to the question of what must persist for the human animal to persist, properly redirects our attention to the question what is (or are) the purpose(s) for which this persistence matters. Why do we care so much about a unique and definitive answer to the question of identity?

Part of the answer to this question has already been indicated, and of course it is an answer that has been extensively discussed in a vast body of philosophical literature on personal identity. Many social relations presuppose the continued existence of persons through time, and would be impossible without such continuity. It is also important to emphasize a broader context to which I have already alluded. Individualism is a dominant theme in much of modern Western thought. I do not propose to offer here a normative evaluation of individualism. Many believe that it is the source of the affluence of modern life; others believe that it is the central cause of inequality and injustice. Both may be right. I will make just three final points on this general topic.

First, it is very easy to take individualism from its home in social and political philosophy and impose it on our thinking about biology. Its role in biology may then be taken to show the inevitability of its place in our social and political life. Indeed such arguments abound in appeals to evolutionary biology to support

competitive individualism. As a matter of fact, however, for reasons I have sketched here I think individualism fits rather poorly with contemporary biology. Moreover it is often argued that contemporary Western individualism is historically and geographically a somewhat anomalous perspective, which make its grounding in biology implausible on grounds quite independent of my reading of contemporary biology.

My second point concerns the ideal of freedom. The major attraction of individualism for many is its connection with an ideal of personal freedom. But of course the idea of freedom is a perennial problem in philosophy: reconciliation with an objective causal order as elaborated by the sciences is notoriously puzzling. I believe that a processual view of the person provides resources for illuminating this issue. First, a view of biological systems as multiple evolving processes fits easily with a non-deterministic metaphysics in which an unpredictable future is constantly being created by both evolutionary and intelligent adaptation to a changing environment. Human intelligence is a novel feature of this creative process. However, human creativity builds on a historical background and depends on language, an essentially social phenomenon. Freedom as a creative force, therefore, cannot be attributed to the solitary individual, but originates only from the relation of the individual to a past and present social context. Thus, I argue, the belief in genuine human freedom, far from requiring the ontologically isolated individual person, requires that persons be seen as deriving their most important capacities from their relations to a social context. A view of the social as no more than the sum of the

individuals of which it is constituted threatens to reduce such an account of freedom to circularity.[7]

My third and final point addresses what may seem to some the impausibility of this, admittedly qualified, skepticism about personal identity. I do not deny, of course, that we have experience that is structured around the idea of ourselves as unique individuals. This, I take it, is part of the explanandum in discussions of personal identity. Nor do I deny that many of our social practices assume the continuity of persons and would be impossible without this assumption, nor that many of these practices are important and well worth saving. I do deny that there is some objective *biological* fact about the world that determines who are the persons we think of as continuing individuals. Perhaps this will seem more plausible when we reflect on the importance of duration in the value of judgments of identity to the practices that personal identity sustains. I have no doubt that I am the same person that I was yesterday or even a year ago. But am I really confident that I am the same person as some infant or child who existed several decades ago? I believe that there are biological processes continuous with some such child, but whether these constitute personal identity is precisely the question at issue. It is also the case that my connection to this child may

[7] An account of freedom along these lines is spelled out in much more detail in Dupré 2001, ch. 7. In that work I presented the view as a variety of incompatibilism. More recently I have preferred to present the idea as an indeterministic compatibilism, where compatibilism is not, obviously, compatibility with a deterministic causal order, but with the causal order that actually obtains, in my view an indeterministic one (Dupré 2012, ch. 16, afterword; 2013). This accords with the idea developed in the earlier work that rather than seeing humans as exceptions to an otherwise seamless causal order, as is often the view of incompatibilist voluntarism, humans should be seen as dense concentrations of causal capacity in a world in which causal order is the exception rather than the rule.

entitle me to certain things, such as inheritance. Living as I do in Great Britain, I might even find myself entitled to call myself an earl or a duke. Such entitlements , however, are neither natural nor even obviously good. They require justification rather than providing it. That I might find myself the bearer of a hereditary title on the grounds that I had received a brain transplant in infancy from the heir to a dukedom strikes me as wholly absurd.

Conclusion

The core argument of this paper is that while animalism is undoubtedly correct in supposing that humans are a kind of animal, the implications of this observation are far less clear than is often supposed. Not only is it problematic to say just what an animal, qua individual organism, is, but there are respects in which humans are quite exceptional animals. With regard to the question of personal identity I take the animalist perspective to problematize rather than solve the traditional question of personal identity.

A central premise of this paper is that humans, as animals, should be seen as processes rather than substances. While there is certainly a process, the multicellular differentiated cell lineage (MDCL), that tracks the material entity that we identify and re-identify as a human process, this process is not identical with what we call an animal and is dependent for its existence as the kind of process it is both on parallel processes with which it interacts and on larger process of which it forms part. While the relevant MDCL serves to track the psychological features with which we are concerned in questions of personal

identity, it is problematic to identify this process with the human animal. Our interest in the continuity of these psychological processes is what justifies our focus on this process rather than the process being something independently given that happily serves this function.

The most important implication of this argument is to problematize the individualism that is an unstated assumption in most discussions of personal identity. I do not mean to say that individualism is ontologically confused or normatively bad. But I do mean that, at least in the way currently understood in most philosophical thought, it is an optional ontological position. It is a position sustained by our concept of personal identity rather than an objective given on which personal identity is unavoidably constructed.

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