Dowsing the Rollrights

Dowsing may be one case of the phenomenon of "self as unrecognized cause." Other paranormal claims might originate in the same misperception.

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I recently had the opportunity to visit the Rollright Stones in the southern Midlands of England. This monument, which lies on the border of the counties of Oxfordshire and Warwickshire, is composed of three elements. The main element, known as "The King's Men," is a prehistoric circle (depicted in Figure 1) some 30 meters in diameter and with stones up to 2.2 meters in height. Some 300 meters away is a group of five large stones known as "The Whispering Knights," purportedly the remains of a Neolithic long barrow (a large mound of stones placed over a burial site). Finally, about 50 meters from the main circle, is "The King's Stone," a monolith that appears to bear a relationship to the stone circle not unlike that of the heel stone to the main circle at Stonehenge. Unlike many prehistoric stone circles, the Rollrights stand on privately owned land and are not commercially exploited. (The small entry fee of thirty pence is declaredly donated to an animal charity).

Figure 1. Engraving of the Rollright Stones in the Grand Atlas of 1667 by J. Blaeu.

According to legend, the circle is a group of "King's Men" magically metamorphosed into rocks. One of the most intriguing legends associated with the Rollrights concerns the number of stones in the circle. The "official" number is seventy-two, while the local written guide indicates seventy-seven. The reason for this discrepancy is that the stones themselves are well worn, and it is difficult to tell whether some of the stones are singles or whether they are connected underground, showing different facets of the same stone above ground. Similar claims about not being able to count the number of stones in a circle are made about Castlerigg in Cumberland and Aylesford in Kent, at different ends of England. It is supposedly fortunate that the stones cannot be counted, since legend has it that anyone who correctly counts them three times in a row is in mortal danger.

The Rollright Stones stand on a high ridge above the village of Long Compton in Warwickshire. On the day that I visited, the crown of the hill was covered in low-lying clouds that blew a damp mist across the circle. Upon exiting the surrounding wooded path, I found several individuals engaged in "dowsing" the circle. What they were dowsing the circle *for* was not clear, but it was certainly not a search for water. I was enthusiastically recruited into the collective experience and quickly found myself with some homemade dowsing rods.

Asked to stand at the center of the stone circle, I was assured that I was on a major "ley" line ("energy" line; see Watkins 1925) and that there was considerable "energy" all around the site. Almost immediately after I had been given the dowsing rods and some instruction in their use, I found the rods moving in my hands, apparently beyond my volition and producing strong "signals," indicating some unseen, but certainly "felt" force. There was an immediate outcry of success by the nominal "leader." I felt proud! Others turned admiringly towards me. Did I have special powers? Did I possess some innate capability that set me apart from the ordinary run of common folk? It was a heady and tempting cocktail of admiration, approval, and mystery. Was dowsing the real thing? And was I privileged to enter into an arcane world of esoteric energies? Well, perhaps. It was however, an important opportunity for an insightful look into the appeal of the twilight world.

Decomposing Dowsing

An author of a popular text on dowsing, P. Naylor, has noted:

> During the twentieth century, the art [dowsing] has come into the open, partly because of a lively scientific interest by learned men and a quiescent attitude on the part of the church. Unfortunately, even today, as over the centuries, there is a widely held belief that dowsing is an agency of the devil, and akin to mysticism. This is not so. It is a purely scientific phenomenon which can be used equally well by the saintly as by sinners. (Naylor 1980, 6)

The quotation attests to Naylor's opinion that dowsing is a purely scientific phenomenon. If so, it should be possible to apply a scientific approach to the question of causation in dowsing. In an attempt to understand my particular experience and to try to distill some of the possible underlying causes

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of the rods' movement, I used a decompositional systems approach that has proved helpful in other realms of behavioral investigation (Hancock and Chignell 1995; Newell 1986). In the present case, I divided observations into those related to: 1) the environment (the stone circle), 2) the instrument (the dowsing rods), 3) the actor (the dowser), and finally, 4) the task itself (the goal of dowsing). The approach recognizes the critical importance of the interactions between these elements but looks initially at the influence of each individual component of the system.

The Environment

The environment of the Rollrights was certainly evocative. It was a somewhat windy day, and the effect of a mild breeze on the rods themselves was difficult to establish. The influence was not overwhelming, however, since the rods did not always follow wind direction. The Rollright circle is located in a glade, three sides of which are blocked with high trees, while the fourth, from which the wind was blowing that day, is open to the elements (see Figure 2). As a result, the light wind swirled in the "bowl" made by the trees, and often it was difficult to tell if wind eddies were having an effect. Given that others present experienced no problems and that dowsing is purported to work on still days, the wind cannot be considered the ubiquitous causal influence.

A more problematic source of environmental influence was the uneven ground both within and outside the circle. Considerable effort is needed to focus on the dowsing rods while walking and stepping around irregular obstacles. It clearly complicates the dowser's effort *not* to impart a direct influence on the rods. Like many unfenced stone circles, there is a worn pathway around both the inside and the outside of the stones themselves. In wet and damp conditions, these areas are slippery. Walking on or through them means exerting some caution. Consequently, approaching any stone means dividing one's attention between two tasks at once—overt balancing and dowsing. Movements associated with slowing and stabilizing locomotion as one approaches stones can easily be transmitted to the arms, which are endeavoring to retain the rods in a "perfectly horizontal position" (Naylor 1980).

There is also the possibility of an *a priori* expectation of success (Vogt and Hyman 1959), encouraged by the evocative setting shown in Figure 2. In sum, it is difficult in natural settings to distinguish the influence of recognizable physical environmental influences from other potential sources.

The Instrument

The rods themselves are of particular interest. I learned from one of the dowsers that any metal could be used. Indeed, some advocate wooden instruments or even no instruments at all, as in "hand" dowsing. A particular point was made that either copper or aluminum rods would work even though they are not affected by magnetic fields, implying that dowsing does not rely on some form of magnetic attraction. It has been suggested by Hitching (1978) that dowsing uses some form of electrical force.

Figure 2. A portion of "The King's Men," the Rollright Stones main circle. The misty, evocative setting was conducive to belief in "mystical forces."

The rods I used were two thin bent metal rods, and the handles were two plastic ballpoint pen cases (see Figure 3). I was assured that these handles meant that I could not *consciously* affect the movement of the rods. The rods were some five inches long in the "handle" and some eighteen inches extending forward. Upon examination, I found that neither was bent precisely at a right angle between handle and extension but, being curved in profile, the bend in the rods themselves provided a facile turning surface to interact with the holders. Also, the more reactive of the two rods was distorted horizontally at the bend between the "handle" and the extension. In short, what I held in my hands were two very unstable systems that reacted to the slightest movements. In this sense, the task of the dowser is very similar to a "critical" tracking task (Jex, McDonnell, and Phatak 1966). The latter is the electronic equivalent of balancing a length of wooden dowel in the vertical plane. When the dowel is long, the balancing task is simple. As the length of the dowel is progressively shortened, and the dowel becomes increasingly unstable, the balancing task becomes more difficult.

The "dowser" is also an active, if unwitting, player in creating this instability. In trying to hold the rods parallel to the ground, the dowser makes subtle adjustments on the assumption that the instrument itself is straight and level. Indeed, individuals are instructed to do so. Naylor again:

> When you are fully relaxed, hold the rods, one in each hand, so that the handles are held in loosely clenched fists. Your arms and those rods should point to the ground. Your thumbs should rest on the fingernails of the forefingers. With the rods hanging loosely at your sides, they should swing freely if the hands are moved. Now raise your forearms by bending the elbows, which should be kept close to the trunk of your body. The forearms should be held horizontally, with the arms of the rods also horizontal and handles vertical. Ideally, the arms of the rods and forearms should be in line and perfectly horizontal, on the same plane and parallel with each other.

Such a system is dynamically unstable and even minor perturbations can be magnified into extensive swings of the rod. The longer the extension portion of the rod, the further the

center of mass is from the hands and the more unstable the system. The combination of slight eccentricities in design and postural adjustments on the part of the dowser to keep the rods in position, leaves the rods particularly vulnerable. This interpretation is further supported by the symmetry of movement of the rods, as well as the fact that the rods rarely rotate a full 360 degrees. The overt request to maintain forearm stability, which becomes the focus of the dowser's conscious attention, is combined with the fact that such overt stability is only achieved by the coordination of many subconscious compensatory movements, thus giving impetus to the rods. Dowsing, therefore, provides a most insidious combination of unstable conditions. This combination of conditions applies to other types of dowsing tools such as the forked twig and the pendulum, as elaborated in the excellent text by Vogt and Hyman (1959).

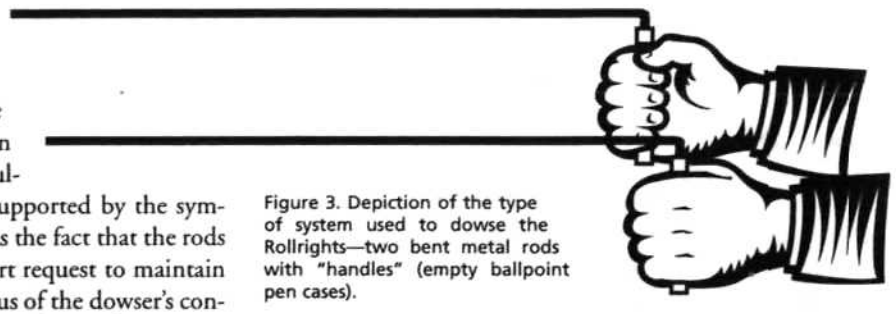

Figure 3. Depiction of the type of system used to dowse the Rollrights—two bent metal rods with "handles" (empty ballpoint pen cases).

The Actor (The Dowser)

If the rods were exceptionally heavy, the ability of the dowser to keep the rods horizontal would be rapidly affected by muscular fatigue. In this case, we would observe that the tremor associated with such fatigue was transmitted to the rods, causing them to move. One would hardly be tempted in such a case to ascribe the movement of the rods to an esoteric force. The causal relation would be clear, in the same way that it was demonstrated for the phenomenon of table turning by Michael Faraday in 1853 (see Faraday 1853). However, as the rods are light, it does not occur to most people to associate the *horizontal* movements of the rod with imperceptible (and by expectation *vertical*) movements of the dowser's arms. Thus, the posture of dowsing and lack of support for the forearms are potentially critical influences.

I was informed that the rods did not need handles for dowsing to be successful, and I was encouraged to try dowsing without them. Here, even more subtle influences come into play. The rods themselves were thin, made from what seemed to be coat-hanger wire. However, rather than using a precision grip between fingers and thumb, as is usual for thin objects, one is instructed to use the same clench-fisted "power" grip as used with the handles, albeit in a "relaxed" manner (see earlier quotation). The expectation is that, being grasped directly, the rods should not move independent of volitional action. However, since the grasp used is inappropriate for the thickness of the object, movement still occurs. When it does, it has a startling effect. The part of the hand used in such a grasp is highly innervated, as shown by the research of Wilder Penfield on the neurosensory homunculus. Therefore, rotational movement in this unusual grasp elicits an intense and novel form of tactile stimulation. While Vogt and Hyman (1959) proposed that subconscious imitation of previously observed dowsing procedures may account for initial rod movement, I suggest that postural stability also plays a crucial role. And since the postural movements are subconscious, but the subsequent effect is so strong, it is not surprising that some external source is invoked to explain the (occasionally profound) sensations experienced.

It is, of course, possible to control the rods consciously. By placing the thumb directly over the point of rotation, or better grasping the long extension of the dowsing rod between fingers and thumb, the movement "magically" disappears. When the instability of the system is removed by changing the grip location, no wide excursions of the rods are observed. Clearly, the esoteric "force" is not able to "overcome" the machinations of such differences in grasp.

Once one has progressed from dowsing with handles to dowsing with just the rods themselves, and putatively assured oneself that the movement of the rods is a response to an external force, it is for some an obvious next step to propose that the force can be "felt" directly and that no rods or other instruments are necessary. Naylor again speculates:

> A very few gifted people are so sensitive that they can dowse using an open hand held palm downwards. They feel a tingling sensation of varying intensity in the hand and fingers. You may be one of those rare people!

Unfortunately, with this proposition, all behavior open to mutual inspection disappears. It was into this trap that introspectionist psychology fell almost a century ago. Similarly, in hand dowsing, we have no overt behavioral measure and frequently no method to provide independent assessment as to whether statements made actually accord with the truth. You may well think it possible to treat this with "light-hearted seriousness," as suggested in the following quotation. I could not possibly comment.

> Dowsers are still in demand, to fill the gaps where modern technology has failed. Dowsing has proved to be more accurate and capable of greater depth than modern search devices such as those used by treasure hunters and statutory undertakings. Some enthusiasts are applying the technique on pre-historic sites, the controversial ley lines and old trackways. The general reader, however, should treat the subject with light-hearted seriousness, considering dowsing to be a genuine form of ancient technology, but practiced for fun and entertainment. (Naylor 1980, 6)

Finally, in considering the effects related to the dowser, it is important to understand the influence of *coactors* (those individuals also engaged in dowsing at the same place and time)

and *evaluative others* (spectators not engaged in dowsing but watching the process). In my case, there were both—others dowsing the circle and additional visitors, some of whom were interested spectators. (I was even asked by some how the process of dowsing worked!) There are strong influences on performance as a result of the presence of coactors and evaluative others (Martens 1975; Schmidt 1988; Zajonc 1965), not the least of which is conformity. However, the problems of social facilitation and coaction are somewhat beyond the present work, although there is no denying their powerful effects. However, Naylor warns us to beware with respect to the attitude of evaluative others:

> . . . the novice is easily distracted by spectators, particularly if there are sceptics amongst them.

This is not the first report of what can be termed a "shyness" effect.

The Task

One of the more problematic aspects of dowsing is the chronic underspecification of the task. Since what is meant to happen and where and when it is meant to happen are often not specified before the event, virtually any outcome can be interpreted as supportive of the utility of dowsing. Are the rods supposed to converge, diverge, both point in the same direction, or even stay absolutely still as some critical threshold is approached or crossed? In my encounter, this was never made clear, and any movement of the rods was considered positive support. Of course, the required direction of movement of the rods *could* be specified; but this would present little difficulty to an experienced dowser since specific reactions can be elicited either by volitional movements (that is, intentional fraud) or subconscious movements (that, is unintentional action or self-delusion). I am persuaded that I encountered the latter. However, where more pecuniary interests are involved, I am sure others could give examples of the former.

Often, the object of dowsing is not specified, as was the case at the Rollrights. While sometimes dowsers will indicate what they are dowsing for—underground water, minerals, oil—what was being searched for at the Rollrights was not made clear. Dowsing the stone circle, then, was unlike dowsing for hidden sources such as underground water; for one, the latter is amenable to strict experimental control, since performance can be compared to what is actually the case (either there is water or there is not).

Indeed, James Randi (1982) has addressed the problem of underspecification by providing objective tests of dowsing capability. None of the dowsers he tested under such constraints came anywhere near the criterion for success. However, standing stones are immediately observable, so dowsers have an obvious opportunity to synchronize their response with the external conditions. Even under these circumstances, however, detailed kinematic and kinetic analysis of the dowser's movements could at least provide some indication as to whether the actions of the dowser are responsible for the gyrations of the rods. For example, it is recognized that, on approaching objects, people tend to slow down (Lee 1976). It is possible that changes associated with slowing down might be partially responsible for movement of the rods.

Interactions Between Influences

I have considered individually some effects that can be caused by environment, instrument, task, and performer. However, it is obvious that each of these work in conjunction. Even in discussing them, it is hard to dissociate interactive effects. It is a central tenet of ecological psychology that the actions of an individual cannot be understood independently of the context (environment) in which they occur (Gibson 1979; Hancock et al. 1995). The individual and the environment have a symbiotic relationship; the environment constrains action, but the individual acts to shape the environment. In this case, the performer is coupled to a highly unstable system that magnifies his or her subconscious, postural movements, bringing them into conscious perception. Rather than accept the effects of this magnification, some choose to attribute the perception to an external force. Vogt and Hyman (1959) observe:

> [W]e find that the theory of unconscious muscular action to account for the rod's movement, first put forth by Schott and Kirchner in the middle of the seventeenth century [Kirchner is credited with the first causal attribution of the rod's movement to muscular action (Barrett and Besterman 1926)] had to be worked out anew by Faraday and Chevreul in the middle of the nineteenth century to explain the movement of rods, pendulum and turning tables. (Vogt and Hyman 1959, 216; parenthesis added.)

There are, of course, similar considerations for interactions between all of the identified elements. As has been illustrated, a dowser's grasp, a property of the performer, cannot be considered independent of the nature and character of what is grasped (the instrument), in the present case the dowsing rods.

The principal error engaged in here is failing to recognize that the human body is a damping system that, although excellent, is not perfect and cannot correct for all environmental disturbances while engaged in walking, flying, driving, or other types of locomotion. Maintaining posture is a very active process. The individual makes constant adjustments and movements. Evolution has granted that such a continuous task is performed subconsciously, so that daily life is not spent in a never-ending effort to merely support oneself. Unfortunately, that battle was fought so long ago that we have no empathy for the freedom it provides. It is so much taken for granted that we are now willing, in the case of dowsing, to invoke mysterious "energies" rather than recognize this marvel of natural engineering.

A Comparable Circumstance

Some of the influences that persuade the naive observer in

favor of the efficacy of dowsing can be more clearly illustrated in other circumstances. I cite only one such example, another personal observation, although the are a plethora of others (for a more complete discussion see Vogt and Hyman 1959). Some years ago, I had an opportunity to observe a parade passing through the center of Kyoto, Japan. The parade consisted of a series of floats mounted upon large-wheeled, wooden wagons. One float in particular captured my attention. On top was seated a life-size figure of an old man holding a long, thin bamboo staff. The artist had designed the figure so well that as the wagon moved, the disturbances from the bumps in the roadway were transmitted via the staff to the arm and body. Was I looking at a genuine old man supporting himself while being bounced along a bumpy road, or was I looking at a puppet, whose movements were solely driven by the environmental disturbance? Many others also were puzzled by the artist's skill, and many spectators, especially children, were calling out or trying to get closer to see if the old man was real or not. In this case, it was a mannequin and not a real person, and all movement stopped when the wagon stopped. The problem was the uncertainty of causal direction. As we are so used to seeing people as the origin of movement, in this case the illusion worked. However, dowsing provides the contrasting circumstance, where we do *not* recognize the actor as cause and, consequently, some are misled to seek cause elsewhere.

Summary

This account is not an empirical evaluation of the efficacy of dowsing. It does not preclude the proposition that the movement of dowsing rods is a response to some, as yet, unknown force. Neither is it an exhaustive evaluation of the topic. Rather, it is an account of an experience and some conventional physical reasons why the effects observed may have occurred. The advantage to the conventional explanations is that they are open to direct experimental evaluation. Until such known physical causes are eliminated as possibilities, it is unwise to postulate additional mechanisms, although it should be remembered that Occam's razor is itself only a statement of belief. It is my current position that systematic kinematic and kinetic analyses of these activities would confirm the factors I have identified as the causes of the observed behavior. Fortunately, through science, such assertions can be validated or invalidated.

I suggest that dowsing is one example of a phenomenon I call "self as unrecognized cause." In this range of behaviors, the individual attributes causation to an external agency (e.g., earth energy) when the actual cause is his or her own, albeit unrecognized, actions. Among these actions are typically subconscious movements, such as respiration or correcting for postural stability. When such movements are magnified through an external instrument,[1] such as a dowsing rod, it can well appear that some environmental force is being encountered. Given the rhythmic nature and replicability of such bodily movements, it is not unexpected that the rods move with regularity as the individual repeats overt actions, such as walking across a "site" to be dowsed. Based on this observed regularity, the dowser is able to claim that the "force" remains consistent over repeated trials. Given that individuals also learn the relationship between such movements and outcome, performances such as dowsing stone circles also become feasible and replicable. Whether such performances are intentional fraud or unintentional self-delusion is difficult to determine (although a cynic might inquire whether money had changed hands). I hope in future to provide additional examples of "self as unrecognized cause" with regard to other putative paranormal phenomenon.

Acknowledgments

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Note

1. Of course dowsing rods are not the only instruments through which such movement can be magnified. It is ironic that some of the first studies in motor control were triggered by the observation of the astronomer Bessel around 1820 (see Welford 1968), who was investigating the sources of inaccuracy of measurements of star transit times across multiple observers. Fortunately, he suspected individual differences in the ability to control fine motor skills, not some paranormal force.

References

Barrett, W., and T. Besterman. 1926. *The Divining Rod: An Experimental and Psychological Investigation.* London: Methuen and Co.

Faraday, M. 1853. Experimental investigation of table turning. *Athenaeum,* July: 801–803. (Cited in Vogt and Hyman 1959).

Gibson, J. J. 1979. *The Ecological Approach to Vision Perception.* Hillsdale, N.J.: Lawrence Erlbaum.

Hancock, P. A., and M. H. Chignell. 1995. On human factors. In *Global Perspectives on the Ecology of Human-Machine Systems.* Edited by J. Flach., P. Hancock, J. Caird., and K. Vicente. Hillsdale, N.J.: Lawrence Erlbaum.

Hancock, P. A., J. Flach, J. K. Caird, and K. Vicente, eds. 1995. *Local Applications in the Ecology of Human-Machine Systems.* Hillsdale, N.J.: Lawrence Erlbaum.

Hitching, F. 1978. *The World Atlas of Mysteries.* London: Pan Books.

Jex, H. R., J. D. McDonnell, and A. V. Phatak. 1966. A "critical" tracking task for manual control research. *IEEE Transactions on Human Factors in Electronics, HFE-7*: 138–144.

Lee, D. N. 1976. A theory of visual control of braking based upon information about time-to-collision. *Perception,* 5: 437–459.

Martens, R. 1975. *Social Psychology and Physical Activity.* New York: Harper and Row.

Naylor, P. 1980. *Discovering Dowsing and Divining.* Princes Risborough, Eng.: Shire Publications.

Newell, K. M. 1986. Constraints on the development of coordination. In *Motor Development in Children: Aspects of Coordination and Control.* Edited by M. G. Wade and H. T. A. Whiting. Dordrecht: Martinus Nijhoff.

Randi, J. 1982. *Flim-Flam: Psychics, ESP, Unicorns and Other Delusions.* Amherst, N.Y.: Prometheus Books.

Schmidt, R. A. 1988. *Motor Control and Learning.* Champaign, Ill.: Human Kinetics.

Vogt, E. Z., and R. Hyman. 1959 [1979]. *Water Witching USA.* Chicago: University of Chicago Press.

Watkins, A. 1925. *The Old Straight Track.* London: Methuen and Co.

Welford, A. T. 1968. *Fundamentals of Skill.* London: Methuen and Co.

Zajonc, R. B. 1965. Social facilitation. *Science* 149: 269-274. □