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# Whirl



T I M I N G O L D

Herein wonder not  
how `tis that, while the seeds of things are all  
Moving forever, the sun yet seems to stand  
Supremely still.

—TITUS LUCRETIUS CARUS, *On the Nature of Things*

The nature of infinity is this: That every *thing* has its  
Own Vortex; and when once a traveller thro' Eternity  
Has passed that Vortex, he perceives it roll backward behind  
His path, into a globe itself infolding; like the sun:  
Or like a moon, or like a universe of starry majesty,  
While he keeps onwards in his wondrous journey on the earth.

—WILLIAM BLAKE, *Milton*

Life in general is mobility itself; particular manifestations of life accept this mobility reluctantly, and constantly lag behind. It is always going ahead; they want to mark time. Evolution in general would fain go in a straight line; each special evolution is a kind of circle. Like eddies of dust raised by the wind as it passes, the living turn upon themselves, borne up by the great blast of life. They are therefore relatively stable, and counterfeit immobility so well that we treat each of them as a thing rather than as a progress, forgetting that the very permanence of their form is only the outline of a movement.

—HENRI BERGSON, *Creative Evolution*

## Turning Life?

Life begins in whirling. By “life” I do not mean an interior property that distinguishes some things we call “animate” from everything else we call “inanimate.” It is not to be found in the behavior of some magic molecule such as DNA that, in the right circumstances, can turn out replicas of itself. I mean, rather, the potential of a world given in movement to generate the forms of things, to hold them fast, and in turn to portend their dissolution. In a world of life, things are formed as eddies in the flow, that is as centers of stillness or dynamic stability that, far from having been fortified against the currents that would otherwise sweep them asunder, are constituted in these very currents. In this sense the whirling nebulae are phenomena of life; so too are the atmospheric storms or the oceanic maelstroms of our own earth, along with creatures of every kind that inhabit its lands and waters. It was in this vein that the Roman author Lucretius, in his essay-poem *De Rerum Natura*, described all things as having been formed in the never-ceasing flows of atomic particles that, falling rectilinearly through the void, swerve ever so slightly from their downward path so as to cause a cascade of collisions and combinations. Out of this commotion a world is formed, of things that, in our eyes, stand still. We see the forms and not the flow, and think of them not as movements but as objects in themselves. It is no wonder, then, that we look to some inner principle, some harbinger of agency or vitality, that would bring them back to life.<sup>1</sup>

In *Milton*, composed in 1804, the visionary poet William Blake was onto much the same theme. In the infinitude of space and the eternity of time, everything is formed as its own vortex in the currents of the cosmos. Blake imagines himself riding with the flow, a cosmic traveler adrift on its tides, sailing into the vortices of things. But only once he has passed through each, looking back, does he see them closing in or imploding, so as to give the appearance of bounded bodies that fall ever behind as he carries relentlessly on.<sup>2</sup> So too the philosopher Henri Bergson, in his equally visionary *Creative Evolution* of 1911, compares every living thing to an eddy or whirlwind in the “great blast of life.” He is with Lucretius in thinking that life in general is given in movement,<sup>3</sup> and moreover in his conviction that for there to be particular living things it is necessary for this movement to veer from a course that would otherwise be absolutely

straight—that is, for it to *turn aside*. It is as if, says Bergson, the living were to accept the movement of life with a degree of reluctance: as if they were to turn in on themselves, lagging behind—or marking time—while life itself moves on. But whereas Blake, riding the cosmos, looks back to see the things that once had sucked him in closing up and receding into the distance, for Bergson this closure is an illusion of the intellect in whose eyes, cast ever rearward, the “whirl of organism” reappears as an immobile figure set off by an outline against the ground of a ready-made world.<sup>4</sup>

Whirling, of course, is a movement, but as Bergson realized, it is not just *any* movement. It is, specifically, a movement that moves: one that, at every moment, veers off course. That is to say, it perpetually inflects or *turns*.<sup>5</sup> But nor is it just *any* turning. Of the mechanical clock, we may observe that its hands turn, or rotate, about a fixed and predetermined center. The turning of the whirl, however, does not so much presuppose a center as give rise to it, as a place of relative stillness, as a form. In the mechanism of the clock, the working parts—cogs, ratchets, hands—have all been manufactured in advance, and their movements are prescribed in their axial displacement from point to point. But in the whirl of organism, movement and form co-constitute one another: movement turns into form, and form into movement. Thus where Bergson distinguishes between the evolution of life in general and the special evolution of a particular life—the one straight, the other describing a “kind of circle”—we would do better, I think, to distinguish the *evolution* of the former from the *revolution* of the latter. By “revolution” I mean a turning that is also a turning *into*; revolving as becoming, becoming as revolving.

As such, the *revolution* of the whirl is quite different from the *rotation* of the clock. The whirl’s revolution is formative, it is a movement of growth; the clock’s rotation is mechanical, amounting to the spatial relocation of preexisting parts. Yet on second thoughts, this may not do justice to the clock. Suppose that it is of the predigital, preelectronic spring-loaded variety. In order for it to go we have had to wind it up. The very act of winding—performed, of course, by a living being—charges the material of the spring with incipient movement; as it is wound, the spring itself becomes a whirl. The cogs and hands of the clock might rotate, but at its heart is the revolution of the spring. And as Bergson said of the living organism, the spring—in turning in on itself—contrives to

hold out against the passage of time. Yet eventually it marks time in its unwinding: in a cumulative sequence of escapements that punctate the evolution of life in its onward progress. As we shall see shortly, this has its precise parallel in the winding and reeling of thread.

### On Describing a Circle

To better understand what we mean by the circularity of life, let me set an exercise that will no doubt be familiar to anyone who has undergone lessons in school geometry. The task is to draw circles, using only a pencil and a compass.<sup>6</sup> Try as you might, you will never be able to produce a perfect circle. This is because the human body, like the bodies of most living creatures, is not designed for rotational motion. In the history of technology, the introduction of the crank marked a key step in converting the reciprocal back-and-forth movement of the limbs to a rotary one.<sup>7</sup> With the compass, we attempt to achieve the same effect by gripping a shaft mounted at the apex between thumb and forefinger, and rubbing back and forth in a gesture known as “twirling.” As I show below, twirling is whirling on a point, and the line that appears under your hand is the trace of this gesture, a form generated in its revolutionary movement. As such, it inevitably betrays the conditions of its production. For the velocity of the turn is never constant; moreover the uneven pressure of the pencil tip on paper inevitably leads to a line that varies in width and density. You have to start the line somewhere, and it is virtually impossible to conceal this starting point as it is always a little darker where the pencil point first makes contact with the paper, or where—in your effort to close the circle—the ending of your line overlaps its beginning.

Now we are taught, in school, to disregard these imperfections. Unavoidable they may be, but they are considered irrelevant to understanding the circle as a pure geometrical form. The pure form of the circle, however, is not a form of life. Neither does it turn; nor is it produced by turning. In its closure and finality—in masquerading as the outline of a figure rather than the trace of a gesture—it is the very opposite of the whirl.<sup>8</sup> Today, of course, the compass has all but disappeared from school classrooms, as more or less perfect circles can be printed to order from our computers. But I do wonder whether this facility has actually enhanced mathematical thinking. Many mathematicians argue to the contrary and rail against the insistence, in conventional teaching, on logical closure and final proof.<sup>9</sup> They would say—and I agree—that imperfection is the

key to the development of mathematical understanding, and that in drawing circles with compass and pencil, and never quite succeeding, the student can achieve a deep understanding of the phenomenon of circularity that repudiates any distinction between the operations of the intellect and skilled bodily practice. Such understanding is both open-ended and in touch with life, as intuitive as it is cognitive. In this sense, geometry is akin to music. With music, the more you practice a piece—the more you inhabit it—the more your understanding grows. This growth is inexhaustible, not convergent on a limit. So too, by inhabiting the circle and entering into the whirl of its inscription, you can begin to understand it from the inside, not as some timeless geometrical abstraction but as the temporal revolution of the ever-turning wheel of life.

### Questioning Words?

Etymologically, *whirl* is derived from the Old Norse *hvirfla*, “to turn” or “to spin,” and is one of a host of similarly sounding words, including *twirl*, *swirl*, and *hurl*.<sup>10</sup> The precise derivation of these words is anyone’s guess. Did *twirl*, perhaps, come from a compound of *twist* and *whirl*? Or did it come from the Old English *þwirl* (meaning “pot-stirrer”)? Is *swirl* just a variant of *whirl*, perhaps with its roots in the Dutch *zwirrelen* rather than the Norse *hvirfla*? Did *hurl* have a quite different origin, in the Low German *hurreln* (“to throw” or “to dash”), from which we also get the word *hurry*? Perhaps then the resemblance of *hurl* to *whirl* is fortuitous. But if it is, why does *hurl* have, as one of its meanings, “to drive a wheeled vehicle,” a meaning it has in common with *whirl*, whence comes the Scots term *hurlbarrow* for what we more commonly call the wheelbarrow? Is there a connection after all, between *whirl* and *wheel*? No one knows the answer to any of these questions. Yet what the words I have listed all share is a strong component of phonological iconicity.<sup>11</sup> We can learn more of their meaning from simply pronouncing them and from the feeling this induces. With *twirl*, as we have already seen in the exercise of drawing a circle with a compass and pencil, the revolution is centered on a point, vividly expressed by the hard, consonantal “t-” before the “-wirl.” It could be the compass point, or the pointed shoe of the ballerina performing pirouettes on stage, or the finger-point of the gentleman twirling his moustache. With *swirl*, by contrast, what counts is the fluidity of liquid motion, with the hissing of the fricative “s” conveying a sense of escape rather than punctuality.

But perhaps the comparison with *hurl* is the most interesting. Say the word out loud and you feel the air being let out from the chest without obstruction. Say *whirl* and it feels quite different. It is as though the air were partially bottled prior to release: an incipient rather than an actual exhalation, a preparation for letting go. Indeed the difference between mouthing the two words, *whirl* and *hurl*, is a bit like that what happens in athletics, when the discus-thrower first whirls with his body, round and round, gaining angular momentum while the discus remains in his hand, only to release it, hurling the object as far as he can where it hits the ground, all energy spent. For the athlete the whirl is a gathering up, an acceleration: in the idiom of philosopher Gilles Deleuze and psychoanalyst Félix Guattari, it is “where things pick up speed”.<sup>12</sup> The *hurl*, to the contrary, is a spin-off. So it is too with breathing in and breathing out. Breathing in is a gathering, a rewinding; breathing out a propulsive release. One sweeps around, the other launches forth through an opening at the center thus formed.<sup>13</sup> Of course one cannot literally speak on the inhalation; nevertheless one can deflect the flow of air to create an eddy, so as momentarily to hold it back, like a bubble that has still to burst. Why should the onomatopoeic variant of *whirl*, by which we imitate what we commonly think of as its sound, end with a rolled “r” that can be continued for as long as one has breath left to pronounce it? *Whirrrrr . . .* It could be the sound of a flying insect, or the helicopter’s rotor as it lands or takes to the air, or the ship’s propeller in water, or the bullroarer. Unlike the continuous hum or murmur, the roll of *whirr* suggests a movement that goes against the grain, a ratcheting, an infolding. This, in turn, sets up the aerial or aquatic vibrations that make it such a noisy affair. In the rolled “r,” you can almost feel the revolutions of the whirl, right there in your mouth.

Most remarkable, however, is the fact that *whirl* begins with the very same sound that, in the English language, prefixes all of its interrogatives. As noted above, the whirl is not a resultant but a becoming, a turning *into* that which remains unknown, a ceaseless questioning from which any answer continually recedes. With the whirl, the thing is not yet settled, neither in its present nor in its future form. It is a problem, for which the steps toward a solution are not already given. Whither is it going? When will it arrive? What will it be? Why? We don’t know. Whirl is a question, *where?* Hurl delivers the answer, *here!* The scribes of medieval

Europe must have known this when they converted what used to be prosodic markers to help the orator in the declamation of a text into what we now know as punctuation. The form of the question mark, with which we are so familiar today, is no less than a miniature whirl.

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Moreover since every question solicits a response, it is addressed to the ear of the listener. While the iconic resemblance of the question mark to the involute form of the human ear may not be entirely fortuitous, what the early architects of punctuation probably did not know is that as sonic vibrations penetrate deep within the ear, they are funneled into the spiraling tube of the cochlea. It turns out that every one of us carries a miniature whirl in each ear! And when you place one cochlear form over another, by covering the ear with a spiral shell, the combination spontaneously generates its own sound, reminding us at once of the maelstrom of the sea.

### Spinning Threads

Tracked along another path, the chain of word associations leads into the language of spinning, in which *whirl*, taken as a noun rather than as a verb, is simply a variant of *whorl*. The whorl is a small, doughnut-shaped disc, of some three or four centimeters in diameter, commonly carved from stone, bone, or hardwood.<sup>14</sup> Fitted to the lower shaft of the hand-held drop spindle, its function is to give weight and angular momentum to the spindle when spinning a fleece from a distaff. Due to its relatively imperishable material, the whorl is often the best evidence we have of the practice of spinning in deep prehistory, where nothing remains of the threads or the fabrics woven from them. Nowadays, when most thread is industrially produced, much of it from synthetic material, the practice has all but disappeared and is sustained—at least in Western societies—only by a select band of hobbyists and craftspeople. But for the greater part of human history, among peoples from around the world, spinning was a ubiquitous activity carried on day after day, for hours on end, in some societies only by women, in others only by men, and in yet others by both men and women. Considering its ubiquity, however, spinning has attracted extraordinarily little attention from historians and ethnologists. For most historians, it only comes into the picture with the onset

of industrialization; for ethnologists the focus has always been more on weaving than on spinning. It is all too easy to forget that there can be no weaving without thread and no thread that has not first been spun.<sup>15</sup>

I am as guilty of this neglect as anyone. In a work on the history and anthropology of the line I had distinguished two major classes of line, threads and traces, and had shown how threads transform into traces in the formation of surfaces, as in weaving, and traces into threads in their dissolution, as when a woven textile is unraveled.<sup>16</sup> It had seemed to me that weaving could be taken as a model for both making and thinking. To treat making as a modality weaving is to emphasize process over product, to see form and pattern as emergent within the process rather than preconceived and imposed on raw material, and to recognize too how material is held together or made to cohere through contrary forces of tension and friction. To treat thinking as a modality of weaving is to adumbrate an alternative mathematics, rooted in the routines of everyday life, that permits an open-ended exploration of the multiple possibilities of permutation and recombination, and of the patterns and symmetries that result. Making and thinking, thus conceived, could both be understood as ways of working with lines. Yet in all this, I had given no thought to how these lines are generated in the first place. Whatever happened to spinning? What if we were to regard making and thinking as modalities of spinning rather than weaving? Does not the turner spin his wood on the lathe, and the potter his clay on the wheel? Do we not turn over ideas in our minds, and get our heads into a spin? And do we not spin our narratives before weaving them into text? Might the whirl be as generative as the weave? Or yet more so?

I have scarcely begun to address these questions and can offer no more than a few speculations on the topic, partly provoked by my first lessons in how to spin from a distaff, using a drop spindle, under the guidance of one of the few specialists in the comparative ethnography of spinning, Tracy Hudson.<sup>17</sup> What took me most by surprise, in my initial attempts, was just how discontinuous an operation it is. Naively, I had imagined that with the revolution of the spindle, the thread would just come spooling out. Of course it did not, for one very interesting reason. This is that the twist travels upstream, and not downstream, from the revolving spindle up toward the distaff. Periodically, then, you have to interrupt the spin, reel the thread you have spun onto the shaft of the

spindle (starting from above the whorl), and commence the spin again. The mistake I often found myself making was to reel on in a way that simply reversed the spin, thus undoing what I had just done. Though I have yet to think through the implications of this discovery for our understanding of thinking and making, it does lead me to question what I have certainly assumed up to now, namely that making and thinking entail an ongoing forward movement. What if every act of making and thinking took you *back* to the source from which your materials were derived, rather than further from them, such that the actual growth of the work would be an accumulation or ratcheting up of these successive backward movements? Is it only by the accumulation of successive gatherings or recollections, of memories, that we can advance? Is the future a succession of vortices in each of which we must necessarily find ourselves spinning into the past, only to reel on to the next?

Evidently the whorl winds up, not down; drawing tension into the thread, not releasing it. It is here that we can return to the parallel with the clock. For winding the thread, just like winding the clock, is a return toward the source, a revolution that goes against the grain, in which the materials—whether the metals of the spring or the fibers of the fleece—turn in on themselves, straining against the inexorable march of time. And just as with the rotations of the clock, or indeed with the rolled “r” of “whir,” it is through the accumulation of escapements, reeled on the spindle, that the line of thread is advanced. What, then, is the relation between the whirl of the spindle and the line of thread? This is what I had missed, in my earlier comparison of the thread and the trace. With the trace, as when I draw circles with pencil and compass, the line issues directly from the movement of the tool and from the gesture of the hand that holds it. But with the thread, the line does not record the revolutions of the whorl, even though it is formed by them. Earlier, I observed that in the whirl, the turning movement continually gives rise to a center of relative rest—an “eye,” if you will. And the thread-line, far from moving *around* the eye, issues *from* the eye itself as it moves. This observation brings me to my final theme, which concerns the meanings of *wind*.

### The Whirling Wind?

Bergson, it will be recalled, compared living things to eddies of dust raised by the passing wind. It seems that the atmospheric wind is itself

inclined to *wind*, turning on itself into a whirl. Wind and *wind* are of course the same word, nowadays distinguished only in pronunciation, which is why I have had to resort here to italics in order to distinguish the turning of the whirl from the draft of air. But if the gyre of the *wind* gives rise to things, that of the wind can rip them asunder. The very same vortex that grows the bodies of the living, as philosopher Michel Serres notes, can also destroy ships at sea: "It is order and disorder at once."<sup>18</sup> When the gyre is of moderate acceleration we call it a whirlwind, but if the acceleration grows to be of destructive force, it becomes a tornado, or on a greatly expanded scale, a cyclone. At its heart is the eye, and as the whirlwind moves we can track its path in the movement of the eye, and in the trail of dust or destruction that it leaves in its wake. That is, we can track its evolution. That the whirlwind evolves is not in doubt, since its movement is not like the transport of a solid body from one location to another across the sky. The whirlwind does not move like an airplane! On the contrary, it moves by perpetually winding up on its advancing front while unwinding at the rear.<sup>19</sup> Indeed, we might say of the whirlwind or the storm that it is continually losing the thread, much as happened to me in my first attempts at spinning, when every time I would reel my thread onto the spindle I would undo what I had just spun. That is why the storm leaves no trace of its evolution in the air, but only on the ground. Nevertheless, we must distinguish—as we have done before with regard to life in general and its specific cycles—between the evolution of the wind and its revolution.

Let's get back to Bergson. Here he is, once again insisting on the same distinction:

The act by which life goes forward to the creation of a new form, and the act by which this form is shaped, are two different and often antagonistic movements. The first is continuous with the second, but cannot continue in it without being drawn aside from its direction.<sup>20</sup>

So it is, too, with the storm. Yesterday, a powerful storm struck the coast of eastern Scotland, where I live. I went walking along the shore, and had to struggle against the wind coming from the south. Later, the strength dropped, only to be replaced by a northerly. The storm itself, however, was tracking from west to east! Walking below as the storm passed

overhead, my experience was of an airflow that had been “drawn aside,” as Bergson would say, from its prevailing westerly direction and put into an anticlockwise spin. First the leading edge arrived, as the wind direction swung from west to south, then came the eye, and finally the trailing edge as the wind got up again from the north. And now, in the aftermath, only a gentle westerly remains. Could this image of the passing storm, I wonder, provide the key to solving a problem that has long perplexed me? Expressed in its most general terms, the problem is about how to understand the environment we inhabit.

I had come up with two possible answers. One was to think of the environment as a *meshwork*, woven by the myriad lines of living beings as they thread their ways through the world. The other was to think of it as an *atmosphere*, an aerial domain suffused with light, sound, and feeling. My questions, then, were: Is the environment a meshwork, or an atmosphere, or both? And if both, then what is the relation between them?<sup>21</sup> Perhaps it is like the relation between breathing in and breathing out. As we have seen, the wind *winds*. We breathe it in and, breathing it out as we walk along, we lay our linear trails through the world. But inhalation and exhalation are not the precise reverse of one another. It is instructive to compare breathing with swimming. In the breaststroke, the backward sweep of the arms and infolding of the legs is followed by a forward thrust that propels the swimmer through the water. Likewise when we breathe the air, the inhalation—a drawing in, a circulatory movement that deviates from or even reverses our direction of travel—is followed by a propulsive exhalation. Recall the discus thrower: the whirl prepares, the hurl delivers. *Whirl—hurl; whirl—hurl*. With every whirl, we draw in the atmosphere; with every hurl we weave a path in the meshwork. The same principle is at work, whether with the whirl of organism, the clockwork spring, the spindle whorl, or the whirlwind. In every case, linearity issues from circularity, and circularity from linearity, in an alternation that is foundational to all life.

## Notes

1. What Lucretius teaches us, as political theorist Jane Bennett shows, is that we need not add vitality to inanimate things to bring them to life, since it is already immanent in the “primordial swerve” from which everything arises in the first place. The swerve, Bennett writes, “affirms that so-called inanimate

things have a life, that deep within is an inexplicable vitality or energy . . . a kind of thing-power." *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2010), 18. For an excellent account of the relevance of Lucretius's cosmology for contemporary anthropology and philosophy, see Stuart McLean, "Stories and Cosmogonies: Imagining Creativity beyond 'Nature' and 'Culture,'" *Cultural Anthropology* 24 (2009): 213–45.

2. It is conceivable that as he wrote these lines, Blake had in mind the theory of Descartes, that the universe is filled with matter that—having been given some initial momentum, a cosmic spin or whirl—has settled into a system of interlocking vortices that carry the sun, stars, planets, and all other heavenly bodies in their paths. I am grateful to Jeffrey Cohen for this suggestion. See Jeffrey Jerome Cohen and Lowell Duckert, "Introduction: Eleven Principles of the Elements," in *Elemental Ecocriticism: Thinking with Earth, Air, Water and Fire*, ed. J. J. Cohen and L. Duckert (Minneapolis: University of Minnesota Press, 2015), 3.

3. Whereas for Lucretius, however, the movement of life was ever downward, Bergson's "great blast" erupted upward. It is perhaps no accident that Bergson was writing during the heyday of balloon flight!

4. The felicitous phrase "whirl of organism" comes from an essay by another philosopher, Stanley Cavell. See Stanley Cavell, *Must We Mean What We Say? A Book of Essays* (Cambridge: Cambridge University Press, 1969), 52. I am grateful to Hayder Al-Mohammad for drawing this reference to my attention. More recently the feminist cultural theorist Astrida Neimanis has compared human bodies to oceanic eddies and herself to "a singular, dynamic whorl dissolving in a complex, fluid circulation." Astrida Neimanis, "Hydrofeminism; or, On Becoming a Body of Water," in *Undutiful Daughters: Mobilizing Future Concepts, Bodies, and Subjectivities in Feminist Thought and Practice*, ed. H. Gunkel, C. Nigianni, and F. Söderbäck (New York: Palgrave Macmillan, 2012), 96. The philosopher Michel Serres would agree. "Who am I?" he asks. The answer: "A vortex. A dispersal that comes undone." *The Birth of Physics*, trans. J. Hawkes (Manchester: Clinamen Press, 2000), 37.

5. For this idea of inflection as movement-moving, I am indebted to Erin Manning. "Perceiving the inflection," Manning writes, "does not mean being aware of it as though you could be outside it. It means moving in its tending. It means attending, in the event, to how movement diverges from its flow, attending to how movement moves." Erin Manning, *The Minor Gesture* (Durham: Duke University Press, 2016), 118.

6. On the exercise of drawing a circle and its implications, see Tim Ingold, "Bindings against Boundaries: Entanglements in an Open World," *Environment and Planning A* 40 (2008): 1796–1810.

7. On the technological consequences of the crank, see Lynn White Jr., *Medieval Technology and Social Change* (Oxford: Clarendon, 1962), 103–17.

8. As Serres has pointed out, in nature there are no perfect circles, only vortices: “No exact rounding off, no pure circumference, spirals that shift, that erode. The circle winds down in a conical helix. The Pythagorean or Platonic circle becomes the Archimedean helix. In other words, nature is not endowed with perpetual motion.” See Serres, *Physics*, 58.

9. See, for example, Paul D. Lockhart, *A Mathematician’s Lament: How School Cheats Us Out of Our Most Fascinating and Imaginative Art Form* (New York: Bellevue Literary Press, 2009).

10. This and other etymological references in this paragraph are drawn from the *Shorter Oxford English Dictionary*, 6th ed. (Oxford: Oxford University Press, 2007), and from the *Online Etymological Dictionary*, <http://www.etymonline.com/>.

11. On the idea of phonological iconicity, see Alfred Gell, “The Language of the Forest: Landscape and Iconism in Umeda,” in *The Anthropology of Landscape: Perspectives on Place and Space*, ed. E. Hirsch and M. O’Hanlon (Oxford: Clarendon, 1995); Eduardo Kohn, *How Forests Think: Toward an Anthropology beyond the Human* (Berkeley: University of California Press, 2013), 27–33.

12. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. B. Massumi (London: Continuum, 2004), 28.

13. See Tim Ingold, *The Life of Lines* (Abingdon: Routledge, 2015), 66–68.

14. *Ibid.*, 56–57. Topologically, the whorl takes the form of the torus, the formation and properties of which are discussed by literary scholar Valerie Allen in her essay “Airy Something,” in Cohen and Duckert, *Elemental Ecocriticism*, 77–104. The whorl also bears comparison with the spinning top, of which Serres has the following to say: “Is it stable? Yes. Is it unstable? Yes, again. Is it rotating, does it follow a circumference? Yes, ever again. The top is a *circum-stance*. Can it move forward, lightfootedly? Yes. Can it lean? Yes, in all directions”. All in all, says Serres, the spinning top “may serve as a little model of the world.” *Physics*, 29.

15. On the importance of spinning for our concept of the line, see Victoria Mitchell, “Drawing Threads from Sight to Site,” *Textile 4* (2006): 340–61.

16. Tim Ingold, *Lines: A Brief History* (Abingdon: Routledge, 2007), 39–71.

17. Tracy Hudson visited my research group at the University of Aberdeen in February 2015, and I am very grateful for her inspiration and teaching. See Tracy P. Hudson, “Variables and Assumptions in Modern Interpretation of Ancient Spinning Technique and Technology through Archaeological Experimentation,” *EXARC Journal Digest 1* (2014): 1–14.

18. Serres, *Physics*, 29.

19. Ingold, *The Life of Lines*, 54.

20. Henri Bergson, *Creative Evolution*, trans. A. Mitchell (New York: Henry Holt, 1911), 129.

21. Ingold, *The Life of Lines*, 87–88.