

Dowser Put to Test

by

A.M.K. Szeto, Earth and Atmospheric Science, York University

and

M.M. DeRobertis, Physics and Astronomy, York University

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Introduction

Dowsers claim to possess abilities of which most scientists would be skeptical. When a dowser, to whom we refer in this article by initials AR, approached us with a claim of paranormal abilities, we saw this as an interesting challenge amenable to scientific scrutiny. In the following, we report our effort in designing a test for AR over a geophysical test site at York University. We discuss how the test may be interpreted by appealing to probabilistic considerations, and reveal its outcome. [A preprint of this article is available as www.yorku.ca/szeto/yes/dowser.doc.]

One of us (MMDR) is a member of the Ontario Skeptics Society for Critical Inquiry (www.skeptics.ca). Among other activities undertaken by the Society is debunking of various myths pertaining to paranormal abilities. The other of us (AMKS) is responsible for the design and installation of the York University Environmental Test Site (YES - visit www.eas.yorku.ca/yes/Design.htm).

	1	2	3	4	5	6	7
A	Chalcopyrite Ore 	EMPTY	Oil 	EMPTY	EMPTY	Metallic Mine 	Plastic Mines
B	EMPTY	Paint Cans 	Steel 	Steel 	Al 	Artillery Shell 	Artillery Shell
C	Brass Steel 	Paint Cans 	Steel 	Steel 	Steel 	EMPTY	EMPTY
D	Al 	Paint Cans 	Steel 	Plastic 	Plastic 	Al 	Fe
E	Al 	Clay 	EMPTY	EMPTY	Plastic 	Al 	Fe
F	EMPTY	Clay 	Concrete 	EMPTY	Plastic 	Al 	Fe

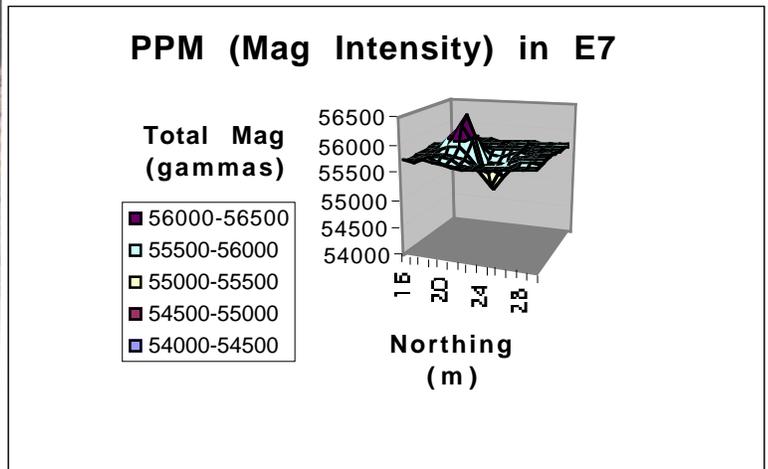
A short time ago AR applied to the James Randi Educational Foundation (JREF) in pursuit of a US\$1 million prize, which is offered “to anyone to can show, under proper observing conditions, evidence of any paranormal, supernatural, or occult power or event” (www.randi.org). JREF contacted the Ontario Skeptics, who in turn asked MMDR to help evaluate AR's purported dowsing abilities. AR claimed to be able to locate buried metallic and concrete pipes using dowsing rods. Through correspondence we ascertained certain limitations to AR's claimed ability, and we designed a test consistent with these limitations. In an amicable iterative effort, AR and we reached an agreement regarding test procedures and a scoring scheme.

Description of Test Areas

Identifying suitable test areas is not a simple matter. In most urban settings, service (sewer, electrical) pipes are often placed at expected locations and directions. Such things as sewer and electrical heads are giveaways. In the end we chose three sites, each about 225 square metres, on the York campus. Two of these are drawn from YES. One is free of buried anomaly, at least up to fist-sized stray metal objects. We know this since the site was carefully prepared in its construction in 1996. The other site is Cell E7. The following diagrams show the buried pipe in question, and its magnetic response, which is about 1400 gammas peak-to-peak. The third site contains a large (0.5 metre diameter) sewer pipe, whose details are supplied by University maintenance officials. Even though AR claimed that he did not require running water in order to detect pipes, we thought that we would oblige him by including a working sewer pipe. We label these sites 1,2,3 respectively for later reference.



Figure 82: E7. Short steel pipe.



Test Procedures, Conditions, and Scoring

Test conditions were negotiated in advance. We stipulated that AR could only use dowsing rods to locate pipes, that there were between 1-9 pipes in total at the three grass-covered sites, and that each pipe was at least 2 metres long and buried within 2 metres of the ground. Grading would not take place until the completion of all three sites. Interpretation of the outcome would be informed by well-defined probability calculations.



The test was performed on October 20, 2001. AR was an affable man with an engineering degree. He had run a successful business before his recent retirement. He claimed that he had dowsed underground pipes over the past forty years about a dozen times, with a 100% success rate.

He employed two bronze brazing (divining) “L-shaped” rods for the test. These were held loosely in each hand and parallel to the ground. He traversed each site in a raster pattern. The rods were held nominally parallel to one another until a pipe is allegedly crossed; at which point they were expected to diverge. The weather was overcast and windy. At times the wind gave AR some trouble in steadying the rods. AR marked

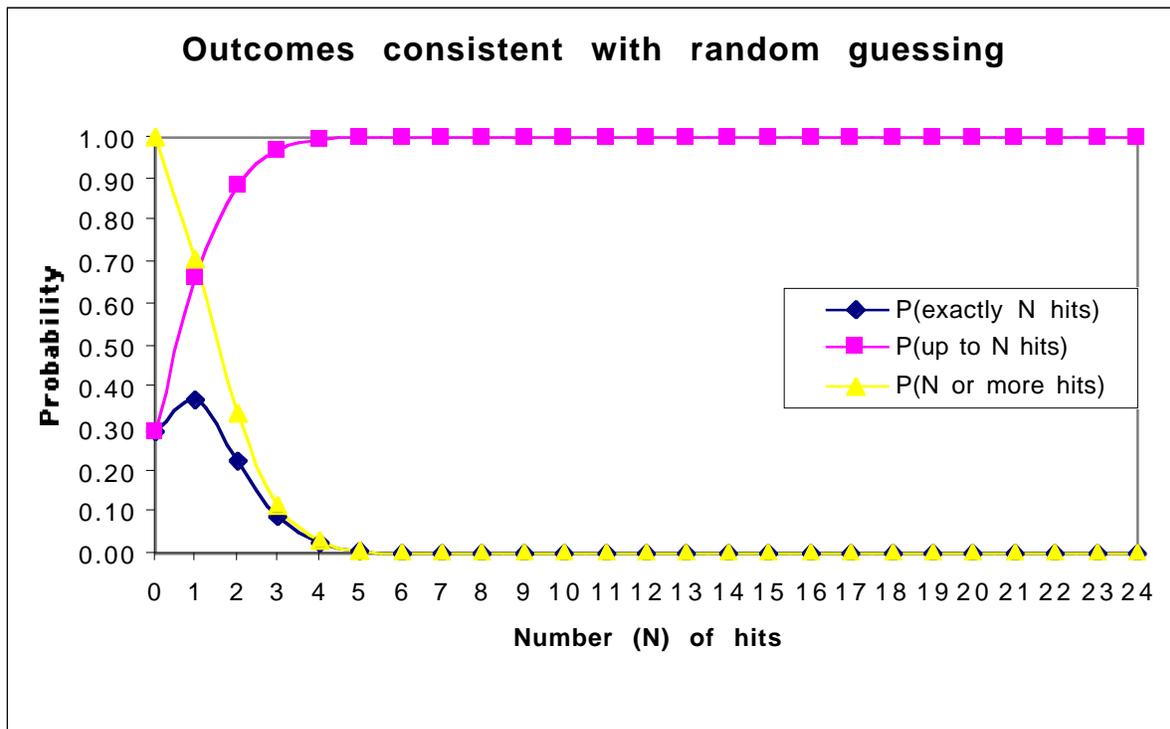
each spot where the rods diverged with a golf ball, and continued traversing the site. After the site was dowsed once, AR checked any aberrant marks to his satisfaction. He seemed quite confident of his final selection of marks, which we will call “trials”. We stipulated in advance that trials had to be at least one metre apart. AR

registered 24 trials in total: 7 in site 1 (the empty site), 8 in site 2, and 9 in site 3. The proceedings were scrutinised by several representatives of the Ontario Skeptics Society.

AR indicated a margin of uncertainty of one metre in locating the lateral position of a buried pipe. This resulted in an advance agreement to register a trial as a “hit” within a one-metre border surrounding any buried pipes.

Interpretation of Score

The two pipes buried underneath our sites together with their borders constituted an area of approximately 34 square metres. Thus the probability of any randomly selected trial being a hit was about 5%. Call this probability p . It is straight forward to calculate the probability of making exactly N hits out of M trials. This is ${}^M C_N p^N (1-p)^{(M-N)}$, where ${}^M C_N$ is a combinatorial coefficient “ M -choose- N ”. The following graph shows probabilities of correctly guessing N hits out of 24 trials.



Outcome and Conclusion

Of the 24 trials, AR registered only 2 hits. Further, we observed that these hits were in fact part a pipe AR identified as running more or less normal to the actual pipe in question. As we can see above, the probability of picking two hits or fewer is about 88%; a highly probable event indeed. One could argue that strictly speaking, the most probable random outcome is in fact one hit (37%), following by zero (29%) and two hits (22%). But it would be disingenuous to suggest that obtaining two hits is a particularly meritorious achievement among what are clearly almost equally likely outcomes. Another way of putting this is that it does not require paranormal ability to achieve such an outcome.

JREF gets to keep its money. There are at least two more skeptics who can now assert with some confidence that our dowser-contender was unable to convince them that pipes can be detected using dowsing rods. [For those who are curious if we would have written up this test if AR had succeeded - the answer is “affirmative”. As part of our advance agreement with AR, we undertook to document and publicize this event regardless of outcome. We imagine, however, we would have been much more "excited", if that would have described our reaction accurately, had AR detected anything more than 4 out of 24 hits!]