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Towards a physics of dowsing: inverse effects in the northern and southern hemispheres

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ABSTRACT: It has been known for some years that parallel horizontal structures separated in a vertical plane produce patterns of equally spaced parallel lines that can be detected and mapped by dowsing detector rods, indicating that the patterns are produced by interaction between the structures and the dowsing field, whatever that is. Consequently the arrangement is called a dowsing interferometer and the lines are referred to as interference fringes. The patterns are produced equally well by electrical insulators as by electrical conductors, and the inference that the field is not electromagnetic was confirmed by experiments carried out in an electromagnetically shielded laboratory. Measurements of interferometer fringe spacings made irregularly from 1991 to 1996, analysed retrospectively, were found to be dependent on time of year, decreasing relatively suddenly by a factor of about three in November and increasing again in April. An isolated rise and fall in early March was also found. These results were confirmed by more frequent measurements in 1997 and published the following year. This paper reports a co-operative programme of interferometry between Scotland and New Zealand from 1997 to 2001. The annual pattern of the fringe spacing is clearly defined, with rapid changes between 2 m and 6 m in November and in April, and an isolated event in early March; but remarkably the pattern in the southern hemisphere is inverted with respect to that in the north. There are differences of a few days in the timings of the events in the north and south, and the amplitude of the March event is increasing.

This paper is a continuation of the work described in *Transactions of the Royal Society of Edinburgh: Earth Sciences* **89** (1998) 1–9.

KEY WORDS: field, fringes, interferometer, patterns, waves

Dowsing is perhaps more widely known as water divining, and has been used for centuries to locate underground sources of water. The technique is now much more widely used for accurate location of underground pipes and cables on farms, building sites and in public utilities. Farmers and builders are practical people who would not waste their time with methods that did not work. Nevertheless the practice is still viewed with suspicion among scientists; even those who have used it and know that it works are often reluctant to say so!

The usual detector system is a pair of L-shaped metal rods held in the hands with the long parts forwards and parallel; they rotate towards each other when carried across an underground linear structure. It is frequently found that they rotate also at equal intervals on each side of the structure, marking out a series of equally spaced parallel lines. These patterns have been rediscovered many times and are familiar to most dowsers.

It is not so widely known that the rods rotate when carried across the line of overhead structures such as cables. Furthermore, when a pair of parallel horizontal structures is separated in a vertical plane, they also produce a set of equally spaced parallel dowsing lines (Reddish 1993; a description of the experimental equipment and methodology used in this work is given in Reddish 1998). The spacing of the lines depends on the geometry and composition of the structures, which shows that the lines must be produced by interaction between the structures and the dowsing field, whatever it is. Consequently the arrangement is called a dowsing interferometer. It was found that the interference pattern can also be produced by a single primary horizontal structure if a short secondary is carried parallel to it by the dowser.

The interference pattern is produced equally well by structures made of a good electrical insulator, e.g. PVC, or by a good electrical conductor, e.g. copper, showing that the field is not electromagnetic. This was confirmed by using a compact portable interferometer (see below) in an electromagnetically screened laboratory at GEC-Marconi Avionics (now BAe Systems) in Edinburgh. The interferometer pattern was just as strong and had the same fringe spacing when the interferometer and the measurements were both inside the laboratory as when they were both outside, when the interferometer was inside and the measurements outside, and when the interferometer was outside and the measurements inside. The electromagnetic screening had no effect whatsoever.

Measurements of interferometer patterns were made irregularly for several years at an isolated site at Rannoch in the Scottish Highlands, chosen for the absence of unwanted linear structures in the vicinity. Retrospective analysis of the measurements made from 1991 to 1996 showed that the interferometer fringe spacings are time-dependent, decreasing quickly in late November and rising again in April, the pattern repeating from year to year (Reddish 1998, Figs 7 and 8). There was also evidence of an isolated event in early March. That these events were discovered by *retrospective* analysis left no doubt about the reality of the interference fringe patterns and the effectiveness of the detector system.

It has been shown that the field is not electromagnetic. Nevertheless, although we do not yet know its frequency or velocity, or whether dowsing fringes are the result of scattering, diffraction, reflection or induction, these extensive investigations using two-component interferometers of various materials, sizes and configurations left no doubt that there is

a field, that its distribution in the detection plane is dependent on the interferometer structure, and that it has wave-like properties. The pattern of fringes associated with linear structures placed on the ground has been mapped in detail by one of us (Fig. 1). The curved fringe loci (shown by + symbols) are detected by dowsing along a series of directions parallel to the tubes but at different distances from them. The number of curved fringes, and their spacings, depend on tube length, whereas the spacings of the parallel fringes shown by crosses are independent of tube length but vary with time of year. Because of these dependencies, scale dimensions for the axes of the figure have not been given. In the remainder of this paper it is the time-dependent, linear fringes parallel to the tubes that are considered. These equispaced fringes lie within the rectangular envelope determined by the length of the tubes and are detected by dowsing along directions perpendicular to them.

The interferometer at Rannoch had a length of 20 m. The demonstration by C. M. Humphries in 1996 that more compact two-component interferometers gave adequate fringe patterns and could be used indoors or out made possible daily measurements free from the effects of the weather. In 1997, R. J. Dodd built such an interferometer in New Zealand and began making daily measurements. It had a horizontal pair of heavy-duty copper cables, parallel and 60 cm apart in a vertical plane between two wooden posts, the top cable being at a height of 2 m. A similar one was built at Edinburgh for daily measurements and also as a standard of comparison for any other interferometers such as the type with a moving secondary, indoors and out. In due course a compact portable interferometer—a pair of horizontal parallel copper tubes 1 m long and 60 cm apart in a vertical wooden frame—was added to the range and sometimes used indoors after comparison with the larger one.

These arrangements enabled dowsing interferometry to be carried out simultaneously in Scotland and in New Zealand at all times of the year. The results obtained from 1997 to 2001 are the subject of this paper.

1. Dowsing interferometry in the northern and southern hemispheres

Edinburgh, Scotland, is at latitude 56°N, and Martinborough, New Zealand, at latitude 42°S. The detector systems and measuring procedures described in previous publications (Reddish 1993, 1998) were strictly adhered to in both countries. Results obtained in New Zealand were sent to Scotland by post, at first two weeks and later four weeks in arrears. There was no other communication about the results in either direction before they were received in Scotland.

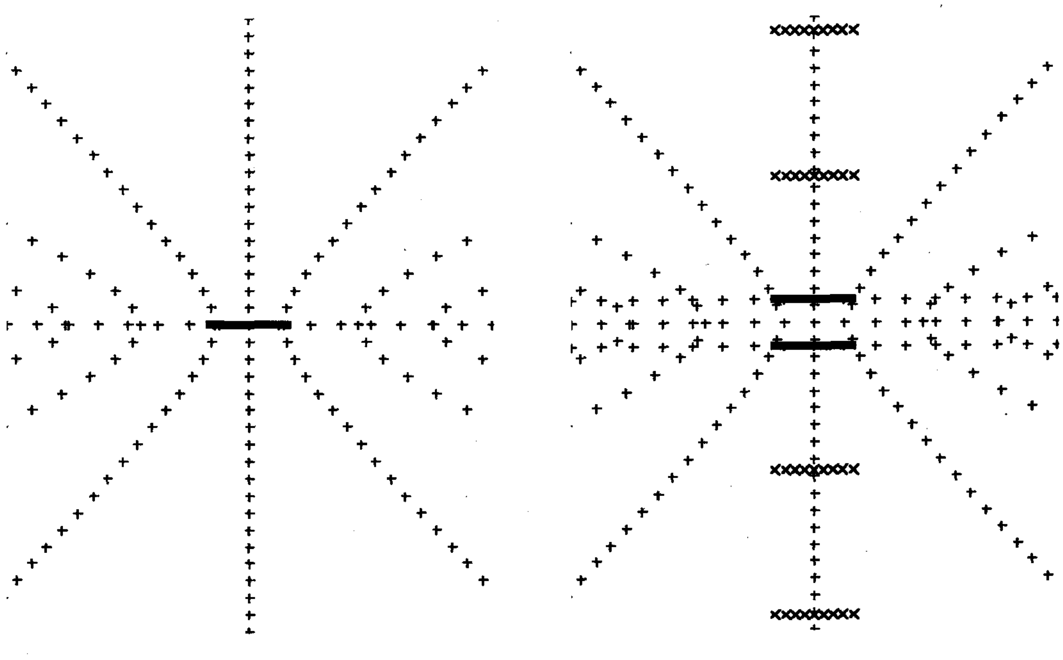
The results from November 1997 to January 2001 are given in Figure 2. They confirm in much more detail the annual pattern of the fringe spacing found for 1991 to 1997. The interferometry at Edinburgh was moved to Livingston (same latitude) in 1998 and this caused some interruption to the measurements.

The most remarkable feature is that the sudden changes in fringe spacing in April and in November, and the isolated event in March, are present but inverted in New Zealand with respect to Scotland. If further evidence of the reality of the fringe patterns and the effectiveness of the detector system was needed this surely provides it. The result was totally unexpected.

In both hemispheres the main events are unequally spaced in time: seven months April to November, five months November to April. That is to say, they are not at exactly opposite points in the Earth's orbit about the Sun.

In between the events the fringe spacing is remarkably stable, with the same maximum and minimum levels in the north and the south, but there is a small amplitude oscillation in October 2000 in the southern measurements; this is probably a real effect. Note the progressive increase in the amplitude of the March effect, particularly noticeable in the south. The events are shown in greater detail in Figures 3, 4 and 5.

The November event, Figure 3, occurs at about the same time in the northern and southern hemispheres in 1997, but in 1998 and 1999 it is earlier by several days in the south than



(a) (b)

Figure 1 Representational plan view showing the loci of the fringes from (a) a single tube and (b) a pair of parallel tubes (shown as solid lines) laid on the ground; the parallel fringes discussed in this paper are shown by crosses; the scale of the figure applies to the period November to April for tubes 1 m in length at Edinburgh.

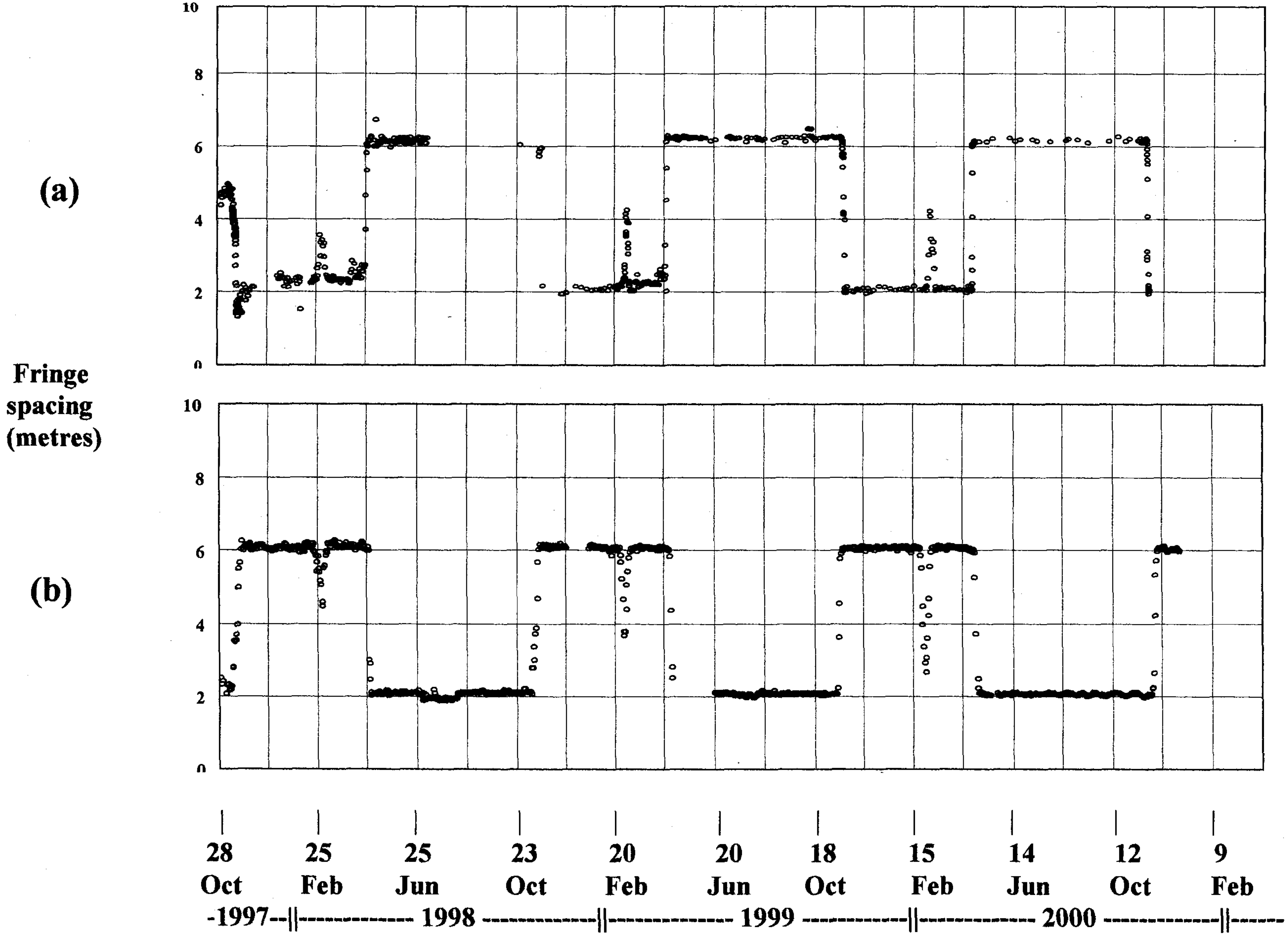


Figure 2 Dowsing interferometer fringe spacings in the northern (a) and southern (b) hemispheres (Scotland and New Zealand) from 1997 to 2001; remarkably the patterns are inverted with respect to each other; note the sudden changes in fringe spacing in November and in April, the increasing amplitude of the isolated event in early March, and the stability at the levels of 2 m and 6 m between these events.

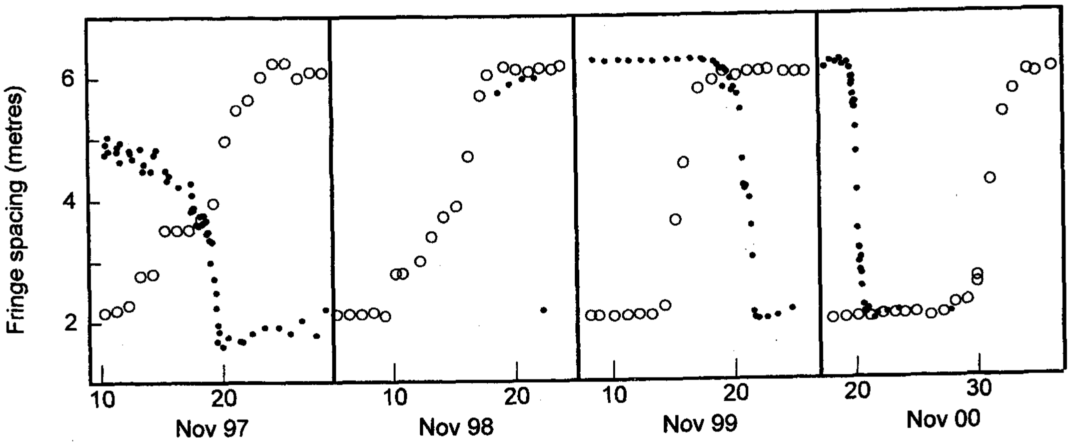


Figure 3 The November event for the four years 1997 to 2000: dots, north; circles, south; the decrease of the fringe spacing in the north is steeper than the rise in the south, and occurs close to 20 November in each year; the rise in the south occurs at the same time as the fall in the north in 1997, a few days earlier in 1998 and 1999, and 10 days later in 2000.

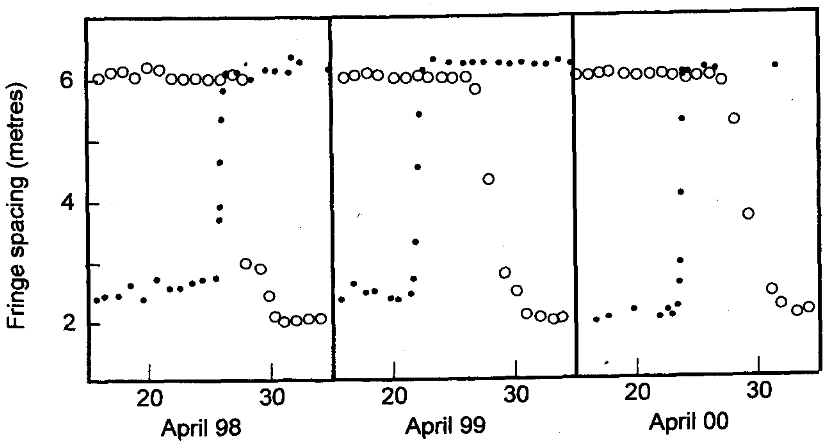


Figure 4 Dots, north; circles, south; in contrast to Figure 3, the timings of the April events are relatively stable.

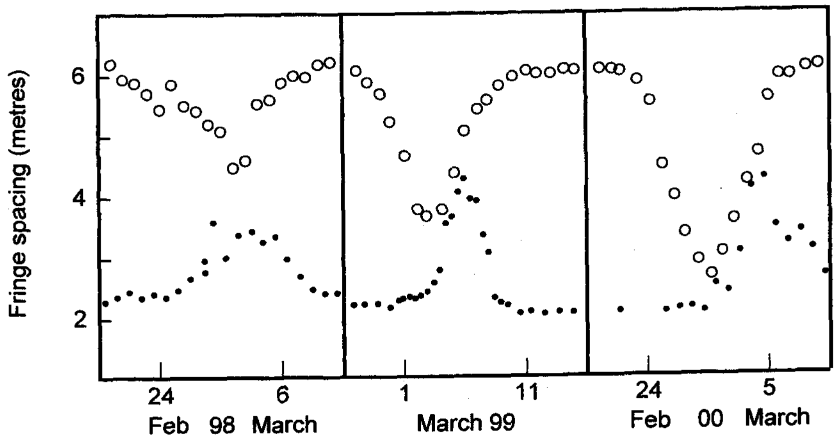


Figure 5 Dots, north; circles, south; the March event in the south occurs just before that in the north; the difference may be increasing as the amplitude increases.

in the north. In 2000 there is a dramatic reversal, the fall in the north occurring some ten days before the rise in the south. There is sometimes a small overshoot at the end of the rapid change, indicating that the system is less than critically damped.

In contrast the April event, Figure 4, is relatively stable, the rise in the north always coming a few days before the fall in the south and close to the same time each year. As in November the change is steeper in the north than in the south.

The March event, Figure 5, occurs earlier in the south than in the north and the difference in time seems to have increased a little as the amplitudes have increased.

During the last three years, research programmes have been under way by us and colleagues to discover the nature and origin of the field, and how it produces the effects recorded in this and earlier publications. These programmes are the subject of other papers being submitted for publication.

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3. References

Reddish, V. C. 1993. *The D-Force.* Edinburgh: Published by the author.

Reddish, V.C. 1998. Dowsing physics: interferometry. *Transactions of the Royal Society of Edinburgh: Earth Sciences* **89**, 1—9.

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