

THE SUPERNATURAL STATE: WATER DIVINING AND THE CAPE UNDERGROUND WATER RUSH, 1891-1910

ABSTRACT

The revisionist scholarship on colonial science assumes its inherent rationality. The example of water divining in southern Africa, however, suggests that the irrational was as much a feature of western as indigenous knowledge systems. The state-led opening of an underground water frontier in the arid (Karoo) interior of the Cape Colony in the two decades after 1890 brought this issue into sharp focus. State water boring was guided by a combination of geological and engineering science, but encountered sustained resistance from settler farmers who preferred the word of their water diviners over the official experts in deciding where to bore. After failing to suppress the practice, the colonial state belatedly promoted and adopted it after water-boring was privatized in the mid-1900s. A detailed analysis of the wealth of correspondence on the subject in the department of agriculture journal after 1905 reveals both a sustained attempt by supporters to rationalize divining and a reticence on the part of skeptics to submit to a definitive empirical test. The debate over water divining suggests that colonial ideologies of agricultural improvement were more eclectic and irrational than crude dichotomies opposing western rationality to native superstition allow. In short, the other was within as well as without.

Science and its Irrational Others

The history of science in South Africa, in being rescued from the dead hand of Whig antiquarianism, has been delivered into a teleology of a different kind. Whereas Whig historians treated science as objective research devoid of social context, revisionists regard it as a “technique of domination”, but still unquestioningly accept the essentially rational premises of both the colonial project and its scientific handmaiden¹. In this they mirror an international trend juxtaposing the Western rational (“state science”, “high modernism”) to its colonial other (“nomad science”, “metis”) and decrying the former’s purportedly relentless appropriation or suppression of the latter².

Otto Krautwurst has cautioned against such crude epistemological dichotomies, arguing that, “the ‘civilising mission’ was not always confined to strictly rational models” and calling for further investigation of what he terms, “non-rational epistemological imperialism”³. For Krautwurst

“colonial and imperial expansion involved not only the export of rationality, but local European forms of non-rationality – sometimes coded as irrationality – as well; that the colonial Self-Same not only encountered ‘external’ Others of its own construction, but also ... brought ‘internal’ Others of its own construction into the colonies”⁴.

He demonstrates his central contention through a persuasive analysis of water divining in Namibia in the 1900s, which, far from being “some quaint anachronistic shadow quietly fading away as Enlightenment comes to brighten the few remaining dark corners of ‘superstition’ in Western and Westernising social forms”, was central to the German colonial project⁵.

Water divining was coincidentally also integral to the concomitant British colonialism south of the Orange River, a consideration of which both confirms Krautwurst’s thesis and provides a useful corrective to the assumed rationality of state and science in South Africa. Hydraulic engineering has long been held to be the founding act of states ancient and modern, and to epitomise modernity in the colonial context⁶. South African historians, however, have paid it little mind – such “blindspots” being, as Krautwurst suggests of anthropology, indicative of the discipline’s own rational prejudices⁷. By reinserting and recognising the central place of the irrational in Cape colonial hydraulic engineering the way is opened to an alternative reading to the “history from above” of science currently in vogue and of science as hybrid, rather than exclusively rational⁸.

Tapping “Nature’s Subterranean Stores”

By the second half of the nineteenth century the lack of a dependable water supply, underscored by frequent drought, was recognized as severely constraining the Cape

Colony's agricultural development⁹. This dearth was particularly acute in the interior. In years of plenty the Karoo was imagined as a promised land, new internal frontier of white settlement, and in years of drought, the desert graveyard of colonialism. Water was the key missing element in both the realisation of the dream and aversion of the nightmare. State irrigation initiatives, however, repeatedly fell foul of intractable environmental and social constraints on large-scale water engineering in the colony¹⁰. The seasonal nature of the rivers and their huge silt loads, frequently borne by floods of biblical proportions, made dam building a high-risk investment which debt laden farmers were neither willing nor able to undertake, beyond makeshift "Boer dams". In addition, two hundred years of European settlement was clustered along watercourses throughout the colony where complex and legally sanctioned water rights had developed, obviating co-operative management of riverine water resources. The state too shied away from dam building and water distribution for fear of the massive construction, insurance, and litigation costs involved. Unable to impound and manage surface water within a unified system it turned instead in the final decade of the century to assisting individual farmers in tapping the sub-surface water table.

The existence of underground water in the Karoo had long been known and its presence commemorated through place names in which "the Dutch word *Fontein* [fountain] is made liberal use of ... [and] the Hottentot word *Kamma* (water,) is not less frequently found in the composition of the aboriginal names"¹¹. In the absence of cultural markers, Karoo water could also be detected through close observation of birds, animals and flora. Burchell advised watching for circling swallows, captive baboons were fed salt and set to

the task and folk-botany recognised an *aarbosje* (literally a “vein shrub”) for its water-finding capabilities. Folk-geology was similarly attuned to reading the landscape for water, prospecting dry river beds for *graafwater* (spade water) trapped by *seekoei gatte* (hippopotamus holes) and dolerite dykes and everywhere else seeking out the dolerite *water klip* (water stone), *keerbanke* or *keerdamme* (weirs) indicating and caching underground water¹². Hydro-geography thus ordered human geography in the Karoo, with the location of permanent water sources determining the siting of towns and the *ordannaties* (central points) of farms¹³.

State attention turned to these “underground dams” in the 1870s as a cheap alternative to re-engineering the colony’s rivers¹⁴. Boring tools and a foreman were duly imported from Britain in 1878 to prospect for water on crown land in the far west as a means of encouraging its sale and settlement as well as for water and coal along the expanding lines of railway¹⁵. The initial liability for all expenses confined private use to syndicates searching for mineral eldorados, but even when parliament fixed a flat rate in 1890 the £25 per month charge elicited few takers¹⁶. Only after part of farmers’ liability was converted into kind in 1893 did the demand for the government water drills take-off, further encouraged by drought and the generous subsidy offered those wishing to purchase their own drills. (see Figure 1)¹⁷.

FIGURE 1 ABOUT HERE

The rush was divided into two phases, state boring (1893-1903) and private boring (1904-1910). More than 4,000 farmers applied to the state to prospect their land for water during the first decade encouraged by drought, the new Scab Act (1895) with its compulsory dipping requirements and the artesian water strikes in Queensland¹⁸. Many withdrew in frustration at the long delays, however, and, despite the number of government drills quadrupling, only half the applicants were served. The backlog was due both to the failure of the subsidised purchase scheme and heavy official demand on the government drills; borehole water sustaining or enabling state development, quarantine and military campaigns in the arid interior during the social and environmental crises of the 1890s¹⁹.

The escalating cost of diamonds and shortage of skilled labour after the South African War made closing the gap between demand and delivery even harder, while a recurrence of drought and the ostrich feather boom made the need more urgent. Under mounting pressure from farmers and the private boring industry, the state agreed in 1904 to subsidise privately drilled boreholes up to half the cost of construction. Thereafter the government service shrunk rapidly and concentrated on prospecting new areas where “the contractor has not yet penetrated” and experimental boring to map the colony’s “water horizons”²⁰. Conversely, the private boring industry, now nurtured by subsidy instead of stifled by competition, mushroomed and in 1905 already the Inspector of Water Drills could envisage a time “not ... very far distant when every village will possess its water borer just as it now has its builder or wagon-maker”²¹. Of the nearly 5,500 boreholes sunk with government support in the period 1904-1907, almost three-quarters were put down

by subsidised private contractors boasting a comparable success rate to the government service (see Figure 2).

FIGURE 2 ABOUT HERE

Recession and fraud forced the curtailment of the subsidy in 1908 and its abandonment two years later, but by 1910 there were 481 water borers in the Cape, more than three times the number in 1891, and “boring work has become a necessity to the farmer, and no consideration of a few shillings more in the cost will prevent him taking advantage of the supplies of underground water”²².

The total quantity of subterranean water made available to farmers by the government subsidised boring programme was estimated at 136 million litres per day in the first decade, more than quadrupling to near 600 million litres per diem in the period 1904-1907 (see Figure 3).

FIGURE 3 ABOUT HERE

These estimated yields, though of dubious reliability, were rhetorically important in sustaining both the momentum of the water rush and the progressive dream of transforming the Karoo through hydraulic engineering. As the astronomer royal said of the colony in 1895, “You have very nearly a piece of white paper, and who can tell what will come to be written on it”²³. Having failed to harness the rivers for irrigation,

progressives dreamed of “the existence of imprisoned waters percolating through the pores and fissures of the rocks in exhaustless volumes” so that “exploration of deeper water levels ... if successful, may so change the arid and sunburnt Karoo as to transform it into the garden of South Africa”²⁴. Just as the value of the surface water supply was reflected in riparian land values, officials sought to map the colony’s underground “water bearing horizons” so that, “Much of the uncertainty which now exists in all water finding operations would thus be avoided, and the underground water rights of a farmer would become a negotiable thing, before they were utilised”²⁵ (see Figure 4).

FIGURE 4 ABOUT HERE

State hopes that “the approaching marriage of land and water” would trigger a “revolution in the rural economy” and mark a new “era in the agricultural history of the country” were frustrated by the limited and uneven distribution of the underground water supply and settler farmers tawdry use of it²⁶. More than 80% of the water tapped was “negative” or “sub-artesian” and in sufficient quantities only for stock and small-scale irrigation²⁷. The chief beneficiaries were commercial pastoralists in the north-east, where geological and economic conditions were most favourably aligned, enabled to enclose and subdivide, cultivate fodder crops and dip stock by the new borehole water (see Figure 5).

FIGURE 5 ABOUT HERE

“Mastering” this largely “non flowing” supply so as to “control [and] ... use it at will” required substantial investment in water lifting technology, storage and reticulation, stymieing anticipations of a “time ... not far distant when the Karroo will be studded with windmills”²⁸. Rather boreholes that did not “flow” at the surface were broken open or dynamited to reach or induce the water or else abandoned as useless. Wrote one Colesburg farmer, “The hole yields so much water that we can see it in the hole, but it has never run out. We can therefore do nothing with the water”²⁹. An official reflected that, “Such negligence almost warrants the assertion that there are people in existence whose greatest enemies are themselves”³⁰. The situation changed gradually after the war with the shift to private boring contractors, sinking larger diameter holes and supplying and installing windmill pumps, but by 1911 a third of boreholes in the Cape still remained without windmills (see Figure 6)³¹.

FIGURE 6 ABOUT HERE

Realisation of the progressive dream was crucially dependent on its being shared by the recipients of state assistance, but, as was soon apparent, only a minority of farmers subscribed to the progressive notion of water as a resource subject to scientific and economic laws and thus capable of appropriation through the application of geology and engineering and conversion into value directly (through land price) or indirectly (through production) by the market. The prevalence and resilience of older notions of both folk-hydrology and farming in the Karoo frustrated state ambition and blunted the impact of

the new underground water supply on agriculture through to the end of the colonial period.

The Nature of Water

Colonial officials and progressive farmers agreed that settlers' farming practices were derived primarily from collective experience. While optimistic about the long-term ameliorative effects of education on the ingrained ignorance and prejudice of custom, they thus also set great store by the immediate effect of the example, particularly on the older generation. Said one, "The very best thing to be done would be to offer a successful example to the farmers who are in such a condition of mind that when they see some successful example they are more likely to take advantage of it than from any theoretical teaching"³². Another explained;

We live among a class of people who talk of ... improvements as being of very little use, and they must see the practical results before they believe. Let them once see the benefits of certain acts, and they will engage in the work at once. But to merely talk about it will not do much good³³.

The ubiquitous insistence on the practical application of scientific knowledge in the Cape was thus driven by important ideological as well as a economic imperatives³⁴. All

“theoretical teaching” and “mere talk” was required to submit to practical test not only to show a return on investment, but also to provide farmers with the only proof accepted on the backveld, the example of own or others experience so that they might be “conquered by ocular demonstration”³⁵.

Few of the colonial state’s imported scientific experts, however, were able to perform the miracle of turning water into wine³⁶. The frequent resort to and failure of itinerant geologists to prove local copper and diamond deposits during the mineral revolution prejudiced popular opinion against geology³⁷. The odds were heavily stacked against its European-trained practitioners, Cape stratigraphy being so different to Europe that a visiting German geologist likened “the attempt to describe the geological history of South Africa in terms of European formations ... to dividing up the history of Germany by the reign of English kings”³⁸. British-trained engineers were similarly handicapped by the colony’s “Rivers without water”³⁹. The failure of dams like Van Wyks Vley and the frequent wash aways on the Matjiesfontein-Beaufort West railway line undermined farmer confidence in “imported engineers” and inspired contempt for their ignorance of local conditions. Indeed farmers openly stated that “they know more about the construction of dams such as they want, the peculiarity of the soil, and know better what the rainfall is, the effect of floods, and so forth, than an engineer from another country”⁴⁰. The popular antipathy on the backveld towards geological and engineering science constituted a serious ideological obstacle to state water boring.

Official water boring rested on a combination of geological and engineering science, the former reading the surface topography to reveal the appropriate place for the latter to tap subsurface water⁴¹. Together they constituted the “mind’s eye” of the state⁴². The geology of the upper Karoo, horizontal sandstone layers criss-crossed by vertical dolerite dykes, produced a landscape that was at once relatively easy to read and “locally artesian”, guaranteeing a high success rate for boring and making the north east the epicentre of the water rush (see Figures 3, 4 and 7).

FIGURE 7 ABOUT HERE

The so-called “dolerite intrusion theory”, generated the basic axioms, which guided state water-boring until the mid-1900s. These dictated boring up-slope from but never into or through dolerite – “similar to boring a hole in a masonry dam wall in order to pump the water from the dam” - and to shallow depths only, the last on grounds that at around thirty metres even sandstone became so compacted as to become impervious to water⁴³. The official geological orthodoxy conveniently served to guarantee the state an acceptable success rate in boring, while limiting farmer expectations and the cost to the public purse. It was however, unsupported by any public geological science. Repeated efforts in the latter half of the nineteenth century to mount a geological survey in the colony fell foul of the prevailing popular scepticism towards geologists and the utility of their work⁴⁴. The state was thus ultimately forced to rely on the part-time labours of the newly appointed professor of geology at the South African College to begin mapping the

colony's stratigraphy from 1896 and its engineers were left to their own devices in defending their drilling practices against critics⁴⁵.

"This is a subject", the first hydraulic engineer noted in 1885, "on which people are often very ignorant; ordinary educational books do not seem to touch the subject, and the popular books issued by unscientific people are often full of blunders"⁴⁶. His successor accordingly distilled the official geological interpretation of the Karoo into a slim handbook in 1885 to educate his drill foremen and the wider public in a scientific reading of the interior landscape⁴⁷. This established the dyke theory of subterranean water catchment areas and the prohibition on drilling down-slope of a dyke as official orthodoxies. Bain's colleagues and successors followed his lead and from 1889 the Department of Agriculture's official journal provided an additional monthly platform to proselytise the countryside in both English and Dutch⁴⁸. These state-printed and -distributed texts were an important medium for educating the backveld in geological theory and hydraulic engineering practice. The other was the drill foremen who, ideally, combined the geological theory of site selection with the practical engineering know-how of boring and whose extended stays on private farms were intended to yield both water and propaganda for progressive hydraulic engineering (see Figure 8).

FIGURE 8 ABOUT HERE

Recruited mainly from the locomotive mechanics at the Salt River railway works, the foreman was the public face of progressive state hydrological science in the backveld, but

fell far short of the ideal “best man ... who knew the country, the people and their language”⁴⁹. Such unlikely emissaries were the product of colonial state parsimony, which restricted it to employing only one hydraulic engineer and a part-time geologist⁵⁰. The former was thus compelled to tutor his foremen “with elementary books on geology ... the reports of the Geological Commission ... as well as boxes of rock specimens so that they can recognise the rocks they meet with in boring”, reinforced by lessons in the field when he came on inspection tour⁵¹. Thus inducted these mechanic para-geologists were dispersed through the backveld, each in charge of a drill, and spent a minimum of three years working in a division to acquire experience, reading and boring the local geology. Farmers neither wanted nor trusted their opinions and “should a foreman once give a farmer an incorrect statement, he becomes sceptical, as regards his ability, as a driller”⁵². Isolation and low pay ensured a steady exodus to the private boring industry and mines, but, although some “had little more knowledge than the ordinary street-corner man” or “man in the moon”, the best among them attained wide reputations for their water-finding skills⁵³.

Ironically, in their informal training and experiential praxis, the drill foremen resembled less their scientific mentors than their main competitors for authority over subterranean water on the backveld, the water diviners of folk-hydrology. Indeed, the hydraulic engineer conceded in 1897 that

“were any, or most of the officers in charge of Government water drills, to employ ‘diving rods’ in connection with their prospecting, they could mystify

some applicants for the use of the drills ... into the belief that it was the ‘rod’ which indicated the water, and not their own common sense and observation, as at present”⁵⁴.

The engineers, determined to demystify underground water, denounced water diving as “quackery” and insisted “We have no one who is regarded as what is called a ‘water finder’ – a sort of witch who professes to do something supernatural”⁵⁵. Farmers were equally hostile to the engineers mechanic protégés holding that, “It was not necessary to have an expert to show them where to bore: most farmers knew that ... no expert was required to point out where water was”⁵⁶.

The preferred rural oracle to geology, the water diviner or *water wyzer* (water pointer), was an old presence in the colonial landscape with an ancient European pedigree⁵⁷. While African folk-hydrology sought to manipulate the heavens through the intercession of the ancestors, the European dowsing tradition claimed to detect the presence of water and minerals beneath the earth through a variety of tools, most commonly a green wood rod, wand or *mikstokkie* (little forked stick)⁵⁸ (see Figure 9).

FIGURE 9 ABOUT HERE

Some insisted on using only the wood of certain trees, claiming that through “the wonderful provision of nature ... in every land peculiar to itself there grows a certain bush or shrub, suitable and used by the natives of that land for the purpose of finding

underground waters”⁵⁹. Others again held “any kind of green wood ... suitable”, recommending quince, willow, apple, *taaibosch* (tough-bush ie. Rhus), blue-bush, mimosa or *katdoorn* (cat-thorn)⁶⁰. A minority regarded the rod as merely a “tool” and wood easily substituted by whatever else was to hand, most commonly by the 1890s a rod fashioned out of fencing wire⁶¹. The practice was based on the theory, contra geological science, that subterranean water flowed in underground “veins” or *aars*, which could only be detected by a diviner at the surface through the medium of the rod⁶². These veins, by freely violating the laws of geological science as to catchment area, strike and depth, disorganised the netherworld that official geology sought to order and directly challenged its claim to authority over the earth.

Folk hydrology thus nurtured the prevailing rural prejudice against foreign scientific experts, particularly engineers, and its authority was further enhanced in the 1890s by reports of the Queensland artesian water strikes made at great depths in defiance of all geological theory. Farmers were consequently sceptical of official boring practice, holding that “Nobody can see underground” and thus “It is very often that the local knowledge of the man is better than the expert knowledge of the geologist”⁶³. Drill foremen and private contractors were inclined to agree, admitting that “the advice of the owner of the ground is always asked, because he is thoroughly acquainted with every inch of it, whereas the foreman who comes on the farm is not”⁶⁴. Geology depended “on the evidence on the surface” read straight off the landscape, which, particularly in the Karoo, was an open book for anyone with the eyes and inclination to read.⁶⁵

“owing to the structure of this country in a great part of it ... nature has provided you with an enormous number of outcrops of strata, or where strata are seen on the surface without investigation, very different from England, where the country is covered over with soil and except for the railway cuttings you would never know what was underneath”.⁶⁶

The readings by the official “mind’s eye” of this topographical text were “mystified” for farmers by being expressed in a language that, for many, was doubly foreign, being both the disciplinary argot of geology and engineering, and English. The diviner, by contrast, provided the irrefutable ocular evidence of the rod’s action, for, as one engineer noted bitterly, “‘Seeing is believing’, and the farmers’ opposition to things scientific will be more easily got over by what they see than by what they are told”.⁶⁷

By promoting the idea of water veins, diviners encouraged the “prevalent delusion” among farmers that water was everywhere available if only they were prepared to bore deep enough and claimed every failure of state boring as a vindication of this theory⁶⁸. For as the hydraulic engineer admitted in 1880, “Borings are, by no means, everywhere successful, even where favourable circumstances encourage the geologist”.⁶⁹ Conversely, water diviners’ success in proving water in defiance of official geological prognostications was widely reported, further cementing the allegiance of rural landholders to their organic intellectuals whose own failures were as readily excused or quickly forgotten as those of the engineers and their mechanics were long held against them. Part of the reason for the latter was that diviners were frequently “brother farmers”

– honest, respectable gentlemen – whose services were offered free of charge in a spirit of mutual self-help, while the language, class and ambiguous authority of drill foremen distanced them from farmers, whatever their results.

State engineers, although quick to dismiss divining as “quackery pure and simple”, found their own efforts compromised by the “very crude idea of the conditions relating to the existence of underground supplies of water [that] exists among the farmers ... in many instances a rooted conviction of huge underground rivers pervades their minds ... bolstered up by the extraordinary statements of certain persons who style themselves ‘Water Wyses’”⁷⁰. “Deep-seated water” they insisted, “owes its presence not to chance, but to geological conditions”⁷¹. The nature of water was crucial in determining the process of site selection and the public denouncement of water diviners and water veins necessitated by the regulations leaving the choice of site in farmers’ hands. The foreman (and hydraulic engineer) could advise, but the final decision rested with the farmer. As one noted, “the great question is to bore at the right place. And this is no doubt the cause of many unpleasant incidents between farmer and boring foreman”⁷².

The switch from state to private boring in 1904 produced a parallel ideological shift in official discourse away from scientific to folk hydrology. Deep level artesian strikes at Tweeside near Maitjiesfontein in the late 1890s and their championing by its proprietor, the maverick railway contractor-cum-settler politician J.D. Logan, severely discredited state geological orthodoxy⁷³. The new subsidy produced an explosion in the ranks of both private boring contractors and diviners. In 1905 one East London supplier alone sold no

fewer than 101 drills, prompting the official journal to remark that “Boring for water is surely becoming a fashionable occupation in South Africa”⁷⁴. Similarly, a Public Works official reported that, “At present time I do not think there is a Division in the Cape that has not its water diviner. One might almost say that each ward has its expert”⁷⁵. The state was anxious to protect farmers (and its investment) against the “land sharks” attracted by the private drilling boom⁷⁶. In addition, the boom displaced its own operations steadily westward into a more opaque landscape bereft of the dolerite dykes on which its hydraulic praxis had been founded in the Karoo⁷⁷.

Thus, after more than a decade of denouncing water divining, the state belatedly sought to harness it to hydraulic development. The new official pragmatism now mirrored that of farmers who had long held that “It makes but little difference what means are applied for finding underground waters, so long as the desired effect is obtained. Hundreds of farmers who have use the little twigs are quite satisfied”⁷⁸. The official journal accordingly opened its correspondence pages to the “occult art” in late 1906 and carried no fewer than fifty-five letters from farmers on the subject over the next five years, two-thirds from practitioners and converts⁷⁹. Nor did this exhaust farmer interest. The editor of the new Union-wide publication perfunctorily ended “the desultory skirmishing” on the “hardy annual” in 1911, but the rival *Farmers Weekly* carried copious correspondence on the topic well into the 1920s⁸⁰.

The provision of an official public platform to the “professors” of the “magic wand” enraged some progressives⁸¹. One, denouncing “this absurd superstition”, declared

himself, “disgusted at finding letters on this subject appearing month after month in an official publication of the Cape Government” and urged the editor “to exclude the subject from your Journal, until, at least, there is something more to go on than ‘the unsupported word of the operators’”⁸². The journal’s original justification for carrying the correspondence was to explain, “the mysteries of the diving rod” and the editor continued to insist that, “No advantage can be gained by arbitrarily suppressing such a discussion, and some good may yet result if the subject is fully debated”⁸³. Rather than endorsing water diving, officials in the Department of Agriculture hoped to demystify it by providing a rational explanation for its operation – “wherein ‘mysterious forces’ and ‘gifts’ shall have to give place to matter-of-fact scientific methods of investigation”⁸⁴. In this, they were no different from the hardcore sceptics who wrote in to denounce them and rod. As a more moderate opponent put it, “the country expects the diving-rod men to break this mysterious force to utilitarian harness, and expects also that the unsupported word of the operator will be no link of the gear”⁸⁵. The majority of sceptics were willing to be persuaded, but dubious of the possibility.

They had a rational explanation of their own. Progressives’ preferred image of the diviner was of a “knave” preying on the credulity of ignorant backvelders to defraud them⁸⁶. The term “stick witch-doctor” neatly captured their contempt for practitioners and audience alike through the ultimate settler insult of equating them to Africans⁸⁷. Such hostility was old. Thus Barrow, at the close of the eighteenth century, reported that a man he claimed to be an Irish deserter

“had taken up the profession of a *water-wyzer* or discoverer of water, and had shown sagacity enough to establish a sort of reputation in the country. By speaking little, looking wise, and frequent application to the eye of a double convex lens, which happened to have an air-bubble within it, he had practised with great success on the credulity and ignorance of the Dutch farmers, and had obtained from them, by this and other means, a pair of horses and several hundred rix-dollars of paper money. Lighting their pipes at the sun by means of his glass, and the persuasion that the air-bubble within it was a drop of water that possessed the sympathetic quality of always turning towards its kindred element, had such an irresistible effect on the rude minds of the African boors, that the Irishman, like a true quack, appreciated his consequence so highly, that he never deigned to pay a visit to any farmer, in order to examine the state of his water, without a previous fee”.⁸⁸

Similarly, a certain Siebert reportedly toured the countryside around New Bethesda after the South African War in the guise of “a professional water-finder, pretending to have made the astounding discovery, while a prisoner-of-war in Ceylon, that South Africa gets its water-supply from the Himalayas!”⁸⁹. The purported successes of the rod in such hands were ascribed to the same basic geological reading of the landscape as made by drill foremen.

“[T]here is not the slightest value in the stick, whether it has been used for centuries or not. How much water has not been pointed out without any other

means than observing the situation of the land and so many other signs as usually present themselves? I have noticed that people who point out water with the 'stick' also keep their eyes wide open at the appointed place, where there is water, and only after having observed how the situation is, begin to use the 'stick'. Such a course of action is sufficient to make anyone suspicious".⁹⁰

This "rationalisation" of divining pointed to the dialectical nature of the ideological contest between folk and scientific wisdom. It was not just practitioners, but also sceptics who were required to furnish a rational explanation of the rod's successes. The point was not lost on diviners who noted that "scientific men appear ... to have looked upon the subject as beneath their dignity to investigate seriously" and held that "as a rule science only explains things after they have been discovered": "It [water divining] was not discovered by science, and may not be solved by science either. Let those who have studied the winds, the clouds, the air, and the earth, solve the problem if they can".⁹¹

Stung by their "enemies" charge of fraud, however, some "wand workers" also sought to rationalise their practice in the discourse of science to dispel its "undercurrent of supernaturalism" and prove "it does not rest on mere superstition, and that those who claim to be successful in its use are not all knaves"⁹². Blaming all failures on "inexperience", these modernisers were confident that "The force actuating the rod will be found to be a purely physical one, and one of the know mechanical forces inherent in matter", prompting a search for the appropriate force⁹³. Said one

“The cause of the peculiar working of the divining rod is almost unexplainable by words, and the nearest explanation I can give is that the rod works something like a magnet that will draw a needle. In the same way will the diviner feel the underground spring. The forked stick of any kind, if pliable, is only a tool to work with. For instance every tradesman must have his tools to work with”⁹⁴.

A variety of other physical forces were proffered – gas, humidity – but consensus favoured electricity, although, as one sceptic remarked, “ignorant people have a way of imputing (often, perhaps, with some truth) all unaccountable phenomena to electricity”⁹⁵. The most ambitious modernisers claimed to be able to discern the depth, direction and quantity of water, patented their practices and sought to sell them to the state⁹⁶. The earlier affective exchange of hydrological knowledge within a rural moral economy of mutual assistance was now being rapidly supplanted by a market in water engineering skills. Once held to be the gift of a few, modernisers reduced divining to a skill that could be bought and taught to anyone – even, heretically, blacks and women.

Despite the best efforts of modernisers to separate practice from practitioner and transform individual art into universal skill and commodify it, the bond was not so easily sundered. The preference for practical experience over abstract theory remained undiminished, causing even a college graduate farmer to declare “I have found that my own experiences are more to be relied upon than theories”⁹⁷. Another agreed wholeheartedly that, “an ounce of experience was worth a ton of theory”⁹⁸. Not only “experience”, but the morals and ethics of the diviner were often deemed important by

more traditional adherents, and even experience could shade imperceptibly into “instinct” and even “faith”⁹⁹. Older religious beliefs thus continued to cling to the practice into the twentieth century, one practitioner asking

“why the Almighty created underground water if He did not mean it for the use of man in various ways, and if so He would surely furnish man with the simple means of treating it, without referring to scientists, when he wishes to utilise any of the underground supply”¹⁰⁰.

Another, citing the example of Moses in the wilderness, noted simply that, “He was told to use a rod, not a crowbar or a pick”¹⁰¹. The curious mix of modern hydraulic engineering and traditional religious beliefs was summed up by the farmer who declared; “I have faith in the divining rod, and shall never attempt to dig for water without first consulting my piece of fencing wire”¹⁰².

The agreed method of proof was a “practical public test” carefully designed “to leave no room for mysterious and unknown forces to beat a retreat to that nebulous realm so long their harbour of refuge whenever the arrows of scientific criticism have been shot at them”¹⁰³. However, all efforts by modernising diviners to stage such a theatre of reason were frustrated by the refusal of the state, progressive farmers organisations and individual sceptics to participate, prompting one to gloat: “let sceptics cavel and the cradle”¹⁰⁴. The judgement of a private boring contractor that water divining was, “like religion; if a man believes in it, it is alright”, applied equally to the progressives’ “faith”

in science¹⁰⁵. The affront of water divining to the latter's modernist pretensions led to foreign experts being pressed into the fray, but to no avail¹⁰⁶. In 1909 a former member of the state water-boring branch quietly acknowledged the quantum shift in official hydraulic theory and praxis.

“Dykes, or volcanic fissures, are one of the main features in this country in guiding drill foremen in the selection of suitable boring sites ... In many areas these dykes are very prominent, more so than in others. It has been found to be of considerable assistance to a foreman confronted with a difficulty of the above nature, to have recourse to the divining-rod, provided he is reliable and capable of using it”.¹⁰⁷

Thus it was not just farmers who were persuaded to divining by the practical test of experience, but also the colonial state.

Indeed, the late 1900s witnessed a new official pragmatism on irrigation, jettisoning the earlier rigid adherence to the shibboleths of engineering and geological science for a more eclectic approach. The spurned civil engineering fraternity blamed “the penny wise and pound foolish policy of our past Governments in employing low salaried advisers, which has brought engineers and other scientific men into such bad repute in this country” and sought to reform their praxis to “break down this distrust in our skill” and “gain the confidence of the farming community”¹⁰⁸. The colonial state was also desperately trying to capture this constituency, but having made little headway in alliance

with engineers belatedly turned to folk rather than scientific hydrology and embraced water diving. Although official acceptance was always tentative and conditional, the shift was unmistakable.

The Supernatural State

The epistemological skirmishing between science and the settler metis of “farm brains” was not confined to hydrology but raged across the full spectrum of late colonial state interventions in the Cape colonial countryside¹⁰⁹. The extent and impact of this contest can only be guessed at, for as Krautwurst observes, “There is, to put it plainly, no search for non-rational forms of development and imperialism because they are not sought and/or thought not to exist and/or thought to be trivial”¹¹⁰. His judgement is certainly true of South Africa, where historians have devoted their time and energy to the documentation and rehabilitation of African irrationality as “disguised pragmatic rationality”, that is to say the calculated use of the irrational to frustrate official ambitions in defence of real material or political interests¹¹¹. This “blindspot” suggests both the continued hegemony of imperial preoccupations and the rational ideology of science over those who would subject both to the discipline of context. Recognition of the irrationality embedded in European epistemologies, of which history is one, and of their hybridisation in both the metropolitan and the colonial encounters is a recognition of one’s own disciplinary limitations.

A “stick witch-doctor” in 1911, W.M. Fraser, who ascribed the divining rod in part to the “power of faith” and could “feel the scientist sneer” as he wrote, insisted that a rational answer was no answer at all. “Why this pen moving in my hand is a miracle. Science tells me that it is brought about by a series of contractions of the muscles, and these in turn are governed by a seat of will-power in the brain. Yea somewhere just behind the bump of ‘so-and-so’! And this little wall of will-power is controlled from – where?” In a bid to demonstrate “how infinitely far back that ‘seat of government’ of the series of causes that lead to the writing lies” he related a stock settler anecdote of a debate between “Stuurman” and Jafta” over the shape of the earth: “Stuurman holds the earth is round, Jafta asks what it rests on. Stuurman says: ‘A great big stone’. Jafta asks what this stone rests on. ‘On another big stone’, says Stuurman. ‘And this big stone?’ Stuurman scratches his head, and says ‘On a great number of other big stones’. Jafta, being a man of limited ideas, sees that the threads of argument are branching out to infinity, and gives it up”¹¹².

ENDNOTES

¹ S. Dubow (ed.), *Science and Society in Southern Africa* (Manchester, 2000), 9.

² See for example A. Escobar, 'Imaging a post-development era' in J. Crush (ed.), *Power of Development* (London, 1995), 211-27 and J. Scott, *Seeing Like a State* (New Haven, 1998).

³ O. Krautwurst, 'Water-witching, modernist epistemologies and dowsing rationality: exporting models of non-rationality through colonial and development discourses', Paper presented to the Canadian Anthropology Society, University of Toronto, 7 May 1998, 2-3. All page references are to this source, although an abridged version has subsequently been published in *Political and Legal Anthropology Review*, 21, 2, 1998, 71-82. Thanks to Nancy Jacobs for alerting me to Otto's work and Otto for so generously sharing it with a complete stranger.

⁴ Krautwurst, 'Water-witching', 6.

⁵ Krautwurst, 'Water-witching', 15.

⁶ See for example K.A. Wittfogel, *Oriental Despotism: A Comparative Study of Total Power* (New Haven, 1957) and D. Worster, *Rivers of Empire* (New York, 1985).

⁷ See L. Guelke and R. Shell, 'Landscape of conquest: frontier water alienation and Khoikhoi strategies for survival, 1652-1780', *Journal of Southern African Studies*, 18 1992, 803-24 and N. Jacobs, 'The flowing eye: irrigation and environmental management in the Kuruman Crown Reserve, South Africa c.1800-1958', *Journal of African History*, 37, 1996, 237-60 for two notable exceptions.

⁸ S. Dubow, *Scientific Racism in Modern South Africa* (Cambridge, 1995), 5 for the quote and Dubow, *Science and Society* for examples.

⁹ See for example Grove, R., ‘Scottish missionaries, evangelical discourses and the origins of conservation thinking in southern Africa’, *Journal of Southern African Studies*, 15 (1989), 22-39.

¹⁰ The subject has yet to find its historian, but the broad outlines can be gleaned from the copious evidence gathered by no fewer than eight select committees of the Cape parliament, which investigated the matter between 1862 and 1909.

¹¹W.J. Burchell *Travels in the Interior of Southern Africa*, Volume 1 (London, 1822), 184.

¹² See Burchell *Travels*, Volume 2, 15 and 21 for swallows and reeds, Cape of Good Hope, *Geological Reports by E.J. Dunn on a Gold Prospecting Expedition, 1872 and on the Stormberg Coal-field* [G31-73], 12 and R.W. Wallace, *Farming Industries of the Cape Colony* (London, 1896) for *aarbosje*; Cape of Good Hope, *Report of the Geological and Irrigation Surveyor, 1892* [G28-93], 12-13 for *graafwater* and C. Warner, ‘The origin of igneous dykes and their relation to the underground water supply of the Cape Colony’, *Agricultural Journal of the Cape of Good Hope* [hereinafter *AJCGH*], 26 (2), 1 February 1905, 263

¹³ See Guelke and Shell, ‘Landscape of conquest’.

¹⁴ Cape of Good Hope, *Report of the Select Committee on the System of Deep Well Boring and the use of Diamond Drills, 1903* [C1-03], 31.

¹⁵ See Cape of Good Hope, *Report of the Hydraulic Engineer, 1878-85*.

¹⁶ See Cape of Good Hope, *Report of the Geological and Irrigation Surveyor, 1891* [G32-92], 11-12..

¹⁷ Cape of Good Hope, *Report of the Inspector of Water Drills, 1894*, [G14-95], 23.

¹⁸ See Cape of Good Hope, Scab Act (No.20, 1894), Clauses 11-24.

¹⁹ In addition to municipalities and state institutions, the drills were widely deployed during the rinderpest epizootic, Langeberg rebellion and South African War.

²⁰ Cape of Good Hope, *Report of the Chief Inspector of Public Works, 1904* [G59-1905], 51.

²¹ *Report of the Chief Inspector of Public Works, 1904*, 50.

²² Compare Cape of Good Hope, *Census 1891*, 306-07 with Union of South Africa, *Census 1911*, Part 5 [G32d-1912], 570-71 for number of well sinkers-cum-water borers and see Cape of Good Hope, *Report of the Chief Engineer for Public Works, 1907* [G12-1908], 39 for the quote.

²³ Cape of Good Hope, *Report of the Select Committee on the Geological Survey, 1895* [A14-95], 17.

²⁴ *Report of the Chief Inspector of Public Works, 1904*, 48 and *Report of the Chief Engineer for Public Works, 1907*, 61.

²⁵ *Select Committee on Deep Well Boring, 1903*, 27 and *Report of the Chief Engineer for Public Works, 1907*, 39.

²⁶ W. Brown, 'Irrigation: some thoughts on irrigation for Cape Colony', *AJCGH*, 12 (3), 23 June 1898, 771 and T. Bain, 'Water boring operations', *AJCGH*, 5 (17), 15 December 1892, 268.

²⁷ Cape of Good Hope, *Report of the Engineer-in-Chief of Public Works, 1905* [G26-1906], 14.

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- ²⁸ P. Joubert Viljoen, 'Boring for water', *AJCGH*, 36 (3), March 1910, 372; E.R. Bradfield, 'Erosion and desiccation of the Karoo', *AJCGH*, 33 (5), November 1908, 657 and Cape of Good Hope *Report of the Inspector of Water Drills*, 1897 [G30-98], 7.
- ²⁹ Cape of Good Hope, *Report of the Inspector of Water Drills*, 1896 [G36-97], 40.
- ³⁰ *Report of the Inspector of Water Drills*, 1894, 3.
- ³¹ Calculated from Union of South Africa, *Census 1911*. See also J. Walton and A. Pretorius, *Windpumps in South Africa* (Cape Town, 1998).
- ³² Cape of Good Hope *Preliminary Report of the Irrigation Commission*, 1883, [A80-83] 35.
- ³³ *Irrigation Commission*, 1883, 55.
- ³⁴ See for example L. van Sittert, 'The handmaiden of industry: marine science and fisheries development in South Africa', *Studies in the History and Philosophy of Science*, 26, 1995, 531-58.
- ³⁵ C.C. Henkel 'The divining rod: remarkable evidence', *AJCGH*, 31 (6), December 1907, 719.
- ³⁶ See for example *Select Committee on the Geological Survey*, 1895 and C.F. Juritz, 'The underground water of the Cape Colony: their chemical composition', *AJCGH*, 32 (5) May 1908, 636-37 and 640 for Cape colonial scientists' bitter resentment of this requirement.
- ³⁷ See *Select Committee on the Geological Survey*, 1895, 6. Merriman also cited the artesian wells in Queensland discovered "in defiance of all geological advice".

³⁸ Quoted in A.W. Rogers, 'The pioneers in South African geology and their work', *Transactions of the Geological Society of South Africa*, 39, 1937, Annexure, 112. See also *Select Committee on the Geological Survey*, 6.

³⁹ C.J. Watermeyer, 'Irrigation', *AJCGH*, 14, (13), 22 June 1899, 880.

⁴⁰ *Irrigation Commission, 1883*, 116.

⁴¹ See for example *Report of the Inspector of Water Drills, 1897*, 3-4

⁴² W. Gibbons Cox, 'Artesian waters and irrigation', *AJCGH*, 20 (11), 22 May 1902, 615.

⁴³ Warner, 'Origin of igneous dykes', 263.

⁴⁴ See Rogers, 'Pioneers' and R.A. Stafford, 'Annexing the landscapes of the past: British imperial geology in the nineteenth century' in J.M. MacKenzie (ed.) *Imperialism and the Natural World* (Manchester, 1990), 67-99.

⁴⁵ *Select Committee on Deep Well Boring, 1903*, 9, 21-22, 24-25 and 27 for the engineers acutely felt need for a professional geologist.

⁴⁶ Cape of Good Hope, *Report of the Hydraulic Engineer, 1885* [G27-86], 9.

⁴⁷ T. Bain, *Practical Hints on Water Finding in Connection with Geology and on the Construction of Dams* (Cape Town, 1885); T. Bain (translated by E.B. Watermeyer), *Praktische Wenken aangaande het Vinden van Water met betrekking tot Aardkunde (Geologie) en aangaande Maaken van Dammen* (Cape Town, 1885) and T. Bain, *Water-finding, Dam-making, River Utilization, Irrigation* (Cape Town, 1886).

⁴⁸ See for example N.J. Gillet, *Water Finding and Artesian Well Boring: The Means of Finding Water Everywhere* (Cape Town, 1890); H.P. Saunders, *Underground Water Supply of the Colony of the Cape of Good Hope with special reference to the Working of the Diamond Drill* (Cape Town, 1897) and Saunders, 'Underground water supply of the

colony', *AJCGH*, 11 (4), 19 August 1897, 183-90; *AJCGH*, 11 (5), 2 September 1897, 242-49 and *AJCGH*, 11 (6), 16 September 1897, 314-24.

⁴⁹ Cape of Good Hope, *Legislative Council Debates*, 1895, 208.

⁵⁰ *Select Committee on Deep Well Boring, 1903*, 21-22 and 24-25.

⁵¹ *Select Committee on Deep Well Boring, 1903*, 21

⁵² C.A. Scanlen, 'Pumping tests on boreholes', *AJCGH*, 36 (5), May 1910, 608.

⁵³ *Legislative Council Debates*, 1905, 23 and *Select Committee on Deep Well Boring, 1903*, 36.

⁵⁴ Saunders, 'Underground water', 321-22.

⁵⁵ *Select Committee on Deep Well Boring, 1903*, Appendix A: Minutes of Evidence of the Select Committee on Diamond Drills and Water Boring appointed by order of the Legislative Council, 10 August, 1899, viii.

⁵⁶ Cape of Good Hope, *House of Assembly Debates*, 1890, 286.

⁵⁷ See for example J. Barrow *An Account of Travels into the Interior of Southern Africa in the Years 1797 and 1798*, Volume 1 (London, 1801), 376-377; J-P Goubert, *The Conquest of Water* (Princeton, 1989), 31-34 and Krautwurst, 'Water-witching'.

⁵⁸ See for example P.S. Landau, When rain falls, rainmaking and community in a Tswana village c.1870 to recent times, *International Journal of African Historical Studies*, 26, 1, 1993, 1-30 and P. Jolly, Some photographs of late nineteenth century San rainmakers, *South African Archaeological Bulletin*, 47, 1992, 89-93 for African rain making.

⁵⁹ RJMC, 'The divining rod once more', *AJCGH*, 32 (1), January 1908, 117.

⁶⁰ T. Watson, ‘How to use the divining rod’, *AJCGH*, 33 (2), August 1908, 247; H.J.H. Claassens, ‘How to use the divining rod’, *AJCGH*, 33 (3), September 1908, 392 and W.M. Fraser, ‘The divining rod problem’, *SAAJ*, 2, 1911, 365.

⁶¹ R.H. Pringle, ‘Water finding by the divining rod’, *AJCGH*, 29 (2), August 1906, 274 and B.M. Bowker, ‘The divining rod not a fraud’, *AJCGH*, 30 (6), June 1907, 825.

⁶² See for example F.P. Retief, ‘Water boring and water finding’, *AJCGH*, 25 (6), December 1904, 732.

⁶³ *Select Committee on Deep Well Boring, 1903*, 16

⁶⁴ *Select Committee on Deep Well Boring, 1903*, Appendix A, xvii

⁶⁵ *Select Committee on the Geological Survey, 1895*, 8.

⁶⁶ *Select Committee on the Geological Survey, 1895*, 21.

⁶⁷ C.E. Lawford, ‘Irrigation’, *AJCGH*, 27 (6), December 1905, 705.

⁶⁸ Cape of Good Hope, *Report of the Hydraulic Engineer*, 1880 [G27-81], 50.

⁶⁹ *Report of the Hydraulic Engineer, 1880*, 15.

⁷⁰ Cape of Good Hope, *Report of the Inspector of Water Drills, 1895* [G22-96], 4. See also W.H. Wayland, ‘Water drills and water boring’, *AJCGH*, 30, 4, April 1904, 559.

⁷¹ Saunders, ‘Underground water’, 315.

⁷² P.Joubert Viljoen, ‘Boring for water’, 371.

⁷³ See W.J. de Kock and D.W. Kruger (eds), *Dictionary of South African Biography*, Volume 2 (Cape Town, 1972), 410-11 for Logan and *Legislative Council Debates*, 1899, 60-61; 1902, 256-57; 1903, 194-95 for examples of his outspoken public advocacy of “deep well boring”. Logan also instigated and chaired successive Legislative Council select committee investigations into the subject in 1903 and 1904.

⁷⁴ ‘Water boring’, *AJCGH*, 28 (2), 1 February 1906, 454.

⁷⁵ Warner, ‘Origin of igneous dykes’, 264.

⁷⁶ Scanlen, ‘Pumping tests’, 608.

⁷⁷ See also Krautwurst, ‘Water-witching’, 6-10 for the celebrated German water diviner J.R.P.A. von Uslar employed by the German South West African authorities between March 1906 and August 1908, during which time he divined 217 sites with an 80% success rate. There is no indication whatsoever that von Uslar’s work had any impact on the Cape debate.

⁷⁸ RJMC, ‘The diving rod once more’, 117.

⁷⁹ H.L. Dugmore, ‘The diving-rod and water-finders, *South African Agricultural Journal* [hereinafter *SAAJ*], 1, 1911, 114.

⁸⁰ E, ‘The diving-rod problem’, *SAAJ*, 2, 1911, 512. Inclusion of correspondence from the latter journal was precluded by the apparent absence of a complete set of the *Farmers Weekly* (established c.1904) anywhere in the country. The earliest (incomplete) volume traced to date being that for 1917 held in the National Library, Cape Town. The official archive of the water boring branch has also inexplicably disappeared.

⁸¹ C.E. Liebenberg, ‘The diving rod’, *AJCGH*, 29 (6), December 1906, 821; E.H.R. Evans, ‘The divining rod – is it a fraud?’, *AJCGH*, 31 (5), November 1907, 594 and F. Biggs, ‘The divining rod again’, *AJCGH*, 31 (2), August 1907, 206.

⁸² Another Sceptic, *AJCGH*, 31 (5), November 1907, 596.

⁸³ See Editorial comment *AJCGH*, 29 (2), August 1906, 274 and 31 (5), November 1907, 596.

⁸⁴ Evans, ‘The divining rod – is it a fraud’, 594.

⁸⁵ H. Francis, 'The divining rod', *AJCGH*, 31 (3), September 1907, 346.

⁸⁶ See L.G. Green, *Karoo* (Cape Town, 1955), 178-82; E. Palmer, *The Plains of Camdeboo* (London, 1966), 30-32 and G. Butler, *Tales of the Old Karoo* (Johannesburg, 1989), 26-35 for the endurance of both the image and practice of water divining in the Karoo.

⁸⁷ J.E. Contat, 'The divining-rod problem', *SAAJ*, 2, 1911, 512.

⁸⁸ *Barrow Travels*, 376-377.

⁸⁹ A.G. Earlink, 'The divining rod – is it a fraud?', *AJCGH*, 30 (5), May 1907, 703.

⁹⁰ SSS, 'The divining rod', *AJCGH*, 33 (6), December 1908, 799. See also Erlank, 'The divining rod', 703 and W. St Leger Seaton, 'The divining rod', *AJCGH*, 34 (2), February 1909, 215.

⁹¹ E.H.R. Evans, 'The divining rod on trial', *AJCGH*, 32 (1), January 1908, 119 and RJMC, 'The divining rod once more', 117.

⁹² J.M. Bowker, 'The divining rod – a challenge', *AJCGH*, 31 (6), December 1907, 720; Henkel, 'The divining rod', 718 and Evans, 'The divining rod on trial', 120 and W.H. Collett, 'Successful water-finding with the rod', *AJCGH*, 32 (3), March 1908, 377..

⁹³ Evans, 'The divining rod on trial', 120.

⁹⁴ Bowker, 'The diving rod not a fraud', 825.

⁹⁵ The quote is from Erlank, 'The diving rod', 704. See for example G.J.P. Sinclair, 'Water finding by the diving rod', *AJCGH*, 29 (4), October 1906, 538; Liebenberg, 'The divining rod', 821-22; Biggs 'The diving rod again', 206-7 and RJMC, 'The divining rod once more', 117 for electricity.

⁹⁶ Sinclair, 'Water finding by divining rod', 538; Bowker, 'The divining rod not a fraud', 824-25; B.M. Bowker, 'The divining rod and underground water supply', *AJCGH*, 32 (4), April 1908, 514; Quod Sciam, 'Water finding with the rod', *AJCGH*, 32 (6), June 1908, 775; R.E. Goodale Oertel, 'The divining rod problem', *SAAJ*, 2, 1911, 121.

⁹⁷ Zulu, 'The divining rod problem', *SAAJ*, 2, 1911, 684.

⁹⁸ *Legislative Council Debates*, 1899, 61.

⁹⁹ See for example Fraser, 'The divining rod', 365-66; Witness, 'The divining rod problem', *SAAJ*, 2, 1911, 683.

¹⁰⁰ C.A. Fincham, 'The divining rod', *AJCGH*, 31 (3), September 1907, 345-46.

¹⁰¹ RJMC, 'The divining rod – is it a fraud?', *AJCGH*, 31 (5), November 1907, 596.

¹⁰² Farmer, 'The divining rod problem', *SAAJ*, 2, 1911, 684.

¹⁰³ H. Francis, 'The divining rod', *AJCGH*, 31 (3), September 1907, 346 and Evans, 'The divining rod – is it a fraud', 595 and 'The divining rod on trial', 119.

¹⁰⁴ See F. Biggs, 'Suggested comprehensive test for the divining rod', *AJCGH*, 31 (6), December 1907, 723-25; J.M. Bowker, 'The divining rod controversy', *AJCGH*, 32 (2), February 1908, 241; F.N. Bellingan, 'Another divining rod challenge', *AJCGH*, 32 (3), March 1908, 378; F. Biggs, 'The suggested divining rod tests', *AJCGH*, 32 (4), April 1908, 519; W. St Leger Seaton, 'Divining and drilling for water', *AJCGH*, 34 (4), April 1909, 440-41 and L.C. Nel, 'Divining and drilling', *AJCGH*, 35 (4), October 1909, 493.. The quote is from Biggs, 'The suggested'.

¹⁰⁵ Cape of Good Hope, *Report of the Select Committee on Water-boring and Diamond Drills, 1904* [C7-1904], 11.

¹⁰⁶ See for example R. Lankester, 'The divining-rod and water-finders', *AJCGH*, 37 (6), February 1910, 708-11; 'An explanation of the divining rod problem', *SAAJ*, 1, 1911, 585 and W. Ingham, 'A few notes on water divining', *South African Journal of Science*, 9, 1913, 203-05.

¹⁰⁷ C.A. Scanlen, 'Artesian well sinking and its uses in general', *AJCGH* 34 (3), March 1909, 298.

¹⁰⁸ Lawford, 'Irrigation', 706. and C.H.D. Braine, 'The possibilities of irrigation in South Africa', *AJCGH*, 24 (1), 1 January 1904, 52.

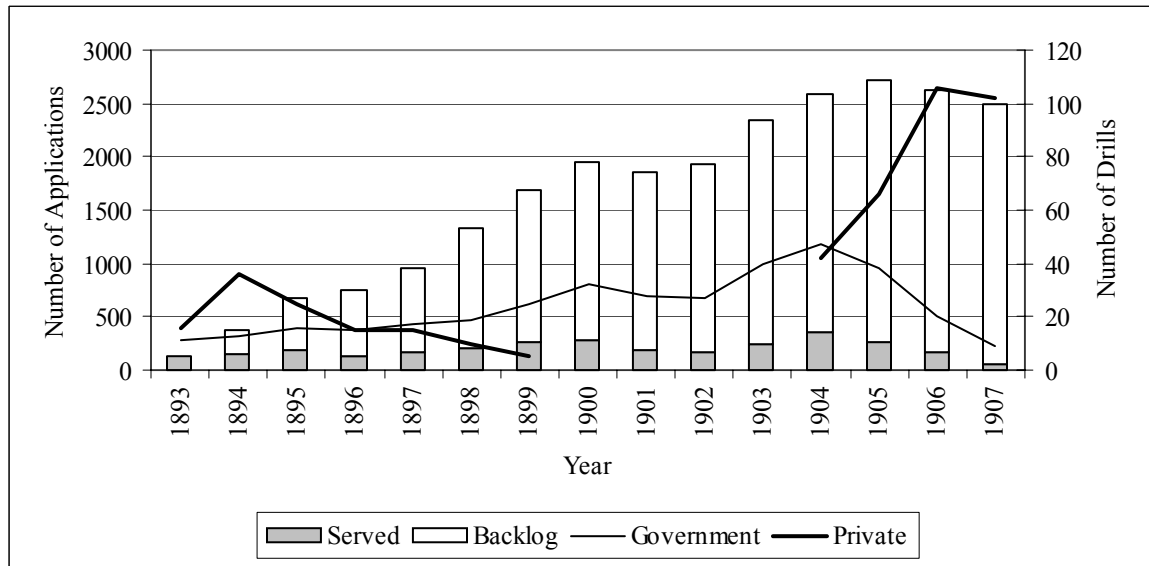
¹⁰⁹ Brown, 'Irrigation', 771 and see for example W. Beinart, 'Vets, viruses and environmentalism at the Cape' in T. Griffiths and L. Robin (eds.), *Ecology and Empire* (Pietermaritzburg, 1997), 87-101; M. Tamarkin 'Flock and volk: ecology, culture, identity and politics among Cape Afrikaner stock farmers in the late nineteenth century', paper presented at African Environments Past and Present conference, St Antonys College Oxford, 5-8 July 1999 and D. Nel, 'For the public benefit: livestock statistics and expertise in the late nineteenth-century Cape colony 1850-1900' in Dubow *Science and Society*, 100-115.

¹¹⁰ Krautwurst, 'Water-witching', 18.

¹¹¹ See J. Peires, *The Dead Will Arise* (Johannesburg, 1989) for the classic nineteenth century African case. Conversely, the enduring prophetic tradition within Afrikaner culture, whose best known embodiment, Siener Van Rensburg, cast a long shadow over twentieth century white politics, has been entirely ignored by academic historians.

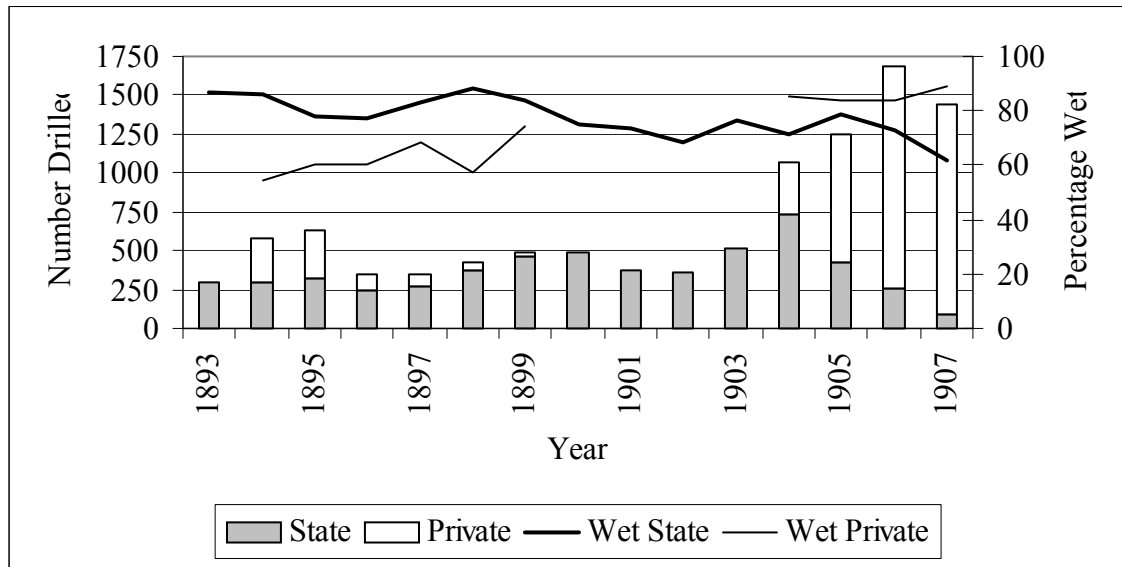
¹¹² Fraser, 'The divining rod problem', 365-66.

Figure 1: State Water Boring 1893-1907¹



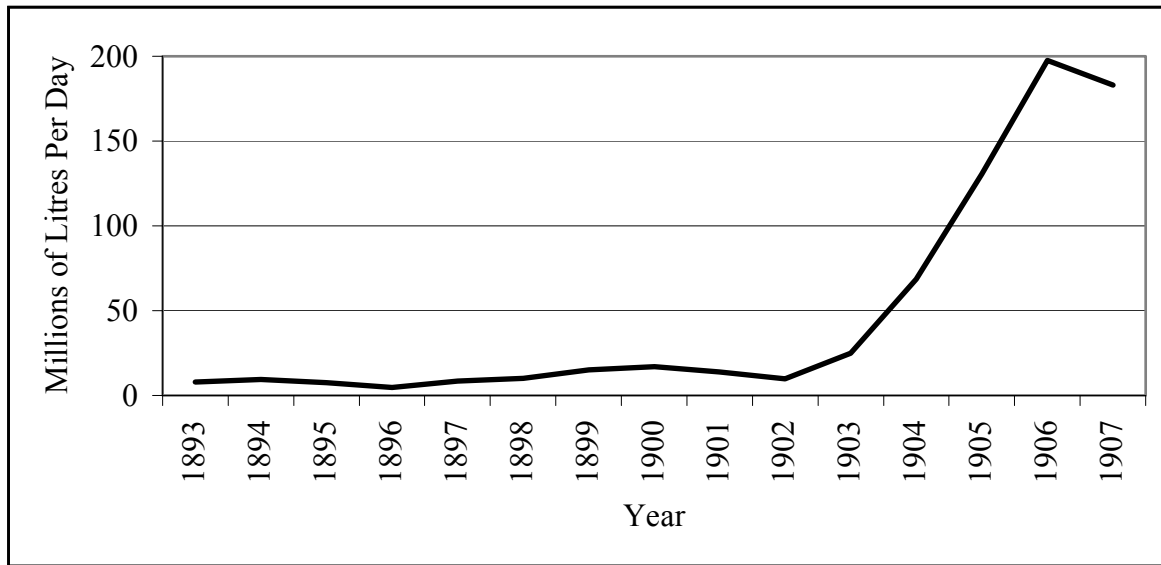
¹ Calculated from Cape of Good Hope, *Report of the Inspector of Water Drills, 1893-97*; Cape of Good Hope, *Report of the Chief Inspector of Public Works, 1898-1904* and Cape of Good Hope, *Report of the Engineer-in-Chief of Public Works, 1905-07*.

Figure 2: The Underground Water Rush, 1893-1907²



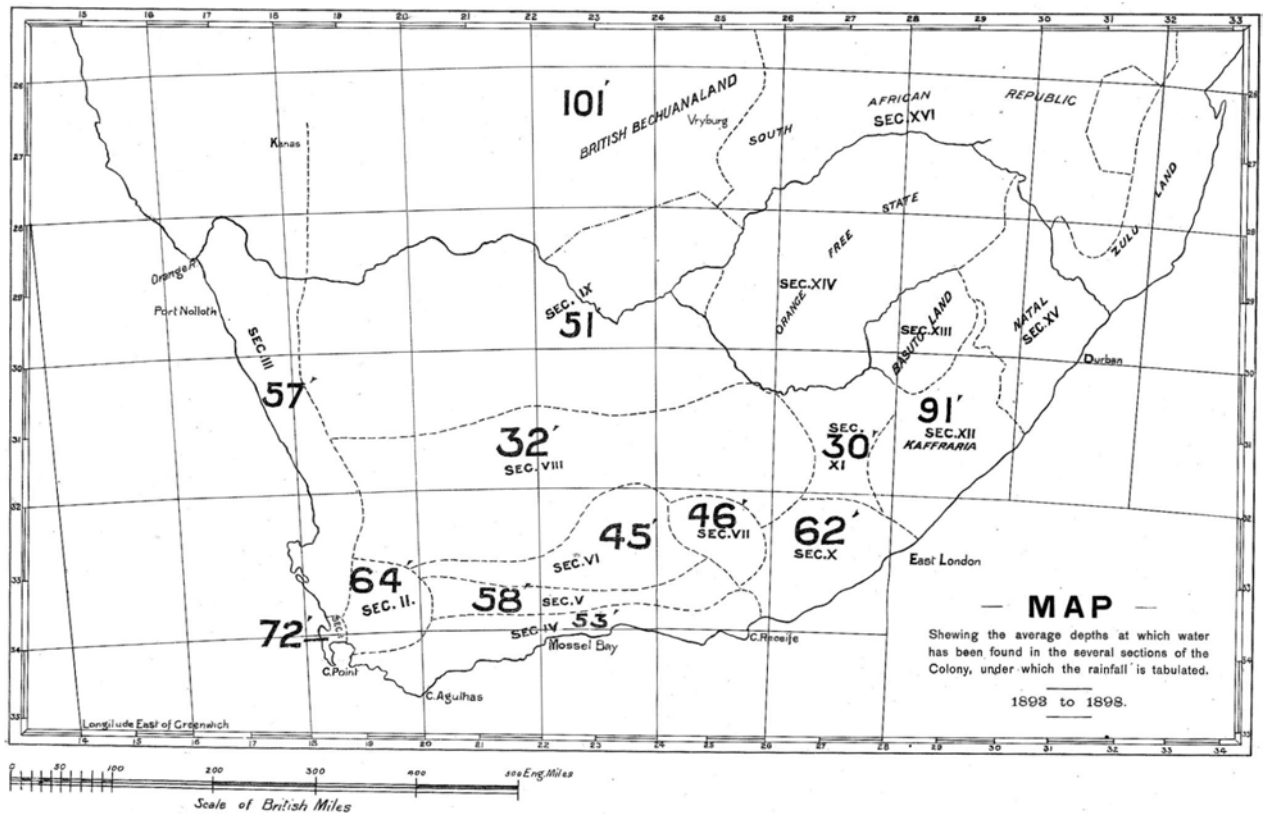
² Calculated from *Report of the Inspector of Water Drills, 1893-97*; *Report of the Chief Inspector of Public Works, 1898-1904* and *Report of the Engineer-in-Chief of Public Works, 1905-07*.

Figure 3: “Proved” Underground Water Supply, 1893-1907³



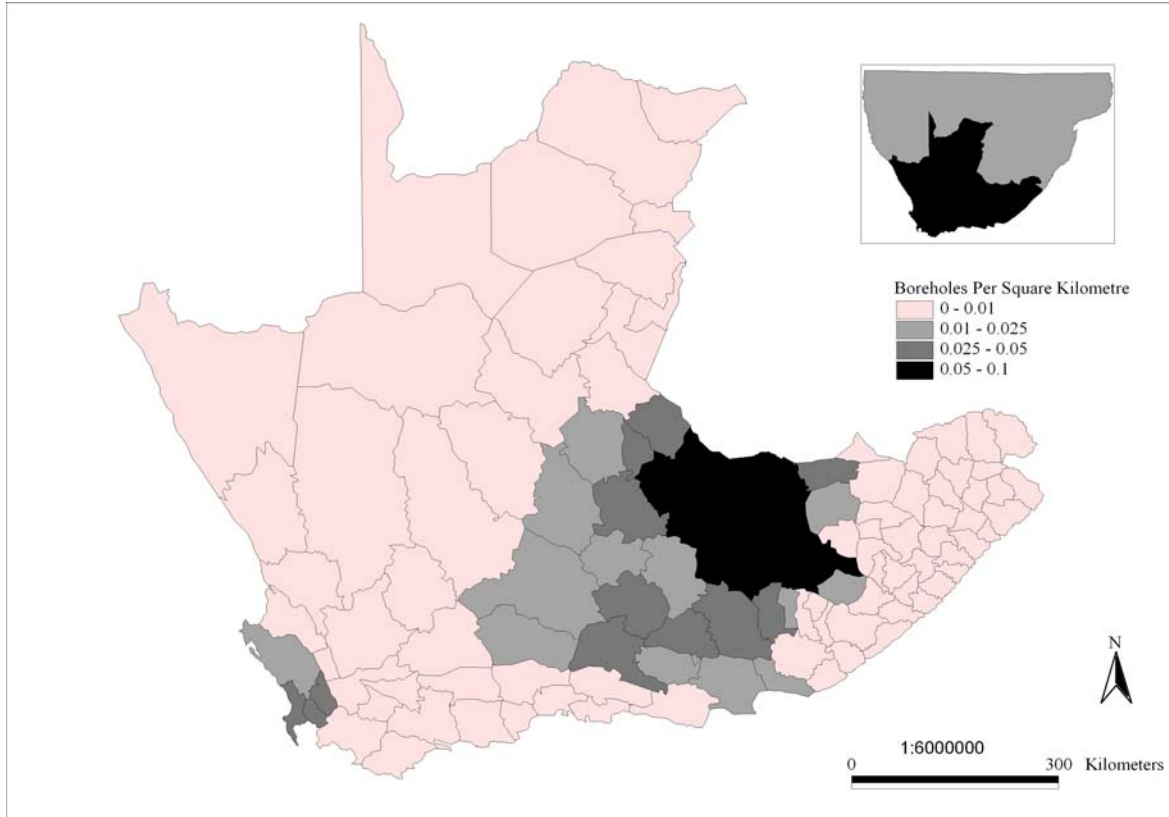
³ Calculated from *Report of the Inspector of Water Drills, 1893-97*; *Report of the Chief Inspector of Public Works, 1898-1904* and *Report of the Engineer-in-Chief of Public Works, 1905-07*.

Figure 4: Underground Water Horizons of the Cape Colony, 1899⁴



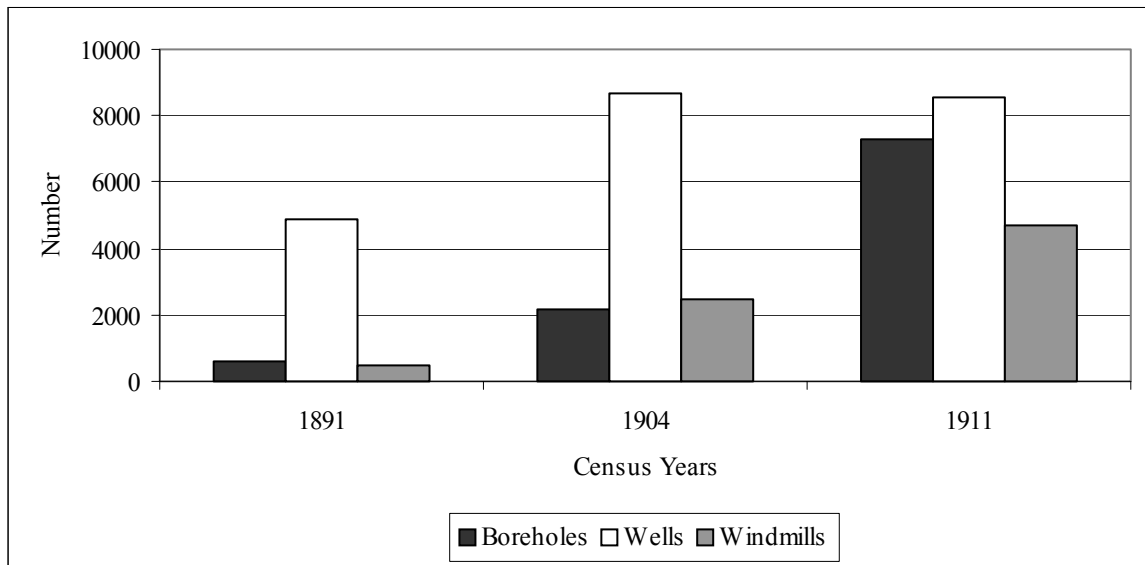
⁴ Cape of Good Hope, *Report of the Chief Inspector of Public Works, 1898* [G53-99], 4-5.

Figure 5: Boreholes per Square Kilometre in the Cape, 1911⁵



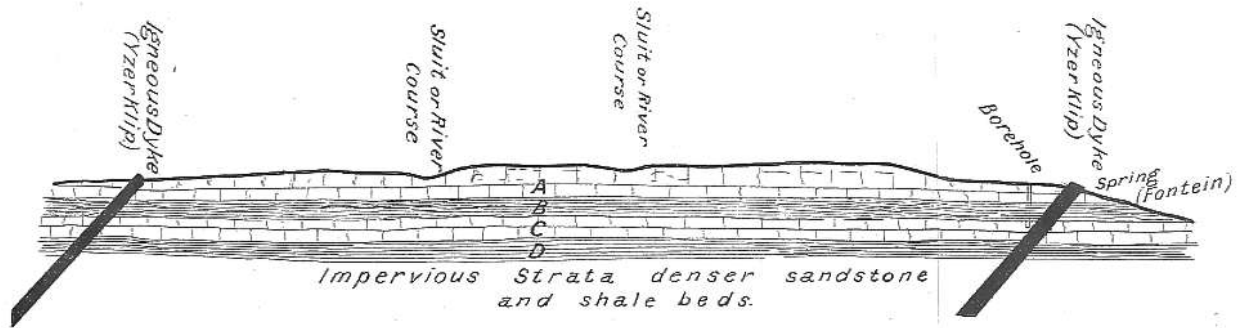
⁵ Compiled from data contained in Cape of Good Hope, *Census 1911*, Part 9 [G32h-1912]. Thanks to Nick Lindenberg, University of Cape Town GIS Laboratory for the map.

Figure 6: Cape Colony: Boreholes and Windmills, 1891-1911⁶



⁶ Calculated from *Census 1911*.

Figure 7: The Official Geology of the Upper Karroo⁷



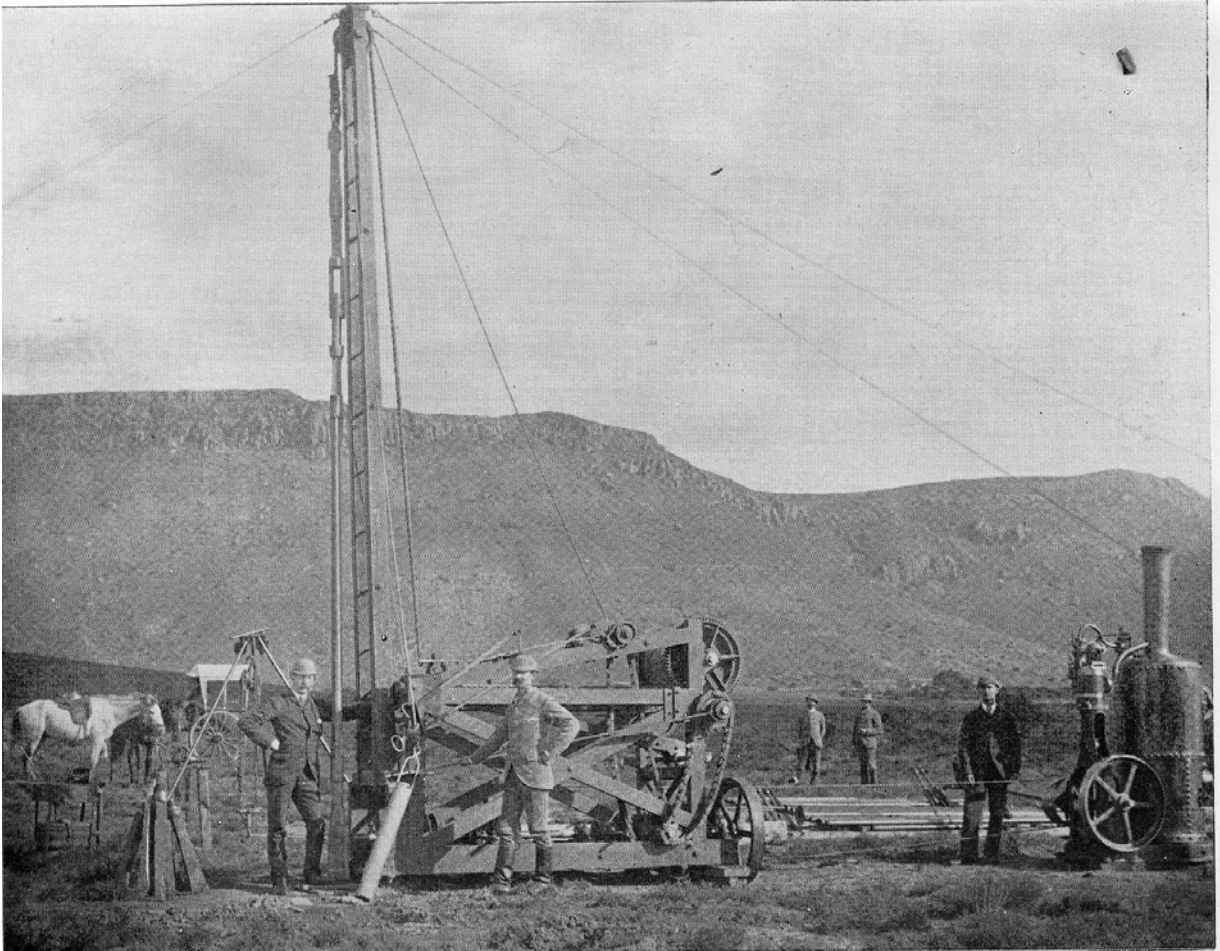
- A Pervious Sandstone.
- B Partly pervious Shale.
- C Pervious Sandstone.
- D Impervious Shale.

Sections of Upper Karroo, or "Flowing-water" Area.

N.B. — The Vertical Scales are exaggerated in order to illustrate more clearly the water-bearing beds.

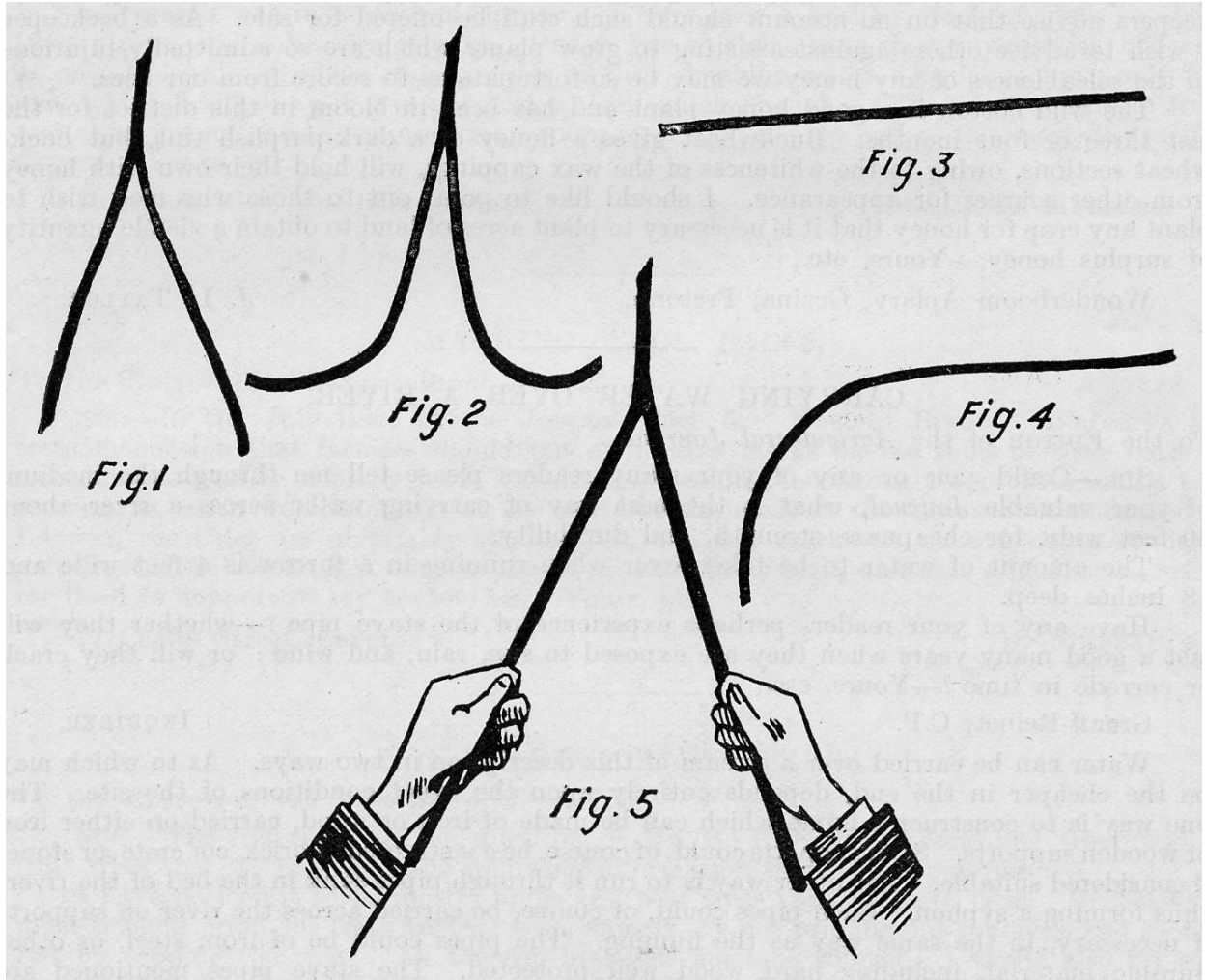
⁷ H.P. Saunders, 'Underground water supply of the colony', *AJCGH*, 11 (4), 19 August 1897, facing 186.

Figure 8: State Water Drill, Graaff Reinet, c.1896⁸



⁸ Wallace, *Farming Industries*, facing 60.

Figure 9: The Divining Rod⁹



⁹ G.B. Newman, 'The divining rod problem', *SAAJ*, 2, 1911, 264.