

# PROCESS PSYCHOLOGY, NEUROLOGY, AND THE SCIENCE AND PHILOSOPHY OF MIND

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## SUMMARY

*This paper begins with a brief survey of the microgenetic process thought of Jason Brown as it has developed from its neuropsychological inception to his more recent neurophilosophy. We then survey some of the arguments and systems of thought that have been put forth since the time of Plato, as they come to bear on the theory of microgenesis and the microgeny of values. Idealism comports surprisingly well with the inward to outward movement from subject to object in the process of microgenesis. Jason Brown (2005), in his most recent work, reveals idealist influences, but steers a middle course that may be regarded as subjective monism. Values are briefly discussed from a perspective that is informed by Jason Brown's work, but which takes more of an idealistic and teleological turn. Possible quantum physical theories of microgenesis are described, in particular as they bear on the problem of the irreducible duration of microgenesis. A quantum model of microgenetic process is necessary for a theory of values, as classical science is mechanistic and does not allow for free will or agency. The problem of recapitulation of the phenomenal now is discussed in view of the now-widely-accepted Holographic Principle.*

## INTRODUCTION

Jason Brown's latest book, *Process and the authentic life: toward a psychology of value* (2005), builds on the microgenetic theory and process theory of his earlier works (1991, 1996, 2000). Brown's work has been a progression that began with the study of brain processes in neurological subjects

with brain lesions. In his earlier work he described the process of microgenesis as a process of elaboration of mental contents in an evolutionary and developmental hierarchy of brain structures within the process of the genesis of the mental state, and related the hierarchy of the genesis of the mental state to deficit syndromes such as aphasia, agnosia, and apraxia.

Brown's theory of microgenesis is in the tradition of the renowned neurologist Hughlings Jackson (Kennard & Swash 1989), who developed the notion of hierarchies of brain process and the concept of the deficit syndromes as disturbances in the hierarchical structure and function of the brain. The concepts of microgeny and microgenesis were later expounded by Arieti (1962) and Werner (1956). The concept of a hierarchy of adaptive ego mechanisms, including lower order defenses such as denial and reaction formation, and higher order defenses such as altruism, was developed by Vaillant (1971), with the more mature defense mechanisms bearing on higher order values.

Brown went on from his neurological work to incorporate process theory, as developed by Henri Bergson (1908/1991) and Alfred North Whitehead (1925/1967, 1929/1978). Bergson had pioneered the concept of duration, which was later elaborated by Whitehead to describe the process by which the actual entity or actual occasion arises through the duration of a discontinuous process of relations between actual entities that are connected by internal relations, feelings, or prehensions, leading to the concrescence of a new actual entity or occasion which prehends its own past, perishes with the passage of the current moment, and goes on to objective immortality as an eternal object. Brown took the duration and discontinuities of process in Bergson and Whitehead and applied them to the duration of the mental state as it elaborates the contents of prior mental states. Through the introduction of novelty in perception of the object world, and through the process of microgenesis during the progression of mental states, the brain brings about a percept of self in the object world at the termination of the microgenetic process.

Brown's earlier theory of microgenesis involved a temporal progression of the genesis of the mental state in a developmental sequence that parallels evolutionary development, or phylogeny; embryologic, or ontogeny, and later development, and movement up the neuroaxis in the caudal to rostral direction through structures of increasing phylogenetic and ontological recentness (Brown 1988). He later developed a view that considered the evolution of mental states to be a continuum from depth to surface, with leaps or saltation across temporal instantiations of the mental state at intervals that are atomic units of the duration of the microgenetic process (Brown 1996). He described the interstices between instantiations of mental states as a timeless duration during which one state overlaps and replaces the preceding one. The process of neoteny was described (Brown 1996) as a change in the development of some aspect of the mental state, which is attenuated at some stage of elaboration. In the case of the deficit syndromes, this stage corresponds with the locus of a lesion or functional deficiency. The signature of the

attenuated stage is carried through the remaining process of microgenesis, leading to objectification of the attenuated phase at the endpoint of the duration of microgenesis, coupled with full elaboration of other elements of microgenesis.

Neoteny in evolutionary theory is the process through which an earlier phase in the evolution of a feature comes to replace a later phase. The use of an evolutionary term in the context of microgenesis is congruent with the phylogenetic and ontological nature of the microgenetic process itself. An example of neoteny in humans is the absence of bodily fur, which harkens back to a much early stage of phylogeny and ontogeny, prior to the acquisition of bodily fur.

Brown turned toward neurophilosophy as he addressed the age old question of the manifestation of the absolute in its dual aspect of mind and nature (2000). He integrated the idealist undercurrent of process philosophy into a kind of subjective monism, which was elaborated in his development of a process psychology of values (2005). He aligned himself partially with the school of absolute idealists that began with the German idealists, such as Kant (1781/1929) and continued through Hegel (1807/1977), and from thence through J. M. E. McTaggart (1927) in England. It is amidst the currents in the history of philosophy of idealism and process theory that Brown (2005) frames his psychology of values.

McTaggart, who is cited a number of times by Brown (2005) in his development of a microgenetic theory of values, was a contemporary of Whitehead at Cambridge. He considered only the present to be actual, while Whitehead believed that the past and future are real, but not actual in the sense of actualizing a becoming. Absolute idealism, in general, is of the lineage of Plato, who held that knowledge is intrinsic to the mind and not based solely on experience. This is in contradistinction to the empiricists such as Locke (1694/1959), who believed that knowledge can only be gained through experience.

Whitehead had focused on process as the passage of time through successive actualizations of the process of becoming. As with the absolute idealists, his philosophy of organism advocated the interaction of all things. However, Whitehead held that actual entities are ultimately neither physical or mental, but become through a progression from a physical to a mental pole. The stuff of reality, was, for Whitehead, the "atom of experience" (Whitehead 1925/1967, 1929/1978), reminiscent of Leibniz's monads. These "atoms of experience", according to Whitehead, constitute novel actual entities through their interactions in a network of internal relations or prehensions. These interactions lead to the final concrescence or becoming actual of the actual occasion, which is a term Whitehead used interchangeably with the actual entity.

## **IMPLICATIONS OF MICROGENETIC THEORY FOR THE SCIENCE AND PHILOSOPHY OF MIND**

The process of extension to objects in microgenesis involves the extension of meaning from a noumenal unconscious into a subjective space that is similar to the noumenal reality of Kant (1781/1929). The noumenal reality is an abstraction that can be used for the subjectivist interpretation of microgenesis (Brown 2005). Kant contended that we can never know the Deep Reality of the noumenal realm. Whatever we learn, according to Kant, is about Synthetic Objective Reality, or Perceptive Reality. Schopenhauer (1851/ 1974) proposed that contact did indeed occur between the mind and the noumenal world, through a kind of intuitive perception that is independent of external sensory experience. David Ray Griffin (1988), a Whiteheadian process philosopher who has also written about reincarnation and paranormal phenomena (Griffin 1997), referred to Schopenhauer's (1851/1974) "world knot" in *Unsnarling the world knot*, in which he proposed that the soul exists independently of the body.

Prehension of the noumenal world may have been the norm for our primitive ancestors, although such prehensions were clouded in superstition for primitive peoples, under the rubric of animism. Animism may also be viewed as a primitive perception of a Whiteheadian world of universal experience. The aboriginal people of Australia refer to a kind of noumenal reality as the "dream time," in which they believe their ancestors continue to exist (Elkin 1943).

The cognition of primitive peoples reflects a preliminary phase in the process of microgenesis in modern humans. There may be a need for a kind of heterochrony of the more primitive view of the noumenal reality in order for the reality of modern humans to be imbued with a value that goes beyond mere instrumentality. The idea of instrumentality as the primary value is characteristic of the sociopath, and group sociopathy remains a constant threat to civilization, as was seen in its collective actualization in various epochs of history, ranging from Hitler's Germany to the killing fields of the Khmer Rouge in Cambodia.

Primitive peoples had a personal or internal relationship with their belongings. This has been described by John Opsopaus (1995:39) as follows:

*Consider the relation of a hunter to his knife. He does not view it as an object but as a participant in his life, bearing, in some sense, a spirit of its own. In traditional societies the knife may be treated as a living thing, named, accorded respect, beautified, given a share in the fruits of its cooperation with the hunter, etc. It's imbued with a personality, a significance that grows through its shared life with the hunter. In time it may be "killed," either in the line of duty, or when it has earned eternal rest.*

*Even in more materialistic cultures, craftsmen treat their tools with respect; they are in effect sacred. A craftsman and his familiar tool are a team functioning to accomplish a shared purpose.*

*The hunter and his knife are on the same continuum with the shepherd and his dog, the rider and his horse, and the master and his assistant.*

The above passage describes the relation of self to object. The ego develops in the course of microgenesis as the self and object differentiate, and the ego takes its place as the self-concept. The ego remains joined to the self as its conscious counterpart in healthy ego function. Ego is taken to be self in narcissism, leading to the fusion of self and object (Kohut 1977). This leads to ego inflation, followed by ego deflation, disappointment, and despair (Edinger 1972), which characterizes the mood swings and emotional lability of the narcissistic and borderline personality disorders.

The self-object, in the sense of Kohut (1977), is a preliminary stage of cognition, prior to the cleavage of self and the object world. The self-object was theorized by Kohut (1977) to be united in the cognition of the infant, and the persistence of the self-object in adults was thought by Kohut (1977) to be the essential basis of narcissism. The object world is a subjective space into which the range of conceptual feeling is projected as it develops in the course of the microgenesis of objects as they are elaborated in an evolutionary, developmental, and anatomical progression. Whitehead had a similar concept of the movement of process from the physical to the mental pole, with consciousness being the end product of the concrescence of experience into the actual occasion. For Whitehead (1929/1978), sensation arises out of perception, and this notion seems to comport with microgenetic theory. Whitehead referred to the doctrine that sensation arises *de novo*, prior to the concrescence of actual entities in subjectivity, as sensationism or sensationalism.

The relationship of humans to objects has changed considerably since the dawn of civilization. Modern humans tend to see personal objects as extensions of the ego or self-image. This kind of object is called an ego-object and is not granted its own subjective existence. In process theory (Whitehead 1929/1978) objects are subjective, that is they have their own modicum of experience, and interactions between objects are internal relations of prehension in which both constitute actual entities in the process of concrescence.

Kant's perspective of the noumenal world, and the perspective of idealist metaphysics in general, is an "inside-out" view of the object world. As Brown (2005:58) writes:

*When we begin with the objects of perception, we can move outward to the noumenal world and inward to the psychic one. The object is a doorway to the physical world on one side and the mind on the other...The materiality of an external world of noumenal entities that is screened by our perceptions corresponds to the physiology of a noumenal unconscious out of which those perceptions develop. The noumenal external is the presumptive*

*substrate of physics, the nature of the noumenal unconscious is intimated in psychopathology.*

Conceptual feelings are projected outward, forming the noumenal world of Kant, which, microgenetically, lies just beneath the object world. In the Freudian sense, cathexis is directed outward through extension onto objects. We perceive the object world in its final form, at the termination of microgenesis, stripped of its underlying process of development.

The notion of reality from the inside out, which typifies the absolute idealists, implies a reverse doctrine of the perception of reality from the outside in, and this is the doctrine of Realistic Metaphysics, which began with Aristotle and has been more recently carried forward by Ayn Rand (1990) and others. This also has been the stance within the psychology of object relations theory (Jacobson 1964). Although this kind of reverse microgenesis is not specifically mentioned by Brown (1988, 1996, 2005), it corresponds neuroanatomically to the reciprocal connections down the neuroaxis from the cortex to the limbic system, through the diencephalon, to the brainstem and spinal cord. However, the nature of neurological deficit syndromes (Brown 1988) does not comport well with the type of outside-in process that is favored by the realists and object relations theorists. In the upward progression of microgenesis, from the inside out, the self becomes conscious as a self-representation, the ego, but remains unconscious at its existential core.

For the idealists, beginning with Plato, ideas need not arise in the neural circuitry of the brain, but can be derived from an ideal realm. This idea was advanced in the Socratic discourses described in the *Meno* and the *Phaedo* (Plato 1977). Plato argued that, since we have knowledge and ideas that are undetermined by experience, we must have been born with these ideas. This seems, now, to be a radical stance, and one that was vigorously refuted by Locke (1694/1959). In the Socratic dialogues, one inquires directly to the self, which is the source of all knowledge.

Noam Chomsky (Baker 2005, Stich 1975), the renowned linguist, resurrected the idea of innate ideas with his notion of the innateness of universal grammar, arguing that the basis of language is underdetermined, and that there is a biological "language faculty." Developments in the field of innate ideas (Stich 1975) have kindled a debate between "nativists," who believe in the existence of innate knowledge, and empiricists, who do not. This debate is similar to the earlier debate in philosophy between the rationalists such as Kant and the empiricists such as Locke. With no recourse to materialism, it has been theorized that innate ideas are genetically encoded, yet there is no genetic mechanism through which concepts can be derived. The absolute idealists, beginning with Kant but with an intellectual pedigree going back to Plato, might describe innate ideas as existing in an ideal realm. Modern neuroscience has rejected all such notions, yet has not fully explained the brain process through which knowledge arises.

In particular, the notion of innate ideas, in an idealist sense, is useful in explaining the savant phenomenon as well as many examples of genius, in which things are known that have never been learned or experienced. Jason Brown (2005:233) has described the feeling that many creative geniuses have experienced in the process of creation as the lack of a feeling of agency in the preliminary layers of cognition that are tapped by the creative mind:

*Creative people often feel that they are passive vehicles of their art, which seems to pass through them to the world...The sense of agency is less pronounced because the creative ideal calls on meaning-laden or dream-like images that retain a feature of preliminary cognition. One could say, the feeling of passivity for a creative idea is a mark of its imaginative depth.*

But even given the microgenetic interpretation of creative depth, it is difficult to explain the "idiot savant" or autistic savant phenomenon. For example, Oliver Sachs (1985) reported that two autistic savants were able to rapidly rattle-off prime numbers of up to twelve digits. Also, dreaming cognition and the lower layers of microgenesis possess a high entropy or level of disorganization (Germine 1993), which does not characterize the exquisite organization of works by geniuses such as Mozart.

The object state is the subjective aim of conceptual feeling, which originates in the limbic system, through the emotional and episodic memory organs of the telencephalon, the amygdala and hippocampus, and upward in two evolutionary progressions to the neocortex (Pandya et al. 1988). Drives originate primarily from the organs of the diencephalons and the midbrain, including the hypothalamus and the midbrain periaqueductal gray matter. Both of these regions of the brain are involved in the feelings of fear and aggression. The hypothalamus regulates consumptive behaviors, such as eating, and through its dopaminergic afferents, mediates the reward system and addictions. Nowhere in the brain, however, do we find the self, although the self-concept or ego is largely generated in relation to others and to objects in the prefrontal cortices. Meaning and value develop as drives that are elaborated upward through higher levels of microgenesis, investing the self with some level of satisfaction as related to the object or event, and investing the object or event with a value of worth commensurate with that satisfaction (Brown 2005).

Values may be viewed as a generalization of object worth and the higher-order perception of emotions in their relations to ego function. Ethical values are part and parcel of the valuation of self, and higher-order ethical valuations fall under the rubric of the valuation of a higher self. The value of others can be no less than the value of self when all selves are perceived to be equal manifestations of some higher principle. This is an ethical perspective, as well as a humanistic and spiritual perspective.

The unconscious self is not differentiated with respect to persons, and it is this self that is the basis of the concept of the higher self or deity. As, conceptually, the deity is all-knowing, so this higher self would have access to the universe of knowledge, as proposed by Plato in the Socratic dialogues. Access to such universal knowledge could be explained by the doctrine that William James (1898/1910:12) referred to as thought transmission: "My thesis now is this: that, when we think of the law that thought is a function of the brain, we are not required to think of productive function only; we are entitled also to consider permissive or transmissive function. And this the ordinary psychophysicologist leaves out of his account." The concept of thought transmission seems to imply the existence of an ideal realm from which ideas originate. Although the idea of thought transmission is perhaps a speculation that was conditioned by James' paranormal tendencies and his involvement with mediums and the like, it still needs to be accorded consideration as the product of the mind of a great genius, both in the fields of philosophy and psychology. Such doctrines have fallen into disfavor with the advent of a purely materialistic science. However, the doctrine of thought transmission is altogether consistent with the doctrines of idealist metaphysics, which have the metaphysical power to explain the origins of subjectivity and values. The microgenesis of values may also be a reflection of Whitehead's (1929/1978) category of the absolute, in a kind of Platonic realm. Science recoils from such an idea, but idealism may yet be salvaged by science itself.

The microgenesis of values is both developmental and evolutionary. The evolution of values was envisaged by Hegel (1807/1977) as an objectification of infinite reason, manifested in a teleological progression towards the unification of a *Geist* or absolute spirit, leading ultimately to the ideal of a world spirit. The famous sociologist Emile Durkheim (Knapp 1985) had a vision of universalization that paralleled Hegel's teleological vision, and concluded that the collective representations of humankind are the basis of both values and ethics. The theory of values must ultimately appeal to an epistemology, or philosophy of knowing, which, in the case of microgenesis, relies critically on the genesis and source of knowledge, whether it is innate to the unconscious core of self and simply elaborated through microgenesis, or produced from neurological networks. Science has developed an epistemological interpretation of quantum physics that is a theory of measurement, and is, for the most part, devoid of a concept of deep reality or of an ontological ground. This interpretation in quantum physics is known as the Copenhagen interpretation, and was developed at a conference in 1927 by some of the most renowned physicists of the twentieth century. The avoidance of ontology was largely the result of the epistemological interpretation of Neils Bohr, and left a gap in science's view of reality that resulted in the acceptance of the materialism of classical physics by default. Whatever the nature of deep reality, it may be something very different from our classical perception of the object world, and may correspond more closely to the idealist or relational conceptions of reality.



## **TOWARDS A PHYSICS OF MICROGENESIS**

Whitehead's atom of experience was derived in *Science and the modern world* (Whitehead 1925/1967) from the discontinuities of energy, space, and time in quantum physics. The mental state of microgenesis may have its putative correlate in the states of distribution of alpha intensity in the EEG (Brown 2005). The duration of these brain electrical states may be identical to the duration of the microgenetic brain state. The Planck Time, the irreducible duration of time in quantum physics, is unimaginably brief when compared to the approximately 85 milliseconds that constitute the brain electrical state. If we are to take Whitehead's allusion to the discontinuities of quantum theory seriously, and apply them to the microgenetic theory of the duration, we will need to hypothesize a much coarser grained system of the irreducible quantum duration.

The physical field of mind cannot be one of the four physical fields that govern external relations. If the field of mind is a quantum field, then it must be governed by the Schrödinger equation. The Schrödinger wave form is not a physical field in terms of energy, but rather of probability, and bears no resemblance to electromagnetic radiation. This is not to say that energy fields are not associated with the microgenetic process, but that, if there is a physical field associated with microgenesis, it is not likely to be a field of energy, but a rather a nonlocal information field. Internal relations would then be analogous to the quantum principle of nonlocality, and to Jung and Pauli's (1955) process of synchronicity (Germine 1991).

In Bohm's theory of the pilot wave, the quantum field informs fundamental, internal relations between particles without imparting any energy. The quantum ontological model of Bohm (1980) is holographic, with the hologram representing the implicate order. The implicate order is explicated through its coming into space/time, and goes through cycles of implication and explication that could be the physical correlate of the duration of the mental state, which may be unfolded out of a matrix of Deep Reality, into Perceptual Reality, and then back to Deep Reality. This process of explication may correspond to microgenesis in the timeless interstices of the duration. Information shares a correspondence to matter and energy (Bohm 1994), and may, through the flux of process, proceed in a cyclical fashion from poles of soma and significance (Bohm 1994), which are analogous to Whitehead's (1929/1978) physical and mental poles.

The duration of a mental state may also be the duration of time that it takes the brain to go through a dynamical cycle of a process known as the Baker transformation (Prigogine 1980, 1986). This involves chaos theory, which is beyond the scope of this paper.

The brain itself may exist, during the course of a mental state, in a superposition of states, which would be equivalent to the Schrödinger wave function of the mental state (Stapp 1993). In this case, there may be a parcella-

tion from whole to part in a process by which a plurality of microgenetic processes leads to a single process which actuates through some mental influence, suggesting a dualistic metaphysics, which has been recently proposed by Henry Stapp. In this model the physical field of observation is inextricably interwoven with the observer, and the mental state is instantiated through the process of observation, which Von Neumann (1932) referred to as Process One. Von Neumann's Process Two is the development of the wave function itself, prior to collapse by observation. This theory of instantiation of the mental state is not mutually exclusive of Prigogine's (1980, 1986) dynamical systems theory, which can be combined with Stapp's (1993) theory of collapse of the brain state, where the period of duration preceding the collapse is dependent upon a dynamical process that must be fulfilled prior to observation. This may be called the quantum/chaotic model.

All and all, Bohm's (1980) model of the implicate order and the unfolding of the explicate order seems the most satisfying with respect to an underlying basis for a physical theory of microgenesis. In this model explication would be the underlying physical process of the duration of becoming, through internal relations of a nexus of actual entities. However, Stapp's model comports more closely with mainstream quantum physics, and follows in the traditions of the founders of the Copenhagen Interpretation, the treatise on quantum theory of Von Neumann (1932), and the later work of Eugene Wigner. Bohm's theory is also plagued by hidden variables, which led Einstein to reject it as "too cheap." However, his theories of the implicate order and of soma-significance need not be wedded to his controversial pilot wave theory.

Regardless of which physical theory that we employ in mental process, the problem of the phenomenal now (i.e. why it is now) and the seriality and recapitulation of states in process time remain a problem. The theory of the Holographic Principle is now widely accepted in physics (Bousso, 2002; Bekenstein, 2003), and holds that the information content of the Universe exists or "lives" fully at the outer surface of the Universe, with information or entropy proportional to the surface area of the boundary of the Universe. This "holographic bound" appears to be moving outward at the speed of light. In this case, time would be standing still at the holographic bound, and our experience of time would be that of a reiterative now that fundamentally recapitulates itself in a serial succession, with the addition of new information as the surface extends outward. Such a theory would have a bearing on the phenomenal now as, if correct, it would imply that we are always in the "now," and that the seriality of temporal actualizations recapitulates previous becomings. This proposition comports well with the process theory of time and with many of the basic elements of microgenetic theory.

There is a lively debate among scientists which has only been briefly touched upon in this exploration of the physical basis of mind. Reductionists would have it that the mind is altogether classical. Speculations based on modern physics can, however, add a richness to the theory of mental process

that would not otherwise be possible. In particular, classical science is completely mechanistic, and does not allow agency or free will to enter the picture. As both agency and free will are basic elements of Brown's (1996) microgenetic theory, some kind of quantum explanation of mental process seems necessary to a system of values that allows the human mind to have the capacity to choose, and thus fulfill the ethical imperatives of purposeful human behavior (Brown 2005).

## **CONCLUSION**

Jason Brown's system of microgenesis has undergone an evolution that has perhaps made it the most complete theory of mind, embracing clinical neurology and neuropsychology; the theories of drives, percept genesis, and object relations; and the origins of agency, free will, and subjectivity. Because of the wide scope of Brown's theory, it can be related to various currents in the theory of mind, as it has been developed in both philosophy and neuropsychology, and can be integrated with a variety of philosophical and psychological systems. The theory of microgenesis stands in closest relation to Alfred North Whitehead's theories of process and relations, but is not limited by these theories, and can also be applied to the idealist perspective of philosophical discourse.

The theory of mind is a vast field, which perhaps represents some of the most important problems in science, both for the advancement of humankind and the enrichment of the individual's self-knowledge. Individuals are endowed with a theory of mind which constitutes social relations, and allows them to understand the existence of other minds. The importance of an individual theory of mind is perhaps best demonstrated in the deficit syndrome of autism, where the lack of a coherent theory of mind is associated with obsessions, compulsions, and a range of impairments including profound deficits in social relations and language acquisition.

As a psychiatrist, I find the microgenesis of beliefs and values most relevant in the psychosocial sphere, in which deficits in morals, ethics, and rational social behavior are associated with what can be viewed as deficit syndromes in the microgeny of values, falling under the rubric of sociopathy and psychopathy. Heterochrony is evident in these social deficit syndromes, as individuals who are lacking in the capacity for remorse and compassion may function quite normally in all other spheres of activity, and may even become leaders of corporations and of nations.

The nature of values intrinsic to social relations is probably the most pressing problem and challenge for social intelligence, as people and groups of people enter into economic and politic turmoil, conflicts of interest, struggles over religious and political values and ideals, and, ultimately, violence and warfare. These social problems cannot be solved by any book, philosophy, or religion, or by any social, economic, or political system, but must be solved by the upward movement of the social relations of humankind in general.

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