J Agric Environ Ethics (2014) 27:1–25
DOI 10.1007/s10806-013-9439-x

ARTICLES

Beyond "Second Animals": Making Sense of Plant Ethics

Sylvie Pouteau

Accepted: 21 January 2013 / Published online: 3 February 2013

Abstract Concern for what we do to plants is pivotal for the field of environmental ethics but has scarcely been voiced. This paper examines how plant ethics first emerged from the development of plant science and yet also hit theoretical barriers in that domain. It elaborates on a case study prompted by a legal article on "the dignity of creatures" in the Swiss Constitution. Interestingly, the issue of plant dignity was interpreted as a personification or rather an "animalization of plants." This sense of irony makes sense when one realizes that on scientific grounds the plant is a "second animal," i.e., it differs from the animal in degree of life or some ethically-relevant criterion but not in nature. From the point of view of ethics however, plants should be defended for what they are by nature and not by comparison to external references: the ethical standing of plants cannot be indexed to animals. It is thus reckoned that to circumvent this odd fetishism, the plant ethics can only be adequately addressed by changing the theory of plant science. Common sense tells us this: plants and animals belong to radically different fields of perception and experience, a difference that is commonly captured by the notion of kingdom. In this paper we remind the ethical conversation that plants are actually incommensurable with animals because they are unsplit beings (having neither inside nor outside), i.e., they live as "non-*topos*" in an undivided, unlimited, non-centered state of being. It is concluded that the unique ontology of plants can only be addressed through a major change from object-thinking to process-thinking and a move from ego-centric to "peri-ego" ethics.

Keywords Animal · Biocentrism · Epistemic standing · Plant · Post-ego · *Topos*

S. Pouteau (✉)
INRA, UMR1318, Institut Jean-Pierre Bourgin, RD10, 78000 Versailles, France
e-mail: Sylvie.Pouteau@versailles.inra.fr

S. Pouteau
AgroParisTech, Institut Jean-Pierre Bourgin, RD10, 78000 Versailles, France

There may be various reasons for addressing plant ethics. First, plants are important designers of our outer and inner landscape: we find them everywhere around us, even in urban areas in streets, parks and stores. Second, plants provide us with vital goods: we obviously need them for our survival: biological (e.g., food, energy and medicine), ecological (e.g., climate and biodiversity) and psycho-spiritual (e.g., recreation and aesthetics). Third, plants are at the forefront of current major controversies on agricultural and environmental issues (e.g., GMO, intellectual property rights on seed stocks and plant species, biofuels, deforestation). Fourth, plants incite novel public policy: we are supposed to desire more urban greening (e.g., green walls and shared gardens) and are called to support technological greening (e.g., green sources of energy and materials) (Lafaye and Thévenot 1993).

Every time we deal with plants, we might ask what it means to respect nature? We do not need to think of exotic plants in a remote forest or at the top of a mountain, we may simply consider our daily encounter with them on the street, in the garden, or in a nearby field. How to live well with, and interact with plants? How to care for plants, and not just technically? Many people might find these odd questions and contend that we actually lack moral intuitions for plants. They might assert that there is nothing compelling for us, no special duty to respect plants: all that we need in order to interact with and care for them is to get to know plants botanically and apply sound science. Any further extrinsic concerns should be addressed on strictly utilitarian grounds, e.g., the potential harm that human beings might encounter because of altered states of plant life, or the extinctions of certain plants. In other words, it is allowed that we may value and respect plants for what they do for us but not for their own sake.

However, the claim that we lack moral intuitions for plants deserves further anthropological and sociological scrutiny. Indeed, in traditional societies, plants often have (or had) a sacred significance and a moral status (Hall 2011). In modern societies, even if plants have no moral status they are commonly met with aesthetic response and empathy. Advertising and public events often take advantage of this empathy, e.g., the launching in 2012 of a "Fascination of Plants Day" under the umbrella of the European Plant Science Organization (EPSO).[1] Their objective was to call the public to discover recent advances in plant sciences and at the same time to make plant biotechnology more popular. Indeed, in European countries (and in other countries), the public is widely opposed to genetically modified plants (GMP; Eurobarometer 2010). Among the reasons given, the technology is thought to be fundamentally unnatural, representing a violation of species' barriers and a disruption of plant-life integrity equated to "playing God." These intrinsic concerns have largely been regarded as irrational and scientifically misguided, especially from within the scientific community. Nevertheless, they indicate that modern society at large does seem to have a moral chord for plants. Interestingly, the Swiss nation was the first to integrate these concerns in its constitution, holding that the dignity of all living creatures—plant included—should be respected. Since its adoption in 1992, the Swiss prescription opened up the opportunity to seek public recommendations on the issue of plant life integrity. At the same time, a growing

[1] http://www.plantday12.eu/.

number of scholars have emphasized the unique complexity and agentive capacity of plants (Hallé 1999; Trewavas 2003; Brenner et al. 2006; Hall 2011; Houle 2011, 2012). Finally, a new field of research termed "human-plant sciences" (HPS) has emerged to encompass the most recent advances in plant sciences within an explicit humanist frame. At its base, HPS supports the notion that plants are social beings with a form of intelligence and agentive efficacy, and that as such they deserve ethical consideration (Ryan 2012).

There seems to be an increasing interest in plant life and plant ethics. It is no longer a largely private issue although it has not yet reached the wider public. At this stage, one may wonder whether plant life will remain a subject of concern for a restricted number of people or whether HPS and other approaches will be able to influence public perception and wider decision-making for the handling of plants. This paper will examine how the issue relies on the evolution of plant sciences and the development of biological ethics. Its objective is to explore the complex contribution of science to addressing moral concern for plants, i.e., the fact that plant sciences provide material for ethical reflection in spite of the barriers set by their mechanistic and nominal premises. This inquiry will first examine how a moral consideration of non-human entities has become possible in a modern, scientifically-informed and anthropocentric philosophical framework, and then how plants fit into this framework. The theoretical difficulties will then be approached by describing the launching of the plant ethics issue in the Swiss public arena and by identifying critical check-points linked to the ontological standing of plants. In particular, the nominal indexation of plants to animals will be examined and the possibility of using an external reference in science but not in ethics will be discussed. To address the unresolved yet productive tension between ethics and science, a change in the ontological standing of plants as self-referred entities with their own, unique properties will be proposed. The notion of "plant kingdom" will be re-assessed on realist grounds and evidence that plants are incommensurable with animals will be presented.

Beyond Human Reason: Granting Non-Human Beings Moral Status

The Kantian Theory of Intrinsic Value: Being Like Gods in a Mechanistic World

The advent of Modernity is linked to a radical change in the position of human beings with regard to the natural world. This change is reflected both in theories of science and in theories of ethics which cooperate to establish anthropocentrism as the new philosophical synthesis. For science, the world is a universal machine that can be explained in instrumental terms of structure and function. These premises are condensed to a high degree in the Kantian theory of intrinsic value (Kant 1785), which establishes simultaneously the moral legitimacy of an instrumental logic, and its limitations. The Kantian theory clearly elaborates on the Cartesian ontological distinction between objects and subjects, stating that there are means with an instrumental value (objects) on the one hand and ultimate ends with an intrinsic value (subjects) on the other. In contrast to the notion of instrumental value, which

is contingent and depends on a subjective evaluator, intrinsic value refers to an absolute value that belongs to the essential nature and constitution of the person.

The criterion that justifies human beings as ultimate ends is reason, i.e., conscious intelligence. For both Cartesian and Kantian thought, reason provides the capacity to comprehend, i.e., to operate mentally and to imitate concretely what the "Watchmaker" or "Intelligent Designer" is supposed to execute mechanistically. Georges Canguilhem (1965) pointed out that the imitation actually works reversely: it is the Cartesian God who has become a substitute for the human watchmaker. This substitution may be readily inferred from Descartes's writings (1664, pp. 2–4): "*I assume their body to be but a statue, an earthen machine formed intentionally by God to be as much as possible like us. Thus not only does He give it externally the shapes and color of all the parts of our bodies; He also places inside it all the pieces required to make it walk, eat, breathe, and imitate whichever of our functions can be imagined to proceed from mere matter and to depend entirely on the arrangement of our organs.*" The modern definition of a moral subject incorporates the notion that this subject is a potent(ial) agent who has the rational capacity to operate mechanistically. Rather than place it at a distance, this new dignity of human beings is strongly dependent on a mechanistic worldview. (Techno) science represents an unprecedented instrument for its enforcement.

Re-Opening the Moral Issue for Both Ethical and Scientific Reasons

If Kantian theory is essentially a moral adaptation of the scientific mechanistic paradigm and the scientific enterprise inherently relies upon an instrumentalizing anthropocentrism, how can one care for the environment and address intrinsic concerns for non-human beings in a scientifically-informed way? Indeed, ultimate ends necessarily have instrumentalizing ends in view, therefore intrinsic value and instrumental value are actually two sides of the same coin. Changing one term in the value partition should inevitably affect the whole scaffolding down to the Cartesian divide between objects and subjects (Callicot 1995). Eventually this would challenge the universal machine premise at the root of Modernity, a change that cannot be conceived let alone levied without extremely strong arguments. To this end we may draw on two main types of contribution.

First, anthropocentric theory carries its own internal contradictions because of the irreducible fact of marginal cases. Indeed, not all human beings possess reason and thus reason alone cannot suffice to grant all human beings a moral status on legal grounds. Other criteria like hedonic and vital interests (vs. pain and decay) must be invoked to consider moral patients who have moral interests but need the intercession of other moral agents to claim adapted treatment for them (Goodpaster 1978). However, the making exceptions for certain humans via the introduction of these other criteria than reason now means that the human exception cannot be justified as exceptional, i.e., that non-human beings lacking reason should also be considered. Attempts to extend the Kantian theory to non-human nature have been widely debated and the notion of intrinsic value itself has likewise been critically re-assessed (e.g., Callicot 1995).

Second, the scientific machinery premise also bears internal contradiction because it does not accommodate self-agency, autonomy and history. In fact, living beings unceasingly thrive, interact, and adapt to create new, complex, individual and social capabilities. Science itself has provided the evidence that contradicts the explanation of non-human nature as solely passive, and mechanistic, and demonstrated the importance of many more factors than human reason for the flourishing of both human and non human beings. Accordingly, science might not be merely a barrier as is often thought: it may even be a key means of raising new ethical awareness for plants and non human nature at large. Nevertheless, one may rightly wonder whether one can explore these internal contradictions of science for moral ends without eventually forcing science itself to bear too much of the weight of its mechanistic premises. As expressed in pragmatic terms by Emilie Hache and Bruno Latour (2009): "*it is impossible to re-open the moral issue without changing the theory of science.*"

Changing the Theory of Science: Do We Need a New Ethics or a New Biology?

Pre-modern rationality relied on mythical and religious thought and is characterized by the notion that nature is inhabited and/or animated by gods, souls and spirits. Modern rationality made a *tabula rasa* of this magical backdrop and has left us with a bare, disenchanted, and yet superb, machinery. Of course, we have never quite entirely believed that nature is a machine, except for the sake of research and production of goods. As pointed out by Latour (1991), "*we have never been modern.*" Yet, we do not seem anymore prepared to address nature solely through a belief system nor to rely on mythical and religious accounts to establish our moral judgments. We seem to also need to raise scientific confidence in our moral intuitions (as dim as they may be). Here it is proposed that, from a moral standpoint, modern science can constitute a device similar to the "*epoché*" in the phenomenology of Edmund Husserl (1913), i.e., a naught level on which a moral perspective could be built as if anew. In other words, perhaps nature had first to be deprived of essential value by a moral blackout, or moral *epoché* before it could rightly gain its novel attention and be re-qualified via a rationale better able to accommodate the stern requirements of thorough-going scientific enquiry. According to this suggestion, the machine metaphor is not only a heuristic device, it is also a critical method for seeking new ethical awareness through strong and rigorous, even rationalistic, endeavor.

In the tension between pre-modern and modern expectations, we have gradually become aware that we are surrounded by beings with an undefined standing. These beings may be described as "inappropriated others" after Donna Haraway's wording (1991), i.e., beings unable to be grasped fully by, or under classical ontological and relational definitions. Because of science and its materialistic approach, entirely new qualifications of the natural world have become necessary and possible. Nature had been valued mostly on essentialist grounds and hence the modern emphasis on reason was somehow a logical outcome of contemplative philosophy since its origin in ancient Greece and China (Zwart 2009). Organic qualities and bodily functions had been overlooked or even scorned because they were bound to the mundane, the trivial everyday. Against this very background, scientific study of the biological basis of

"motions" in the general sense, e.g., behavior, sentience, and growth, has unraveled a wealth of organic properties that has changed our sense of the standing of organic matter itself. In particular, the discovery of organic proximity between different entities changed the type of questions that could be addressed both on scientific and ethical grounds. For instance, the existence of a central nervous system proved to be essential in mediating the capacity to suffer and experience pain. Neurobiological findings completely changed the understanding of pain and hence changed the consideration granted to beings capable of experiencing it, including animals. Nevertheless, insights into brain-based sensitivity do not impose drastic changes on the theory of science because (higher) animals can still be apprehended as human beings, e.g., children or mentally disabled people, and their body can still be considered to be (or to function like) a machine.

In spite of enormous progress in biological knowledge, vegetative, organic life still remains a rather obscure and abstract concept, and is still conceived mainly on essentialist and mechanistic grounds. Already a century ago, Henri Bergson (1907) diagnosed that logical thought is adapted to solid matter but not to the moving, evolving nature of life. Life itself confronts us with the compelling necessity to think in a way that we would never have thought, and in ways beyond our habitual modes. Georges Canguilhem (1965) takes Bergson's pragmatist position a step further when he writes that we are not condemned to choose between dead, crystalline thinking and lively, obscure mysticism: for the sake of biology, we should necessarily draw the thinking of life out of the *experience* of life. Undoing the stasis of the ontological premise of pure objects, life itself points to process and dynamics. Organic life cannot be understood without the recognition that it has to do fundamentally with becoming and, if one endorses the theory of evolution, with "becoming other." After about 150 years, the theory of evolution is still in need of adequate thought able to approach the dynamic, ever changing an (re)creating shapes of the natural world. Living beings are not a fixed collection of Newtonian-like objects or machines but extend into wider natures, not only logically but also ontologically. This dynamic picture is actually more messy since plants and populations of microorganisms unceasingly proliferate and do not have Newtonian-like boundaries like animals. Non-animal beings extend into wider natures not only genetically but also synthetically, i.e., *organically*. For this reason, as long as plants are addressed ethically on the same theoretical grounds as animals, one will be faced with a lack of realist grounds on which to properly open the ethical issue. This major difficulty will be explored in the following sections. As we will show, it will lead us to the proposal that it is necessary to change the biological theory into a postmodern bio-theory able to accommodate both the theory of evolution with its dynamic implications and a new style of ethics, biological ethics.

Beyond Animal Sentience: The Organic, Vegetative Life Issue

Being Alive… Like Animals: How Plants Have Become a Subject of Science

Since Aristotle, plants and animals have been thought to be organized according to distinct principles. The emergence of plant science in the eighteenth century

introduced a radically new ontology and thus epistemic standing for plants. The philosopher François Delaporte (1979), starting his historical research with Michel Foucault, detailed how plant science was born through granting plants the same theoretical standing as animals. A major step was the discovery that the plant body is made of organic matter like the animal body. Plants suddenly gained in interest and complexity and became a new subject of scientific investigation. In contrast to the general method of science, plant scientists used the superior to shed light on the inferior. On purpose and not incidentally, i.e., using an explicit methodological rationale, they elaborated their questions by reference to the animal, trying to identify similarities and differences: do plants have lungs, stomach, mouth, veins and a brain? How do they breathe, eat, grow and mate? The analogical method and the experimental method, representing the two main competing streams, differed in their cognitive approach but they converged towards a unique position: "*Whoever discourses on the nature of the plant must assume that the plant is neither completely different from an animal nor its complete replica*" (Delaporte 1979, p. 34).

After the eighteenth century, the indexation of the theoretical standing of plant to animal was further enforced by the unification of biology as a scientific discipline based on the theory of evolution. It clearly established that plants belong to the community of living beings because they share a common ancestor with animals and are made of the same components, e.g., cells and genes. The unification of biology under the life criterion represents at the same time a unification of kinds. There are obviously differences between kinds but these are taken to be ultimately only differences in gradations of life. From a theoretical perspective, insofar as the life criterion is invoked, plants are inherently—and logically—kinds of animals. And if the animal is "the first animal after humans" as defined by Karen Houle (2011), one may wonder whether the plant has not become—theoretically speaking—the second animal after humans.

By revealing the organic proximity of plants and animals, plant science also raised new proximate moral concerns Logically, since the ethical debate was focused on what was thought to be important for animals, especially their capacity to suffer, plant sensitivity and ethology became a new important subject of debate (Delaporte 1979). Besides questions regarding how plants eat and mate, the issue of plant movement attracted much attention because it was interpreted to manifest the capacity of plants to direct their activity in order to escape injury and pain. This scientific historical account by Delaporte is quite instructive because it shows that: first, the plant ethical issue is not new; second, from the beginning of biological science, ethical concerns for plants and for animals have run in parallel; and third, the focus of plant ethical issues has not changed drastically since the eighteenth century. Borrowing each others' arguments, the two intricate issues of plants and animals have nevertheless taken contradictory orientations. On the one hand, there has been an effort to establish a continuum between plants and animals and to demonstrate that plants, just like animals, possess sensitivity, self-agency, autonomy, and even intelligence (Trewavas 2003; Hall 2011; Houle 2011, 2012; Ryan 2012). On the other hand, there has been a drive to draw a clear-cut

ontological line between plants and animals and to reject plants on the side of things (see below).

Degradation as a Prerequisite for Exploitation: Conflict(s) of Interests Between Plants and Animals

Dignifying one through degrading the other is a typical attitude in Western culture. From slaves and women to animals and then to plants, the rationale is quite similar in that it serves to justify instrumentalizing purposes already at work in society. Dignity becomes possible only inasmuch as second-hand others, "other than others," can be substituted for first-hand others. Plants are certainly not the last "others" on the list—next to plants, one may think of algae, microorganisms, the dead, water, and land—but they are nearest ontologically, theoretically and historically to the "animal others" and they both benefit and suffer from this proximity. One may even wonder whether the animal is not incidentally the best enemy of plants, a conflict of interests that could be explained by the need to raise the status of animal life above its own previously-degraded condition.

Degradation of animal life became fully embodied in the Cartesian animal-machine (Descartes 1637) but its logic existed already. As indicated by Canguilhem (1965), the animal-machine was in fact a rehashed justification for the instrumentalization of lower beings in general, in this case of animals: "*Descartes does for the animal what Aristotle did for the slave: he disqualifies it to justify man to use it as an instrument.*" Likewise, machines existed already before the advent of mechanism and a science of machines. Canguilhem agrees with André Leroi-Gourhan (1964) in stating that the machine is primarily a biological phenomenon because it allows an extension of bodily functions. Eventually, the theory of machines should be traced back to organic life: the model for the living machine is the living organism itself. The biological model of the animal-machine is thus theoretically coherent, although it does not do full justice to the complex nature of animals. Nevertheless, mechanism within scientific domains provided new concrete grounds to debate what would have remained otherwise a metaphysical issue focused on the existence of an animal soul. This contribution of science helps explain why animal ethics has not endeavored to contradict mechanism in itself and has even taken advantage of mechanism in claiming that animals, too, have a soul, a sensitive soul, and that their condition is close to that of human beings and deserves respect. In the process, which will be documented by four arguments, the animal-machine paradigm has been implicitly turned into a plant-machine paradigm, i.e., a soulless mechanical green thing.

First, the emergent field of biology provided an arena for confronting the relevance of the automaton paradigm versus autonomous life paradigm, and thus to assess sensitive life not only on essentialist grounds but also on concrete, organic grounds. Much of the controversy opposing a mechanistic, deterministic interpretation and an autopoietic, self-oriented, autonomous interpretation of animal reactions and behaviors revolved around the notion of reflex (Canguilhem 1965, 2000). The issue at stake was the capacity to self-orientate motion and to assess values in a directional, autonomous manner; in other words the capacity to perceive

and create meanings and to adapt rather than to react mechanistically. Both ethology and neurobiology accumulated evidence to bridge the outside and the inside, i.e. behaviors and the properties of a central nervous system, establishing that sensitivity and intelligence are tightly interconnected.

Second, the newly upgraded standing of sensitivity and the novel understanding of sensory behavior demonstrated that animals have their own hedonic interests and orientations, and thus supported the notion of animal welfare and the development of animal ethics. Animals are sentient beings that may experience pain, fear and various kinds of emotions like human beings. For this reason, pathocentrism, i.e., the claim for a moral consideration of animals on the criterion of sensitivity, proposes that (higher) animals should be included in the moral circle alongside human beings (Singer 1975).

Third, the emphasis on sensitivity acted as a lock-out for the consideration of vegetative life for its own sake, rather than just the upshot of sensitivity for effective handling of plant matter. Plants do not have a brain and a central nervous system and thus are considered to be deprived of all the necessary attributes that enable animal and human life to be worthy: animation, perception, emotion, sensitivity, suffering. For the purpose of dignifying animal sensitivity, pathocentrism recycles the very argument that it opposes in the case of animals and reduces vegetative life to mechanics. For instance, Florence Burgat (2006) claims that suffering represents the very ground of life. Below this alleged ground, the plant world is mere mechanics: plants are mechanistically conditioned by their environments. Elisabeth de Fontenay (2000, pp. 41–42) takes up the same line of thought when she states that one ought to stop "*the assimilation of beasts to machines or plants*" and the idea that "*man can exploit animals in the same way as he grows potatoes*". The link between machines and plants in this sentence is not without preconception, neither is the choice of potatoes strictly anecdotal: not only does a potato figure as an ill-shaped and dirty thing but it is also merely one terminal piece of a larger plant, and it actually resembles a dead animal or a thing than a living plant. A potato example is thus perfectly suited to reducing the plant to a comatose animal, i.e., an insensitive thing, or more radically, to mere organic matter.

Fourth, the degradation of plants for their lack of sensitivity seems at first to be merely a logical by-product of the moral consideration of animals but in fact it is not new. Pathocentrism merely reinforces a position that had already emerged during the eighteenth century. One important argument was that God could not be so unfair as to create beings able to experience pain and yet unable to walk away and protect themselves. At the same time there was an urge to provide moral justification for plant exploitation by human beings. By using a similar argument as Canguilhem, Delaporte (1979, p. 194) explained: "*One does for plants what Descartes did for animals: in other words, one degrades them in order to allow human beings to use them*". Indeed, the emergence of plant sciences cannot be dissociated from the socio-economic context and the need to gain knowledge for an extended instrumentalization of plants in a century of major agricultural developments. In the modern era, plant production systems have widely contributed to promoting the view that plants are essentially a primary resource or material for making things in order to meet human needs: food, heating, decoration, construction, etc. In recent

years, new possibilities of using plants as "green factories" to produce biofuels and various biomaterials have only added to this general instrumentalization, rendering even more apparently frivolous or vain the issue of a limitation on plant exploitation. For plant production systems and a green economy in general, it is obviously crucial to retain the plant outside of the sphere of moral concern. Furthermore, plants as "biomass" or "biomaterial" are not simply even resources and materials anymore, they are also—at least—potentially—"waste" or "rejects," i.e., vague entities that are beyond any ontological definition. From this additional degradation of plants, one may foresee that the next field of contest might not be centered so much on whether plants are able to experience pain—though this may also be an important issue—but on what it is *to be* alive in the absence of a brain and a central nervous system.

Biocentrism: Towards a Recognition of Thriving, Sensitive Vegetative Life?

As far as human beings or animals are concerned, life *per se*, i.e., organic life, is not given a major emphasis and hence plants are considered to have nothing special to be defended. Even in the case of comatose people and fetuses, plants are named as the counter instances that lack the goods that these marginal human conditions possess: vegetables (e.g., Feinberg 1974). But human vegetative life is in no way similar to vegetables because the former has or once had the potential for sensitive and reasonable life, i.e., soul life. In this context, the plea by Kenneth Goodpaster (1978) to recognize interests other than hedonic or cognitive represented a major step toward a recognition of life as a good not reducible to sensitivity or reason. If being alive represents a good on its own, then all living beings should be recognized as having vital interests and for this reason deserve moral consideration. The criterion of life provides grounds for an extension of the pathocentric theory into a biocentric theory that encompasses all livings beings. Accordingly, animals are no longer in a privileged position: plants are also clearly able to strive and preserve themselves, they defend their life through their own vital effort and no one needs to tell them to grow and proliferate.

The recognition of vital interests irrespective of sensitivity or consciousness is radically new because it acknowledges the unique potency of (organic) life as a value-creating principle that should be able to conduct the evolutionary fact in general into the moral sphere. However, evolution can be understood in contrasting ways, that we may relate to the notions of *natura naturata* and *natura naturans* (Spinoza 1677), hence leading to two major orientations of biocentrism. The first one, represented by Paul Taylor's (1981) biocentrism, does not address the historical and creative dimension of life. In Taylor's analysis, life represents a criterion that living organisms possess as a good of their own like the color green. On theoretical grounds, life does not differ from sensitivity or reason. In this context, the biocentric community remains a collection of organic objects that can be grouped without challenging the prevailing hierarchical view of nature. Yet, by introducing the notion of "inherent value," defined as an intrinsic value that is not absolute, Taylor asserted that all living beings do not rank at the same level on a

considerability scale, and that conflicting interests can be arbitrated according to a default of common sense.

On the contrary, Holmes Rolston (1994) made the strong case that the criterion of life plays a role similar to the criterion of reason in the Kantian theory and that it confers an absolute value on all living beings. Accordingly, it should be possible to extend the notion of moral subject to all living beings: beings endowed with life could be seen as "vital agents," just like beings endowed with reason are moral agents. In Rolston's biocentrism, life is not a criterion or a good that a discrete individual possesses, like reason or sensitivity, but a dynamic, creative process that embarks living beings through a historical, evolutionary perspective. The fact that the life criterion cannot be separated from historicity is paramount and in fact constitutes a major departure from the Kantian notion of intrinsic value, which is fundamentally a-historic and conceived in a static perspective. One consequence is that life cannot be restricted to currently living organisms but extends historically into wider natures, including organisms, species, ecosystems, and the earth: "*Things do not have their separate natures merely in and for themselves, but they face outward and co-fit into broader nature* […] *Value-in-itself is smeared out to become value-in-togetherness. Value seeps out in the system, and we lose our capacity to identify the individual as the sole locus of value*" (Rolston 2002, p. 8).

Based on the historical and social dimension of life, Rolston's analysis leads us to the conclusion that value in nature is not an absolute value but a shared process that finds its primary expression in life itself. Life thus appears as a creative fountain, an integrative principle that values itself through its own productions and provides everything with value. Through emphasizing the wholeness of life, Rolston's biocentrism tends to merge with an ecocentric position that values integrated systems. This perspective however is faced with the difficulty of addressing distinct beings. Lacking resources to weigh in otherwise, Rolston's position on animals and plants remains in fact rather close to pathocentrism. Animals have a face and a brain whilst plants are mere objects that do not have goals and live without sentience (Rolston 2002). Finally, evolutionary and ecological knowledge proves insufficient in addressing interests that are not truly vital, irrespective of reason and sensitivity. As long as biological advances are ignored, "life" remains a rather vague, intellectual concept that fails to account for the reality of organic life exemplified by plant agency. The difficulty of applying biocentrism to plants without first addressing the biological significance of life will be further illustrated by considering the Swiss experience.

The Dignity of Plants in Switzerland: A Real-World Biocentric Assay

Würde der Kreatur in the Article 120 of the Swiss Constitution

The first opportunity for launching the issue of plant ethics in the public arena arrived via an article in the Swiss Constitution, which stipulates that "the dignity of creatures" (*Würde der Kreatur* in German) should be considered in the case of animal, plant and microorganism life. Since the adoption of this article by

referendum in 1992, a number of attempts have been made to examine what the dignity of plants and other creatures could actually signify and how to deal with it. The lawyer Hanspeter Schmidt (2001, p. 22) recalls that the notion was introduced by "*a small group of legislative experts who were not very clear what the nature of Würde der Kreatur in the context the Swiss Constitution should be*". This could explain why the wording itself is controversial. For the lawyer Marie-Angèle Hermitte (2011), the article represents a case of "substantial personification", i.e., referring to non-human entities in legal documents using attributes, behavior, feelings and perspectives that have long been restricted to human beings, that may eventually lead to considering these entities as legal persons. She recalls that, in law, dignity is a non-derogable principle. This means it is an obligation for all human persons to ban any behavior that might alter the ideal image of humanity for society. She is thus dubious about the appropriateness of the use of the term "dignity" in the case of non-human entities: "*it seems difficult to see how a poppy could have an obligation to behave as an ideal poppy*" (Hermitte 2011, p. 188).

In fact, dignity is a rather ubiquitous concept and can be used in other instances than human rights (Harmon 2009). The term dignity in the phrase "dignity-of-creature" points to at least two meanings that cannot be substituted for each other: inherent value and integrity. Schmidt (2001) reminds us that according to Cicero there are actually two sides to human dignity, one relative to an achievement (as in that pointed out by Hermitte) and the other intrinsic by virtue of one's very nature. This second meaning was explicitly emphasized in discussion with the World Trade Organization by the Swiss Federal Council, who explained that the term *Würde der Kreatur* "*is understood to be an inherent value, which is owned by non-human organisms and which prohibits treating these organisms as instruments for a purpose*" (Schmidt 2001, p. 19). The Federal Council explained further that *Würde der Kreatur* is not an absolute value, which is clearly in line with what Taylor (1981) meant by the term inherent value. These statements by the Federal Council explain why a biocentric framework has been favored to address the Swiss article. On the other hand, Ariane Willemsen (2009), the executive secretary of the Federal Ethics Committee on Non-Human Biotechnology (ECNH) reminds us that the term *Würde der Kreatur* was elaborated in a theological tradition, initially expressed in German in the Constitution of the Aargau Canton in 1980. In its first appearance in the Federal Constitution in 1992, the translation into the other two national languages (French and Italian) and into English was rather accurate to that theological idiom. But in the revised Constitution of 2000, the French translation was significantly modified and became the more scientifically-inflected "the integrity of living organisms" (*l'intégrité des organisms vivants*). Schmidt (2001, p. 20) explains that "*the difference was caused by the refusal of the French language service in the Federal Secretariat to use the term dignité de la creature," since this constituted an "impossible" phrase in French and the same meaning was captured in "intégrité des organisms vivants.*"

Schmidt suggests that the term "integrity" was chosen possibly to address the protection of genomic integrity. This interpretation points to another aspect of the specific context in which the Swiss article emerged. Indeed, its origin has to be traced back to the 1960s when the potential impact of recombinant DNA first raised

social concern and Swiss parliamentarians began to call for legal regulation of genetic engineering. Thus, the first aim of the Swiss article was to define constitutional limits to scientific research and commercial use in order to protect not only humans but also the environment from the misuse of gene technologies (Willemsen 2009). This explains why the first international workshops on the dignity of creatures with respect to plants were held in the context of a reflection on genetic engineering (Ifgene 2001, 2002). Thus, even if the term integrity was not explicit in the initial wording of the Swiss article, and dignity was adopted instead, it seems important to bear in mind that it was somehow implicit from the beginning.

The Report by the Federal Ethics Committee on Non-Human Biotechnology (ECNH 2008)

To address the legal article in the Swiss Constitution, the ECNH and the Federal Committee on Animal Experiments jointly produced a report on "The dignity of animals" in 2001. The ECNH was also mandated by the Swiss administration to clarify the meaning of the article for the handling of plants. Seven years after the first report, the Committee published a report entitled "*The dignity of living beings with regard to plants. Moral consideration of plants for their own sake*" (2008). A clear majority of the ECNH panel adopted a biocentric approach, thus recognizing that individual plants, and not only species or communities, have an inherent value. This entails that we may not just use plants as we please, even if the larger plant community is not in danger; even if our actions do not endanger the species; and even if we are not acting arbitrarily. Arbitrary harm, such as decapitating flowers by the roadside, was banned by all members of the ECNH. Yet because of the mandate given to the ECNH and the historical context in which the Swiss article emerged, and the wider scientistic framework discussed above, the emphasis of the enquiry was clearly put on gene technology. Genetic modification in itself and patenting were not considered to alter plant dignity but a majority of members recommended that genetic modification should not affect plant autonomy and diversity, and that in any grant-funded research these prescriptions should be respected. Autonomy infers the capacity to reproduce and adapt to the environment, which ought to be preserved in the genetic stock. It also depends on the capacity to evolve and diversify, and requires that natural relational structures are maintained and protected. Obviously, human activities other than research and breeding approaches based on gene technology—e.g., production, decoration, landscape design, etc.—could also adversely affect individual plant capacities of reproduction and adaptation and their natural relational structures. Thus, one could expect that the ECNH recommendations apply to gardening and agricultural practices too. This precipitated a major point of discussion with respect to the ECNH report.

Biocentrism Defeated by Nominalism?

Unsurprisingly, the report by the ECNH raised some controversy among the plant breeding and GMO research front. Researchers were concerned that the Swiss recommendations might lead to ridiculous and unnecessary barriers to scientific

knowledge and innovation (Abbot 2008; Landon 2008; Naik 2008). Some critics interpreted the whole issue as a threat to human rights and as an extreme form of anthropomorphism that could both hinder the progress of agriculture, whilst countless human beings are starving, and weaken sound reflection on human rights (Lev-Yadun 2008; Sandberg 2008; Smith 2008; Harmon 2009). The international controversy was addressed by Ariane Willemsen (2009) who critically reviewed the committee's majority opinion. She admitted that the enforcement of the Swiss Constitution for the handling of plants might be limited: "*where plants are concerned, dignity of living beings remains an empty construct, except in the case of arbitrary harm inflicted on plants*" (Willemsen 2009, p. 438). In scientific research programs "*it can almost be taken for granted that no research project is considered arbitrary,*" thus effectively bracketing the question inside research. Indeed, no production activity in agriculture, forestry, horticulture, landscape, etc., can be judged arbitrary. Because there is nothing to be counter weighed on the side of plants, any intention whatsoever could serve as a moral justification on the side of human beings. Florianne Koechlin (2009), a member of the ECNH, agreed that, beyond acts of vandalism such as decapitating flowers on the roadside, the argument against arbitrariness was in fact rather thin. She also stressed that the committee could not agree on the meaning of "arbitrary." She and a few other members considered that it should apply to the thicker interpretation: the "massive and total instrumentalization and industrialization of plants."

If the biocentric framework leads to the general conclusion that there is nothing to be weighed on the side of plants, does this mean that vital interests cannot in fact be recognized for what they are? For Willemsen, a major difficulty is that life develops gradually and for this reason one cannot establish a clear-cut distinction between living beings and non-living beings. In this respect, the biocentric issue may be compared to the issue of the concept of species. According to Charles Darwin (1859), in the light of evolution a species can no longer be conceived as an absolute essence and should thereafter be seen as an artificial combination. Darwin's nominal position was re-examined in later debates and was used to refute the Platonic, essentialist (or typological) species notion that had prevailed until then. Using the same argument, Willemsen (2009, p. 439) concludes: "*'Life' must then be understood as a nominal definition as well and 'being alive' cannot be morally relevant for its own sake. It therefore ensues that a biocentric position can no longer be defended.*"

As a matter of fact, the objectivity of the life criterion of is not so conclusive. There is still much debate among scientists and philosophers over a plurality of definitions of life. Based on methodological and natural arguments, it does not seem possible to reach a unique and unambiguous definition. There are not only varying degrees of lifeness because of the gradual development of life; there are also varying means for achieving lifeness in different types of living systems (Malaterre 2010). Therefore, life cannot be pinned down to an a-dimensional property or "good" as implicitly suggested in Taylor's biocentrism. To circumvent this difficulty, one option may be to look for other criteria as proposed by Willemsen (2009) and other authors (e.g. Afeissa 2010; Maris 2010). However, the fuzziness of life is not itself sufficient to definitely undermine biocentrism. A first argument is

that the weight given to a criterion does not depend on its objectivity. Indeed, it is rather clear that the criteria of consciousness and sensitivity are no less fuzzy and nominal than life. Nevertheless, they are considered as relevant arguments in support of pathocentric and ratiocentric positions. A second argument alluded to above is that the historical, dynamic nature of life and the fact that life cannot be circumscribed to specific loci or to a dualistic divide between living and non-living beings can be accommodated by a holistic position as Rolston's biocentrism: life is a shared process, and thus so is value.

Finally, the issue of the dignity of plants needs not hang only on the possibility of reaching a comprehensive definition of life, whether in nominal or essential terms. It depends also on critical, pragmatist re-assessment of nominalism itself. For one who endeavors to analyze scientifically the organization of the natural world everything necessarily appears in nominal terms. Taxinomic classification, emblematically illustrated by the species debate, is probably the best example of this trend. Yet, on nominal grounds it is impossible to reach a conclusive definition not only of what it is *to be* alive, but also of what it is *to be* a plant, an animal, or even a human being. Indeed, if the plant is defined as a member of the "biocentric community," then it should be considered a nominal definition. But if plant is to be considered a nominal definition, it would be rather difficult to agree on the actual subject of moral enquiry and the whole issue of the dignity of plants would disintegrate into parts or units of biodiversity, i.e., "artificial combinations" in Darwin's words. It is concluded that, although life and "being alive" definitely represent a crucial, unsolved issue, the undue emphasis put on this issue in the debate has concealed the difficulty of defining the deeper subject of enquiry: on what grounds should a plant be defined? Further analysis of the controversy on the ECNH report indicates that the life criterion raises problems not only because of its nominal definition but also because it indexes all living beings to animals and eventually to human beings.

Merging Kinds: A Funny, Disguised Animal

Obviously, no one meant to equate plants with animals in the Swiss enquiry. Yet the theoretical context in which the issue of the dignity of plants appeared provides good ground to interpret this issue as a personification or animalization of plants. The biocentric framework is not anchored in psycho-social reality and ignores the major difference between the theoretical standing of plants and common sense. Indeed, on nominal grounds plants are "second animals," i.e., inappropriate appropriated others. Accordingly, the plant issue will merely appear as "*kind of ethics for ethics sake*" or an intellectual "*purification ritual*" (Sandberg 2008). In this legalistic and scientistic context, granting plants a moral standing ends up being equated with plants being literally treated like animals (or human beings) as if the two issues could not be separated. Witness the humorous notes that bloomed on the internet parodying an animalization or personification of plants (e.g., "*the silent scream of the asparagus*" or "*the silent sobbing of the salad*"; Smith 2008; Berit 2009). Much vocabulary was recycled or added to the existing literary semantics in order to describe the distressful states

encountered by plants figured as a kind ("*chlorophyll-kind,*" "*leafy-kind*") and granted a soul, e.g. humiliation, insult, offense, barbarism (of vegans), cruelty, mortification, slavery (Bailey 2008; Hamill 2008). Animalization and personification were also used in a more classical way to sketch transgression of kinds and monstrosities allowed by genetic engineering, e.g., transforming trees with human DNA in order to create "transgenic tombstones" (Ring 2009). Last but not least, the ECNH as well as the Swiss nation itself were awarded a peace Ig Nobel prize, an American parody of the Nobel Prizes that celebrates improbable research, i.e., research that is thought to be ridiculous or trivial: "*research that first makes you laugh, but then makes you think.*"[2]

Sketching plants like animals or humans in cartoons and word-plays has long been used to obtain comic or horrific effects among the public. Laughter and horror are two sides of the same coin: up to a certain degree monstrosities can be fun. For Bergson (1900), the process of laughter results from a caricature of mechanical features in living beings, i.e., when the continuous creation of new forms gets stiff and repetitive in more or less subtle ways (e.g., habits, automatic acts, stumbling, duplications, alliterations). Imitations (e.g., disguises and fancy dresses, take-offs, parodies) can also be interpreted in terms of repetition suggesting mental confusion or lack of attention. Taxinomy has its own repetitive repertoire and plants as theoretical animals might be seen as one of its comic by-products. Of course, the way plants and animals or humans have become woven together in comic or critical discourses is probably rather more complex and would deserve further scrutiny. For instance, a survey of the literature showed that different higher order metaphors are used for the GM food debate and the cloning debate: "plants are humans" in the former, whilst "clones are plants" in the latter (Nerlich et al. 2000).

Merging kinds works both ways. Animal defenders have also been criticized for turning animals into plants. Even before the report by the ECNH was published in Switzerland, a parody of the rights of animals termed "plant rights" appeared, claiming for instance, that "*advocates of plant rights describe the unnecessary eating of plants or indiscriminate killing of plants as 'plant genocide'*".[3] The joke "salad is murder" is also often invoked to stigmatize vegans and vegetarians. Finally, indexing plants to animals or humans, and vice versa, serves the general function of indicating that we have crossed the line of absurdity and "*gone to absurd land*" (Lev-Yadun 2008). Though this may seem a cruel conclusion, laughter should be taken seriously as among the most useful outcomes of the Swiss experience. Laughter reveals an otherwise hidden thought stiffness: one can theoretically "disguise" plants into animals for the sake of science, but not for social and moral purposes. Accordingly, the Swiss experience represents a real-world demonstration of the statement quoted above: "*it is impossible to re-open the moral issue without changing the theory of science.*"

[2] http://improbable.com/ig/.

[3] http://rationalwiki.org/wiki/Plant_rights.

Standing Out, Standing in or Outstanding: In the End, What is a Plant?

Fetishism Versus Realism: Modernity at a Crossroad

A major conclusion of sections Beyond animal sentience: the organic, vegetative life issue and The dignity of plants in Switzerland: a real-world biocentric assay is that, as long as plants are addressed via the category of biodiversity, they can only represent a class of objects that are indexed to animals and differ from them only by degree. Whatever the moral criterion employed or the ethical framework then adopted, whether it be biocentrism or relational anthropology (e.g., Arz de Falco and Müller 2002; Ryan 2012), this difficulty persists as the background because it is intrinsically bound to the structure of biological knowledge. Behind a plant actually stands a theoretical animal because plants and animals have become constitutively inseparable in a theoretical, scientific corpus. In this context, a moral consideration of plants is inevitably confronted with a major difficulty because it can only be settled on the basis of external references. But to value something on the basis of external references is a resort in fact to fetishism (Berque 1987). Marx developed an efficient theory of fetishism concerning market stuff: goods are endowed with a value of their own by the market but in fact this value comes from labor, exchanges and social relationships that have been incorporated into them. Similarly, insofar as they are theoretically framed by the idea of the biotic community, plants can only be valued for the virtues, properties and attributes they stand for on scientific grounds, and as such they can only be animalized fetishes. At this stage, the theoretical heritage of the eighteenth century seems to make the issue of plant ethics far more difficult than animal ethics: for a modern standpoint, a moral consideration of plants seems to be doomed to either fetishism or to unscientific or pre-scientific thought.

To come to terms with this fetishistic dead-end, at least two breakthroughs would need to be achieved: first, to recognize the relational nature of value; and second, to re-open the question of the cognitive standing of plants. As pointed out by Callicot (1995), value can only be the fact of an intentional subject: it is not a passive, objectifying experience but requires the participation of an evaluator. This contradicts the notion of an intrinsic value that is purely objective. Yet, the recognition of subjectivity alone is not sufficient to avoid an irrational fetishizing of the natural world. One also needs to recognize that the intrinsic value granted to human beings is defended at the expense of their ontological and existential belonging *to* the world, i.e. their constitutive co-creation in an integrative whole. Value does not rest in an object (A) or in a subject (non-A): value is in fact "in between" (neither A nor non-A) and/or "in both" (A and non-A). This symbolic, relational nature of value requires a complete deconstruction of the notion of ultimate ends, thus a deconstruction of the Cartesian subject, or quasi-Cartesian subject in the case of animals, and the instillation of a true evolutionary awareness as moral life. Callicot (1995, p. 222) already touched upon the issue when he wrote that with plants the deconstruction of the Cartesian subject gradually leads to the level of "*non-subjects.*" Yet, he did not address the implications of this statement for the theory of science. Here, it is proposed that the moral issue of plants is not one more step along a continuum of deconstruction. The plant moral issue can only be

(re)opened through a radical departure from human and animal references *and thus* by re-assessing the cognitive standing of plants. In other words, the ontological term non-subject should provoke a change in the theory of plant science, hence to consider plants on realist grounds as an entirely distinct, unique kind of ontological being.

Re-Opening the Plant Kingdom Issue: Have We Ever Perceived Plants as a Class of Objects?

According to the analysis of the Swiss experience presented in section The dignity of plants in Switzerland: a real-world biocentric assay, the many ironic comments on the ECNH report should be re-interpreted as stating: "a plant is not a second animal." This claim is quite different from saying that plants do not deserve any attention and care for their own sake. It implies that the granting of moral standing needs to take place by means of internal references: a plant must be defended for itself and not for a theoretically decerebrated animal or a biological instance. To common sense plants and animals belong to different fields of perception and experience, a difference that used to be conveyed by the notion of "kingdom." For science, a kingdom is a nominal definition: it is simply a section of the biotic community and represents a class of objects that share common features. In contrast, for common sense a kingdom is a realist definition: it is a sensory, aesthetic and pragmatic experience of everyday life.

Now it appears impossible to make sense of plant ethics without re-opening the kingdom issue in the same way as the species issue was, though in reverse direction. The species debate came up as an echo of the great medieval battle that took place between nominal vs. realist positions on Platonic universals or essential kinds, and led eventually to see species as intellectual constructs. In contrast, the kingdom question need not be addressed as an essence of any sort, but rather in its most concrete manifestation and properties. The matter is not to simply take for granted categories established by common sense but to recognize that categorization relies on common sense in the first place. Categorization is part of our cognitive relation to the world. Eastern and Western philosophers reflecting on our thinking about living beings agree that (common) sense emerges from reference to sameness and otherness, resemblance and difference (e.g., Imanishi 1940; Houle 2011). Making sense cannot be reduced to empirical chains of resemblance: to start with, we can only speak of plants as "others." Otherness, and not only sameness, should be a leading principle to proceed with the issue of the moral consideration of plants.

Rather than to try unifying living beings under the life criterion and create an artificial (intellectual/nominal) circle of entities that morally count (standing in), it appears more appropriate to positively discriminate these entities, i.e. to examine the positive basis for the standing out; that is, identify what makes them ontologically unique and irreducible to others. If one agrees that "a plant is not a second animal," then it is crucial to assess what makes plants radically and unconditionally different from animals. In other words: what makes plants stand-out or outstanding? The point is not to depart from science but rather to raise science beyond its currently limited scope and to consider the way plants actually and

objectively possess attributes that we subjectively value *because they are valuable* (and not because we project on them attributes belonging to other unique and valuable entities). It is thus necessary to seek a more comprehensive and realist approach of the plant kingdom, able to encompass aesthetic or pragmatic features that make plants not merely intellectual constructs but also (e)motional and concrete percepts and experiences in everyday life.

Building a Post-Modern Perspective on Plant Life: An Incommensurability with Animal Life

In everyday life, one does not need to be an expert to distinguish plants from animals: even a child can do it. Plants exhibit distinctive features that can be easily recognized: to be green and photosynthetic, modular and sessile, quiet and voiceless. Yet, one may wonder whether these features have anything to do with each other, whether there is an overarching or integrative property or character that may encompass these various features and explain plantness. One property often discussed is the open character of plants, i.e., their proliferous and unlimited mode of being. This openness blurs object outlines and merges the categories of part and whole, hence the categories of individual, colony, community and species (Hallé 1999). Consequently, it is difficult to define what is the plant entity itself. Captured by the notion of rhizome, the open character of plants has become a reference for becoming in the work by Gilles Deleuze and Felix Guattari (1980). Obviously, not all plants make rhizomes in a strictly botanical sense, but plant generative and regenerative potency can reasonably be subsumed by the generic term "rhizome": proliferative, net-like, connectively robust. For instance, trees can make kilometers of underground roots. Thus individual trees over vast areas of land and wide expanses of time can actually be parts of a single wider individual, also termed meta-population (Hallé 1999).

Here it is proposed that the open character of plants subsumes the essence of plantness and can be explained by an unsplit, undivided state of being. Plants seem to face only outward because in fact they have neither an inside nor an outside. In contrast, animals undergo a major change early on during embryogenesis. This change, called gastrulation (Wolpert 1992; Solnica-Krezel 2005), consists in an invagination of the embryo and the creation of an actual space inside: an empty tube. This inner space is in fact an internalization of what was initially facing outward. The inside of animal bodies represents a subset of the outside wider world now hanging through the inside. Gastrulation is radically different from cell division, which of course is seen in plant and animal cells, because it does not give rise to duplication but instead to an actual dualistic state of being. On the organic level it is the equivalent of the Copernican revolution, consisting in an ontological fission of a whole and in turn leading to the phenomena of self-centeredness and a dualistic divide between the self and the world such as Cartesianism expresses.

In plants, there is no gastrulation at any stage during development and no inner space can be found. Nevertheless, striking similarities to animals can be observed during plant reproduction. In particular, the ovary formed during flower and then fruit morphogenesis seems to exhibit a closed, inner space. But the ovary of the

plant is in fact a pseudo inner space since it does not result from a dualistic fission like the animal's gastrula inner space but rather from a folding or a merging together of parts (Sattler 1974; Sporne 1974; Verbeke 1992). Thus, the fundamental ontological difference between plants and animals is that animals are split, Cartesian-inclined beings whilst plants are unsplit, pre-modern-like beings. Interestingly, Gilles Deleuze and Felix Guattari in their *Rhizome* plateau contended that becoming does not rely on dichotomy and duplication, proceeding from one to two and so on, but on "being at n–1", i.e., never coming from nor arriving at an "n," completed state. This claim is confirmed by another ontological difference between plants and animals, i.e., the fact that plants are (potentially) unlimited beings whilst animals are perishable. This difference is also captured by noting that animals fit the definition of a "*topos*" whilst plants are "non-*topos*."

The notion of *topos* is linked to Aristotle's concept of place and is defined in *Physics* (IV 212a20) as the "*immediate motionless boundary of what contains*[4]" (*to tou periechontos peras akinêton prôton*), i.e., the primary immobile limit or border that acts to include and surround all at once what belongs to a given place. In the case of animals, this definition may be translated and applied as follows. From the very moment of conception, they are confined and circumscribed to an enclosed space, whether in an egg or in a womb. Then, through undergoing gastrulation, animals become finished, closed and centered in themselves with a single tube of outside passing through that confined space. They can change size around this tube but their condition will remain limited, separated from the Whole outside. As a consequence, animals miss the totality of all that is outer and must thrive to enrapture, capture and consume the outside as food, intimacy and social life. Second, because of their finished "n" state, animals are at any time present all-at-once, extemporaneously. They typically cannot adaptatively produce new limbs, lungs, wings or bones. As a direct consequence, they need to protect each of their parts in order to maintain their current level of life integrity. They must also strive to expand in the future through technical and symbolic performances like language. Third, because they are self-centered, animals can never depart from their center. They can move around but from an ego-centric perspective they are immobile, rooted in the same place and unable to reach the other's place. As a consequence, they need to develop sensitivity and mental faculties to get an inner sense of movement and encounter of the Other and eventually of the Whole. According to this threefold implication of the notion of *topos* of animals, one may rephrase its definition as a "split inside/out, finite, self-centered entity, being or space."

From this adapted definition of a *topos*, it is possible to proceed to infer the definition of a "non-*topos,*" and apply it to plantness. First, because they do not gastrulate, plants are open, unclosed beings, with no set boundaries. They do not need to take in the outside, to grab and consume others because ontologically they do not lack anything. In a proper sense, plants do not feed, mate or communicate but *they are* food, multiplicity and communication. They only need to thrive to maintain togetherness. Second, plants are never embodied all at once but they are always

[4] After Sattler, B. (in press) «Space in Ancient Times: From the Presocratics to Aristotle». In Janiak, A. (Ed.) Space: history of a concept. New York, Oxford University Press.

becoming and passing through, better aligned with the biocentric insights of Rolston we saw above. They are *at any time* more than what they show extemporaneously and they always override the boundaries of a *topo*s or Newtonian object. For plants, an "n" state is always "beyond," unachieved, allowing becoming to proceed virtually endlessly. Unlike animals that rely on consumption and catabolism, plants are (photo)synthetic beings. They continuously incorporate diffuse matter in their ever-expanding body (so-called biomass). At the same time, they let go of some of their parts and in so doing they re-circulate matter for other beings. They do not expand in techno-symbolic performances but in becoming together with other beings, creating multiple relationships—or rather inlets and conveyances—with humans, animals, microorganisms and the mineral world. Third, because they are non-centered beings, plants are in fact both heliocentric and geocentric beings, i.e., "cosmocentric" beings. They directly mediate and circulate energy coming from the first great engine, the Sun, which stands in as their heart. They provide this energy in the form of synthetic matter to the entire biosphere, which acts as their brain and limbs. In between Sun and Earth, plants are essentially vanishing lines that start from nowhere and go nowhere. As a ferryman, they ever weave and thrive to re-create junctions and join together all forms of living and intelligence on earth.

Plant and Biological Ethics: Moving Thought from Ego-Centers to Peri-Ego-Surroundings

The argument of this preliminary description could be further developed but it seems clear at this stage that an unsplit versus split state of being is sufficient to ground the most essential features of plants versus animals. Scientifically we can see that plants and animals rely on the same biophysical properties of organic matter, but their most essential, ontological, innate laws are radically different. This radical difference has been ignored so far because the theory of science is focused on objects rather than process and, thus, becoming is a blind spot for it. The animal can be scientifically explained inasmuch as it reaches a completion stage called "adult stage" where becoming finishes in a dead-end and life goes round in circles and eventually degenerates (e.g., Bergson 1907, considers that living beings revolve on themselves). The animal, and then the human, is seen to be able to survive and escape from this perishable state because in the process of self-fission it has gained an entirely new capacity of becoming, i.e., actantial, technical and symbolic becoming that culminates in human gesture and speech (Leroi-Gourhan 1964). Yet we can see how this split condition explains why motion, sensitivity, agency and mentality are so important for animals and human beings.

Plants are from the outset not totally deprived of motion-inclined capacities. Yes, biological evidence shows that they exhibit a drive toward animal life and merging with sensitive life (Brenner et al. 2006). However, these capacities do not have the same implications for plants and animals. It is crucial to recognize that the most basic law of plant life is unceasing synthesis and becoming and that through becoming plants do meet their most essential ontological requirement, i.e. to be "at n−1". To be "at n−1" is beyond unity and dichotomy, beyond any Cartesian definition: simply "beyond". To capture the unique state of being exhibited by

plants, the term "non-subject" proposed by Callicot (1995) and even the notion of "non-*topos*" introduced in this paper are not satisfactory because they remain to a degree indexed to animal reference. In addition, these terms do not account for plants' drive toward animal life. The term "becoming everybody" which comes last in the series of becomings proposed by Deleuze and Guattari (1980) may prove more accurate in that it points to the unique capacity of plants to be "in-togetherness," making it possible to embody the world and nurture the entire biosphere with sun power.

Through being referred to animals by plant sciences, plants have acquired a new standing in human history. In spite of the caveats of the animal reference, plants cannot be pushed back to the unvoiced or unformed "material" world. But they cannot come to rest on animal reference either. Recently, biologists and philosophers have pointed out the contradiction of the automaton paradigm applied to plants and stressed a wealth of unexpectedly complex properties of plants uncovered in the past decades (Hallé 1999; Trewavas 2003; Hall 2011; Houle 2011; 2012; Ryan 2012). Yet these properties have still been tended to be described by reference to what is important for animals and humans. The use of zoomorphic words such as "agency," "intelligence," "sensitivity," and "communication" suggest that the primary animal reference embedded in the theory of science has not yet been expunged. In particular one may be dubious about the attempt to stretch pathocentrism under the term "plant neurobiology" (Brenner et al. 2006). One may argue that we simply do not yet have appropriate words for plants and that the use of zoomorphic words is the only way forward at the moment. One may even claim that organic life should be redefined as the primary source for any form of sensitivity, intelligence and consciousness. Brain is only one instantiation of this primary sensitive intelligence, an instantiation that allows ego to develop and in turn claim egotistically that it is the only thing to value.

As Karen Houle (2011, 2012) contends, "thinking-the-animal" has saturated Western culture and "onto-stabilized" a certain version of human life. One may subsume this onto-stabilization under the term 'modernity', culminating in object-thinking and ego-centric development. Here it is proposed that "thinking-the-plant" requires a reversal of this position, a mutation of one's ego-center in order to reach a "post-ego" stage. Accordingly, biological ethics, the type of ethics needed to properly address vegetative life, should itself develop an all-embracing moral consideration, the nature of which expresses the perspective of the surrounding open periphery rather than the perspective of a center. The truly counter-image of an ego-center, i.e., "post-ego," is not a circle or a sphere: it is a line, a "line of becoming". This line is not made of multiple centers or points or larger circles including more kinds of life but is a metamorphosed center, re-opening new possibilities for becoming beyond organic, technical and symbolic life. To quote Deleuze and Guattari (1980), only lines can proliferate because they have no beginning and no end, hence in order to overreach their finished condition centers should be transformed into abstract lines, vanishing lines or "deterritorialization" lines.

To understand and respect plants, one has to eventually *think* morally what it is to be an unsplit being and this implies going beyond the Copernican revolution and

initiating a new form of becoming: thought-becoming, which is at the same time becoming in-togetherness. Thought becoming may be described as performing thought in the same way as plants perform their lives, through reversing Newtonian objects, *topoï* and centers into open-ended, vanishing lines. Thinking-the-plant does not require merely a change to the object that is thought (i.e., from animal to plant) but to change thought itself and depart radically from object-thinking. Because plant is process, thought must also be process, moving the ego-center to all around, cycling from center to line so as to reach a "peri-ego" state in which humans meet plants fully and not only their transient parts or functions. A peri-ego state is one in which humans also meet humans and possibly their humanness. Accordingly, biological ethics—or plant ethics—is not only a normative and prescriptive endeavor, it is also a critical method to seek new epistemic awareness out of one's own perceptive and aesthetic experience and, to use again a phenomenological image (Husserl 1913), to allow a genuine form of eidetic variation or mutation to take place.

Conclusion

The scientific translation which stripped plants of sensitivity, vital interests and value cannot simply be reversed by fixing a fetish value on them. We may attempt to value plants via their resemblance to what they are not, but what makes plants valuable in the first place is not the sole fact of an evaluator: it rests with plants themselves. To common sense and from an aesthetico-ethical perspective on plants, the animal proves to be a theoretical lock-out rather than a reference. This paper leads to the proposal that the moral consideration of plants is not only an opportunity to address a new ethical issue but also a call to re-open the question of plantness itself and widen our cognitive perspective on plant specific ontology. For this reason, the question of plant ethics is radically new because it requires a reassessment of *both* moral and cognitive references and provides pragmatist grounds for reinterpreting the intricacy of science and ethics. Science as a moral *epoché* is not an interruption of moral judgment but of atavistic moralism: it can serve as a method or a tool for gaining a more mature moral and epistemic faculty. Biological ethics as an epistemic or eidetic variation is not a parodic departure from rational judgment but a surpassing of theoretical pre-conceptions: it is a method or a tool for gaining a more mature faculty for knowledge.

To value plants for what they are depends on a clearer understanding of the ontological nature of plants. Implicitly this is thought to require that we resort to science. Yet, the difficulty of departing from an animal reference clearly points to the fact that after three centuries of plant sciences we still need additional means to truly understand what it is to be a plant, irrespective of what it is to be an animal. Furthering this work, it is anticipated that the acknowledgement of the unsplit nature of plants is a precondition for making sense of plant ethics not only for a few educated scholars but also for the wider public. This recognition is expected to facilitate a major change in our thought-patterns leading to a deeper understanding as to why we should value plants (Pouteau 2011). Moreover, we could thereby attune our current human needs to their open-endedness and begin to share with them the benefits of our companionship since the beginning of domestication.

Acknowledgments We wish to thank Christine Roberts for language editing. We are also most grateful to Karen Houle for improving the accuracy of the manuscript phrasing and for stimulating discussion. And for the helpful comments of the anonymous reviewers of an earlier version of this paper.

References

Abbot, A. (2008). Swiss "dignity" law is threat to plant biology. *Nature, 452*, 919.
Afeissa, H. S. (2010). *La communauté des êtres de nature*. Paris: Editions MF.
Arz de Falco, A., & Müller, D. (2002). *Les animaux inférieurs et les plantes ont-ils droit à notre respect? Réflexions éthiques sur la dignité de la créature*. Geneva: Editions Hygiène et Médecine.
Bailey, R. (2008). How dare you insult Chlorophyll-kind! Reason.com, May 5. Available at: http://reason.com/blog/2008/05/05/how-dare-you-insult-chlorophyl
Bergson, H. (1900). *Laughter. An essay on the meaning of the comic*. Los Angeles: Green Integer.
Bergson, H. (1907). *Creative evolution*. Los Angeles: Indo-European Publishing.
Berit, B. (2009). The silent sobbing of the salad—on the dignity of plants. *RogueDiplomat.com*, February 7.
Berque, A. (1987). *Ecoumène. Introduction à l'étude des milieux humains*. Paris: Belin.
Brenner, E. D., Stahlberg, R., Mancuso, S., Vivanco, J., Baluska, F., & Van Volkenburgh, E. (2006). Plant neurobiology: An integrated view of plant signaling. *Trends in Plant Science, 11*, 413–419.
Burgat, F. (2006). *Liberté et inquiétude de la vie animale*. Paris: Kimé.
Callicot, J. B. (1995). Intrinsic value in nature: a metaethical analysis. *Electronic Journal of Analytical Philosophy*, 3. Available at: http://ejap.louisiana.edu/EJAP/1995.spring/callicott.1995.spring.html.
Canguilhem, G. (1965). *Knowledge of life*. New York: Fordham University Press.
Canguilhem, G. (2000). Selected writings. In F. Delaporte (Ed.), *A vital rationalist*. New York: Zone Books.
Darwin, C. (1859). *On the origin of species*. London: Murray.
de Fontenay, E. (2000). Les bêtes dans la philosophie et la littérature. In D. Müller & H. Poltier (Eds.), *La dignité animale* (pp. 37–68). Genève: Labor et Fides.
Delaporte, F. (1979). *Le second règne de la nature: Essai sur les questions de la végétalité au XVIIIe siècle*. Paris: Flammarion.
Deleuze, G., & Guattari, F. (1980). *A thousand plateaus: Capitalism and schizophrenia*. Minneapolis: University of Minnesota Press.
Descartes, R. (1637). *Discourse on method and the meditations*. London: Penguin Classics.
Descartes, R. (1664). *Treatise of man*. New York: Prometheus Books.
Eurobarometer. (2010). *Biotechnology report.* http://ec.europa.eu/public_opinion/archives/ebs/ebs_341_en.pdf.
Federal Ethics Committee on Non-Human Biotechnology. (2008). *The dignity of living beings with regard to plants. Moral consideration of plants for their own sake*. *Report* Available at: http://www.ekah.ch/en/topics/dignity-of-living-beings/index.html.
Feinberg, J. (1974). The rights of animals and unborn generations. In W. J. Blackstone (Ed.), *Philosophy and environmental crisis*. Athens: University of Georgia.
Goodpaster, K. E. (1978). On being morally considerable. *Journal of Philosophy, 75*(6), 308–325.
Hache, E., & Latour, B. (2009). Morale ou moralisme? Un exercice de sensibilisation. *Raisons politiques, 34*, 143–165.
Hall, M. (2011). *Plants as persons: A philosophical botany*. Albany, NY: SUNY Press.
Hallé, F. (1999). *In praise of plants*. Portland,OR: Timber Press.
Hamill, M. (2008). Switzerland places ban on the humiliation of plants. *Planetsave.com*, October 18.
Haraway, D. J. (1991). The promises of monsters: A regenerative politics for inappropriate/d others. In L. Grossberg, C. Nelson, & P. A. Treichler (Eds.), *Cultural studies*. New York: Routledge.
Harmon, S. H. E. (2009). Of plants and people. Why do we care about dignity? *EMBO Reports, 10*(9), 946–948.
Hermitte, M. A. (2011). La nature, sujet de droit? *Annales. Histoire, Sciences Sociales, 1*, 173–212.
Houle, K. L. F. (2011). Animal, vegetable, mineral: Ethics as extension or becoming? The case of becoming plant. *Journal for Critical Animal Studies*, *IX*(1/2), 89–116.
Houle, K. L. F. (2012). Devenir plante. *Chimères, Ecosophie, 76*, 183–194.
Husserl, E. (1913). *Ideas: General introduction to pure phenomenology*. New York: Routledge.
Imanishi, K. (1940). The world of living things. In P. J. Asquith (Ed.), *A Japanese view of nature*. London: Routledge.

International Forum for Genetic Engineering. (2001). Genetic engineering and the intrinsic value and integrity of animals and plants. In D. Heaf, & J. Wirz (Eds.), *Proceedings of an Ifgene workshop*. Hafan, UK: Ifgene.

International Forum for Genetic Engineering. (2002). Genetic engineering and the intrinsic value and integrity of animals and plants. In D. Heaf, J. & Wirz (Eds.), *Proceedings of an Ifgene workshop*. Hafan, UK: Ifgene.

Kant, I. (1785). *Foundations of the metaphysics of morals*. New York: Liberal Arts Press.

Koechlin, F. (2009). The dignity of plants. *Plant Signaling and Behavior, 4*(1), 78–79.

Lafaye, C., & Thévenot, L. (1993). Une justification écologique? Conflits dans l'aménagement de la nature. *Revue Française de Sociologie, 34*(4), 495–524.

Landon, V. (2008). Dignity of plants humiliates researchers. *World Radio Switzerland*, October 15.

Latour, B. (1991). *We have never been modern*. Cambridge, MA: Harvard University Press.

Leroi-Gourhan, A. (1964). *Gesture and speech*. Cambridge, MA: The MIT Press.

Lev-Yadun, S. (2008). Bioethics. On the road to absurd land. *Plant Signaling and Behavior, 3*(8), 612.

Malaterre, C. (2010). On what it is to fly can tell us something about what it is to live. *Origins of Life and Evolution of Biospheres, 40*, 169–177.

Maris, V. (2010). *Philosophie de la biodiversité. Petite éthique pour une nature en peril*. Paris: Buchet-Chastel.

Naik, G. (2008). Switzerland's green power revolution: ethicists ponder plants' rights. *Wall Street Journal*, October 10. Available at: http://online.wsj.com/article/SB122359549477921201.html

Nerlich, B., Clarke, D. D., & Dingwall, R. (2000). Clones and crops: The use of stock characters and word play in two debates about bioengineering. *Metaphor and Symbol, 15*(4), 223–239.

Pouteau, S. (2011). Providing grounds for agricultural ethics: the wider philosophical significance of plant life integrity. In T. Potthast & S. Meisch (Eds.), *Climate Change and Sustainable Development. Ethical Perspectives on Land Use and Food Production* (pp. 154–159). Wageningen: Wageningen Academic Publishers.

Ring, H. (2009). The dignity of plants. *Archinect.com*, March 23.

Rolston, H. III (1994). Value in nature and the nature of value. In R. Attfield & A. Belsey (Eds.), *Philosophy and natural environment*. Cambridge: Cambridge University Press.

Rolston H. III (2002). What do we mean by the intrinsic value and integrity of plants and animals ? In D. Heaf & J. Wirz (Eds.). *Genetic engineering and the intrinsic value and integrity of animals and plants. Proceedings of an Ifgene workshop* (pp. 5–10). Hafan (UK): Ifgene.

Ryan, J. C. (2012). Passive flora? Reconsidering nature's agency through human-plant studies (HPS). *Societies, 2*, 101–121.

Sandberg, A. (2008). The dignity of the carrot. *Practical Ethics*, April 24. Available at: http://blog.practicalethics.ox.ac.uk/2008/04/the-dignity-of-the-carrot/

Sattler, R. (1974). New approach of gynoecial morphology. *Phytomorphology, 24*, 22–34.

Schmidt, H. (2001). The dignity of man and the intrinsic value of the creature (*Würde der Kreatur*)—conflicting or inter-dependent legal concepts in legal reality? In D. Heaf & J. Wirz (Eds.), *The Intrinsic Value and Integrity of Plants in the Context of Genetic Engineering. Proceedings of an Ifgene workshop* (pp. 19–23). Hafan (UK): Ifgene.

Singer, P. (1975). *Animal liberation*. New York: HarperCollins Publishers.

Smith, W. J. (2008). The silent scream of the asparagus. Get ready for "plant rights". *WeeklyStandard.com*, May 12.

Solnica-Krezel, L. (2005). Conserved patterns of cell movements during vertebrate gastrulation. *Current Biology, 15*, R213–R228.

Spinoza, B. (1677). *Ethics*. London: Penguin Classics.

Sporne, K. R. (1974). *The morphology of angiospserms: the structure and evolution of flowering plants*. London: Hutchison and Co.

Taylor, P. W. (1981). The ethics of respect of nature. *Environmental Ethics, 3*(3), 197–218.

Trewavas, A. (2003). Aspects of plant intelligence. *Annals of Botany, 92*, 1–20.

Verbeke, J. A. (1992). Fusion events during floral morphogenesis. *Annual Review of Plant Physiology and Plant Molecular Biology, 43*, 583–598.

Willemsen, A. (2009). Moral consideration of plants for their own sake. In K. Millar, P. Hobson West, & B. Nerlich (Eds.), *Ethical futures: Bioscience and food horizons* (pp. 434–439). Wageningen: Wageningen Academic Publishers.

Wolpert, L. (1992). Gastrulation and the evolution of development. *Development*, Supplement, 7–13.

Zwart, H. (2009). Biotechnology and naturalness in the genomic era: Plotting a timetable for the biotechnology debate. *Journal of Agricultural and Environmental Ethics, 22*, 505–529.