

Hydrogeology and water-dowsing: countercurrents and confluences

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Abstract:

The history of hydrogeology has been well documented by historians of science and technology. Folk conceptions on groundwater have been studied by anthropologists, who have also paid some attention to water-dowsing. However, these bodies of research generally lack an attempt at a joint analysis that would try to bridge the gap between considerations on scientific and non-scientific knowledges.

Trying to do so helps to shed some light on historical exchanges and communications between different means for groundwater detection. Recent ethnographic research in southern Europe shows, for instance, a surge of interest toward water-dowsing on the part of certain professional hydrogeologists (sometimes organized in associations) in spite of its lacking any scientific demonstration for its claims. This example also provides a way to relate such relatively circumscribed cultural shifts to socially much wider current changes in folk representations about water, fostering their better understanding by social sciences.

Social sciences, among which anthropology represents the standpoint from which is written this contribution to the conference, have devoted a wide range of studies to the subjectmatter of water. They have shown a long-standing attention to various economical, social, political or strategical, technical and symbolical aspects related to this theme, chiefly in Europe (Bromberger and Pelen 1985), certain African areas, the Middle East, southern Asia, in the Andes. However, one cannot help but notice that, in most of these researches, water appears to always be there. Albeit sometimes scarce, of course, it nonetheless seems to always be more or less at hand, which is obviously far from being the case, at least not without some more or less important physical or financial effort. But before actually tapping an aquifer, whichever its size and regardless of the costs of the operation, one needs to locate it. Broadly speaking, and keeping in mind the fact that this short presentation cannot avoid a certain level of schematization, it appears possible to say that social sciences have overlooked the way people in need for hydric resources look for them, how they choose between the various groundwater prospection techniques.

Folk hydrogeology

With that fact in mind, I did fieldwork in southern Europe and also, to a lesser extent, in New England. In Portugal, as anywhere, when a landowner wants a reliable hydric supply that would free him from depending on public waterworks, one option is to sink a well more or less at random: what the oil industry calls a "wildcat". Sinking a well is always a somewhat uncertain business, and it can quickly get very expensive. Needless to say, very few people dig at random, if only because of the cost of such an endeavor. The second option thus aims at minimizing the economic risks: one will rely on some form of geological knowledge in order to narrow down the odds of boring a dry hole. These conceptions are often learned at school or by way of various means contributing to the popularization of geological knowledge. They can also be refracted and interpreted through a variety of ideas deriving from common sense as well as from local knowledge, "folk representations" or "ethnotheories" informed by more or less sophisticated cosmologies (see James Dooge's communication to this Conference, "Changing concepts of the hydrologic cycle"). It is for instance generally taken as more rational to look for water at the bottom of a valley rather than on top of a hill. And professional hydrogeologists are used to hear their clients express a whole range of representations about groundwater and its behavior which they would rarely accept as valid, or only in very specific natural environment : for instance that subterranean water flows in veins, not only in karstic structures but in all sorts of terrains; or that the water seeping from "good" springs inevitably comes from faraway regions and is purified by its underground journey. But what may be true for an Egyptian oasis is not necessarily valid in the case of Corsica, where certain springs, noteworthy because of some specific feature such as a peculiar minerality or the fact that they are perennial, are said to originate two or three hundred kilometers to the northwest, beyond the Ligurian arm of the Mediterranean sea, in the Alps. The ethnographical literature abounds with countless examples of similar ideas formed more or less along the lines of ancient representations about the hydrologic cycle.

In fact, when you are in the field, you quickly realize that, when looking for water, most

people will call upon professional specialists who resort to two sets of theories and practices: on the one hand geology and one of its specific subfields, hydrogeology, and, on the other hand, water-dowsing. Or, in other words, a scientific discipline and a non-scientific set of proliferating theories and practices. This picture is somewhat oversimplified: in fact, a combination of these options can be observed, exactly like one can resort to a medical doctor and, at the same time, to an alternative healer. Therefore, before actually deciding where to dig, people negotiate between the various, oftentimes opposed, opinions they get from each side. Someone may thus very well rely simultaneously on geology and dowsing, even though geologists express their forecasts as probabilities, never providing a client with a straightforward, detailed prediction in the way dowsers do: dig to this depth and you'll hit water with such flow and such qualities (polluted or not, good for your digesting system, and whatnot). Anyway, such a complementary attitude is quite similar to what can frequently be observed between «popular devotion» and institutionalized religion or, as I have said above, when a patient goes to a medical doctor and also to a healer or a witch-doctor of some kind. It is also necessary to say that the scientific/non-scientific dichotomy is valid only to a scientist's eyes or, even more so, to a skeptic's. From the dowsing practitioners' standpoint, what they do can be described either as parascientific, protoscientific, etc., depending on how they posit themselves in relation to institutionalized scientific knowledge.

Some scientists would admit (some do) the possible existence of a still unidentified physical effect explaining dowsing. This possibility of a scientific explanation is called upon by most dowsers as a very strong rhetoric device («Science has not explained dowsing *yet*»), a manifestation of what certain skeptics call the "Galileo syndrome": "they threatened to burn Galileo at the stake but then later he was proven right". Dowsers take the explicative power of science as a guarantee towards a rationalist proof for their «gift». This claimed protoscientific status of their activity is extremely important to most of them, and they usually perceive the ethnographer's interest as one more step towards recognition. With the geologists, as with most other scientists, it is of course generally the opposite since, for a whole range of more or less founded reasons, the public image of anthropology is more that of a discipline which would be keen on promoting all sorts of folk knowledges against science. However, those «traditional»

scientists who are ready to accept dowsing (like, for instance, Prof. Yves Rocard (1989), a renowned physicist who was responsible for the production of the first French atomic bomb) generally would only go as far as it is practiced in the field (as opposed as from a distance) and as far as it limits itself to the search for water and does not get into the identification of the qualities of this water, or into the wide range of other inquiries that dowser claim they can respond to. As a matter of fact, dowsing is not limited to *water*-dowsing. We are here clearly getting much closer to divination and, consequently, further away from a rationalist justification situated within the current paradigm of Western science.

As everyone here knows, hydrogeologists are the people who study the behaviour of underground water with the help of an array of scientific data they sometimes produce by using high-tech equipment and they treat through computer-assisted modelling: nowadays mostly geological data, geophysics, and geochemistry. The history of hydrogeology has been well documented by historians of science, and few contemporary hydrogeology manual do not include at least a few pages about the history of the discipline and some of its founding figures, from Aristotle, Vitruvius or Al Biruni to Palissy, Mariotte, Halley, and later on Lucas, Darcy or Meinzer, among many others. As for water-dowsers, they find subterranean objects (not only water) by means of a forked twig, or a pendulum. They also locate lost goods (a lost wallet for instance), archeological artefacts, missing persons or stray animals; they identify diseases and their cure; they select their food, or the film they're about to rent at the video store. And for doing so they can dowse on a person's body, on a map, on the phone, holding a forked twig (of wood, metal or plastic) or pendulum. There exist other tools (starting with the dowser's bare hands), which are getting increasingly popular, such as various kinds of metallic rods. Anyway, the working principle is the same with all these tools. It is always a movement of the dowser's instrument, caused by minute unconscious muscular contractions, that indicates the presence of what is being looked for. Its presence, but also, in the case of water, its depth, its quantity, the direction in which it is flowing, and its qualities: is it good water or is it polluted? Is it mineral water with such and such properties? And what not. This is done through interpretive procedures that every dowser establishes for himself or herself, generally starting from the observation of another practitioner or from instructions found in books on dowsing. It is

important to note that, in spite of a widespread cliché about a supposedly exclusively male dimension of this activity, the historical record clearly show that there are always been women who dowse, those among the bourgeoisie and nobility having left more traces -- of course, since they lived among literate people and could themselves write about their experience.

I first got interested in that subject matter in the early nineties, when a two-year period of very dry weather affected the region I'm from, in southern France. As a response to this draught, people, whom sometimes I had known since my childhood as absolutely ordinary people, all of a sudden started acting publicly as dowsers and started marketing their capacities as such. A bibliographical search quickly showed that social sciences had done very little on the topic: besides very repetitive ethnographical descriptions, the only serious analytical work was a series of papers and a book published in 1959 by Evon Vogt, an anthropologist at Harvard University, and Ray Hyman, a psychologist who is a former professional magician and who specializes in debunking paranormal claims. Central to what is the most comprehensive anthropological study of water-dowsing to date are the questions "Does it work?" (meaning: as well as hydrogeology, and better than chance) and, if not, "why does it persist?" in this technological world. The preface to the newest edition reaffirms the need for a systematic scientific study showing whether dowsing is empirically reliable or if it is an instance of magic that persists because it helps satisfy unfulfilled social and psychological needs, an approach that most anthropologists, influenced by relativist trends, would now probably not follow (see for instance Krautwurst 1998; Vogt and Hyman have acknowledged this criticism in the preface to the latest edition of their work, nonetheless clinging to the necessity of an empirical evaluation of dowsing's reliability).

Dowsing: folk or elite?

This book is also one of the most reliable places where to look if one wishes to find brief, objective historical information on dowsing, a topic on which it is difficult to find information that escapes the bias of either proponents or oponents. Dowsers, who often are prolific writers, frequently try to find very remote roots for their practice, for instance latin

texts, or in certain Egyptian archeological objects, or on an ancient Chinese engraving, etc. In fact, the first reliable historical documents on dowsing only date back from the 15th century, when this technique was used in Bavaria by mineralogists who looked for metal veins. And the subsequent expansion of dowsing is easy to follow: the use of the rod spread throughout England when the king called upon German engineers to improve British mining; the same happened later in Russia with a similar decision taken by Catherine II. It is a 17th century French baroness, one of these upper-class women who dowsed, who is at the origin of the shift to water-dowsing from the use of the rod in mining. Later on, around 1690, a famous criminal affair occurred in France, in the city of Lyons, when a dowser was used to track the murderers of a shopkeeper and his wife. While saying that some of them had fled by boat on the Mediterranean where his gift was useless, he also designated a hunchback who was tried, convicted and executed on the wheel. A few years later the same dowser was used by the king's soldiers in order to identify the Huguenots in southern France.

It is when dowsing really started to gain visibility in the media of the time, with the publication of countless articles and books. While early dowsing theory was produced mostly by mining experts, a shift then occurred, with the controversy taking on a much more theological dimension: wouldn't the movements of the rod be inspired by the Devil? Then the debate evolved towards an attempt at integrating dowsing within the paradigms that the study of electricity, magnetism, etc., were starting to constitute. By the end of the 19th century, it was the turn of the discovery of radiation to play the same role, hence the word "radiesthesia" now preferred among French-speaking dowsers. And in the following century dowsing theorists used various theories in the same way, among which of course chiefly quantum physics. Incidentally, Udo Krautwurst (1998: 75-76) argues that the permanent attempts at integrating water-dowsing into the universe of rationalism are perhaps more an illustration of the will by a "State science" to incorporate a "nomad" one, in order to defuse its subversive potential, than of the latter trying to get incorporated into the former. He supports this view by showing how the German colonial authorities in Namibia keenly fostered the integration of dowsing in mainstream hydrogeological prospection.

Indeed, it is not uncommon to find officials of all kind asking for a dowser's

intervention. Once in a while, one finds in the newspaper an article about a city council hiring a dowser to find a spring, or about a police department seeking the help of a radiesthesist in the search for a missing person. But this relative openness of "the authorities" is not necessarily enough to let us suspect of a covert attempt by "science" at phagocytizing dowsing. In fact, but it could be a mere rhetorical strategy, in most dowsers' opinion, they are the object of a shameful ostracism on the part of official science. Similar expressions are recurrent in their discourse, and some of them (for ex. Gautier 2000: 17) even suggest that dowsers used to be burnt at the stake for, somewhat paradoxically, being water-finders. The records of the Portuguese Inquisition are very well preserved and show a lack of even the slightest bit of historical evidence (for the same absence in Great Britain, see Thomas 1991 [1971]) for this idea. Perhaps does it ensue from the once popular American expression "water-witch" and, in French, from the apparent proximity between "sourcier" (water-dowser) and "sorcier" (sorcerer, witch), but these words have two totally different etymologies, and their near homophony is fortuitous and absolutely devoid of signification. On the other hand, even a cursory look at the literature quickly shows that official science has devoted quite an amount of time to empirically testing dowsers' claims (whether it has done it properly remains another issue, another level of the controversy).

Anyway, in the course of time the diffusion of dowsing became linked to colonialism: there is no ethnographical evidence whatsoever of a comparable practice existing prior to Western colonization anywhere, with the possible, but unclear, exception of a region in India. The role of international contacts, and of the printed word, in the popularization process of dowsing is obvious: the Lisbon National library holds the unpublished 17th century translation, by a priest, of an obscure earlier French treatise on the divining-rod. Clearly, networks existed before the world-wide-web, which is now of course the main vector of dowsing theory in its latest versions. It is interesting to note here that, in the past, many learned, if not elite, people were among the promoters of dowsing. While others chose the critics' side, of course, the point is that there existed direct bridges between this form of "folk practice" and scholarly research. Goethe, a scientist, notably a geologist, and a statesman as much as a great writer, was interested in the pendulum: the session he describes in a novel is closer to divination and to

what now passes as modern urban dowsing than to mere water-witching. We are here quite far from the uneducated peasant snapping off a hazelnut twig as custom supposedly demands it when he needs to make a rod. It is only one example among many other possible ones, a certain number of which points towards the contacts between geology and dowsing. As clearly shown by the bibliographical corpus, a specific social group played an important role in these mediation processes roughly between 1850 and 1950: catholic priests, who essentially are intermediaries between two different orders of reality, and also between social universes. This is especially true in northern Portugal where the inheritance system often forced younger sons into priesthood, thus giving them access to forms of knowledge usually denied to boys of low extraction. Countless are those who studied and published about a variety of activities: beekeeping, philology, archeology, ethnography, geology, and dowsing. Some of their books still sell, and remain influential. I met a Portuguese geologist who had copied by hand, in a library, a rare book on dowsing published by a priest in the 1870s. He wants to sound half serious about it, but he nonetheless systematically questions his clients on water-witching, he uses the book to interpret their answers and to discuss what for him are erroneous geological conceptions.

Dowsing and hydrogeology

One can also call up the figure of Edouard-Alfred Martel (1921), a founder of spelunking and of karstic hydrogeology, who in 1913 was commissioned a report on dowsing by the French Academy of sciences. Starting off as a skeptic he never was entirely convinced but nonetheless adopted a sympathetic stance in his later work. It turns out his writings had a wide audience: with other "popular science" writers, he played a role in the legitimation and spectacular expansion of dowsing in Europe in the early 20th century. One of his followers, the great speleologist Norbert Casteret (1968), also wrote on the topic, trying to avoid taking side. However, Casteret was not a geologist, and when considering the geological discipline as a whole, one has to admit that, whereas numerous scientific theories have influenced dowsing ideas, the opposite has strictly never proven true. It is the case in physics or biology: even who

admits that the human body may be responsive to magnetic fields does not necessarily take this idea as evidence towards the existence of a "dowsing sense" and even less so towards its reliability. As for dowsers' geological conceptions, most of the time they diverge radically from the canonical views in geology. And very few are those who have tried to elaborate a grand theory that would explicitly dispute hydrogeological established representations (some, however, maintain that groundwater accumulates in enormous "water domes" interconnected by an earth-wide network of huge underground rivers). They rather tend to present themselves as less expensive substitutes for hydrogeologists and as potential mitigators for the errors they think are inherent to any scientific approach, supposedly prone to overlook the impalpable side of the universe and of human existence.

As for the authors of hydrogeology manual, they appear to be rather ambivalent, and in fact they frequently avoid the issue. Not a single "sourcier" for instance in the *Dictionnaire français d'hydrogéologie*, written by two of the French leading figures in the discipline (Castany and Margat 1977). One of them is no less silent on that topic in his *Principes et méthodes de l'hydrogéologie* (Castany 1982). The tendency seems to be similar among Russian-speaking authors (Pinneker 1983) in spite of an apparent long-standing interest in biomagnetism on the part of Soviet authorities (Bird 1979: chapter 13). Most English handbooks do not expose dowsing theories (for ex. Brassington 1988) but, although dubitative, Michael Price (1985 : 151-152) nonetheless gives some information. The only really enthusiastic proponent of dowsing among professional hydrogeologists I was able to identify is the Spaniard Darder Pericas, who published numerous texts on the topic in the first half of the 20th century (Darder Pericas 1926, 1932). And, about two decades later, the Spanish Ministry of agriculture published at least twice the handbook in which Murcia Vidas (1960 [1953]) advocates the use of radiesthetic methods for locating ground water. At about the same time, the Portuguese official view on the matter remains unclear but, by the end of the paper on that same question he gave to a journal published by the Instituto Superior Técnico, in Lisbon, a mining engineer sounds rather hesitant, in spite of a title describing radiesthesia as a "widely used but unjustified practice" (Paradela 1957).

Since most hydrogeologists now admit that they need to take into account their own

interaction with their client, one cannot help but think that they should not be afraid of talking about dowsing, whatever their opinion about it: the vitality of its social existence is obvious. As they very well know, they constantly meet dowsers or dowsers' clients when they are in the field. Of course there is no general rule about these encounters, their quality depending entirely on each participant's personality and prejudices. What is however for sure is that, as I have witnessed it in many situations, one frequently sees hydrogeologists, sometimes officials of a State division such as, in France, the Bureau des Recherches Géologiques et Minières, who, while saying they are sceptical, do not hesitate in more or less openly advising their clients to get another, less orthodoxical advice. Hydrogeology, as a discipline, is reluctant when it comes to admitting that it must sometimes compromise with dowsing. But its individual practitioners are more straightforward and they easily admit that they think "there's something to it".

In fact, there has been in recent years a clear surge of interest toward water-dowsing on the part of some hydrogeologists. I have met in France several of these professionnels who make a joint use of the two methods. Their number is indeed on the rise, and a few associations have been created recently. In May 2000, a French free-lance hydrogeologist who uses pendulum dowsing in his work (both in the field and on maps or photographs) invited me to a week-end seminar he had organized at his place in south-east France. It drew an audience of over twenty of his colleagues (of which one third were women), from other French regions as well as from Belgium, Switzerland, and Italy, eager to experiment with a practice they all had become familiar with in the field. Some of these epistemological tricksters openly talk to their clients about their methods, others never do, or they only give a few hints about it, depending on the type and quality of each relationship. They are divided by the same great fault-lines one observes among ordinary dowsers: some follow a more "physicalist" or a more "mentalist" line, some are quite pragmatical, others are more on the poetic side. When confronted with the fact that dowsing lacks even the slightest hint of scientific demonstration and that its tenets are incompatible for instance with geophysic principles, most of them dismiss the objection by saying that in their eyes there is no opposition between dowsing and geology, but instead a reciprocal complementarity. In all its varieties, their practice obviously transcends the limits of opposed paradigms, but it is well known that practices are better than theories at accepting

contradictions and that they are much swifter to play with them.

Including among scientists, the common view on popularization is that of a top-to-bottom flow in which pure and exact knowledge gets inexorably deteriorated, an intrinsic quality of "popularization" which popularizers themselves find hopeless. Recent research on this issue has mitigated this idea and tends to prefer talking about "public understanding of science" (Ziman 1991). By stressing the role agency and social context hold in these complex processes, this notion does not obliterate the relative autonomy of social actors when they are confronted with scientific discourse, it sheds some light on the forms of resistance they can oppose to hegemonic scientific discourse or on the way they appropriate it. The examples provided by dowsing certainly indicate that locating top and bottom in the popularization process of a "parascience" is not always easy, let alone identifying a one-way flow of information between these two polarities. And, as with any other paranormal claim, the public debate about the reliability of this activity has been stalled for ages: Marianne Doury (1991) aptly labels it as "the immobile debate". Centuries of more or less heated discussion have not been enough for one side or the other to get the upper hand: rationalists and paranormalists alike remain certain that their convictions will eventually prevail, and they express the same kind of astonishment at the way their opponents' ideas, which they take as absolutely wrong, can still exercise some appeal. In fact, most laypeople remain entirely immune to this controversy and seem content with a merely circumstantial and very pragmatic way of relating to two sets of ideas that they do not necessarily take as incompatible. They are more interested in solving specific problems (such as getting abundant water at a low cost in order to be able to fill up the swimming-pool) than in revealing the hidden nature of reality and finding the best ways to get access to its knowledge. When questioned about geology and water-dowsing, most people have not much to declare. That is, until the day where, because of a specific need, they have to make up their mind and take a choice. In fact, as we have seen already, such a situation does not necessarily result in side-taking, among other reasons because these two bodies of theory are more or less equally abstruse albeit in different manners in the eyes of an observer who would wish to go beyond their more superficial rudiments.

Of course, this is true not only about water-dowsing, but also of many other areas of knowledge in which an established scientific paradigm is face to face with some other kind of approach. Resorting here to the word "knowledge", for lack of a better, unambiguous concept, is of course problematic in that it implies on the part of who uses it an evaluation of the validity of the statements it refers to, something that it has precisely been attempted to avoid all along this paper. This is not the place where to explore all the long-range implications of the issue. Let me simply stress the fact that by talking of "areas of knowledge" I mean sets of representations and activities aimed at producing some sort of control on the world, whether their practical, material efficiency has or has not, can or cannot be empirically verified. One may think of a wide range of cultural practices, from all sorts of alternative healing procedures to forms of divination whose tenets are incompatible with the rules of modern physics, from apparently altered states of consciousness to religious experience.

In the past twenty years or so, social sciences have proposed various interpretations for the patent surge of interest in the occult, the paranormal, etc.: the consequence of a disillusion resulting from science's unfulfilled promises, a reaction to an excessively arrogant scientism, a desire to re-enchant the world, a psychologically reassuring way of dealing with risk and uncertainty, and so forth. Within this broad framework, a peculiar dimension of dowsing lies with the fact that it is, at least for a good part, concerned with the very precise problem of locating underground water. And, more than from its own characteristics as a parascientific activity, it is from its specific close link with water that dowsing appears to get part of its current renewed strength and visibility. Most people would be skeptical about map-dowsing at a distance, and even therapeutic dowsing, although it can be done directly on the body of the patient, appears hard to buy. But field-dowsing for water immediately raises a weaker skepticism. That our body could be in some way sensitive to the presence of underground water does not only seem more plausible, it even appeals to many. The ancient and extremely rich array of symbols attached to water is probably at play here. And, far from being buried and forgotten, it is now constantly reactivated by the commercials for mineral waters. Even popularized biology plays its role in this process: virtually anyone has heard that our body is composed by a surprisingly high proportion of water. From that fact to the idea that we can

vibrate in harmony with nearby groundwater, the analogical and poetic slip is reduced. Moreover, needless to say, conservationist ideology and ecological concerns are on the rise within the general public, along with the awareness of the importance of water in the equilibrium of life on the planet. Hence, perhaps, the relative tolerance most of the hydrogeologists I have met now manifest in relation to dowsing: they do know that their clients think that if science and technology have unwanted side-effects, maybe the time has come to try other approaches, possibly less rational but seemingly more attuned to the need for a sustainable way of exploiting natural resources.

This brief presentation of some historical exchanges and communications between different means for groundwater prospection shows along what kind of countercurrents and confluences the relationship between dowsing and hydrogeology have flowed in the course of time. Although still fledgling, the resurgent interest that some hydrogeologists show towards dowsing may very well be here to stay and thrive, at least in the near future. This shift from a more or less explicit skepticism towards an explicit interest is taking place in a relatively circumscribed social and cultural group. But all the ins and outs of the question can be grasped only through the effort of relating it to the much wider current changes in folk representations about water and even, beyond that, to an emerging way of conceiving the individual human being's relationship to the universe. Social studies of science have aimed chiefly at deconstructing scientific discourse and demystifying the conditions of its productions from a relativist standpoint which sometimes prompts an irate response by scientists who are unwilling to see science as equivalent to other forms of knowledge (which, by the way, the same social studies of science rarely appear willing to submit to such a scrutinizing treatment). By providing a domain where scientific and parascientific paradigms seem to be timidly getting closer to each other in the everyday practice of a few professionals, hydrogeology may represent an experimental arena where the dynamics of the two sides get reciprocally illuminated and where social sciences may find the opportunity to shift from the position of judge to that of go-between.

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