Dowsing: a review

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Dowsers have recently defined dowsing as 'the art of knowing'. This reflects the fact that it was traditionally known as water divining and was a commercially important means of locating water and minerals, but it is often used today to detect a much wider range of apparently 'unknowable' information, from medical diagnosis to the location of lost objects. Although I suspect that I am not alone among members of the SMN in finding that the 'scientist within' at times protests at cases of apparent uncritical faith in dowsed information, this should not mask the underlying reality of this fascinating, complex and, under some conditions, surprisingly reproducible phenomenon.

This review article aims to cover the history of dowsing and the key theories, controversies, research and references. However, as with many areas of interest to SMN members, the story is by no means cut and dried, so I hope this article will initiate a discussion via e mail and the SMN web site, so that those interested can continue to share ideas.

As will become very clear, the understanding of dowsing is in that early stage in which it is very difficult to decide which parameters and results are relevant. We are in the equivalent state to the early days of the investigation of electromagnetism in the 19th Century, when the research and understanding had to push its way through confusion, misinterpretation of results, irrelevant coincidences and the claims of charlatans so as to uncover genuine phenomena. I have tried to cut through the confusing plethora of reported results and theories, but will inevitably have thrown out some of the baby with the bathwater.

What is the evidence that dowsing is real?

I will primarily consider the evidence for basic 'on site' dowsing, where the dowser walks over the site of interest, and the dowsing rods respond when the dowser is over the target. I will then move on to remote dowsing.

I find on-site dowsing particularly interesting. Unlike remote dowsing, which seems to be more related to *psi*phenomena, about 90 per cent of the population can do it at a basic level and it is relatively easy to replicate results; yet the phenomenon is largely ignored by the scientific community. It is also nothing to do with the type of dowsing rods used and in fact it works quite well with no rods at all. On this basis, it therefore seems to be a basic human neurophysiological response to an unknown stimulus. Since dowsing is also widely used as an adjunct to arguably more psychic techniques of gaining information remote from the site, the stimulus may well be subliminal and internal as much as external and 'physical'.

Eight thousand years of dowsing

Engineers tend to be a pragmatic bunch. If something doesn't work, we tend not to use it for long. I therefore find it significant that engineers appear to have used dowsing for at least 8,000 years.

The first recorded use is thought to be a cave painting at Tassili N'Ajjer in the Sahara, dated at about 6000BC. There are other references by the Egyptians c. 3000BC, the Hebrews c. 2000BC and in the Bible, while CICERO recorded the use of the *virgula divinatorium,* the dowsing rod, in AD50.

MARTIN LUTHER denounced dowsing as the work of the devil in AD1528. In 1556 a German metallurgical text commented on the common use of dowsing to detect metallic ores while the author, AGRICOLA, pointed out that the dowsing instrument did not move of its own accord, but only in the hands of sensitive persons. In 1632 and 1640 the Baroness of BEAUSOLEIL, who seems to have made a thorough investigation of dowsing, published reports on it in connection with the utilization of France's mineral wealth. Shortly afterwards, in 1665, the well known scientist BOYLE referred to the possible reality of dowsing in a paper to the Royal Society.

More recently, the Cornish tin industry started when dowsers came over from the Harz mountains of Germany to teach the techniques of dowsing for tin.

By the turn of the century, dowsing rods were a standard part of a water engineer's toolbox and featured in catalogues along with pumps and valves, while extensive scientific investigation were carried out by MABY (1939) and TROMP (1949) focusing on potential physical explanations.

Use has declined since, with the growth of alternative techniques, but it is still used by water boards, the military, farmers and private companies. Walker's Crisps and Roche Pharmaceuticals both use dowsing for locating water supplies for their factories, while Honda even brought dowsers from Japan to identify the best site for their new factory in Swindon. We may not know how dowsing works, but it certainly seems to have been in use for a long time.

Scientific research

Most dowsing research was either carried out before the development of the concept of double blind controlled trials, or has been done by enthusiasts who dispense with the complexities it involves in the excitement of investigating their theories. As a result, the experiments are often very vulnerable to claims that the dowser subconsciously generated the desired response, and they are frustratingly poorly documented. However, some excellent work has been done, which in my view offers convincing proof of the reality of the phenomenon.

1. **Novice dowsers can get repeatable results.** In 1971 CHADWICK and JENSEN of Utah State University investigated the abilities of novice dowsers to replicate each others' results. One hunderd and fifty novice dowsers, mostly staff and students of the University walked along four test paths with dowsing rods, placing blocks at the points where they detected a reaction. The position of the blocks was measured and they were then removed before the next dowser.

To (the initially sceptical) Chadwick and Jensen's surprise, the dowsers seemed to get responses at the same points along the path. For three of the tests the results were significant at the 0.05 per cent probability level, the fourth at 6 per cent.

Chadwick and Jensen were electrical engineers and also compared the dowsing results with a magnetic survey carried out after the last trial. It is possible that there is some correlation between the results, as more dowsing reactions occurred where the magnetic field gradient was over 1.6 mTm -1 than where the gradient was less, but the results are less convincing than the striking ability of the novice dowsers to get responses at the same places.

Similar results have been obtained by TROMP (1949) and the research group of the British Society of Dowsers (BSD), who achieved $p < 0.1$-1% in a series of double blind trials in 1997.

It therefore seems that even novice dowsers are genuinely detecting something at a particular position, although it is not clear what it is.

2. **Experienced dowsers are twice as successful at detecting water than conventional geophysical techniques.**Much the most significant recent study is a 10 year research program in the 1980s on the application of dowsing to the location of water in arid regions, sponsored by the German government. This was led by Professor BETZ of the University of Munich.

The results were striking. In 691 test drillings in Sri Lanka, dowsers achieved an overall success rate of 96 per cent, where a success rate of only 30-50 per cent would be expected by conventional techniques. It was not only the success rate that was impressive, but also that in hundreds of cases the dowsers successfully predicted the depth of the well and yield of the well to within 10-20 per cent. These results far exceeded what would have been expected by lucky guesses. In some cases the dowsers successfully located sources 30 m down, which were so narrow that an error of on metre would have resulted in missing the source.

These results support the experience of Soviet Geologists in the 1960s and 1970s, where dowsers achieved a 91.5-94 per cent success rate in siting water wells in Chelyabinsk and successfully used dowsing from aeroplanes to locate mineral ores in Kazakhstan, Karelia and Tadzhikistan.

3. **Experienced and sensitive dowsers can sometimes dowse successfully for information without being at the site** . Dowsing can also be used to find information without being on site. Map dowsing is quite frequently used by experienced dowsers as a precursor to an on site survey as it can often save time, although it is less accurate. In this technique, the dowser uses a map of the site and 'asks' the rod or pendulum to respond at the co-ordinates what was sought while the dowser moves a finger along the sides of the map. Related techniques have been used to diagnose diseases or find a virtually unlimited range of information.

However, although various studies have been done on remote dowsing or dowsing purporting to require *psi* ability, (summarized by HANSEN 1982) most experiments produced negative results or were inconclusive. Nevertheless, as with many paranormal phenomena, individual occurrences can be extremely impressive.

In one well documented example, PETER STEWART (SMN member) was asked to assist in finding the location of a crashed aircraft. Using map dowsing, Peter identified a crash site in the sea. This initially seemed improbable, as the site he suggested had been searched without success. However, three months later a fishing boat brought up a piece of the aircraft in its nets, very close the identified point.

Remote dowsing for information is generally agreed to be a more difficult and less reliable process than on site dowsing, although dowsing is still much easier than trying to use *psi* abilities to find the answer to unknown information. This suggests that remote dowsing probably involves more '*psi*' capability than on site dowsing, but that the near digital nature of the dowsing response makes it easier to access

subconscious *'psi'* information than trying to generate a more complex clairvoyant 'image' of the information.

What can be detected?

Novice dowsers find it relatively easy to detect steel and other electrically conducting materials, geological water, (particularly moving water), but they often find the results very confusing as there are too many responses and they cannot tell the difference between them. Experienced dowsers can detect almost anything at any distance, probably by utilizing *psi* capabilities, but minerals, oil, and disturbed ground such as archaeological sites and caves seem to be relatively easy. Wet sands and clays seem to reduce the 'penetration' of the dowsing ability through the ground.

The situation is confused for the novice by the tendency of buried structures (e.g. a pipeline) to create a series of parallel dowsing lines, similar, though not identical, to diffraction pattern. However, with experience the dowser learns to 'focus on the question' and can then get a reaction only at the centre line, without being confused by the parallels. Interestingly, the spacing of these parallels oscillates with the diurnal cycle, reaching a maximum at about 1500h local time, thus suggesting a possible link with the normal daily variation of earth's magnetic field which reaches a minimum at about 13-1400h.

LYONS (SMN) has identified these parallels as parts of contiguous three-dimensional toroids surrounding the object (in one experiment this was a cable carrying electric current). He reports that the spacing between successive shells reduces by the ratio of 0.891 as one moves further away from the object and draws a parallel with the diatonic scales in music and vorticity.

Very complex patterns of lines have been described (UNDERWOOD, 1968), including spirals and intertwined lines, a flow direction, positive or negative lines and grids of lines (HARTMANN, CURRY).

Dowsers interested in geopathic stress have identified some of these zones as beneficial or harmful to human health. Most of the scientific work in this area seems to have been done in Central Europe following a major study by VAN POHL in 1922. He was invited to investigate by the town of Vilsbiburg where cancer deaths were above the national average. A group of doctors and dowsers mapped zones of severe geopathic disturbance in 565 houses in the town and correlated these with the town's medical and death records. The study concluded that earth radiation of the type detected by dowsers was the prime cause of the most serious diseases. In 1989 Austrian researchers completed a two-year study on 985 subjects, which showed changes in the serum values of serotonin, zinc and calcium after 10 minutes' exposure to a 'pathogenic' site. RIGGS (1993) and others have suggested that this is due to the influence of the dowsing zone creating a change in the local electric, magnetic and radio fields in turn causing a deficiency of ATP (the main energy releasing agent in cells) and thus depression of the immune system.

Many attempts to demonstrate dowsing experimentally are probably frustrated by experimenters not recognizing that a substance seems to need time to 'imprint' a 'dowsing zone' into the ground. For example, it is much easier to detect a well established natural dowsing zone, as used in the Utah experiment, than something that has only been present a short time, like a hosepipe full of water.

Equally confusingly, the dowsing imprint can remain when the original object that caused it is removed. For example, this imprint can be detected when a steel scaffolding pole is left *in situ* on the ground for some months, and then removed.

Sometimes it is very hard to understand what is being detected. For example, I am not a very sensitive dowser, but last summer I mapped a series of very strong dowsing lines through almost all the stone circles I visited in SW Ireland. I have no idea what I was detecting, but as a scientist, I am certain that I was detecting something.

Given the well recognized coincidence of the position of standing stones and patterns of dowsing lines, there is debate as to whether megalithic sites were deliberately built on pre-existing dowsing lines or whether the lines were 'generated' subsequently. GRAVES (1976) reports a case in which stones have been moved by up to half a mile but still remain 'linked' to the other stones by dowsing lines (one example is in St Stephen's churchyard in St Albans), which would suggest that in some way the stones create the lines. It has been suggested that this capability may in some way be linked to the magnetic properties of the stone used.

I was once involved in a double blind controlled trial with the dowser HARRY LOVEGROVE, in which a fan of permanent dowsing lines was produced by a 60W 'black box' that Harry had designed. The box was pointed over a 5 × 5m test square, switched on for one minute and then removed before Harry and I were shown the test site. We then plotted the fan of lines and successfully located where the box had been positioned, 30 m away. After the experiment, the lines seemed not to fade with time, and continued for miles. We had no conventional explanation for how this might work (even after looking inside the box).

I have no idea what caused this imprinting effect, or how one Joule of energy could have such a significant effect, but the phenomenon was clearly real. It may also be involved in various reports that lines can generated by thought and detected by a dowser with no knowledge of the position of the line. It is very tempting to speculate that there is some parallel with the imprinting of homoeopathic remedies where, once again, it would seem that energy levels are too low to be involved, but that interesting properties of water molecules may perhaps be important.

How might dowsing work?

Physiological responses

It is almost universally accepted that dowsing is a neurophysiological response and that the rods or pendulums are only present as a mechanical amplifier of otherwise unnoticeable small tilts and movements of the hand. The material and type of the rod doesn't matter, but some designs are mechanically more sensitive to small disturbances and individuals have their preferences. Rural dowsers seem to like the traditional sprung forked sticks because the very definitive spring action is unaffected by cross wind, engineers like L-rods which are less tiring to use, while medics seem to prefer pendulums which have a greater range of potential responses.

The most common response is a subtle twitch of the wrist or arm, and learning to hold the rods with a particular extension and tension in various muscle groups is used to increase the magnitude of the response. When using the L-rods and a tensioned forked stick, the dowser is using a position of static instability to amplify the small movements. In other cases, such

as when holding a swinging pendulum or allowing L-rods to perform complete rotations about the vertical axis, the dowser seems to rely on changes in the dynamic instability.

A range of other neurophysiological responses has been reported. It is quite common to feel a tingling in arms or solar plexus, or a shudder down the back, while occasional responses include an eye blink, a clicking in the ears, seeing a blue light coming out of the ground, or even vomiting! This range of responses suggests to me that the dowsing reaction may be a response to stimulation of various parts of the nervous system, but is perhaps not confined to a single 'sensor'.

It is worth noting that a minority of dowsers dislike the neurophysiological viewpoint and feel certain that the rods move independently of the dowser, perhaps as a form of psychokinesis (PK). In many cases this is because they fail to recognize how effectively the rods amplify very small movements, or else fail to recognize that even though an L-rod may be free to rotate in its handle, this does not mean that it cannot be rotated by the hand. This common fallacy can easily be demonstrated by tilting the handle away from the vertical and letting the L-rod swing under gravity. Although I personally favour the neurophysiological viewpoint and know of no definitive evidence to support the PK viewpoint, it is possible that in some cases it could be involved. HANSEN reports that in the 1970s an electrical engineer, Kaufmann, used a strain gauge to measure the bending force on a rod during the dowsing reaction and found that the force was higher than could normally be accounted for, although Kaufmann's report gives few details.

Even when the rod has moved, it is not always easy to interpret the result. Dowsing is a technique designed to pick up subtle responses and hence it is very easy for the dowser's expectations to influence the results. Experienced dowsers recognize this effect and will always check results to try to eliminate this effect, but it is very easy to fool oneself.

This also means that, when trying to gather experimental data, it is very important that the dowser has no possible clues to draw on and does not know the location of what is being sought. In some experiments (e.g. BSD, 1997) the dowsers are blindfolded. This often causes complaints amongst dowsers who feel that they need to be able to see their L-rods to get the correct response. Personally, I find this a very reasonable possibility, as the rods will only act as sensitive amplifiers if they are held virtually horizontally, but without some level of visual feedback it is very difficult to maintain this.

Interpreting the result is also complicated by the fact that there is typically a time delay in the dowsing response after passing over dowsing zone. The delay is generally in the range 0.1-0.5 s, depending on the chosen detection threshold. This would suggest that the brain must be involved in processing the dowsing signal and that the response is not a simple reflex action.

The size of the dowsing response seems also to depend on the rate of change of the signal, so that the dowser can produce a bigger response by walking faster over the zone. Interestingly, the same effect is seen correlating the dowsing response with the rate of change of the magnetic field surrounding the dowser.

It is noticeable that most dowsers find that their ability to pick up and interpret subtle signals improves with practice. It is as if the motor output is not only being imprinted (as when learning to play the piano) but the 'concept' for what is being sought also becomes clearer, thus making the subconscious recognition process easier. Perhaps this is analogous

to one's ability to see something only when one has a concept of what one is seeing, or to pick out a familiar voice in a noisy room.

Dowsers use a variety of techniques to establish the depth of water, or to help focus attention. I suspect that, as has been proposed for the healing effect, the details of the technique may be less important than the degree to which the dowser has become accustomed to it.

The mental state of the dowser seems to be important. For good results the dowser should be in a calm, relaxed but focused state of mind, very similar to the meditative state, and also to the state conducive to *psi* experiences. GEOFF BROOKS, a psychologist and dowser, has reported measurements showing an increase in his *theta* waves while dowsing.

Dowsing also seems to relate to the electrical characteristics of the body. TROMP (1949), a Dutch geophysicist, carried out a very extensive two-year research program on dowsing and found that sensitive dowsers have a lower palm to palm skin resistance than non dowsers. For sensitive dowsers it would be about 50,000 ohms (measured with 4.5V DC, 3 mm electrodes) while non dowsers it is often 10-60 times higher. Similar results have been found by other workers in 1953 and 1964.

Tromp also claimed that washing the hands, which reduces the skin resistance, temporarily increases dowsing sensitivity. Other investigators have found that there is a significant change in the skin potential measured between the wrists of dowsers, when passing over a 'dowsing zone' while HANSEN (1989) reports this can be as high as 100 mV for a good dowser or 10-30 mV for non dowsers.

Experimentally induced dowsing responses

Physical theories of dowsing are attractive to those who prefer to stay near the shores of 'conventional' science: they tend to consider it either as a response to electromagnetic field gradients (for example from a magnet or a current in a coil), or as a response to electromagnetic radiation from the earth or even as a response to the influence of a complex combination of geomagnetic fields, electromagnetic radiation and other factors. As far as I am aware, this later viewpoint was first suggested by Tromp. I find it very attractive, in that it provides potential scope for the apparent information content of dowsed information and the variety of physiological responses. It may also explain why, although both the 'field' and 'radiation' theories have been fairly successful, it seems that neither can explain all the results, yet neither can be ignored.

The field theories are attractive because there is some correlation between dowsing responses and magnetometer results (and perhaps electric fields), while magnetic field gradients can be used to generate an artificial dowsing response in the laboratory. Birds are known to use the declination of the magnetic field during long distance navigation, suggesting similar physiological receptors might be involved in dowsing.

The electromagnetic radiation viewpoint is attractive since the dowser is (almost always) above the source, and the patterns of dowsing lines are often similar, but not identical, to a diffraction pattern. The hypothetical electromagnetic radiation can also be used to generate an artificial dowsing response in the laboratory.

1. **Electromagnetic fields.** The most convincing demonstration of the induction of a dowsing response by an electromagnetic field was carried out in 1978 by HARVALIK.

This was a double blind trial on the response of 14 reputed dowsers to a low power high frequency electromagnetic field, switched on and off at random. The results were extremely significant, in that out of 694 trials, the dowsers scored 95 per cent hits in comparison with the chance level of 50 per cent.

Aluminium sheet was then used on various portions of the body to shield the 'dowsing sensors'. Harvalik concluded that the dowsing sensors are in the region of the kidneys and the brain, possibly the pineal gland. I find it interesting that others (e.g. SMN member SERENA RONEY-DOUGAL) have suggested a link between the pineal gland and *psi* .

2. **Electromagnetic radiation.** In one of my experiments with the dowser, Harry Lovegrove, I stood him with his dowsing rods facing a non reflective curtain. Behind him I made a 3 mm slit between two sheets of steel lying on the ground, above which I had a 300 mm square mirror at 45° on a height stand. Harry couldn't see the mirror. By moving the mirror up and down the stand, I could therefore 'project' a beam of this hypothetical dowsing energy onto his back. Harry would tell me when he felt a dowsing response and I would note down the height then select and move the mirror to a new position. The results were extremely statistically significant: Harry got a dowsing reaction only when I was projecting the 'energy' onto an area of his spine between the shoulder blades, at about T2-T4. Although not a double blind trial, I find it hard to see how Harry could have known where the 'beam' was directed, other than by dowsing.

Similar results have been reported independently in 1995 by JENNISON, who used an aluminium plate as the reflector but located the dowsing zone as being on the lower spine. He also obtained reactions when projecting microwaves of various wavelengths onto his back. However, Jennison's results seemed to suggest that the wavelength was in the cm range, while my results suggested a wavelength of 0.1-0.3 mm.

Both are maybe involved, but I personally find the sub millimetre range very interesting as, although it has only recently been possible to generate or detect it, silica (and thus probably most rock) is transparent to it, while water is highly absorbing. Body tissue is selectively absorptive. (Bell Labs have recently demonstrated using this for non- invasive imaging of the body). It is also a wavelength at which the thermal radiation from the earth's mantle might be expected to be great enough to generate a potential of perhaps 10 mV in an antenna of suitable dimensions. This could well be significant, as the longitudinal dendrites in the spinal column seem to have the correct dimensions, while a 10 mV voltage swing is quite significant in comparison to the normal 120 mV swing when a neurone fires.

(As an aside, I am struggling to understand and calculate how one might expect radiation at this wavelength to be diffracted round conducting objects (a pipeline), while passing through a permeable, non-uniform, dielectric medium (the soil), under the influence of (the earth's) external electromagnetic fields. If any members know how to do this, I'd love some help!)

Others have suggested a wide range of other potential causes for the dowsing reaction ranging from ionization (MABY, 1935), radio waves (RIGG), electrostatic fields, 'W-radiation' (WüST, 1934) to radioactivity.

As mentioned above, I personally find it attractive to envisage that the complex neural network within the body is affected by a wide range of electromagnetic influences including magnetic and electric fields as well as electromagnetic radiation. Thus the dowser's 'art of knowing' involves learning to recognize and respond at a subliminal level to the

characteristic 'spectrum' or signature of what is sought. This might explain both the ability to focus and pick out particular signals and the range of physiological responses, including the potentially damaging 'geopathic' effects of extended exposure.

The relationship between dowsing and *psi*

Although I initially approached dowsing in the expectation that there would be a purely 'physical' explanation, I have increasingly come to the conclusion that closely linked phenomena such as map dowsing imply that it must also involve some form of wider consciousness relating to *psi* capabilities. It is remarkable that almost all dowsers and dowsing researchers that I have spoken to have reached the same conclusion.

Parapsychologists have found that there seems also to be a link between *psi* capabilities and electromagnetic conditions, as even though electromagnetic screening cannot mask out *psi* transmissions, electromagnetic fields can adversely influence performance in *psi* experiments. For example, DEAN RADIN (1997) has reported statistically significant data showing that payout percentage in casinos increases when the geomagnetic conditions are quiet. The head of Sony's parapsychology lab told me that they have observed that when they are doing experiments on clairvoyance, the more electronic equipment they have switched on round the experimental subject, the worse the results! (Not a result that would please Sony Marketing department!)

In an attempt to provide a mechanism for *psi* 'transmissions', it has been suggested that *psi* information is shared by a form of quantum entanglement or *psi* -field. I have developed the following mental picture: when one uses telepathy or clairvoyance to obtain information from the *psi*- field, it is like looking at a reflection on a still pond, while the effect of electromagnetic 'noise' might be like the breeze that breaks up the image into a confusion of ripples, although it does not itself carry the information.

Continuing this analogy, when the novice dowser detects a large dowsing signal it is perhaps analogous to a small boat being buffeted by the wake from the invisible speedboat on the far side of the pond.

Could the concept of the interconnecting *psi*- field also move us towards explaining how experienced dowsers seem to be able to receive information from a remote site, or information that seems unknowable? Maybe the subtle signature of the dowsing signal is actually data from a *psi* -field, detected by its interaction with the complex, chaotic electromagnetic system that is our nervous system? A system in which practice at detecting the larger signals helps raise the dowser's sensitivity threshold to smaller signals.

Dowsing therefore seems to offer a fascinating bridge between *psi* capabilities and a replicable physiological effect, which can be experienced by about 90 per cent of the population and is probably grounded in the complex interactions between the electromagnetic environment and neurophysiology. Further research should therefore be very productive, but experimenters will have to endure the complexities of working under double blind conditions for this work to be useful.

Further discussions: subscribe to smn_dowsing@cis.plym.ac.uk or post your comments in the Dowsing Chatroom of the web site.

Further reading: Where out of print, they can be obtained from the BSD or copyright libraries.

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