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Dowsing

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For years, farmers, builders and prospectors have all claimed to use dowsing to help them locate buried objects and underground streams. Scepticism abounds about the practice, but does it really work? And, if so, how? Science writer John Gribbin reports on new physics that could be the key.

DOWSING WORKS. SOME PEOPLE CAN LOCATE underground streams, pipes or cables simply by walking about with some sticks or rods in their hands and waiting for them to twitch. I can do it myself, and many sober businesses use it to locate underground cables and pipelines, for the simple reason that it saves them money. But why does it work? One of Britain's most eminent astronomers of the past 50 years thinks he has the answer - and it involves a new kind of field, which he claims is generated by any rotating object. If he is right, there are massive implications for areas of research (and commerce) as diverse as telecommunications, astronomy and body scanning.

Although dowsing has been used for centuries, until recently very little scientific research had been carried out on the phenomenon by western scientists, perhaps because they were wary of getting involved in something that smacked of mysticism and magic. But in the old Soviet Union there were no such inhibitions, and all kinds of studies were carried out on phenomena such as telepathy, telekinesis and dowsing (often referred to in that part of the world as 'biolocation'). Some of these projects really were highly dubious and unscientific. But some didn't look quite so crazy when news of the work emerged after the thawing of the Cold War.

One of these piqued the interest of the UK's Ministry of Defence. In the late 1990s, they had found claims, made in Russian scientific papers, that rotating masses generate a field that passes through all materials. The ministry thought that such a field might be used for communicating with submarines, and asked Vincent Reddish, a former Astronomer Royal for Scotland, to look into the idea.

Reddish was already known to be a keen dowser - his interest had been triggered after he saw a neighbour locate a blocked drain using the technique - and he had published scientific papers on the subject. "Dowsing is now used daily by thousands of people in Britain in the fanning, building and utility industries, and frequently by gardeners, archaeologists and prospectors," he says. "Planners and builders are practical people who would not waste their time with methods that did not work."

Reddish is also a highly respected scientist. As well as Astronomer Royal for Scotland, he was Director of the Edinburgh Observatory from 1975 to 1980, and earlier in his career he had been in charge of the planning for the UK Schmidt telescope, a special kind of astronomical camera that was built in Australia to carry out a complete photographic survey of the southern skies. It would be hard to pull the wool over his eyes.

Reddish's own experiments had already shown that, as well as locating underground objects, dowsing rods are affected by cables strung overhead, even when the cables aren't carrying any electric current. This made it relatively easy to map a 'field of influence' around the cables, in much the same way that the field around a bar magnet can be mapped using a small compass needle.

When Reddish investigated the field around parallel pairs of overhead cables, or with one overhead cable and one buried cable, he found a distinctive interference pattern, like that caused by two sets of ripples overlapping on a pond. And he found the same pattern time and again using standardised experimental setups, which he describes in detail in his published papers. Anyone can repeat his experiments by following his instructions.

Astronomers are very familiar with interference patterns, which they use in their studies of the Universe both with

visible light and at radio wavelengths. It is the technique of radio interferometry, for example, that enables two or more widely spaced radio telescopes to work together, creating a virtual telescope as big as the separation between the real telescopes - in some cases, as big as the Earth. Reddish had worked as a radio astronomer at Jodrell Bank observatory near Manchester during the late 1950s and early 1960s. "The experience of three years at Jodrell Bank doing interferometry led me to discover that dowsing patterns are produced by pairs of linear structures such as the edges of buried old roads and field drains," he says. "That is how I came to develop interferometry in dowsing."

Field the noise

Reddish quickly spotted that the interference pattern seen in his dowsing experiments resembled that produced by a field that was being reflected from each of the cables in the pair, rather than being generated by the cables themselves.

Experiments carried out between 1991 and 1996 at an isolated site in the Scottish highlands, well away from any man-made interference, showed that the interference pattern changed with the seasons in a regular way, and simultaneous experiments carried out in Scotland and New Zealand between 1997 and 2001 showed exactly the opposite seasonal effect in the southern hemisphere. The implication is that there is a field of some kind affecting the entire Earth which reflects off some materials and is responsible for the dowsing phenomenon. But where does this dowsing field come from?

Reddish wondered if the rotation of large celestial bodies could be responsible. To find out, he and his colleagues set about creating their own dowsing field inside a shielded laboratory, lined with aluminium foil and polythene sheets - to reflect away the outside field. Reddish then introduced his own field, generated by two spinning discs, each 150mm in diameter with a thickness of 20mm and mass of 800 grams, separated on an axle by 227mm and spun up to 1,900rpm by a workshop bench grinder. The new field was probed using standard dowsing techniques, indicating that it was the same as the field responsible for the dowsing phenomenon. "At first," comments Reddish, "it was surprising that the techniques of interferometry we had developed to study dowsing worked just as well with rotating masses; but this was explained when we realised that the natural dowsing field is produced by the rotation of the Sun and the Earth."

By using pairs of field generators at different orientations to each other, Reddish was able to mimic the effects of the Sun-Earth system's changing geometry and map the resulting changes in 'seasonal' interference patterns. "The annual changes in the dowsing interferometer fringe pattern result from the changing orientation of the spin axes of the Earth and Sun as the Earth follows its orbit about the Sun," he says.

Body matters

Reddish's experiments imply that all rotating objects generate a field, and that it can be detected. The field from the Sun passes right through the Earth, so it can also be detected at night. He found that about half of the materials he studied transmit the field (including copper, iron, pvc, wood, earth and most liquids) while half reflect it (including aluminium, tin, silver and rubber). Water produces a particularly strong response, re-radiating the field in all directions. Since more than half of the human body's weight is water, this may explain why people are such sensitive detectors of the field. Reddish claims interactions between the interference patterns and water in our bodies trigger the muscle-twitches that move dowsers' rods. It may also explain why dowsing is so effective at finding water that it is sometimes referred to as 'water divining'.

Some scientists argue that for this reason dowsing is unscientific. They say that using the human body as a detector in this way is too imprecise and subjective to give consistent results. But Reddish counters that, prior to the invention of photographic plates and electronic imaging devices, much valuable research in astronomy was done simply by the power of the eye. "A lot of nonsense has been written about dowsing," he adds, "not least by the scientists who have not taken enough trouble to look into it properly."

Despite that, nobody yet knows exactly what the field is, or even whether or not it carries energy. Reddish believes the field could be used for communications, and might be particularly useful for medical scanners, because of the way it interacts with water. He naturally hopes that the discovery will be applied in astronomy; there are certainly plenty of rotating objects out there to investigate, starting with the Sun and the planets of our own Solar System.

And there could be commercial spin-offs as well. Reddish says that researchers in the UK, Germany and Russia are working on a new instrument to pick up the dowsing field. Although the details of the instrument's operation are a trade secret, he says it will be able to detect the field with far greater precision than the traditional rods and sticks. And he suspects other countries are also in on the hunt. It can only be a matter of time - perhaps only a short time before such devices are making someone a lot of money.