< Note >

# Winsor's Challenge to the "Essentialism Story" in Biology

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## Introduction

"In positing an evolutionary process wherein natural selection sorts among hereditary variations, *Darwin identified variation as a centrally important fact of biological systems*. In doing so, he broke with a 2000-year-old tradition that dominated Western thought. ··· In this philosophy of ESSENTIALISM, variation is accidental imperfection; only essences matter." (Futuyma 1998: 6)

"In the past fifty years, a number of philosophers and biologists have argued that species are not natural kinds with essences... They maintain that species essentialism is inconsistent with evolutionary theory and therefore should be abandoned." (Ereshefsky 2008: 101)

The quotations above, one taken from a textbook of evolutionary biology and the other from a handbook of philosophy of biology, represent the textbook narrative of one of the conceptual shifts brought about by Charles Darwin's evolutionary theory. The shift primarily concerns the principle of the classification of biological species [1]. But given the importance of the species as a unit of evolution, it has more profound import for biology, or so it has been said.

Several biologists and philosophers of biology are responsible for the articulation of the narrative mentioned above. Among them is the prominent biologist, Ernst Mayr. Mayr (1959: 2) claimed that one of the contributions of Darwin's *Origin of Species* is the

[1] Hereafter the term "species" means biological species.

replacement of "typological thinking [2] by population thinking," and that "[v]irtually every controversy in the field of evolutionary theory··· was a controversy between a typologist and a populationist." As the quotations above indicate, Mayr's view has been accepted almost universally and has gained the status of the received view.

If the received view is reliable, we have a useful clue to understanding the historical background of the controversies in modern biology. My work-in-progress (Yamamoto 2011) employs Mayr's view to analyze the historical and conceptual backgrounds of the Lysenko controversy in Japan. There it is assumed that biologists trained in relatively old disciplines would show stronger resistance to the principles of modern evolutionary biology than those who were trained in younger disciplines, like genetics, since those younger disciplines are thought not to have had a strong association with typological thinking. However, recently some historians of biology, notably Mary P. Winsor, have presented a grave challenge to the received view. They insist that the received view is so flawed that it is to be regarded as a "story" (not history). Thus, they call the received view the "Essentialism Story."

In this note, I summarize the recent challenge to the received view and scrutinize its validity. Settlement of such a complex issue as this requires further historical survey into pre-Darwinian biology, which is beyond the scope of this piece. However, simply mapping out the points of debate will be of benefit to future discussion. In what follows, I first describe briefly what is (or is thought of as) essentialism and how the term was introduced to the biological community. Second, I summarize Winsor' s arguments against the "Essentialism Story." Thirdly, I analyze the received view to make clear what is thought of as the crucial difference between population and typological thinking, or essentialism. Finally, I argue that Winsor fails to capture what is thought of as the watershed brought about by the Darwinian theory of evolution. I conclude that, at the present time, we have good reasons to regard the received view as dependable. I also find that settlement of this issue requires further sociological inquiry into the biological community at large, not just into specific individuals, such as Winsor conducts. It seems that little scholarly effort has been invested in this line of

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[2] Mayr originally used the term "typologist thinking" to refer to the pre-Darwinian mode of thought. He later adopted the term "essentialism" as a synonym for "typological thinking." See Section 1 for details.

investigation. I believe that this note contributes preliminary research on the historical sociology of the establishment of modern Darwinian biology.

## 1 The Received View Concerning Essentialism in Biology

Traditionally, the concept of essence or essential property has been understood in the Lockean way. In John Locke's terminology, "real essence" (in contrast with "nominal essence") corresponds to the modern conception of essence. Locke's real essence is "a real, but unknown Constitution of their insensible Parts, from which flow those sensible Qualities, which serve us to distinguish them one from another" (Locke [1690] 1975: 418). In science, this concept is closely related to the concept of "natural kinds," of which chemical elements are the paradigmatic example. For example, all members of the kind "gold" share a specific atomic structure, and no other chemical elements have the same structure. Thus, possession of that structure is essential for classification of an object as gold. That structure also accounts for other properties of gold; its color, its melting point, and so on. It seems that there is a general consensus that essence, or essential property, is a property or a set of properties that (1) all and only the members of a kind have, and (2) explains other properties typically observed in them [3].

Thus, essentialism in biology is construed as the position that every species, or higher taxon, has an essence. It is this position that Mayr referred to as "typological thinking." Before looking at Mayr's discussion, let us look at a general explanation about why essentialism has no place in modern biology. According to Elliott Sober (2000: 151), "biologists do not think that species are defined in terms of phenotypic or genetic similarities. Tigers are striped and carnivorous, but a mutant tiger that lacked these traits would still be a tiger. ... Martian tigers would not be tigers, even if they were striped and carnivorous." An organism need not have specific properties to be a member of the species that it actually belongs to. The central reason why species are not defined in terms of similarities is the fact that organisms in nature have phenotypic and genetic variations to the extent that no two organisms are identical, even within a species. Darwin ([1859] 1998: 42, italics added) famously asserted that "I

[3] I owe the summary here to Ereshefsky (2008: 101) and Okasha (2002: 194–5).

look at the term species, as one arbitrarily given for the sake of convenience to a set of individuals closely resembling each other, and··· *it does not essentially differ from the term variety*, which is given to less distinct and more fluctuating forms."

From the 1940s onward, Mayr maintained that recognition of this fact as the central issue that biologists deal with was Darwin's breakthrough. Mayr's attempt to incorporate Darwin's theory into taxonomy led him to abandon the traditional conception of species ("Morphological Species Concept" in his terminology) and to adopt his own concept of species, called the "Biological Species Concept." According to Mayr's new concept, species are not defined in terms of similarities. Instead, "[s] pecies are groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups" (Mayr [1942] 1999: 120). Suppose a group of organisms of a single species is geographically divided into two groups (for example, by an earth fissure), and the groups are then placed in ecologically different environments. According to Darwin's theory of natural selection, in such a situation members of each group will develop different traits and, after many generations, it is expected that members of one group will become unable to interbreed with members of the other. Under Mayr's concept of species, this event, called speciation, corresponds to the generation of a new species. Note that evolution is explained by variation among individuals within a group and environmental conditions. Mayr called this mode of thought "population thinking." Population thinkers claim that "all organisms and organic phenomena are composed of unique features and can be described collectively only in statistical terms" (Mayr 1959: 2). Mayr posits "typological thinking" in contraposition to population thinking. In typological thinking, Mayr (1959: 2) states, "there are a limited number of fixed, unchangeable 'ideas' underlying the observed variability··· and the observed variability has no more reality than the shadows of an object on a cave wall." On the contrary, for the population thinkers "only the variation is real" (Mayr 1959: 2).

It is easy to grasp that Mayr had in mind Plato's theory of ideas when he characterized typological thinking as mentioned above. Against this background, David Hull introduced Karl R. Popper's criticism of essentialism. According to Popper, (1966: 31) "methodological essentialism" is "the view, held by Plato and many of his followers, that it is the task of pure knowledge or 'science' to discover and to describe... the hidden

nature or Form or essence of things." And, "a description of the essences of a thing they all called a 'definition'." Hull (1965: 315) claims that "in no other science has there been as much empty verbiage about the meaning of 'species'." And although "Darwin supposedly put a stop to all that," "a spectre of essentialism continues to haunt the taxonomist" (Hull 1965: 315). Following Hull, presumably, Mayr brought the term "essentialism" into use as a synonym for "typological thinking" (cf. Mayr 1982: 4, 45–7).

Mayr's view has met with global acceptance. Thus, we find philosophers and biologists saying that "it is widely recognized that Darwin's theory of evolution rendered untenable the classical essentialist conception of species" (Dupré 1999: 3), or "elements of the Aristotelian form of definition have persisted in modern biological taxonomy in that the names of taxa continue to be treated as if they are defined by lists of organismal characters" (de Queiroz and Gauthier 1990: 308).

## 2 Winsor's Challenge to the "Essentialism Story"

After the turn of the century, doubts concerning the received view were raised. The leading figure is no doubt Winsor (2003, 2006a, 2006b, 2009) [4]. Simply stated, she claims that the received view lacks historical evidence (so it is "story" not "history"), thus "the business about essentialism is the scholarly equivalent of an urban myth" (Winsor 2006a: 2). Winsor's approach is twofold: on one hand she offers historical evidence to undermine the received view, on the other hand she looks into "when, where, why, and by whom the essentialism story was first told" (Winsor 2006b: 151). Each subsection below addresses each dimension of her approach respectively.

### 2-1 The Independence of Methodology in Pre-Darwinian Biology

According to Winsor (2003: 389), "[m]uch of the literature relating essentialism to systematics is seriously flawed by the failure to separate ontology [world-view] and

[4] The ones offered by Winsor by no means exhaust the criticisms of the received view. For instance, Ros Amundson (2005) offers another criticism focusing on Mayr's and others' description of the historical relationship between embryology and modern evolutionary biology. Since a large proportion of Mayr's and other's narratives about essentialism concerns the characterization of the pre-Darwinian naturalists and this is the very topic that Winsor focuses on, I believe that Winsor is the central critic of the received view.

epistemology [method]." Practical naturalists "had to deal with the ever-increasing number of kinds of seashells, butterflies, fruit, beasts and other natural wonders that were astounding European collectors" (Winsor 2006b: 150). Taxonomists of the day should not have had time to search for the hidden reality of essence (i.e., essentialist ontology). In reality, taxonomists' primal concern was to accommodate practically the considerable variability found in nature within their classification scheme. Instead of defining species in terms of essential properties, Winsor (2003: 390) argues that the taxonomists adopted the practice "to let a list, or cluster, of properties count as a definition without insisting that any particular property be always present." Suppose that there are three organisms ($A$, $B$, $C$) where $A$ has properties $p$, $q$, not-$r$, while $B$ has $p$, not-$q$, $r$, and $C$ has not-$p$, $q$, $r$. While two organisms do not have a set of properties in common, they are classified as members of one kind, where the minimum quorum is two.

Winsor (2003) offers evidence suggesting that in the 18th and 19th centuries normal taxonomic practice permitted using clusters of properties in definitions. First, in a botanical textbook published in the 19th century "each species or genus was linked to the next by clear similarities, but by the end of the chain all the characters of the first link had been lost" (Winsor 2003: 392). Second, Carl Linnaeus and Georges Cuvier, among others, adopted what Winsor (2003: 392) calls "the method of exemplars." According to this methodology, "a group could be created by association or agglomeration, each new member being judged similar to the exemplar in most of its characters, without any particular character of the exemplar being privileged" (Winsor 2003: 392). Additionally, this kind of method was appraised by William Whewell, a prominent 19th-century philosopher of science, as a distinct practice beyond the reach of classical logic (Winsor 2003: 394–6, 2006a: 3).

Winsor also calls our attention to Linnaeus's terminology. "The context, as well as his own definition, shows that the word [*essentialis*] only meant 'taxonomically useful' and nothing more" (Winsor 2006a: 5). Linnaeus's *character* of a genus "was the list or suite of features found to be dependable," and the adjective *essentialis* was "a single feature, or as few as possible, peculiar enough that it serves to distinguish this genus from the other genera." And "[t]he *character essentialis* was desirable because it enabled the production of a succinct catalog" (Winsor 2006a: 5). Given that there is no

direct evidence showing that Linnaeus acquainted himself with classical logic, "whether the concepts of scholastic logic played any role at all in the 18th century taxonomy… entirely remains to be demonstrated" (Winsor 2006a: 6). There, her thesis that the pre-Darwinian taxonomists by no means idled their time away in metaphysical speculation is repeated.

### 2-2 The Creation of the "Essentialism Story" in Context

Winsor (2006b) investigates the background and trajectory of Mayr's writings on typological thinking and essentialism [5]. It was in the mid-1950s, when Mayr was asked to organize a symposium of The American Association for the Advancement of Science (published as Mayr [1957]) and invited to a lecture of the Anthropological Society of Washington (published as Mayr [1959]), that Mayr began to associate population thinking with Darwin. On those occasions it was not required for Mayr to conduct historical examination. "He was speaking and writing *ex cathedra*, from his position of eminence in science, and his historical claims were not submitted to peer review nor did he always supply full citations" (Winsor 2006b: 155).

To explain Mayr's move, Winsor refers to his contemplation of placing taxonomy in line with other branches of biology. "There is not the slightest doubt that Mayr's readings, thoughts, and writings on history were undertaken for the service of his prime interest, the promotion of the modern evolutionary synthesis and, in particular, in support of his view that the process of speciation should hold the limelight in neo-Darwinism" (Winsor 2006b: 155). Note that speciation plays a significant role in what Mayr calls population thinking. By giving speciation a central role in the theory of evolution, Mayr's new taxonomy would become an important part of the modern evolutionary synthesis [6], which meant that it would be regarded as a legitimate branch of modern biology. Mayr was motivated, Winsor indicated, by the low status of taxonomy in his day. "Trained in Berlin as a museum taxonomist in the 1920s, Mayr

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[5] Actually, Winsor (2006b) deals with Hull and Arthur J. Cain as contributors to the creation of the "Essentialism Story" along with Mayr. But here I concentrate on Winsor's discussion of Mayr's writings, since she devotes many pages to it.

[6] The modern evolutionary synthesis is the unification of the disciplines of biology that occurred in the 1940s and provides a general account of evolution on the basis of individual variation and natural selection.

discovered when he came to New York in the 1930s that the leaders of academic biology considered the collection-based research he was doing to be little better than stamp collecting" (Winsor 2006b: 156).

These considerations strengthen Winsor's skepticism of the received view. Winsor (2006b: 170) concludes that "[s]imply putting Mayr's statements about typology in context was enough to make me doubt their soundness" (Winsor 2006b: 170).

## 3 Explicating the "Essentialism Story"

Scrutinizing Winsor's arguments requires closer analysis of the received view, which has sometimes been stated vaguely and harshly. For example, suppose we read Mayr's (1959: 2) statement that "only the variation is real" quite literally. As Sober (1980: 352) rightly points out, "[t]he Lotke–Volterra *(sic)* equations, for example, describe the interactions of predator and prey *populations*," [7] so "it would appear that much of population biology has its head in the clouds." On the other hand, before the advent of Winsor there is ample evidence showing that pre-Darwinian scholars, including Aristotle, attempted to explain the diversity found in nature. John Ramsbottom (1938) shows that Linnaeus had to give up his belief about the Creation when he thought he had discovered a new species, which arose through cross-species hybridization. Aristotle admitted the difficulty of drawing a boundary line in nature (Sober 1980: 357). At first glance, these facts undermine the received view, but it must be noted that the supporters of the received view were not ignorant of these facts. Mayr (1957: 3) clearly states that "Linnaeus was too experienced a botanist to be blind to the evidence of evolutionary change." And Hull (1967: 312) points out that Aristotle "does not say that offspring are always of the same species as their parents… the production of another like itself is only the most *natural* act." These facts prompt us to examine more carefully what Mayr and others thought of the crucial difference between essentialism (or typological thinking) and population thinking.

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[7] The Lotka–Volterra equations are a pair of differential equations, each modeling the marginal rate of population growth of a population that interacts with the other in an ecosystem.

### 3-1 Essentialism and Population Thinking as Explanations of Diversity

Sober (1980: 360) calls Aristotle's scientific thinking the "Natural State Model," and claims that this model "provides a technique for explaining the great diversity found in natural objects." For the sake of argument, let us turn our attention to the 17th century and examine Newton's first law of motion, which states that the velocity of an object is constant unless acted upon by an unbalanced force. An object is in its natural state, according to Aristotle, when it is not being acted on by a force (i.e., at a constant velocity). Applied to biology, "[d]iversity was to be accounted for as the joint product of natural regularities and interfering forces" (Sober 1980: 361). Using this model, "the essentialist can countenance unlimited variety in, and continuity between, species, as long as underlying this plenum one can expect to find discrete natural tendencies" (Sober 1980: 363). Sober (1980: 363–4) offers some evidence that the Natural State Model was adopted in pre-Darwinian biology.

Departure from the Natural State Model is found, Sober argues, in the conception of variability in Francis Galton's work published in the late 19th century. According to Sober (1980: 368, 366), "Galton's discovery of the standard deviation gave him the mathematical machinery to begin treating variability as obeying its own laws," not as "deviation from type." This new way of treating variability clearly appears in the "law of ancestral heredity" that was formulated by Galton and reformulated by Karl Pearson (1898: 387), a protégé of Galton. The law states:

$$k_0 = \frac{1}{2}\frac{\sigma_0}{\sigma_1}k_1 + \frac{1}{4}\frac{\sigma_0}{\sigma_2}k_2 + \frac{1}{8}\frac{\sigma_0}{\sigma_3}k_3 + \frac{1}{16}\frac{\sigma_0}{\sigma_4}k_4 + \cdots$$

where $K_s$ is the deviation of the $s$th mid-parent from the mean of the $s$th generation, and $\sigma_s$ is the standard deviation of the $s$th mid-parental generation. In other words, Galton and his successors "explained diversity in terms of an earlier diversity" (Sober 1980: 370). Sober takes as an example the norm of reaction, a graph which plots different phenotypic results as a function of environmental factors. Concerning different phenotypes, e.g., the height of rice plants, "[t]he Natural State Model presupposes that there is some environment for the genotype to be in," but "these presuppositions find no expression in the norm of reaction: all environments are on a par, and all phenotypes are on a par" (Sober 1980: 374). This recognition of a population as an independent entity is the key difference between typological and population

thinking.

### 3-2 The Novelty of Population Thinking

According to Sober's view on population thinking, "[i]ndividual differences are not *the effects* of interfering forces··· rather they are *the cause* of events" (1980: 371). But when one treats a population as an entity obeying its own laws, Sober (1980: 370) claims, "[t]he details concerning the individuals who are parts of this whole are pretty much irrelevant," and in this sense "population thinking involves *ignoring individuals*." Sober's analysis looks almost sound, but recent developments in population thinking concerning the discussion of cultural evolution [8] 8 reveal that there is more to be said.

Cultural evolutionists insist on the importance of cultural inheritance (e.g., learning from others) for the evolutionary explanation of human culture. They model cultural inheritance as replication of representations, ideas, technologies, and so on, using an analogy with gene replication. Some critics of the theories of cultural evolution argue that "unlike DNA replication, inferential processes 'transform' these representations during their transmission and reconstruction" (Henrich and Boyd 2002: 88). Thus, it appears that the theories of cultural evolution cannot account for cultural inertia (the stability of some representations). In response to those criticisms, Henrich and Boyd (2002) formally demonstrate that even if the error rate is high in cases of cultural inheritance, cultural inertia can be realized (i.e., representations can be correctly replicated in the population). The assumption that they make when modeling replication dynamics is that individuals have an empirically established tendency called "conformist bias," i.e., "a tendency to adopt the more common representation" (Henrich and Boyd 2002: 100). It is correct that, as critics point out, individuals create poor replications, but the conformist bias can compensate for it. The critics' mistake is "to assume that the only process that can give rise [to] accurate replication at the level of the population is accurate replication at the level of individuals" (Henrich and Boyd 2002: 99–100). In a sense, Henrich and Boyd treat a population as an independent entity: a population can possess the property of stability, regardless of the stability of

[8] See, for example, Richerson and Boyd (2005: 5, 59) for cultural evolutionists' reference to population thinking and Darwin.

individuals' minds. But equally important is that their discussion provides us with a new insight *about the individuals*.

Indeed, readers of social science literature will find nothing surprising in these discussions. Methodological individualists in social science, notably Friedrich A. Hayek, have argued that we should be cautious when inferring what occurs at the individual level from what occurs at the group level. Hayek (1944: 30) criticized that the mistake of collectivist theorists (of his day) was their inferring, "from the assertion that society is in some sense 'more' than merely the aggregate of all individuals", "that in order that the coherence of this larger entity be safeguarded it must be subjected to conscious control." Treating a population and the individuals constituting it as independent entities frees us from erroneous presuppositions about the individuals. Perhaps Sober overlooks or underestimates this benefit when he says that "population thinking involves *ignoring individuals*" (Sober 1980: 370) and when he suspects that models of cultural evolution will be of little interest to social scientists, stating that "these models concern themselves with the *consequences* of transmission systems and fitness differences, not with their *sources*" (Sober 1992: 18).

## 4 Rights and Wrongs of Winsor's Challenge

The previous section examined where the key difference between typological and population thinking lies. Typological thinking is a mode of explanation that assumes the existence of a state unaffected by interfering forces. Thus, typologists explain variation in a population by reference to that state and interfering forces. Such a state lacking interference no longer has its own place in the populationist explanation. Now we have reached the point of scrutinizing Winsor's arguments. First, I briefly examine Winsor's argument about the background and the trajectory of Mayr's writings about essentialism, which is not directly related to the discussion in the previous section. It is accepted that the consideration of Mayr's motivation and the context in which he wrote the history of biology provides a good reason to make one doubt the soundness of his history. However, in light of the discussions about social epistemology [9], Winsor's

[9] See, for example, Kitcher (1993: Ch. 6). To put it crudely, social epistemology is the (descriptive

(2006b: 168) conclusion that "structurally what is evident in the subsequent literature is that the story's authority simply grew with repetition" appears too hasty. Whether the originator of a doctrine is moved by non-epistemic factors is one thing, and whether the doctrine is justifiably accepted *in the scientific community* is another. Indeed, we looked at Sober's (1980) close analysis of the difference between typological and population thinking. Hull (1967) also cited the original texts of pre-Darwinian biology.

Next, let me examine Winsor's more substantial claims. Her claim that, in practice, pre-Darwinian taxonomists were concerned with practical matters is soundly based on historical evidence. But in light of Sober's argument, Winsor's discussion does not sufficiently support her global skepticism about the received view. The fact that the pre-Darwinian biologists were using clusters of properties in definitions does not undermine the received view. It is not only Sober who acknowledges that the pre-Darwinian biologists dealt with variation. Mayr (1957: 11–2) indicated that "[t]ypological thinking finds it easy to reconcile the observed variability of the individuals of a species with the dogma of the constancy of species." This shows that even the supporters of the received view recognized the fact that the pre-Darwinian biologists were detached from strict essentialism in practice. A charitable reading suggests that Mayr did not think that the boundary between typological and population thinking was marked by acceptance of the diversity in nature. In this regard, it is noteworthy that Hull (1994: 382) states that essentialists "acknowledge that entities in the natural world vary··· but [for the essentialists] any variation from type is a deviation, and science deals primarily with regularities among typical individuals." It is the emancipation from this conception of variation, as Sober (1980) convincingly argued, that allowed biologists to treat a population as an entity of its own so that they could conceptualize the dynamics of populations as evolution in the modern sense. Indeed, Darwin wrote about Whewell that "[o]n my theory an 'exemplar' is no more wanted than to account for the likeness of members of one Family" (Darwin Archives, Volume 105.5, Item 143; quoted in Hull [1994: 383]) [10] . Separating ontology

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or normative) study of the social dimensions of our acquiring knowledge. It studies, for example, how consensus is achieved in the scientific community, in a given institutional setting or group structure. While its central concern is philosophical, it integrates some insights from sociology of knowledge and sociology of science. See Goldman (2010) for a brief account.

[10] David N. Stamos (2005) offers a counter argument to Winsor, pointing out that Winsor's

and epistemology, as Winsor does, should not mean downplaying the role of ontology. As Ingo Brigandt (2009: 86) suggests, "[i]n taxonomic contexts, where species and higher taxa are viewed as taxonomic units consisting of organisms sharing many biologically important characters, it is more natural to speak of taxa as natural kinds," whereas in "evolutionary contexts where species··· are viewed as evolutionary units that originate, undergo change, and go extinct," another conception of species is more favorable. Thus, how to conceptualize species does have an influence on how we can do well (for example, invent a better theory) in a given epistemic context. Winsor (2003: 397) admits that the "early naturalists must have given some idealistic meaning to their chains and exemplars," but she has some reservations, saying that they left the naturalness of their taxonomic categories "as a fact of nature to be recorded without explanation." But if a change in the method of explanation is crucial to the conceptual shift towards population thinking, as it has been discussed so far, limiting our focus to biologists' practices will shed little light on the correctness of the received view.

These comments should not be interpreted as downgrading the value of Winsor's challenge entirely. It is true that the supporters of the received view often characterize essentialism or typological thinking so crudely that a quick look at their writings leaves readers with a misleading impression. The sentences "[t]he eidos of Plato is the formal philosophical codification of this form of thinking" and "the type (*eidos*) is real" (Mayr 1959: 2) make it appear that biologists before Darwin were trapped in a cage of ancient metaphysics. In addition, it is easy to find a tendency to oversimplify and provoke when it is stated that "[t]he typologist stresses that every representative of a race has the typical characteristics of that race··· All racist theories are built on this foundation" (Mayr 1959: 3). These expressions are no doubt prejudicial to the proper understanding of the situation. It is necessary to detect these defects and create an accurate picture. But we should be careful not to throw the baby out with the bathwater. In another article, Winsor (2009: 46, italics added) claims that "[m]ost narrators give taxonomy a

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historical evidence only shows that the pre-Darwinian biologists used clusters of properties when they defined higher taxa. When they defined species, Stamos argues, they adopted the strictly essentialist method of definition. While this work is of great value for painting an accurate picture of pre-Darwinian biology, it seems that he fails to appreciate the important point suggested by Sober and others. Even if Winsor is correct at the species level, it remains possible that the biologists of the day adopted the essentialist explanation.

rather inglorious role" in the development of Darwin's evolutionary theory while "the record shows overwhelmingly that taxonomy was the *main* factor causing Darwin to believe in branching evolution." In light of the discussion above, her complaint is not justified unless she clearly distinguishes what Darwin shared with the taxonomists of his day from what he did not. Although it is accepted that the taxonomy of his day provided Darwin with useful observations, what made Darwin's theory distinct might not be directly derived from taxonomic practices. The considerations so far suggest that Darwin and his predecessors parted company on how to explain those phenomena. While her claim that "[taxonomy's] past achievements should be accurately understood and appreciated" (Winsor 2009: 43) is fully agreeable, there is an unbridgeable gap between the claim and the statement that "the 'Essentialism Story' is at best exaggerated and possibly dead wrong" (Winsor 2009: 46).

Certainly it is possible that Winsor's theses will prove to be correct and the received view will be abandoned in the last analysis (recall Derek Freeman's difficult challenge to Margaret Mead) [11]. However, at the present stage, as long as we are concerned with the conceptual shift in the theories of evolution, we still have good reasons to support the received view, albeit without oversimplification or misguiding references to ancient or medieval metaphysics.

## Conclusion

In this note I have summarized and scrutinized Winsor's challenge to the received view, created by biologists and philosophers, which is accepted almost globally. The received view tells us that one of the important conceptual shifts brought about by Darwin's theory of evolution is the replacement of essentialism (or typological thinking in Mayr's terminology) with population thinking. Winsor's challenge sheds light on the fact that pre-Darwinian biologists were much more practical-minded than the term "Essentialism" leads us to imagine, and warns us that the typological/ population distinction may not be an adequate schema to understand the nature and development of Darwinian evolutionary theory. A close analysis of the ideas of the

[11] See Brown (1991: Ch. 1) for a brief summary.

creators of the received view reveals that Winsor fails to capture what was thought of as the watershed in biology of Darwin's day. The boundary line between typological and population thinking does not appear to lie in how biologists carved up the natural world with an incredible amount of variation. Rather, it concerns how the variation is explained. Thus, my conclusion is that we still have good reasons to regard the received view, in a modest form, as dependable.

Winsor's work is no doubt stimulating for the scholars of history, philosophy, and sociology of science. She brings to our attention the defects in the triumphant story of Darwinian theory. Sociological research into the biological community before and after the modern evolutionary synthesis will shed light on how those defects were produced and crystallized. Combined with further historical and conceptual investigation, that type of research will contribute to a more fine-grained picture of the development of evolutionary thought before and after Darwin. The debate must go on.

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(Kohei Yamamoto, Doctoral Course)

# Winsor's Challenge to the "Essentialism Story" in Biology

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In this note, I summarize Mary P. Winsor's challenge to the received view concerning the conceptual development of evolutionary thought in biology, as established by Ernst Mayr and several biologists and philosophers, and scrutinize its validity. The received view states that one of the contributions of Darwin's *Origin of Species* is the abandonment of essentialism. Winsor and other critics of the received view insist that the received view is so flawed that it is to be regarded as a "story" (not history).

I first describe briefly what is (or is thought of as) essentialism, and how the term was introduced to the biological community. Second, I summarize Winsor's arguments against the received view. Thirdly, I analyze the received view to make clear what is thought of as the crucial difference between pre- and post-Darwinian biology. Finally, I argue that Winsor fails to capture what is thought of as the watershed brought about by the Darwinian theory of evolution. I conclude that, at the present time, we have good reasons to regard the received view as dependable.