Zeitschrift: Bulletin für angewandte Geologie

Herausgeber: Schweizerische Vereinigung der Petroleum-Geologen und –Ingenieure; Schweizerische Fachgruppe für Ingenieur-Geologie

Band: 3 (1998)

Heft: 2

Artikel: An urgent research proposal in groundwater search : dowsing versus geophysics

Autor: Lohmann, Hans H.

DOI: https://doi.org/10.5169/seals-220736

Bull. appl. Geol.	Vol. 3	Nr. 2	199 - 203	December 1998

An urgent research proposal in groundwater search: Dowsing versus geophysics

Hans H. Lohmann*

Zusammenfassung

In der Grundwassersuche stellt die Wünschelrute nach wie vor ein ungelöstes Problem für Geophysiker und Geologen dar. Erfolgsmeldungen aus der ehemaligen Sowjetunion und aus der deutschen Entwicklungshilfe sind aus fachlicher Sicht nie hinterfragt worden, sondern nur von Physikern ohne Geo-Wissen. Es wird ein internationales Forschungsprojekt in einem warmen Trockengebiet vorgeschlagen.

Résumé

L'usage de la baguette magique dans la recherche des eaux souterraines pose des problèmes pour les géopysiciens et les géologues. Des publications sur le succès provenant de l'ancienne Union Sovietique et de l'aide allemande au développement n'ont pas incitées une discussion scientifique par les hydrogéologues mais seulement par des physiciens sans des connaissances géoscientifiques. On propose un projet international de recherche dans un pays chaud et aride.

Summary

The use of the dowsing rod in the search for groundwater is a still unresolved problem for geophysicists and geologists. Success stories from the former Soviet Union and from German development aid have not been analysed in the appropriate professional sphere, only by physicists without geoscience input. An international research project is proposed in a warm arid country.

1. Introduction

The most empowering raw material of the 19th century was coal, this present century is running on oil. In the 21st century groundwater is expected to be the commodity of supreme strategic and humanitarian importance. The challenge is to locate groundwater boreholes fast, with high reliability and at low cost.

In many parts of the world the historical and popular method of groundwater search was by a dowser (also called a diviner or a doodlebugger). Let us have a look at the Oxford Dictionary: «Dowsing; searching for latent water or minerals with the dowsing (or divining) rod, a forked twig held by the dowser and dipping over the right spot». In our times dowsers tend to use variously shaped copper or steel wires (sometimes connected to a potentiometer.- Comunetti 1978) or a pendulum (in

* Mittlere Str. 143, CH-4056 Basel, Switzerland

that case often called radioaesthesists). Most dowsers will agree that their own body is actually the observation instrument and that the movement of the rod serves only as an indication, as an amplifier or even as a measure of the sensed reaction. Comunetti & Treadwell (1979) go as far as to claim that the sensitive human organ sits somewhere near the stomach. Rocard (1991b, p.54), who is convinced that the dowsing effect is of magnetic origin, believes that the human sixth sense, the magnetic sense, is distributed over fourteen distinctive points of the human body.

2. Literature review

Quite an extensive literature exists about the dowsing rod. According to Foulkes (1971) the most ancient known mention of dowsing goes back to a Chinese emperor in the year AD 147. The old Romans apparently used the dowsing rod for search purposes. In medieval times there is Agricola's famous handbook for miners, «De re metallica», dated 1557. This book carries drawings of dowsers who search for underground minerals. Since then the dowsing rod has been extensively used in the search for groundwater, the rod giving an indication where to dig or drill.

Obviously, over the last 200 years competition took place between geologists and dowsers. This has been intensified by the introduction of geoelectrics during this century. Joint application of geoelectrics and hydrogeology has led to a partial withdrawal of dowsers from locating water wells to paramedical activities in people's bedrooms, looking for «water arteries» and «ground radiation». For examples of this new tendency see Comunetti (1978), Endrös (1993).

Four, more balanced studies of the dowsing rod, looking at it from a physical point of view - but all four without any geoscience input - were published by Brüche (1962), König & Betz (1989), Betz (1990) and Rocard (1991a, 1991b). All four authors are professors of physics. Rocard believes that the dowsing effect is of magnetic origin. The other three see evidence for the existence of an unknown agent.

König & Betz conclude, based on their Bavarian experiments and without claim to completeness, that the «reaction zones» could be due to

a) non-ionizing electromagnetic radiation,
b) ionizing radiation, and
c) air-related effects.

They stress that only few of the many tested dowsers have shown successful recognition and repeat recognition of reaction zones, in one of the test series for ex. 10 out of 43 persons tested. Their main - but not exclusive - hypothesis is as follows: The dowser does not react to the flow of water itself but to a parallel or subsequent effect. Such effect could be due to minerals precipitated by running water and deposited on the walls of water-bearing fractures. This leads us to a groundwater search project in Sri Lanka on which König & Betz and especially Betz (1990) base a major part of their conclusions. Could it not be that the dry lands of northern Sri Lanka are a better testing ground for the dowsing rod than the humid climate and soils of Bavaria?

3. Groundwater dowsing in Sri Lanka and Russia

In the years 1982 to 1985 the German Technical Development Agency GTZ carried out a groundwater search and drilling campaign in the districts of Vavuniya and Mullaitivu in northern Sri Lanka (Schleberger 1986). This area is very dry; its underground consists mainly of hard crystalline rock, its vegetation of thorny low jungle. Water supply for the wet season, October to March, is possible from shallow dug wells. The project's target was a deeper groundwater level at around 30 meters depth in hard rock to guarantee drinking water supply during the dry season.
At the beginning of the campaign the drilling locations were jointly decided upon by geoelectrics and by dowsing. After 100 wells had been drilled the project manager, a hydraulic engineer and a dowser himself, decided that geoelectrical measurements were too slow and that he would rely entirely on dowsing. Of 654 wells drilled only 27 did not yield sufficient water flow (a lower limit had been set at 35 liters per minute). *This gives the dowser a success ratio of 96 percent.*

Going through Schleberger's text one finds for example on page 44 that the project manager and dowser posesses sound geological knowledge. The text states also that he used aerial photography and vegetation observations extensively. In an enlargement on Schleberger's text Betz (1990) describes other successful dowsing activities by the same GTZ employee, succeding against geoelectrical and hydrogeological competition in countries as varied as Niger, Congo, Philipines, Dominican Republic, Cabo Verde and Yemen.

A review of satellite images of northern Sri Lanka indicates to this writer that the southeast halves of the mentioned districts of Vavuniya and Mullaitivu are located on a folded metamorphic foldbelt of NNE-SSW strike direction. Anticlines, synclines and faults are clearly visible. Therefore this writer is not convinced that the 96 percent success ratio is necessarily due to the dowsing rod, it could also be due to the dowser's photogeological and other observational skills. This possibility was also envisaged by Betz & König with their hypothesis of a «super observer».

Dowsing successes in the former Soviet Union have been descibed in the 1970s (Sotchevanov and Matvejev 1974; Bakirov et al. 1976). At that time around 40 different field parties there used the so-called biophysical method, and this not only walking across the ground but also driving across it and flying above it. Their targets were not only groundwater but also different ores, petroleum and hidden faults under a Quaternary cover.

As an example of successful groundwater search the area of Tcheljabinsk is mentioned, located southeast of the Ural mountains. This is apparently a rather dry region. There, 1120 wells were drilled based on the recommendations of four dowsers. Their success rate was 93 percent. In the same area and during the same period 158 drilling locations were proposed by geoelectric methods but with a success ratio of only 87 percent. In view of the large number of wells involved this difference of 87 versus 93 percent supports the application of the dowsing rod. Further, if we assume that comparable conditions and lengths of time apply, then each dowser marked 280 drilling locations whereas the geoeletric team achieved only 158 locations. This comparison makes dowsing much more economical than geoelectrics. Regrettably, we posess only the two above mentioned superficial review articles about these campaigns, without any map or other details.

4. Some speculations

If you read Rocard's books (1991a, 1991b) you may think that almost everything has been resolved about the dowsing rod and the pendulum (preferred by him). He believes in magnetism connected with groundwater flow. The dowser's sixth, magnetic sense plus his biophysical instruments would be the fastest and cheapest geophysical instruments to find water wells. Some indirect support for magnetic groundwater prospection comes from the existence of magnetotactic bacteria. They have been described from ocean sediments (Petermann 1996) and from soils (Fassbinder et al. 1990); they may be present in groundwater flows.

Rocard's findings have some similarity with König & Betz (1989) whose first hypothesis points to the recognition of precipitated minerals on the walls of groundwater-filled fractures, but without indication on what or by what means of observation the dowser acts or reacts.

An interesting method to search for hydrocarbon seepage has been published by Bailey and Skolnik (1996). They use a simple boat radar instrument to recognize air shear and they claim that air shear to be related to hydrocarbon seepage. It is not clear if they are really observing hydrocarbon seepage or - in my view more likely - just water seeps (which could still be associated with hydrocarbon emanation). Based on their findings a boat or helicopter radar could serve as a groundwater search tool in arid areas, especially over fractured basement rock. One could even go a step further: A sensitive person may be able to feel air shear. This person would be the already mentioned «super observer» who relies on many facets of observation. In this context the before mentioned carborne and airborne groundwater searches become meaningful. To what degree does a hydrogeologist apply «super observation» when proposing a drilling site, consciously or unconsciously? One may draw a different conclusion: Sound observation, sensitivity and knowledge are required but no dowsing rod.

Another method of groundwater search could be based on the search of radioactive radon gas which emanates from the same basement fractures in which groundwater is most likely to be found.

Depth penetration of georadar is restricted by several factors, an important one being humidity. Therefore georadar may be a useful groundwater exploration tool in arid areas.

5. Conlusion and recommendation

Science is based on measurements, controlabilty, and repeatabilty of findings. Therefore the challenge is to identify which phenomenon or which phenomena are observed by a dowser. Or: Which geophysical instrument delivers the same (measureable) effects as the dowser? The foregoing examples from Sri Lanka and Russia seem to indicate that an arid area would be the ideal testing ground for a comparison of instruments (and the most needy area too).

Therefore it is proposed to select an international test area, perhaps under the aus-

pices and supervision of the International Union of Geological Sciences, to carry out a structured comparison of dowsing with as many geophysical and geological («super observing») methods as possible (also at different times of the year and of the day with their different humidity distributions). Most important, there must be money available to drill a reasonable number of control wells afterwards and to have all results published. The challenge is to locate groundwater boreholes fast, with high reliability and at low cost.

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