Assessing Ontologies: The Question of Human Origins and Its Ethical Significance[1]

Daniel Cohnitz and Barry Smith[2]

Introduction

In their paper "Sixteen Days" Barry Smith and Berit Brogaard try to answer the question: when does a human being begin to exist? In this paper we will address some methodological issues connected with this exercise in ontology. We shall begin by sketching the argument of "Sixteen Days". We shall then attempt to characterize what is special about the ontological realism of "Sixteen Days" as contrasted to the linguistic constructivism which represents the more dominant current in contemporary analytic philosophy. This will allow us to infer guidelines for assessing the quality of ontological theories of various types. We shall argue that ontological parsimony, groundedness, faithfulness to ordinary language, consistency with science, coherence, and fruitfulness are at least part of the adequacy criteria for such theories. These criteria will then be applied to the theory presented in "Sixteen Days", and they will lead us to some revisions of this theory as well as to some reflections on its ethical implications.

1. The Argument of Sixteen Days

Ontology is the science of what is, of the kinds and structures of the objects, properties and relations in every area of reality. (Ontology is thus closely related to what is sometimes called 'metaphysics'.) Ontologists deal with the classification of entities and of the parts of entities; they deal with questions of identity and essence and of coming into being and passing away.

The focus of our inquiries here is the question: when does a human being begin to exist? Smith and Brogaard argue that it is possible to provide a definitive answer to this question through a combination of ontological theory and embryological fact. They lay down a set of conditions for being a human being, and they seek to determine precisely when the relevant transition event occurs, or in other words when, in the course of normal fetal development, the conditions for being a human being are first satisfied. They give an a priori

argument for the thesis that it is the conclusion of the process of gastrulation, which occurs at sixteen days, which is the latest admissible candidate for constituting this transition event, and they use empirical considerations to support the view that sixteen days is also the earliest time in the course of normal fetal development at which a human being may properly be said to exist.

The paper concludes that the lives of human beings have temporal boundaries – their beginnings and endings – which are genuine discontinuities even in the face of the underlying continuity of the physical, chemical and biological processes in which they are involved, and that the initial temporal boundary occurs precisely at 16 days after fertilization

2. Realism vs. Reconstructivism

Carrara and Varzi (2001) seek to characterize ontological enterprises within analytical philosophy as either linguistic or ontological reconstructions.

Linguistic reconstructivists try to answer the question: what has to exist for our utterances to be true? They are concerned, in other words, with the ontological commitments embodied in given types of language. However, they assume that our ordinary uses of language are ontologically opaque. Thus to establish these commitments sentences have to be paraphrased into those of some canonical language, usually that of first-order predicate logic. Only after this translation has taken place can questions of ontological commitment be raised. But since there is always more than one alternative regimentation, and thus more than one ontological system that can be used to interpret those linguistic usages which relate to entities of problematic sorts, additional considerations need to be brought into play in order to eliminate alternatives. These include pragmatic considerations as well as considerations growing out of pre-theoretical intuitions of the sort reflected in our common-sense ontology.

Quine, on this account, is a linguistic reconstructivist. For him it is our uses of language that "commit" us to recognizing entities of given sorts:

> When we say that some zoölogical species are crossfertile we are committing ourselves to recognizing as entities the several species themselves, abstract though they are. We remain so committed at least until we devise some way of so paraphrasing the statement as to show that the seeming reference to species on the part of our bound variable was an avoidable manner of speaking. (Quine1953, 13)

Thus, investigating (a regimented fragment of) scientific language and its possible paraphrasings is what ontology is concerned with. This might make it seem as if such linguistic reconstruction were the *aim* of ontological investigations. Quine, however, tries to play down such a conclusion with the following disclaimer:

> We look to bound variables in connection with ontology not in order to know what there is, but in order to know what a given remark or doctrine, ours or someone else's, *says* there is; and this much is quite properly a problem involving language. But what there is is another question. (Quine 1953, 15-16)

At the same time he claims that our ontology is "determined" once we have "fixed" the "conceptual scheme" which is to accommodate science (Quine 1953, 16-17).

Strawson, too, is a linguistic reconstructivist by our lights. Just like Quine, his concern is with the linguistic (or, equivalently, with the conceptual) level and he understands metaphysics as "in [...] intention" indistinguishable from conceptual analysis. And – again like Quine – the "commitments" he finds at the linguistic level are not taken at face value:

> Up to a point, the reliance upon a close examination of the actual use of words is the best, and indeed the only sure, way in philosophy. But [the structure the metaphysician] seeks does not readily display itself on the surface of language, but lies submerged. He must abandon his only sure guide when the guide can not take him as far as he wishes to go. (Strawson 1964, 9-10)

Ontological reconstructivists, on the other hand, "take the commitment of ordinary language rather at face value, but regard it as metaphysically misleading" (Carrara/Varzi 2001, 33). Thus such philosophers hold that

> ordinary language need not be massively corrected or reinterpreted, and neither is it ontologically neutral. The ontological reconstructivist will not deny that tables exist (for instance). Yet she will urge that tables are not what we normally think they are. (Carrara/Varzi 2001, 46)

Smith and Brogaard, now, are not reconstructivists in any sense. Rather, they are ontological realists. This means that they hold that not only is ordinary language in (broad) ontological order as it stands as far as its true positive assertions about reality are concerned, but so also is the language of science. Not only do tables exist, but so also do electrons and molecules, and entities of each of these types are what we normally think they are. Their task, then, is to show how our common-sense conceptions of tables or organisms can be compatible with our scientific conceptions of physical and chemical objects and processes.

The concerns of Smith and Brogaard start at the ontological level. They try to reconstruct an inventory of what there is – not an inventory of what this or that language says (or should say) there is. Smith and Brogaard believe that the world exists and has the structure that it has independently of the ways we

think or speak about it. At the same time they believe that, via a complex process involving appeal to common-sense usage, to the results of scientific investigation, as well as to philosophical argument, one can find out what this structure is, both in regard to the sorts of substances which make up reality and in regard to the sorts of processes in which these substances are involved at different levels of granularity. Thus they initially appeal to common sense when formulating the conditions for being a human being, but then they show that the criteria dictated by common sense are inadequate for their ontological purposes, and so they appeal also to the details of biology, allowing the latter, where necessary, to correct the account implied by common sense.

Smith and Brogaard thus do not use ordinary language as a criterion of adequacy for the correctness of their theory. Rather they hold that what we might call technically extended English – English as extended by the various technical vocabularies of the different medical and scientific disciplines – provides at best a good first clue as to what the basic joints of reality might be.

3. How Adequacy Criteria Help Ontologists

As their paper makes clear, however, even ontological realists must occasionally appeal to adequacy criteria similar to those used by their linguistically oriented counterparts: there is no easy route to establishing what there really is. The sorts of criteria of adequacy available for these purposes are the following:

(AC1) *Ontological Parsimony*
A good ontology should be as parsimonious as possible.

(AC2) *Faithfulness to Ordinary Language*
A good ontology should be centered around categories reflected in ordinary English (perhaps as extended by particular technical vocabularies).

(AC3) *Consistency with Science*
A good ontology should be as far as possible consistent with the best which empirical science has to offer.

(AC4) *Homogeneity*
Ontological demarcations should be treated uniformly throughout the theory. If something (some object, event or quality) is taken to be of ontological significance in one instance then objects, events or qualities of the same kind should have the same ontological significance in all instances.

(AC5) *Fruitfulness*
An ontology of a given domain should have broader implications for theory or practice. It should help us to solve problems of an extra-ontological sort.

Although Ockham's Razor (AC1) seems to be widely acknowledged as a criterion of adequacy among ontologists, it is notoriously difficult to specify what it is supposed to mean. Theories in general and ontologies in particular can be parsimonious in a variety of ways. Ontologies can for example be parsimonious with regard to their size. The nominalistic ontology of Hartry Field's *Science Without Numbers*[3] is in this respect in no way more parsimonious than a Platonist's ontology of numbers, since Field postulates a space-time which is isomorphic to $\mathbb{R}^4$, and thus there are for him as many space-time points as there are real numbers in the Platonist's ontology.

Field's ontology is more parsimonious, though, with respect to the number of *kinds* of entities. In Field's ontology all entities are supposed to be concrete, whereas the Platonist typically acknowledges concrete as well as abstract entities in his ontology.

Another familiar difficulty with parsimony is the fact that there might be alternative ontologies which are equally parsimonious (compare Quine's example of a phenomenalistic and a physicalistic conceptual scheme). In such a case other criteria, like (AC2-5), must come into play.

The significance of (AC1) is clearly diminished from a realist point of view. Reconstructivists and realists differ also in regard to (AC2) and (AC3). For the linguistic reconstructivist (AC2) is *the* criterion of adequacy for an ontology; for realists its significance is at best indirect.

Prima facie, (AC3) plays a role for the linguistic reconstructivist, although in a somewhat different way than it does for the ontological reconstructivist. Consider how Quine argued for the existence of sets. Quine was once famous for his dismissal of abstract entities from his ontology. His early paper with Goodman contains the following statement:

> We do not believe in abstract entities. No one supposes that abstract entities – classes, relations, properties, etc. exist in space-time; but we mean more than this. We renounce them altogether. [...] Any system that countenances abstract entities we deem unsatisfactory as a final philosophy. (Goodman/Quine 1972, 173)

Later, however, Quine had second thoughts. He recognized that in the linguistic reconstruction of science we still need to quantify over both abstract and concrete objects; science, as he conceives matters, is not feasible without an ontology of sets. This is what was later called the "indispensability argument": science (and philosophical argument) informs us about what there

---

[3] Field 1980.

is; science tells us that there must be certain abstract objects; therefore these abstract objects (sets, real numbers) exist.[4]

In fact, it is rather the "ontological commitment" derived from the logical reconstruction of scientific usage that led Quine to the view that science is (among other things) about real numbers. This suggests that (AC2) is really the background of the indispensability argument and not (AC3).

This example illustrates how ontological reconstructivists and realists on the one side and linguistic reconstructivists on the other side might be led to different decisions by very similar adequacy criteria. In the rest of this paper we shall consider the other examples for ontological criteria of adequacy, this time applying them to "Sixteen Days" directly.

4. Amoebae and Human Beings

"Sixteen Days" investigates whether, at each of its successive states of development, the foster is already a human being.[5] This is done by considering at each such stage whether the foster as identical to the human being as it exists after birth (the latter being taken as an uncontroversial reference object). For their argument to work, Smith and Brogaard must assume that the question

(Q1)   When does a human being begin to exist?

can be translated into

(Q2)   At what stage is the foster first transtemporally identical to the human being as it exists after birth?

The problem here turns on the fact that fission – of the sort which amoebae and the early human zygote undergo – "gives rise to new entities and destroys the entity which existed earlier". For suppose we have an amoeba that came

---

[4] Standardly the argument is reconstructed as follows (taken from Shapiro 2000, 228):

(P1)   Real analysis refers to, and has variables that range over, abstract objects called 'real numbers'. Moreover, one who accepts the truth of the axioms of real analysis is committed to the existence of these abstract entities.
(P2)   Real analysis is indispensable for physics. That is, modern physics can be neither formulated nor practised without statements of real analysis.
(P3)   If real analysis is indispensable for physics, then one who accepts physics as true of material reality is thereby committed to the truth of real analysis.
(P4)   Physics is true, or nearly true.
∴   (C)   Real numers exist.

[5] Following Smith and Brogaard we employ the Danish term 'foster' to refer in neutral fashion to the human zygote, embryo, or fetus at different stages of development. 'Foster' should be understood by analogy with terms like 'president' or 'customer'. It is a definite functional description meaning: organic individual possessing a full set of chromosomes and inhabiting the fallopian tube, uterus or uterine lining.

into existence through the fission of an earlier amoeba. Given our interpretation of fission, the later amoeba is not identical with the earlier. Hence the beginning of existence of the later amoeba will have taken place with the fission event.[6] Of course, this tells us something about the beginning of existence of *this* later amoeba, but it says *nothing* about the kind membership of the precursor entity, which – by assumption – was also an amoeba. By identifying (Q1) and (Q2) for the case of human beings, however, Smith and Brogaard violate the principle (AC4), since an event which is taken to be a reason for a change in kind-membership in the case of the human being is not taken to be a reason for such a change in the case of amoeba. The amoeba case shows that being transtemporally identical with a later substance uncontroversially of a given kind is not necessary for a substance to be itself a substance of that kind.

It is then possible that the foster at some early developmental stage could fail to be transtemporally identical with the human being after birth yet still be a human being in its own right. The single-celled zygote that is formed immediately after conception might be a human being even though, because it is immediately subjected to a series of fission events, it is not transtemporally identical with the human being that exists after birth.

However, there are countervailing intuitions which lend support to the view of "Sixteen Days" according to which (Q1) and (Q2) really are the same question. Thus we normally assume that each human being (in cases of normal development) begins to exist at some point in time and then continues to exist and to move around on the surface of this planet until the point of death is reached. If (Q1) and (Q2) really were different questions, then this would mean that it was possible for human beings to exist already before the sixteenth day as rather short-lived organisms which during their *normal* development would not be born, would not develop legs, etc. Assuming that human beings normally are born, develop legs, etc. an answer to (Q2) is simply an answer to (Q1) (even though this would not be the case in regard to the equivalent question in the case of amoebae).

5. Death and Duality

Smith and Brogaard are concerned with the issue of when the substantial change occurs which transforms a body of cells into a human being. A substantial change, as they conceive it, is in every case an instantaneous change: it is a change of the sort which occurs, for example, when two drops of water become one. Their paper tries to establish that neither the development of a brain stem at about 40-43 days after conception nor the development of self-consciousness at some time after birth can constitute a substantial change. Hence the latter are not possible alternative thresholds for

---

[6] Some philosophers claim that amoebae actually survive fission. This leads to a different treatment of fission than the one presented in "Sixteen Days". See Robinson 1985 and Noonan 1985.

the beginning of existence of the human being. Let's concentrate on the development of the brain stem. Here one of their arguments is that a change in one *part* of a substance cannot constitute a substantial change. On the other hand at another point in their paper Smith and Brogaard assert that a change in the brain can serve to determine that substantial change – called death – which is the end of our existence. This seems to violate (AC4) again.

If a change in a part is in one instance considered to be of ontological significance for the substance as a whole, but in other instances not, we should have a theory saying why this is so. It seems possible to provide an argument which could help us out here. Smith and Brogaard argue that the development of a brain stem is a mere intensification within the continuous process of neurulation which starts at day sixteen. The change does not appear to be abrupt enough to constitute a substantial change. There is also an alternative option open to Smith and Brogaard to save duality (the ontological symmetry of coming into being and passing away) for human beings. This would be to insist upon a *total body death criterion*. In this case instantaneous changes in human individuals as a whole would constitute both the beginning and the end of their existence.

6. Fruitfulness

Although appearances sometimes suggest otherwise, philosophy is not just *l'art pour l'art*. Whatever opinion one might have regarding the autonomy of the so-called *a priori* sciences, and whether or not one thinks that philosophy differs from the natural sciences in degree rather than in kind, the products of philosophical theorizing should not be conceived of as ends in themselves. If, as we believe, philosophy is a problem-solving activity just like science, then philosophical theories can be compared by assessing how well they respond to problems, in other words, how fruitful they are. Furthermore, satisfaction of the criterion of fruitfulness is taken by most realists to provide indirect evidence of a scientific theory's truth.

How, now, can these remarks be applied to the theory of "Sixteen Days"? What, in other words, is the Smith-Brogaard ontological exercise good for? Is it anything beyond an exercise in pure ontology, and thus of interest only to the aficionados of the ontological art? To answer these questions we must first try to explicate what could be meant by the fruitfulness of a theory.

6.1 Fruitful Categories and Concepts

The fruitfulness of a theory can mean not only that it yields solutions to problems. It can also mean novel predictions. When applied to conceptual explications the criterion of fruitfulness can mean: usefulness "for the formulation of many universal statements" (Carnap 1950, 7). Conceptual explications are in Carnap's view mere linguistic stipulations designed to regiment the vague or ambiguous usages of ordinary language by providing, for each *explicandum,* the most semantically similar *explicatum* for which

exact rules have been defined in such a way that the resulting explication is maximally useful for the formulation of universal statements.

Applied to concepts it is rather easy to see how this is supposed to work. Consider as an example Sally Haslanger's definition of gender categories, such as 'woman', a definition which she formulates in order to "identify and explain persistent inequalities between females and males":[7]

> S *is a woman* iff$_{df}$ S is systematically subordinated along some dimension (economic, political, legal, social, etc.), and S is "marked" as a target for this treatment by observed or imagined bodily features presumed to be evidence of a female's biological role in reproduction. (Haslanger 2000, 39)[8]

Whatever other virtues this explication might have, it is clear that it is not fruitful in the sense Carnap had in mind. Putting social subordination within the explicatum of 'woman' renders the universal statement to the effect that women are suppressed in society *X* true by definition. It is highly doubtful whether any interesting universal empirical laws might be formulated by using this explicatum, for "women are systematically suppressed" must now be expressed as an existential statement: 'There are women.'

However, ontological realists like Smith and Brogaard attempt not to find more convenient ways of speaking about human beings, but rather to investigate what human beings are. They provide theories, rather than new conceptual stipulations. How can we determine the fruitfulness of theories as a whole (rather than conceptual stipulations within a theory)?

6.2. Fruitful Theories 1: Ontology and Information Systems
With respect to *scientific* theories fruitfulness can be explicated as meaning: leads to new observations, makes possible the deduction of new hypotheses, etc. With respect to ontological theories the matter was until recently much less clear. Nowadays, however, there are ways to test the fruitfulness and other pragmatic merits of an ontological theory empirically. This is done by using the theory as a domain ontology for the construction of systems for database management and by checking the relative merits of the resulting systems in terms of their reliability, capacity to sustain efficient representation and delivery of information, and so forth (Smith in press). In medicine, as in many other fields, nomenclatures (standardized, controlled vocabularies) and classification systems are used in the coding, retrieval and management of the knowledge gained through research. Existing classification systems have

---

[7] Haslanger 2000, 36.
[8] This is Haslangers "tentative" explication only. Her final (and much longer) definitions are however no better from the fruitfulness point of view of. This is strange, since her project is definitely one of explication: "My priority in this inquiry is not to capture what we do mean, but how we might usefully revise what we mean for certain theoretical and political purposes." (Haslanger 2000, 34)

however proved inadequate for a number of reasons. First, all such systems are based on the contextually rooted knowledge of human experts, and ways must be found to do justice to the different perspectives and background knowledge of different communities of specialists. One approach to creating more adequate and more robust systems is to develop realist ontological theories of the medical domain like that put forward in "Sixteen Days". For this purpose, of course, the theory of "Sixteen Days" would itself have to be embedded within a much richer ontological framework. Thus it would ideally have to have the resources to sustain not merely an anatomical ontology at the level of organs within the structure of the human body, but also cell, gene and molecule ontologies at successively finer resolutions. It would have to sustain also classifications of processes at different resolutions, including the chemical and biological processes taking place inside the body. A project along these lines is currently being undertaken under Smith's direction at the Institute for Formal Ontology and Medical Information Science at the University of Leipzig (http://ifomis.de).

6.3 Fruitful Theories 2: Ontology and Ethics

However, there is another, quite different, way to assess the fruitfulness of ontological theories like that presented in "Sixteen Days". The latter concerns the question of the beginning of existence of a human being, and this question is of course of interest for areas other than that of human embryontology – namely for bioethics and for the metaphysics of personal identity. In both fields it seems, prima facie, that it would be useful to know when a human being begins to exist.

Smith and Brogaard are of course aware of the potential bioethical implications of their theory. In the following passage, however, they distance themselves from the drawing of ethical conclusions on their own behalf:

> What follows is an exercise in ontology, and clearly no conclusions of an ethical sort can be drawn directly from the answer to any ontological question. It seems to us, however, to be equally clear that *an answer to the question as to when a human organism begins to exist can be of some help in settling the difficult problems which arise in connection with the issue of abortion and embryonic stem cell experimentation.* (Italics added.)

The italicized claim seems innocuous as it stands. But closer investigation will reveal that it is not so easy to specify what the significance of their arguments for these "difficult problems" might be. The following is not meant to show that "Sixteen Days" draws moral inferences from ontological premises, which it does not. Rather we seek to use the Smith/Brogaard paper as a means of

illustrating wherein the ethical fruitfulness of an ontological theory might lie and how we can try to assess it.[9]

7. The Moral (In-)Significance of Exercises in Ontology[10]
In order to check whether and how an ontological theory might be fruitful for bioethics, we can simply make use of the fact that ethical theories often ascribe moral significance to entities of certain sorts (to human beings, persons, actions, environments, societies, communities, and so forth). Good ontological theories about what properties make something count as an entity of the relevant sort can then be useful plug-ins for such ethical theories. They can be in this sense *fruitful* ontologies. To check whether we can ascribe this kind of fruitfulness to the theory presented in "Sixteen Days", we will simply review some of the relevant ethical theories and examine whether we can plug-in its ontological insights.

7.1 Speciecism and Potentialism
There are – for example for most moral philosophers with a Christian background – reasons why we should be immensely interested in determining when human beings begin to exist as beings of a certain biological species. For according to such philosophers, human beings have a special moral status *qua* being human, they have a different moral status from that of beings of other kinds. Human beings are held to possess this special status for two reasons. One reason is that their species is a species that has its special moral status essentially (for example because members of this species are formed in the image of God) – this position we will call 'speciecism'. A second reason is that members of this species will come to share a unique additional property at some point in their lives – standardly the property of self-consciousness – which is such as to give the bearers of this property a special moral status. Because the members of this species are said to have this property potentially from the very beginning of their existence we shall call this position potentialism.[11]

If the Smith-Brogaard account should indeed prove to be of some significance for "settling the difficult problems which arise in connection with the issue of abortion" and so forth, then it seems most likely that this significance will be for accounts like the ones just characterized. On these views the question of when a being of a certain biological species begins to exist does indeed play a crucial moral role – and it seems that that is precisely what the Smith-Brogaard theory is all about.

On closer examination, however, it is not at all clear that "Sixteen Days" can so easily serve as an ontological plug-in for such ethical positions.

---

[9] Berit Brogaard's current thinking on these matters is expressed in her (forthcoming).

[10] Our comments here are designed merely as an illustration of what we mean by the fruitfulness criterion. For a more informed discussion of the ethical issues connected with the moral status of early embryos, we recommend Kaminsky 1998.

[11] On the thorny problems associated with this notion see Hershenov 1999.

For "Sixteen Days" tries to answer the question "At what stage is the foster first transtemporally identical to the human being as it exists after birth?" The answer proferred is *gastrulation*, and the reason given is that, with gastrulation, there occurs a substantial change from what is a relatively unstructured whole of cells to what is a highly structured unity that is marked, for the first time in the course of development, by the natural impossibility of fission or fusion at any later stage. That potential fission and fusion play any role at all in an account of when a human being begins to exist is due to the fact that the Smith-Brogaard account focuses on the transtemporal identity of an *individual*. Twinning is described as fission and is interpreted as the ceasing to exist of the being which existed immediately prior to the twinning event.

According to the argument of "Sixteen Days", therefore, the beginning of human *life* is something quite different from the beginning of the existence of a human *being*. The early zygote is certainly alive, and its life is an instance of human life, but the early zygote cannot yet be transtemporally identical to the human individual as it exists after birth, because it is predestined to undergo fission and hence to cease to exist almost immediately after it has been formed. Out of a one-cell zygote there arises, via a succession of substantial changes, a series of two-cell, four-cell, eight-cell (and so on) descendants. The early zygote is – given the interpretation of fission defended in detail in Smith and Brogaard's paper – not identical to the human being as it exists after birth, since it is not the same substance and thus not the same *individual human being*.

This, so it might be argued, strips the beginning of an individual human being of much of its prima facie significance for the ethical positions in question. For according to "Sixteen Days" human *life* (*humanae vitae,* in the mass noun sense of this term) is present at all developmental stages prior to gastrulation even in the absence of a human *being*. Human life is already instantiated by the early zygote. It is then difficult to see why it shouldn't be this human life that is of essential moral significance rather than the human life (in the count sense of this term) which develops later, and it seems arguable from the speciecist point of view that it is precisely the former that deserves our protection. This view, too, seems to be the most popular form in which speciecism is presented to the wider public.

This kind of speciecism is not a very plausible view to hold, however. As it stands, it would also ascribe moral significance to single somatic human cells taken at random. More plausible versions of speciecism should therefore restrict the bearers of intrinsic moral significance to human individuals. The beginning of existence of these beings is of high ethical significance and thus so also is the argument of "Sixteen Days".

A quite similar conclusion is reached from the point of view of potentialism. As we've said, if potentialism deems early embryos worthy of protection then this is because of certain morally significant properties they possess potentially (because there are certain ceteris paribus laws to the effect

that beings of this kind will develop these properties later in their lives). But, again it could be argued, if mere potentiality to develop a certain property can be of moral significance in its own right, then the *humanae vitae* present in the mother's womb and instantiated by the early zygote can be said to lead *potentially* to the life of a human being, too. Indeed, it might lead to two human beings if twinning occurs. But if human life in the mass sense thus leads *potentially* to human life in the count sense, then why should this potentiality not matter, but only the potentiality of the human individual?

We must beware of confusion here. Of course, if there exists a human zygote in the mother's womb, there is a ceteris paribus law to the effect that a human being will exist (after sixteen days) and develop certain interesting properties later in its life. Maybe one could say that a certain fact in the mother's womb has a potential to result in the fact that there exists a conscious human being. However, it is not the zygote which is the bearer of this potentiality. The zygote does not have the potentiality to develop into a conscious human being at all. For (again:) the zygote will cease to exist long before any conscious human being appears on the scene. Since, as Smith and Brogaard have argued, the human being as it exists after birth is not transtemporally identical with the zygote, it follows that the features and properties the human being actually has are not – or at least not for this reason – among the features and properties the zygote potentially had. Although in a loose way of speaking one could get away with saying that we might have the potentiality to become pretty good fertilizer after death (which might well be false, but let's assume this as a biological fact for the sake of the argument), it will not be us who become fertilizer, since we will long have ceased to exist by then (and will not anymore be among the things which can become anything). It is only the human individual that begins to exist at day 16 that can be said to be the bearer of the potentiality to become a conscious human being.

7.2 Ensoulment
If we allow a somewhat more adventurous metaphysics into the picture, then another possibility emerges for the applicability of the Sixteen Days theory. According to some, it is God's instilling an indivisible soul into an embryo which constitutes the beginning of existence of a human being. From the perspective of such views, the sixteen day threshold would be highly relevant from a moral point of view.

God could neither allow human beings running around who lack a soul, nor cope with the difficulties involved in the idea of bifurcating souls. Hence it can reasonably be argued that the sixteenth day would be the first – and perhaps the last – day upon which God could have chosen to infuse the soul into the early embryo. The proponent of ensoulment views of the beginning of human existence should start worrying about the protection of

the embryo's life only from the sixteenth day onward.[12] This ontological insight would not guarantee that God really chose this rather than some later day (God moves in mysterious ways, after all), but the good news would be that, during the first fifteen days at least, there is nothing for which we could have reason to worry about (from a moral point of view) and this would prove that the Sixteen Days-theory is fruitful also for this influential family of ethical positions.[13]

7.3 Actualism

Of course there are views in ethics according to which human beings do not have their moral status in consequence of their merely belonging to a certain species, and views according to which mere potentiality is not sufficient to ascribe morally relevant attributes. We have decided to subsume such views under the label of "actualism", which embraces above all the sorts of "life-interest-oriented" positions defended for example by Peter Singer or Norbert Hoerster.[14] The fact that a being has the property of being sentient might – for example – carry moral weight insofar as such beings should be treated with a certain due care and respect. If we have dealings with them, we are morally obliged to treat them in ways which spare them unnecessary pain. We are obliged to do so, not because they are beings of a certain natural kind, or because they are beings which potentially will develop certain properties, but because they *actually* have the property of being sentient. There might be several such properties whose actual possession is of moral significance.

How does "Sixteen Days" fare in relation to views of this type? Here, too, what Smith and Brogaard have to say is prima facie ethically irrelevant. For ethical positions of this sort would try to find a point at which the species member in question starts to gain a morally significant feature *actually* (as opposed to merely potentially), and this will – as we've said – presumably be a feature additional to that of species-membership. But at the stage of gastrulation there is no such new morally significant feature that is gained by the species member in question. The best we might hope for is a feature like that of organic unity, which the foster first enjoys with the conclusion of gastrulation; organic unity seems, however, to be too weak a thread from which to hang the sort of moral respect with which we are here concerned.

Actualist views, rather, grant a right to life not to the sixteen-day-old embryo, but rather to the infant who gains with his developed self-awareness an interest in its future existence which is (on the views in question) worth protecting. It is not the human being which is the relevant entity whose

---

[12] Ensoulment theorists may, alternatively. take a view according to which God the omniscient can know beforehand which fosters will split and thus that He is able to assign to each foster an exactly sufficient supply of souls from the very start.

[13] Catholic moral philosophers might still point to other moral factors, such as the obligation to propagate; these factors, however, relate not to the actual or potential foster but rather to its parents.

[14] Kaminsky 1998, 103-135.

beginning to exist is of relevance to "settle the difficult problems which arise in connection with the issue of abortion and embryonic stem cell experimentation" but rather the *person*, an entity which is held to begin to exist later than does the human being.

Hence trying to assess the theoretical fruitfulness of "Sixteen Days" for bioethics leaves us with a relatively negative result. Only if human existence is intrinsically worth being protected (or if one subscribes to potentialism) will the initiation of this existence be of ethical significance, and only then will an ontological account of this initiation be fruitful in ethical terms. However, there do not seem to be too many good theoretical reasons why anybody would want to hold such views.

8. Intrinsic, Practical, and Indirect Relevance

Even if the question of when a human being begins to exist were of no moral significance whatsoever, it might still be an *ontologically* interesting problem. It seems that we sometimes do wish to talk about substances such as human beings or human individuals (e.g. in biology or medicine) and that an ontological investigation like the one mounted in "Sixteen Days" will surely be illuminating for these cases. And as we noted earlier, a philosophically satisfying ontology could prove more than helpful for practical concerns within the medical realm.

There are also other ways in which philosophical issues could be clarified by means of an ontological analysis of when a human being begins to exist and what the conditions of transtemporal identity for human beings are. Thus personal identity theorists like John Perry use constructions which are parasitic upon an answer to the question of when one human being stage is diachronically identical with another human being stage. Consider the famous circularity objection against a psychological criterion of personal identity: the objection is that any account of personal identity in terms of memory must be circular, since memory presupposes personal identity and therefore cannot be used to define it. Since "to establish that someone not only *thinks* that he remembers, or *seems* to remember, but actually *does* remember doing or experiencing something, we have first to establish that he, that very same person, did indeed do or experience it." (Noonan 1989, 172) To get round this problem, psychological continuity theorists proposed a substitute for our usual notion of 'memory', namely 'quasi-memory', which does not entail the viciously circular epistemic dependence of veritable memory on personal identity, but is defined, rather, with reference to causal chains that connect the memories of the later person stage[15] with the experiences of the earlier. This still leaves the problem of identifying the right kind of causal chain that has to obtain between memories and the experiences they are of. And this problem,

---

[15] Are we, in talking of person stages or of human being stages, committed to a four-dimensionalist view, which would make the latter temporal parts of persons and human beings? The virtue of a four-dimensional ontology is its ontological parsimony. From an ontologically realist point of view, however, parsimony is of no account.

of course, cannot be solved in terms of person stages (that would, again, be viciously circular). To identify the right kind of causal chain, the personal identity theorist has to point to a contingently obtaining causal connection in the real world, the connection an overwhelming number of diachronically identical *human being* stages instantiate whenever later stages have reliable memories of experiences the same human being had earlier in its life (Perry 2002). Thus, in solving the problem of personal identity we have to rely on a solution of the problem of human being identity. These are all interesting theoretical, even philosophical, questions, which the approach of "Sixteen Days" can help to answer.

9. When Did You Begin to Exist?
In the last paragraph we established the indirect relevance of "Sixteen Days" for a mentalist theory of personal identity. Mentalists or Neo-Lockeans hold the view that psychological continuity is a precondition of our identity over time.

In reviewing different alternative starting points for the beginning to exist of a human being, Smith and Brogaard criticize the Neo-Lockean tradition for locating this event at the beginning of self-consciousness:

> The final alternative is that it is the acquisition after birth of some extra feature which marks the beginning of the human individual. This extra feature is what makes the foster a human being. One obvious candidate (at least since Locke) is consciousness, and in particular self-consciousness. This alternative, too, falls prey to the arguments advanced above [according to which a change within a certain part of the matter of an object cannot constitute a substantial change in the object as a whole]. (Smith/Brogaard forthcoming)

In fact, of course, the philosophical tradition has long been aware of the fact that the human being is a special sort of biological organism and that the initiation of existence of a human being is thus not to be identified with the beginning of consciousness. To see this point, consider what Locke himself had to say:

> This also shows wherein the identity of the same man consists; viz., in nothing but a participation of the same continued life, by constantly fleeting particles of matter, in succession vitally united to the same organized body. He that shall place the identity of man in anything else, but like that of other animals, in one fitly organized body taken in any one instant, and from thence continued, under one organization of life, in several successively fleeting particles of matter united to it, will find it hard to make an embryo, one of years, mad and sober, the same man, by any supposition, that will not make it possible for Seth,

16

Ismael, Socrates, Pilate, St. Austin, and Caesar Borgia, to be the same man. (Locke 1975, 36-37)

And a little later:

And whatever is talked of other definitions, ingenious observation puts it past doubt, that the idea in our minds, of which the sound man is the sign, is nothing else but of an animal of such a certain form: since I think I may be confident, that, whoever should see a creature of his own shape or make, though it had no more reason all its life than a cat or a parrot, would call him still a man [...]. (Locke 1975, 37-38)

But what the Neo-Lockean tradition indeed claims is that consciousness marks the beginning of a new entity, the beginning of a person. It is the latter's identity that has been held by many since Locke to be dependent on certain functions of our brains, and it is the latter kind of entity that is connected to those metaphysical puzzles of personal identity which have interested much of the philosophical tradition ever since.

Rather surprisingly, now, the defenders of the Neo-Lockean position hold that it is the beginning of existence of the person – not of the human being – that can be of some help in settling the difficult problems which arise in connection with the issue of abortion and embryonic stem cell experimentation. For (they argue) it is persons which are the bearers of the relevant moral properties, and therefore that it is the beginning of the existence of persons which is the question of significance for an ethically fruitful ontological theory.

Why does the Lockean distinction between "person" and "human being" matter for our problem? Of course, there does seem to be a *conceptual* difference between the two, but the question of whether the results of "Sixteen Days" carry over to the metaphysical questions which are dealt with under the heading "personal identity" is the question of whether there is any *ontological* difference between persons on the one hand and human beings on the other. If there is not, then the sixteenth day will be ipso facto the beginning of existence of a person also, and the theories from the Neo-Lockean tradition about personal identity will collapse onto theories about the transtemporal identity of human beings as biological organisms.

There is not enough space here to deal with this problem in detail. An argument in favour of the view that there is no ontological difference between human beings and persons (a view referred to in the literature as "animalism"[16]) could be the following:

---

[16] More precisely, animalism is the thesis that any person coincident at any time with an animal is that animal. For a defense of animalism see Olson 1997, 1998, Mackie 1999. For a defense of Neo-Lockeanism against animalist objections see Shoemaker 1984, Noonan 1998, 2001, Baker 2000.

Suppose intelligent animals and persons truly are distinct but coincident entities. Suppose now that an intelligent animal such as a human being happens to think "I am a person"? Would this thought be false for the animal, but true for the person having the same thought at the same time? Or would it be ambiguous because, since both person and animal are simultaneously thinking the thought, the reference of 'I' is equivocal? There are several strategies open to the Neo-Lockean to sidestep the issue. One could deny that animals can think; rather, they coincide with entities that think (Shoemaker 1984). Another could define persons as the object of self-reference and endorse a distinction between user of 'I' and referent of 'I' (Noonan 1998). It is still an open question whether any of these strategies will prove successful.

Moreover, even if 'person' and 'human being' are conceptually distinguishable, it does not follow that they must refer to two distinct substances. For it could be argued that we do not begin to exist twice, first as human beings (at the sixteenth day), and then once more as persons a number of months or years later. Instead each of us has been around since gastrulation and has been gaining a new neurological complexity ever since – the conclusion of gastrulation corresponds, after all, to the beginning of neurulation – bringing with it, in the course of time, the development of astonishing skills.

If you could download all of those psychological properties upon which the Neo-Lockean tradition focuses and upload them into the brain of another human being, the substances would still remain exactly where they were before we started. The human beings in question would simply gain new memories and character traits. They would not change identities (the notion of changing identities is indeed, on the conception of substance underlying "Sixteen Days", simply incoherent). A challenge for this view is that it needs to give an account of the reasons why we seem intuitively to care so much about the psychological properties rather than about the mere body. If such an account could be formulated, then "Sixteen Days" would indeed prove fruitful for almost all puzzles and questions raised in connection with the metaphysical problem of so-called personal identity. The problem would become a part of the ontology of biology.

References

Baker, L. R. 2000 *Persons and Bodies. A Constitutions View*, Cambridge: Cambridge University Press.

Brogaard, B. (forthcoming) "Stem Cell Research and the Moral Status of the Human Embryo", *Free Inquiry*.

Carrara, M. and Varzi, A. C. 2001 "Ontological Commitment and Reconstructivism", *Erkenntnis* 55, 33-50.

Field, H. 1980 *Science Without Numbers*, Princeton: Princeton University Press.

Goodman, N. and Quine, W. V. O. 1972 "Steps Toward a Constructive Nominalism", in: Nelson Goodman *Problems and Projects*, Indianapolis/New York: Bobbs-Merrill, 173-198.

Haslanger, S. 2000 "Gender and Race: (What) Are They? (What) Do We Want Them To Be?" *Noûs* 34, 31-55.

Hershenov, David B. 1999 "The Problem of Potentiality", *Public Affairs Quarterly,* 13: 3, 255-271.

Kaminsky, C. *Embryonen, Ethik und Verantwortung. Eine kritische Analyse der Statusdiskussion als Problemlösungsansatz angewandter Ethik*, Tübingen: Mohr Siebeck.

Locke, J. 1975 "On Identity and Diversity", in: J. Perry (ed.) *Personal Identity*, Berkeley: University of California Press, 33-52.

Mackie, D. 1999 "Animalism Versus Lockeanism: No Contest", *The Philosophical Quarterly* 49, 369-376.

Noonan, H. 1985, "The Only x and y Principle", *Analysis* 45: 79-83.

Noonan, H. 1989 *Personal Identity*, London: Routledge.

Noonan, H. 1998 "Animalsim Versus Lockeanism: A Current Controversy", *The Philosophical Quarterly* 48, 302-318.

Noonan, H. 2001 "Animalism Versus Lockeanism: Reply to Mackie", *The Philosophical Quarterly* 51, 83-90.

Olson, E. T. 1997 *The Human Animal. Personal Identity Without Psychology*, New York/Oxford: Oxford University Press.

Olson, E. T. 1998 "Human Atoms", *Australasian Journal of Philosophy* 76, 396-406.

Perry, J. 2002 *Identity, Personal Identity and the Self*, Cambridge, Mass.: MIT Press.

Robinson, D. 1985 "Can amoeba divide without multiplying?" *Australian Journal of Philosophy* 63: 299-319.

Shapiro, S. 2000 *Thinking about mathematics. The philosophy of mathematics*, Oxford: OUP.

Shoemaker, S. 1984 "Personal Identity: a Materialist Account", in S. Shoemaker and R. Swinburne *Personal Identity*, Oxford: Blackwell.

Smith, B. (in press) "Ontology", in Luciano Floridi (ed.), *Blackwell Guide to Philosophy, Information and Computers*, Oxford: Blackwell.

Smith, B. and Brogaard, B. 2003 "Sixteen Days", *The Journal of Medicine and Philosophy*, 28 (forthcoming).

Strawson, P. 1964 *Individuals*, London: Methuen.