# Dowsing achieves new credence

## Reports from the Soviet Union of successful scientific experiments in the ancient arts of water and mineral divining have forced a fresh look at possible practical applications of the technique

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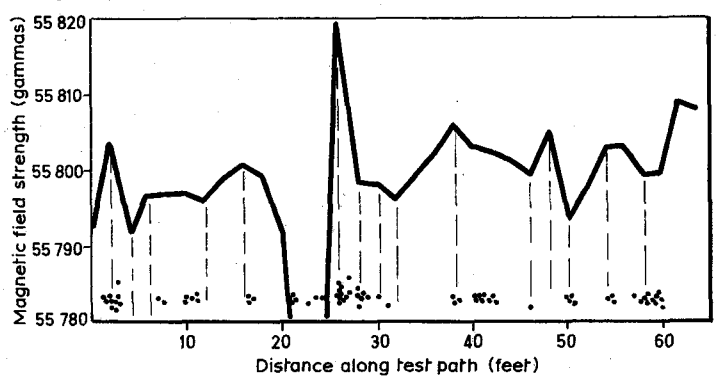
In 1974, two geologists from the All-Union Scientific Research Institute of Hydrogeology and Engineering Geology, Moscow, reported the results of mineral surveys in Karelia, the Ukraine and Tadzikistan, carried out using a variety of photogeological, geophysical and geochemical methods. The two scientists, N. N. Sochevanov and V. S. Matveev, emphasised the merits of one particular method recently developed in the Soviet Union and known as "BPM". In conjunction with other techniques, BPM anomalies, identified from the results of air and ground surveys, had proved extremely useful in pinpointing several worthwhile metal ore deposits. In a more recent paper, Sochevanov and three other Moscow geologists list many further applications of BPM, particularly to the successful siting of water wells. When it is added that BPM prospecting equipment is extraordinarily cheap, lightweight and simple in design, it seems astonishing that such an important new method should have been so ignored in the West. Ignored by the scientific community, that is to say. For, as it turns out, BPM (bio-physical method) is simply a respectable new name for water and mineral divining or dowsing!

The use of a divining rod—traditionally a forked hazel twig—as a prospecting tool, dates at least from the 16th century, when miners in the Harz mountains of Germany used it in their search for veins of copper, lead or tin ore. Contemporary mineral divining was well described by Agricola in his *De Re Metallica*, published in 1556.

> "All alike grasp the forks of the twig with their hands, clenching their fists, it being necessary that the clenched fingers should be held towards the sky in order that the twig should be raised at that end where the two branches meet. Then they wander hither and thither at random through mountainous regions. It is said that the moment they place their feet on a vein the twig immediately turns and twists, and so by its action discloses the vein; when they move their feet again and go away from that spot the twig once more becomes immobile."

Although controversial from the start and frequently attacked by the Church as the work of the Devil, the use of the divining rod in the search for ore veins persisted; in 18th century Germany mineral diviners were held in as high esteem as surveyors. By this time, the practice had spread to other European countries and had broadened to include the siting of wells. It is this application of dowsing that has flourished so much during the past century. Today, many thousands of wells throughout the world are sited every year by water divining—in fact, a rather misleading term for a technique that is alleged to be capable of locating zones of strongly flowing ground water as opposed to the "quasi-stationary" water always present in rocks below the water table.



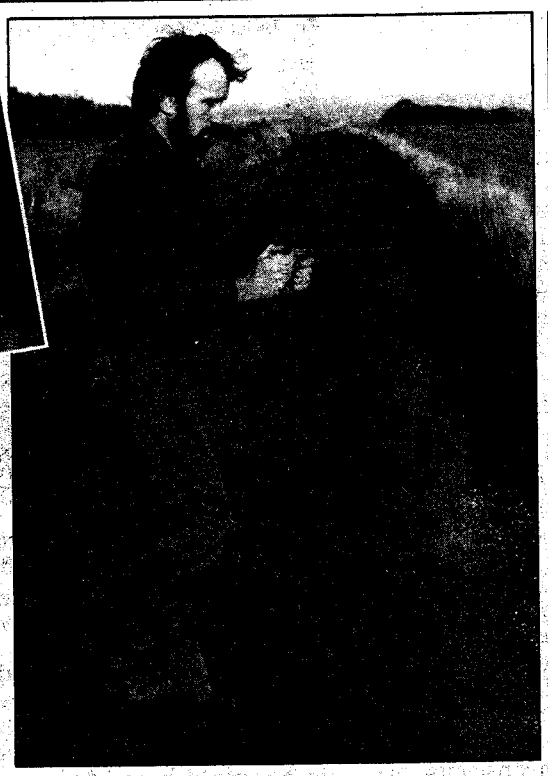

*Magnetic field over test area. Dots show where dowsing reaction occurred*


Illustration from G. Agricola's *Treatise on Mining* (1557)

Unfortunately, water diviners have not been prepared to master the rudiments of ground water geology or other relevant sciences, preferring instead to elaborate their own naive theories about dowsing. So they have never been able to present their claims in a form acceptable to scientists. Understandably, hydrogeologists and other scientists concerned with ground water supplies have traditionally viewed water divining with distaste or even hostility.

One way out of this impasse might be to shift attention away from the claims of practising water diviners towards a study of the dowsing reactions of ordinary people. It seems that the ability to obtain such reactions is far more widespread than had previously been thought. For example, in the BBC *Tomorrow's World* programme "Now You See It, Now You Don't", broadcast on 22 December, 1977, viewers were shown how to make simple L-shaped dowsing rods for themselves. Using these devices which, like the traditional hazel twig simply act as high-gain mechanical amplifiers of small hand movements, hundreds of people found that they could experience dowsing reactions. Of course, sceptics can maintain that the small hand movements of the dowsing reaction are entirely psychological in origin and that if they do bear any relation to the external environment it is only through information received along normal sensory channels. But the hypothesis that some dowsing reactions are direct physiological responses to small changes in the environment should also be considered. In the light of the suggestions, for example by Madeleine Barnothy of the University of Illinois and Alexandr Presman of Moscow State University, that some biological systems may have evolved a remarkable sensitivity to very small changes in ambient magnetic and electromagnetic fields, this hypothesis is not as implausible as might at first sight appear.

How could such a theory account for the phenomenon of



*Above Dowsing device made from two strips of fibreglass. Left A pair of L-shaped metal rods being used for dowsing. Far left Dowsing rod flicks upward as dowsing reaction occurs*

water and mineral divining, or BPM as applied by Soviet geologists? Mineral veins and flowing ground water are both associated with geological discontinuities such as faults, fracture and shear zones, prominent joint planes, old stream channels, solution cavities in limestones, lava tubes in volcanic rocks and so on. These discontinuities cause small geophysical perturbations, in magnetic field strength for instance, that could be responsible for the dowsing reaction. This is the belief of the Soviet geologists who have been using BPM for over a decade and whose work deserves to be better known in the West.

The first paper on BPM as applied to geological prospecting was published by V. S. Matveev in 1967 (*Isvestiya Akademia Nauk Kazakskoi SSR*, Ser Geol No 3, p 76). He described a series of standardised V-shaped metal frames, designed to rotate freely in the hands when the small hand movements of the dowsing reaction occurred. To carry out a BPM survey on foot, the geologist simply records the number of rotations within each unit of distance covered. In this way, Matveev obtained a series of BPM profiles across several copper-zinc sulphide ore bodies related to the Tasti Butak porphyry copper deposit in Kazakhstan. He selected areas where exploration drilling had revealed local geology in some detail, and compared BPM data with Bouguer gravity, magnetic, resistivity, and self-potential anomalies obtained along the same base lines. BPM data correlated better with the local geology than with any of the geophysical measurements, the largest BPM anomalies occurring where massive sulphide ore bodies approached the surface. So although this preliminary investigation shed little light on the physical nature of BPM, it did suggest that in mineral exploration the method could play a useful part in complementing geophysical data.

BPM quickly attracted great interest among Soviet geologists. Conferences on the subject were held at Moscow in 1968 and 1971; the second was attended by more than 100 scientists from 40 research institutes throughout the Soviet Union. But by 1971 it was becoming clear that BPM research was a far more formidable undertaking than it had seemed at first sight. The cooperation of scientists of many different disciplines was required; until such cooperation had been achieved, little progress in elucidating the physical mechanism of BPM could be expected. However, unperturbed by this lack of theoretical progress, Sochevanov and Matveev continued to develop BPM as a prospecting technique (*Geologiia Rudnykh Mestorozhdenii*, No 5, p 77, 1974). Two examples will illustrate their approach. A combined dowsing and photogeological helicopter survey was carried out of several hundred square kilometres of Precambrian metamorphic terrain in north Karelia, where rare mineral-bearing pegmatite bodies occur in association with a regionally developed migmatite complex. The angle of dip of a hand-held BPM frame was continuously monitored along a series of flight paths 250 metres apart. In conjunction with the air photographs, BPM anomalies—where angles of maximum frame dip were recorded—proved valuable in delineating local fracture zones, where rare metal mineralisation was subsequently proved by exploration drilling. In the Karaminsky mountains of Tadzikistan, where zones of polymetallic sulphide mineralisation occur in Upper Palaeozoic limestones and lavas, geochemical prospecting had already identified some interesting broad anomalies. Contour maps of BPM intensity showed maxima coinciding with geochemical anomalies, which were resolved in sufficient detail for successful exploration drilling to be carried out.

## Lack of theoretical basis?

Sochevanov and his colleagues have listed (*Geologiia Rudnykh Mestorozhdenii*, No 4, p 116, 1976) many other examples of the successful application of dowsing in the Soviet Union, not only to the location of ore bodies but also to the siting of water wells and even to problems in engineering geology. For instance, in one region near Cheliabinsk, 1120 wells had, by 1973, been dug on sites suggested by four BPM operators compared with 158 on sites located by geophysical methods. The proportions of dry wells in the four BPM-sited groups ranged from 6 to 8·5 per cent, while 12·7 per cent of the geophysically sited wells were dry.

Despite its successes in the field, though, BPM is by no means accepted as a valid technique by all Soviet geologists. N. G. Schmidt, for example, has opposed it on the grounds of its unscientific nature, lack of theoretical basis and alleged links with the occult (*Geologiia Rudnykh Mestorozhdenii*, No 5, p 88, 1975). Another weakness

pointed out by Schmidt is the repeated failure of experienced dowsers in the West to demonstrate their abilities under test conditions. Schmidt quotes the experiments reported by R. A. Foulkes (*Nature*, p 163, vol 229).

Foulkes's experiments, conducted on behalf of the UK Ministry of Defence, were primarily designed to assess the ability of dowsers to detect buried mines, in which they failed conspicuously. But a few tests were relevant to water divining. In one a dowser failed, in a series of 50 trials, to determine whether or not water was flowing in a small polythene tube beneath a lawn, and in a second test only one out of four student dowsers showed a small significant ability (at the 5 per cent probability level) to find buried 6-inch pipes containing flowing water.

In the same year in which Foulkes conducted his experiments in England, the results of a more comprehensive inquiry into the possibility of water divining were published in America by Duane Chadwick and Larry Jensen, two scientists at the Water Research Laboratory of Utah State University (*Utah Water Research Laboratory Progress Report* 78-1, p 57, 1971). The main aim of this study was to discover if dowsers could achieve results significantly different from chance. But instead of examining a small number of "experienced" dowsers as Foulkes did, the investigators tested the abilities of 150 novice dowsers, most of whom were staff and students at Utah State University. The dowsers, using L-shaped rods, walked one at a time along test paths selected for the absence of visual features or changes of slope that could provide subconscious cues for dowsing reactions. Each dowser was issued with 30 small wooden blocks, which he or she was instructed to drop at those places where dowsing reactions were obtained. Positions of the blocks were measured and, of course, the blocks were removed before the next dowser walked along the test path. To determine if there was any significant clustering of blocks, chi-square tests were performed on the results of four experiments along different routes. Much to the surprise of the initially sceptical investigators, three out of the four results were significant at the 0·05 per cent probability level, the fourth at the 6 per cent level. These results suggested that it would be worth examining the possibility that the dowsing reactions were related to small magnetic field variations along the test paths, as measured by caesium vapour magnetometers. Some correlation was found; dowsers obtained more frequent reactions along path segments in which larger magnetic field gradient changes occurred. Chadwick and Jensen concluded that the possible link between dowsing reactions and magnetic field changes related to flowing ground water could form the basis of future research.

In a subject as controversial and ill-defined as dowsing, distinguished by centuries of unbridled speculation and volumes of dubious literature, there are few facts. The recent Soviet work and the little-known Utah study have added considerably to the body of knowledge. Apart from providing good statistical support for the hypothesis that some dowsing reactions are direct physiological responses to small changes in the environment, the Utah researchers came up with the important finding that more than 99 per cent of the people they tested obtained dowsing reactions. If the dowsing reaction is as general as this, and if the Soviet claims as to the effectiveness of BPM as a prospecting technique are to be taken at face value, there would seem to be every reason for making water and mineral divining the subject of a concerted research effort. The Soviet geologists, who believe that the theory that dowsing reactions are related to weak electromagnetic fields may be the most fruitful idea to explore, have repeatedly pressed for the setting up of a Research Institute specifically devoted to BPM.

It does seem that only careful experimental work by a multidisciplinary team of the kind suggested by the Soviet geologists will ever make any progress in solving a problem that involves so many different sciences. The thesis that dowsing should be investigated in the context of electromagnetism surely deserves a more comprehensive experimental treatment.

*Various ways of holding the divining rod, shown in a French publication of 1693*

What benefits might result from a well planned and carefully executed scientific investigation of water divining? Once the underlying principles were discovered, a cheap water prospecting technique as effective as BPM is claimed to be would have obvious application in the many regions of the Third World that depend on ground water. But if the solution of an age-old mystery, frequently linked with clairvoyance and the occult, were shown after all to be merely a question of thorough analysis it would be a timely demonstration of the value of scientific method. □