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OF THE
BRITISH SOCIETY OF DOWSERS

Vol. II. No. 16 June, 1937

CONTENTS

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BRITISH SOCIETY OF DOWSERS

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OBJECTS OF THE SOCIETY

(*a*) To encourage the study of all matters connected with the perception of radiation by the human organism with or without an instrument.

(*b*) To spread information amongst members, by means of a journal, lectures and other means, about the use of dowsing for geophysical, medical and agricultrual and other purposes and for tracing objects animate or inanimate.

(*c*) To keep a register of dowsers for water, minerals, oil, and for other purposes.

RULES OF THE SOCIETY

I.—Membership.

The Society is open to all persons interested in radiation-perception.

The Council has power to appoint honorary members.

II.—Subscription.

The subscription is five shillings per annum, or three guineas for a life member.

III.—Management.

The Society will be managed by a Council consisting of a President, who will act as Chairman, and five members, one of whom will act as Treasurer and Secretary.

The President and members will be replaced as necessary by the Council, appointments being confirmed at a General Meeting.

All questions regarding the publication of the journal, lectures, meetings, etc., will be settled by the Council.

Decisions of the Council will be arrived at by correspondence if necessary, the facts being recorded in the Minute Book.

Decisions will be decided by a majority vote, the Chairman having a casting vote.

The Council has power to co-opt other members for special purposes.

IV.— Accounts.

The financial year will be from July 1st to June 30th.

Accounts will be published annually within two months after the end of the financial year.

Accounts will be audited privately.

V.—General Meeting.

A General Meeting will be held annually, and other meetings when considered necessary by the Council.

JOURNAL OF THE
BRITISH SOCIETY OF DOWSERS

Vol. II. No. 16 June, 1937

NOTICES

We deeply regret to record the death of Major R. Creyke, late of the Scots Guards, who passed away in his sleep on Friday, April 30th.

Endowed with intellectual ability of a high order and with a gift for concentrated study, there were few branches of science which he was not qualified to discuss and several in which he was an expert.

Dowsing was one of the subjects in which he took a keen interest. He made a critical study of the methods of the best French water diviners and by careful experimentation gradually developed a method of his own which gave excellent results, aided as he was by an extensive knowledge of geology.

It is worthy of mention that he was a believer in " samples " for selective purposes, having finally adopted their use in preference to that of " colours."

Unlike so many continental experts, he wisely refrained from the temptation of formulating theories, but devoted his efforts to the perfecting of a reliable technique.

An original life member of this Society, he was ever active in attracting new adherents, and did much to advance the practice of water-divining by instructing others in his methods.

He was a contributor to this Journal under the name of " Elvan," and his valuable article on the " Point Depth Method," which originally appeared in September, 1935, is reprinted with some extra information in this number.

* * * * *

We also regret to record the death, on April 30th, of Mr. Thomas John Pugh, of Cowbridge, Glamorganshire, a member of this Society. He was well known throughout South Wales as a successful water diviner.

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The Summer Meeting this year is, by the kindness of Mr. and Mrs. Darlington, being held on the afternoon of June 12th at Hazelhurst, Frant. Members who have not received a notice should apply to the Editor.

This number ends Volume II. of the Journal. A title page and list of contents is being printed for the benefit of members who wish to have their copies bound, and will be sent to any member applying to the Editor.

* * * * *

Lieut.-Colonel H. M. Edwards, D.S.O., has kindly consented to undertake the duties of Hon. Secretary and Treasurer, pending the confirmation of a General Meeting under Rule III., on the resignation of Mr. T. R. Whitley.

* * * * *

The Editor would be glad to know whether any member has a copy of No. 11 Journal (March, 1936) to dispose of.

* * * * *

Mumetal rods can be obtained from The Telegraph and Construction Company Ltd., Telcon Works, Greenwich, for about £2 10s. This price will be reduced to £1 10s. if there are sufficient purchasers. It is suggested that any member requiring one of these rods should apply to the Editor.

* * * * *

Angle rods with a swivel handle can be obtained from Messrs. Windley Bros., Crown Works, Chelmsford, for 6s. 6d. post free to any address in England.

* * * * *

Messrs. Devine and Co., St. Stephen's Road, Old Ford, London, E.3, supply pendulums of whale ivory, with central suspension and cavity for sample, at the price of 6s., and other dowsing instruments.

They also supply whalebone for rods, cut to size.

* * * * *

Pendulums of rosewood can be obtained from the Hon. Secretary at 3s. each.

* * * * *

Communications for the Editor, and inquiries, should be sent to Colonel A. H. Bell, York House, Portugal Street, London, W.C.2.

LOCATION OF UNDERGROUND WORKINGS BY THE ELECTRICAL RESISTIVITY METHOD

(A Lecture delivered by E. P. Wilson, A.M.I.Mech.E., to the British Society of Dowsers on February 17th, 1937).

Introduction.—From time to time subsidences have occurred at Norwich. In the early part of this year there was a subsidence in the City which resulted in the collapse and disappearance of property and loss of lives. It was thought that this may be due to underground workings carried out many years ago, and running from an old chalk working now filled in, but no records were available to give any indication of the existence of these.

As the recent subsidence was very close to the new Corporation Hospital in course of construction, it was thought advisable to investigate the possibility of any workings existing beneath the site.

It was suggested by the City Engineer that boreholes should be put down, each to a depth of 100ft., in the hope of striking any workings should they exist beneath the site. As the site to be tested covered an area of about 4,000 square yards, this would have meant putting down over 100 borings costing several thousands of pounds, in order to make sure that the site had been thoroughly tested.

It was then suggested by Messrs. Le Grand, Sutcliff and Gell Ltd., the well-known consulting and contracting water well engineers of London, that an Electrical Resistivity Survey over the site might locate any underground workings if they existed, in which case, the survey, together with a limited number of boreholes, would prove the existence or otherwise of any workings at a very much reduced cost. Electrical Resistivity Surveys had been carried out to determine thicknesses of strata in connection with underground flood relief sewers, gravel deposits, and reservoirs, and the results obtained had been proved to be very successful, but had not been used before to locate underground workings of this nature.

Earth Resistivity Method.—In the resistivity method, a measured electrical current is passed through the earth between two electrodes, and the potential difference, due to the flow of this current between two other electrodes, is measured. The quotient of the potential difference and the current gives a resistance, and from the value of this resistance and the disposition of the electrodes, a value can be determined for the specific resistance of the soil. This "specific resistance" will not in general be a true specific resistance, since the earth is far from homogeneous, and is referred to as the "apparent specific resistance."

The method consisted of using four electrodes, two for passing the current into and out of the ground, and two for the measure-

ment of the potential difference. The four electrodes were placed in a straight line at equal intervals as show in Fig. 1.

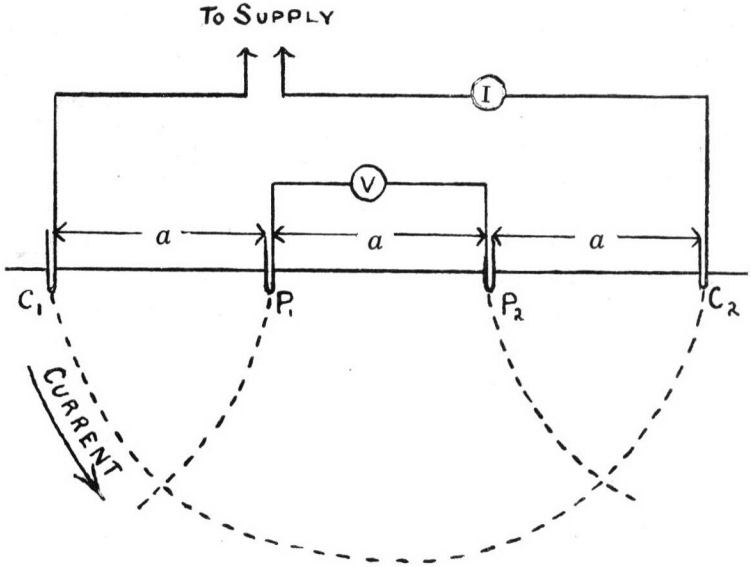


Fig. 1.

I = current flowing between the outer electrodes.
V = potential difference between the inner electrodes.
a = electrode separation.
p = specific resistance of the soil, is given by the formula

$$p = 2\pi a \frac{V}{I}.$$

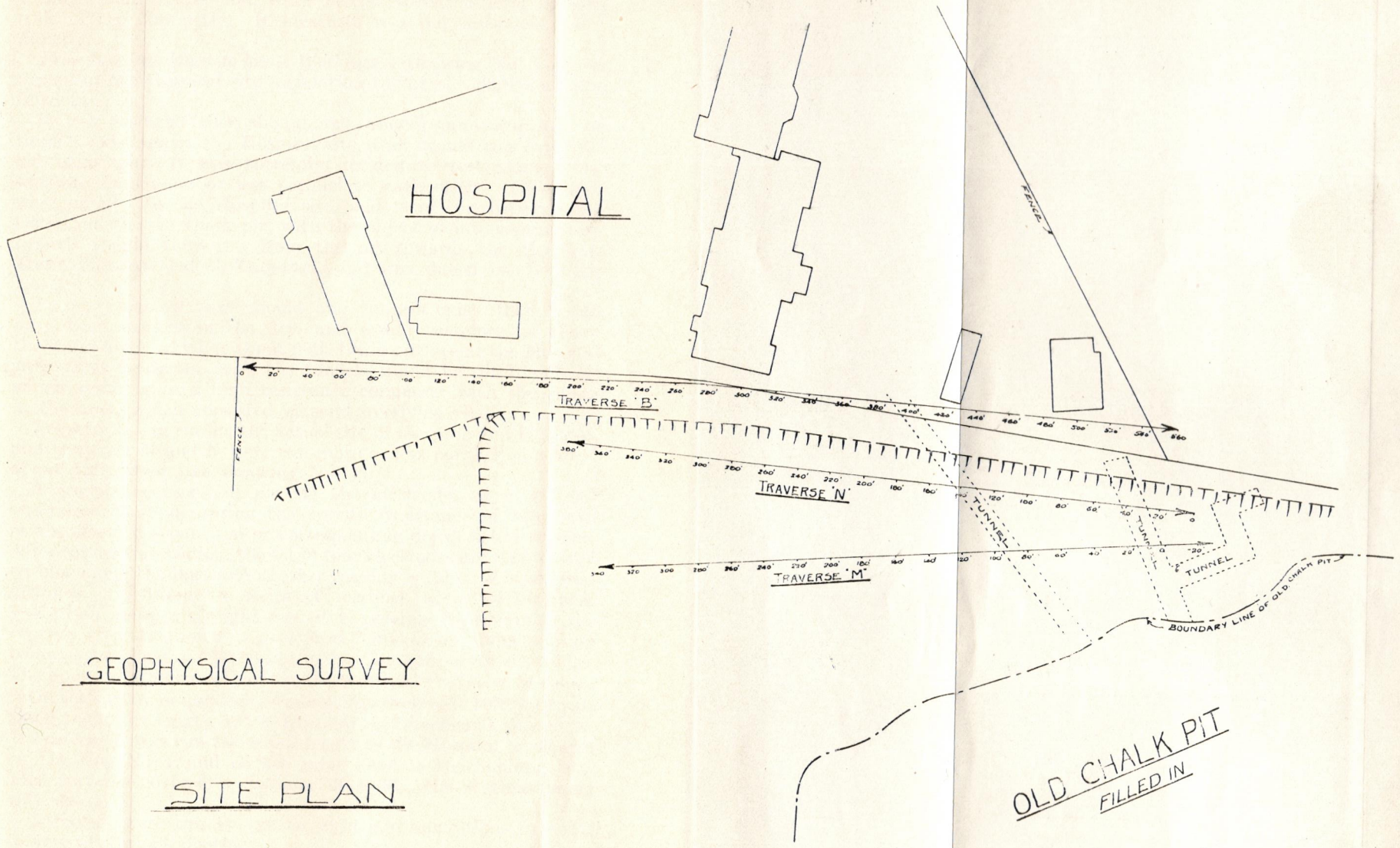
The value of p is an average value, and is affected by the nature of the strata and their depth in relation to the separation "a."

If the quotient $\frac{V}{I}$ is represented by a resistance R this formula becomes— $p = 2 \pi a R$.

By this method it is therefore possible to measure the specific resistance of strata to any depth—limited only by the instruments used—by varying "a," *i.e.*, the electrode separation.

As most strata have different resistances (*i.e.*, clay and gravel), it is possible to determine the thickness and depth of the strata being surveyed by the use of master curves and formulæ obtained by mathematical investigation.

Machine Used.—The machine used at Norwich was an Earth Testing Megger so designed that back E.M.F. or stray currents do not effect the test in any way. The "Megger" Earth Tester



GEOPHYSICAL SURVEY

SITE PLAN

DRAWING Nº 1.

LE GRAND, SUTCLIFF & GELL LTD.

mentioned above comprises an ohmmeter and generator of special type, so designed that alternating current is used in the testing circuit in the soil, while direct current is used in both coils of the ohmmeter. It measures required resistance "R" directly.

Procedure employed to locate Workings.—Drawing No. 1 shows a plan of the Hospital site in relation to the old chalk pit, now filled in.

It was assumed that should any underground workings or tunnels exist under the Hospital site, they would run from the old chalk pit. It was therefore decided to test along three separate lines more or less parallel to each other. These lines were parallel to the Hospital site, and were run between the latter and the old chalk pit, with the object of intercepting any tunnels should they run from the pit towards the Hospital. These lines are called Traverses, and are shown on Drawing No. 2.

It was reasoned that should any tunnels exist, they would have been worked in the dry, and would therefore be above the water level, which is about 90ft. below surface at the Hospital site. This being the case, the tunnels would be filled with air which would give a high resistance compared with the strata in the area, which consisted of sand overlying chalk.

Traverse B was run on the actual site of the proposed Hospital, and traverses M and N were run more or less parallel on ground about 12ft. lower (see Drawing No. 1).

A traverse consists of placing the electrodes at a selected separation, and measuring the specific resistance of the earth at the selected separation or corresponding depth below surface. After taking the reading, the set of four electrodes are then moved en bloc along the line, and another reading is taken at a selected distance. By taking a series of readings at a set electrode separation along a straight line, it is possible to determine the contour of a stratum or a geological fault, or anything unusual below ground level along this line within the range of the electrodes. The points at which readings are taken are referred to as Stations.

On the survey in question, readings were taken at 10ft. intervals along the entire length of the Hospital on traverses B, M and N.

Traverse B was run the whole length of the Hospital, as shown on Drawing No. 1, and on the same level as the building site. This traverse covered a distance of 560ft., the stations being 10ft. apart.

Traverses were run at various electrode separations in order to test at various depths.

Drawing No. 2 shows the plotted results in ohm feet of the various traverses, and it will be seen that electrode separations were taken at 30ft., 40ft., 60ft., 80ft. and 100ft.

The 40ft. separation on traverse B indicated high resistances

at the 265ft. mark and at the 345ft. mark. Boreholes were put down to test these points, but no underground workings were located.

Whilst not locating any tunnels, it was proved by the boreholes that large pockets of gravel, clay and stones existed below these points, and no solid chalk was met until a depth of about 65ft. below surface, whereas on other parts of the site the chalk was met at 18ft. below surface. This provided useful information for the design of the new foundations.

The 40ft. traverse or separation gives a comparatively low resistance at the 390ft. station, which would indicate that if a tunnel existed it would be between 40ft. and 60ft. below surface, as the 60ft. and 80ft. separations give a high resistance.

The 40ft. traverse can also be taken to represent to a certain degree the contour of the chalk, as it was found that the contour of any particular strata could be traced fairly accurately by using an electrode separation roughly equal to twice the average depth of the strata. This indicated a fold, giving rise to the question that it may have been a suitable site for driving a tunnel under, in which case it should be beneath the 390ft. station.

On exploring by means of a borehole, it was found that a tunnel did exist beneath this station at 60ft. below surface, which confirmed the survey over this area, and the theory that a tunnel filled with air should give a higher resistance than the surrounding strata in this part of the country.

The traverse beyond this up to the 560ft. station is rather complicated, due to this part of the survey having to be taken over made up ground and old foundations, also folds in the chalk.

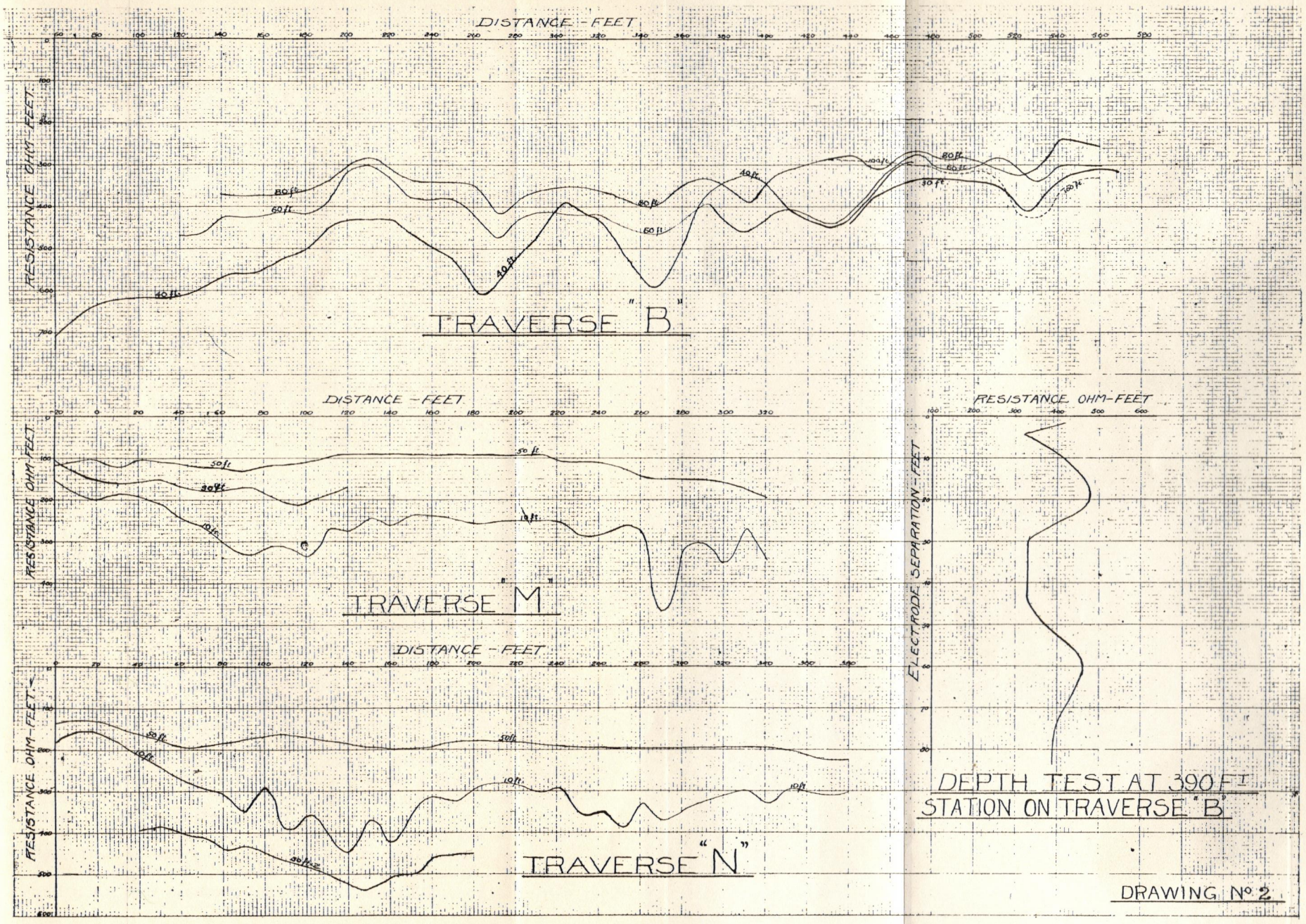
It was assumed that if a tunnel existed at say 50ft. to 60ft. below surface the electrode separations from 50ft. upwards should be affected, and also smaller separations to a certain extent, as it is known that a certain percentage of this current travels to a greater depth than the separation according to the strata. Working on above theory it appeared that something unusual existed in the vicinity of the 510ft. and 540ft. stations, the centre being about the 525ft. mark, as the various separations gave high resistance readings over this area.

The area was tested with boreholes, but no tunnels were located.

It is interesting to note, however, that a tunnel located on traverses M and N did run to within 25ft. of the 525ft. mark on traverse B, and there is no doubt that this was affecting the readings. The tunnel was about 15ft. square and 48ft. below surface, but, as mentioned, stopped short of the actual building site.

Traverses M and N.—In order to make certain that no tunnel had been missed, traverses M and N were run more or less parallel to traverse B as shown on Drawing No. 1.

From the plotted readings shown in ohm feet on Drawing


DISTANCE - FEET
RESISTANCE OHM-FEET
80 ft
60 ft
40 ft
TRAVERSE "B"
DISTANCE - FEET
RESISTANCE OHM-FEET
50 ft
30 ft
10 ft
TRAVERSE "M"
DISTANCE - FEET
RESISTANCE OHM-FEET
50 ft
30 ft
10 ft
TRAVERSE "N"
RESISTANCE OHM-FEET
ELECTRODE SEPARATION - FEET
DEPTH TEST AT 390 FT
STATION ON TRAVERSE "B"
DRAWING No. 2

No. 2, it will be seen that beyond the 120ft. station on traverse M, and the 190ft. station on traverse N, nothing unusual is shown. The 50ft. separation shows higher resistances towards the end of the traverses, but this is due to the ground having a higher resistance at this end.

Traverse M.—As the 50ft. electrode separation between stations 20ft. and 120ft. did not give any definite point to bore, a 30ft. electrode separation was run between these points which may be affected down to about 40ft. to 45ft. below surface. At the 95ft. mark (see Drawing No. 2), the resistance was higher than elsewhere, and it was decided to bore on this mark. The borehole penetrated a tunnel at 31ft. to 41ft. below surface, the chalk being met at 9ft. below surface.

Attention was then given to the curves obtained between the 0 and 20ft. stations. A test bore put down on the 20ft. station proved the chalk at about 35ft. below ground level, whereas it was only 9ft. at the 95ft. mark. Traverses M and N were run over ground, the level being 12ft. lower than the ground over which traverse B was run, the sharp sand and ballast having been removed in the past for brick making.

The results of small test holes compared with the traverse, proved that the overburden over these traverses had a lower relative resistance than the chalk beneath, whereas it was the opposite over traverse B. The location of a pocket at the 20ft. station on traverse M, which appeared to run to a peak at the 10ft. station, indicated that a tunnel may exist in this area, as the 30ft. traverse is still of a high resistance, although there is about 35ft. of overburden of a low resistance at this section.

As a matter of interest, the reciprocal of the specific Resistance would have to be plotted in this case to obtain the contour of the chalk, as the top layer (overburden) has a lower resistance than the lower (*i.e.*, the chalk).

A peg was driven into the ground at the 10ft. station as a site for boring. Instead of boring, however, a shaft was put down to the tunnel beneath the 95ft. mark on traverse M, and a heading driven parallel to the traverse towards the 10ft. station, so as to cut any tunnels should they exist between these points. No tunnels were encountered until the heading reached the 15ft. mark, but at this point it entered a tunnel 15ft. square, the centre of the tunnel being under the 10ft. station. This confirmed the survey over this part of the traverse.

It was found that this tunnel ran in a direct line to the 525ft. mark on traverse B, but stopped short, as mentioned earlier on, when dealing with traverse B.

Traverse N.—Similar operations were carried out over this traverse. It will be seen from Drawing No. 2 that the 30ft. separation shows a high resistance at the 145ft. mark. A boring put down here penetrated a tunnel between 35ft. and 45ft. On

investigating, it was found that it was a continuation of the tunnel located at the 95ft. mark on traverse M, and crossed the 395ft. mark on traverse B, where it was located in the first place.

Depth Tests.—After locating the tunnels by the traverses, the depth of these were ascertained by depth tests before boring. This is carried out by taking a fixed point over one of the tunnels and by readings taken every 5ft., by moving the electrodes to correspond to the depth required and keeping the station fixed.

The depth curve on Drawing No. 2 shows the type of curve obtained, the tunnels being indicated by a high resistance reading.

Polar Test.—This is used to find the direction of the tunnel after locating this by a traverse. A fixed station is selected over the tunnel, and the electrodes placed at a selected separation. A 30ft. separation was used in this case on the lower ground.

The station is kept fixed and the electrodes moved round in a circle en bloc pivoting on the station. Readings are taken at selected degrees completing the circle. On plotting these, it is found that the degree corresponding to the highest resistance reading will give the direction of the tunnel.

Conclusion.—To make sure that no tunnels had been missed by the survey, the City Engineer ordered headings to be driven the whole length of the traverses, but no further tunnels were located.

The result definitely indicates that the Electrical Resistivity Survey Method is eminently successful for investigations of this nature, at least in certain parts of the country where the strata are of a reasonably low resistance and where the dimensions and depths of the tunnels are suitable.

The cost of the survey work, in addition to twelve boreholes, was roughly 20 % of the cost of the original programme, which would have entailed at least 100 boreholes.

THE POINT DEPTH METHOD

By ELVAN

[The first part of this article appeared originally in *B.S.D.J.*, II.,9, September, 1935.]

It seems essential for progress that successful new methods which have been sufficiently developed and tested should be published so that other Dowsers may try them.

Nearly five years ago it appeared to the writer that two things were badly needed—a simple and accurate technique for measuring the depth of fissure streams, which did not require long experience or cumbrous apparatus—and a sound method of gauging the rate of flow in gallons per minute along the fissure. The technique developed for the latter, though reasonably reliable for flows up to a certain volume, has an unsolved pressure complication, and is not ready. But the depth method seems to have reached a satisfactory stage. Except for two improvements in the special tool employed, there has been no material development for three years. It is now giving results roughly to tape accuracy for several Dowsers, some of whom, though sound performers, have no great length of experience behind them.

That a metal rod stuck vertically into the ground acted as a " radiating point " for what might be below it was discovered at the end of 1930. This system of measuring depth has been gradually evolved from that discovery. A great deal of experimental work has been done, and quite a number of different metal " points " tried.

The well-known " insulated wire " technique, which M. Viré attributes to M. Probst, presents no difficulty to any Dowser, and is perhaps the most reliable of published methods ; but it involves the transport and setting up of much clumsy apparatus (a drum of wire alone is not very portable), sufficient space at right angles to the stream line, and is very slow. With the majority of methods normally used, considerable skill and experience are essential for any kind of accuracy ; quite a large margin is usually allowed, and the " off day " is always possible ; while a number appear to be purely psychic.

The " point " method needs space, but not necessarily at right angles to the stream line. It is very quick, and the " point " is little trouble to carry. During selection, rough pacing is good enough ; when the choice has been made and real accuracy is wanted, marking out with the rod often takes less time than measuring up with the tape.

The Point now used is a cylindrical rod of Mumetal, about half-an-inch in diameter. For convenience it can be made up as a walking stick, with a crook at one end and a slightly sharpened point at the other. Mumetal is an induction melted nickel iron

alloy of extremely high permeability, as its name implies. After it has been worked or bent it must be heat treated to restore its full magnetic properties.

The Technique.—The " point " is stuck vertically into the ground (as a rule 6in. is enough to hold it), just inside the " stream band "—*i.e.*, the band of radiation directly over the stream. The Dowser stands with the " point " immediately behind him, holding his rod and water sample. He then walks straight out from it. At a certain distance the rod will lift sharply ; a couple of feet or more beyond, the lift will fade out, and the counter pressure applied to the rod will make it flip down. The spots where these reactions occur should be carefully marked, and their distances from the " point " measured with a tape. Suppose these measurements are 57ft. and 60ft. ; the former is the depth of the top of the stream below the " point," the latter the depth of its base.

It is unnecessary to walk out at right angles to the stream line, the " depth band " lies round the " point " in a wide arc on both sides of the stream, fully 50 degrees on either side of the right angle. This is useful, as a line of sufficient length, free from obstacles or excessive slope, can usually be found within a reasonable angle to the perpendicular on at least one side of the stream.

While the point is in position, radiations from other objects will not be felt by the Dowser walking out from it. Last year I depthed two big streams of about equal size, flowing roughly parallel in the bedding at c. 150ft. down. In each case on the line taken, the " stream band " of the other stream was crossed before the " depth band " was reached ; in neither case was it felt.

If the " stream band " is narrow and the " depth band " wide, the flow is along a steeply inclined fissure ; a narrow " depth band " indicates a flat flow. Examination of the two bands thus provides useful information. For example, where a small flat flow is spread out widely, the pump will not draw it well ; and where a fissure is almost vertical and really deep, it offers a narrow target for a borehole.

The inside edge of the depth band can sometimes be fixed more sharply by re-crossing the band towards the point ; the drop is often cleaner than the lift ; but the best way to get the exact position of the edges is to turn sideways over them.

Occasionally there may be more than one stream below the point. I once examined a case where a minor flow at a shallower depth had been mistaken for the main stream. This minor flow had been cut by the borehole at about the depth given ; the main stream was much deeper. If there is a single flow below the point, the lifts over the stream and depth bands are roughly equal in strength. If there are two flows at different levels there will be two depth bands ; the relative importance of the

streams they represent can be judged by comparing the intensity of the reactions over them.

During the summer of 1933 I showed this technique to one of the most experienced and successful professional Dowsers, whom I will call " X." Some months later I discovered he had adopted it, having found it simpler and more accurate than any method he had used during over 30 years of professional dowsing.

At this stage a copper point was used. With copper there was a gentle lift at once ; perhaps half-way out this began to increase in strength ; so, though the final drop was good, it was by no means easy to judge just where the true lift came, especially if one was tired and touch had become a little dulled. In the spring of 1934 I tried a point of Low Moor soft iron. With this the preliminary lift did not occur, the true lift was sharp, and the whole action cleaner cut and stronger. This suggested that permeability might be the governing factor, so a Mumetal point was ordered.

Before it arrived, I saw " X " again and showed him the soft iron point. At first he was loath to leave it, saying he could not get his " current." Eventually he walked out protesting, he could feel nothing, and so forth ; suddenly he got a strong lift and stopped dead : his expression of delighted astonishment was most eloquent. The Mumetal point was a further improvement both in sharpness and strength, but the change from copper to soft iron was the real step forward.

Examples.—In 1933 " A " asked me to test him. I found he was a very good natural Dowser, and gave him a number of lessons. During the summer of 1934 he did his first three wells. The first was in Hampshire chalk ; being his initial attempt, he summoned an experienced local professional to assist. They found a good fissure stream, which the expert said was about 50ft. ; using the copper point, " A " made it 45ft. The borehole cut the fissure at 45ft., the water rose up it to 13ft., and the supply proved more than ample.

The other two were in slate (Macduff group, Highland schists). The first taped 35ft., which proved correct. The second, two miles N. and 300ft. lower, was sited on a steep slope. Accurate measurement proved impossible ; it was judged to be 39ft. ; the fissure was cut at 36ft.

Early in 1935 " B," whom I had coached in September, was asked by an engineer friend to find a water supply for a farm and three cottages : his first independent attempt. The existing supply came from three shallow wells in boulder clay on andesite. Before their covers were removed or any information given, " B " offered to read for each well—the distance from the ground surface to the water—and the total depth. He made the former—17, 5 and 7 feet : all three proved exact. The total depths were 22, 10 and 11 feet ; in each case he over-estimated these by either

1 or 2 feet. He wrote asking if these apparent errors might not actually be due to an equivalent saturation of gravel or fissured rock below the well bottoms. The Engineer, who had never seen Dowsing before, was much impressed, but within an hour proved to be a good natural Dowser himself.

Deeper examples :—In December, 1933, " X " pegged for several wells in a Scottish county. In September, 1934, the Engineer responsible took me to see them. The first had been bored, the pumping test completed, and the borehole covered pending arrangements for a permanent pump. To try the depth of the main stream, I stuck the point in over it a few yards from the borehole (where there was a deeper cross stream), walked out with the rod, marked the edges of the depth band with matchboxes ; we taped them—138ft. and 142ft. I then asked at what depth the stream had been cut ; out came the pocket book, but it only contained " X's " original copper-point estimate, 125-145ft. —an excellent illustration of the difference between copper and Mumetal. The 9in. bore cut the fissure at 138ft. ; the water rose to 60ft. from the surface. This borehole is in Old Red Sandstone.

At the second, seven miles away, the pumping test was being carried out. I found more than one flow : working from near the borehole, the base of the shallowest taped 125ft. When the pump was stopped, the water level, which had been 176ft. down, rose rapidly ; the Engineer followed its rise with the float wire. Suddenly the sound of water falling in ceased : the rising water had reached and submerged the shallow stream entry ; he nipped the wire, pulled it out and measured it—120ft. Satisfactory, if rough, confirmation. Except for the first few feet this borehole was entirely in olivine dolerite.

More examples could be added, but these should suffice ; actually twelve have been given. They have been chosen, firstly, to show that long apprenticeship is not essential for accuracy ; secondly, to prove the all-round precision possible ; they have not been selected from less successful ones ; the general standard seems fairly level. When I last saw him some months ago, " X " told me of a very close recent result at about 500ft., but I have no details. So far, I have not heard of a proved example with bedded clay, often considered the Dowser's *bête noire*.

The need for lateral space is an obvious disadvantage, but the system is easily applied. I know of no other which consistently gives this standard of accuracy. Only its simplest application has been described, it has also proved successful for more complex dowsing problems.

One further experience might be of interest. Last May, I went to see a very sensitive Dowser who normally uses no instrument : he dowses with his hands. For many years he has been employed by a firm of well-borers in Exeter, who assured

me that he had never made a mistake. They added a story of a local authority's refusal to allow them to bring their Dowser. The Surveyor sited the borehole ; after it had failed, this prohibition was withdrawn, and a satisfactory supply obtained.

He gave me an exhibition with a stream under his cottage garden. I have never seen anyone so sensitive. After checking it with the rod—a good little stream of some eight gallons per minute total flow—I asked how deep it was ; he replied that he did not profess to tell depth, but thought it about 30ft. I stuck the point in, paced out, and made a little mark—a flat flow at c. 45ft. Then I asked him to start out in the same direction from the point, holding his hands as he normally did when dowsing, and walked out a few yards to watch.

On reaching my little mark his hands lifted strongly and then dropped, just as my rod had, and at exactly the same places ; he was obviously much surprised. When I paced out, the expert remained by the point ; no doubt he realised that something happened when I reached a spot 15 yards from it, but as he was directly behind me he could not have seen what occurred.

. . . . .

This outline was written two years ago ; there is little to qualify, though much might be added. Boreholes do not often give really close checks against previous depth measurements, conclusive incident at an exactly ascertainable depth is generally lacking, core recovery is often imperfect, and pumping tests cannot be carried out at close intervals ; any sudden change in water level is a good guide, but as a rule borehole confirmation is rather rough.

Two examples of this : a pupil's sites checked over before boring :—

" A "—A good flow in a highly inclined fissure—63ft. 6in., a lesser flow crossing at a small angle below — 69ft. 6in., no whinstone (suspected), pumping estimate 15 g.m. Result : nearly all hard sandstone, very little soft, no whinstone, little water by 60ft., cores of cracked sandstone about 65ft., bored to 73ft. 7in., pumping test 25 g.m. after 40min., after 5 hours 14 g.m., at which it was steady for rest of 4-day test.

" B "—Small oblique fissure flow—70ft., pumping estimate 5 g.m. Result : split sandstone core about 72ft., bored to 79ft., test 6 g.m.

The boreholes were five miles apart, the same rising main, air main and compressor were used. Depths of split cores approximate. Neither give opportunity for close check, but are roughly satisfactory. However, many excellent checks have been got and the accuracy possible with the method is now beyond question.

Minor qualifications and additions :—

1. Two pupils bought a length of mumetal rod. One who is a plumber (he found lost pipes with a rod and was keen to

learn) made it into two sticks. These have had no subsequent heat treatment, but work well.

2. The point gives what is below it anywhere ; there is no need to stick it in just inside the " stream band " as recommended.

3. Use of sample. Individuals differ but in the main—changes and flows are felt with the plain rod, flows and soaks with the water sample ; there may be a soak at a change if its nature is suitable. Examination should be made with each in turn. If necessary, further examination can be made with the point off the stream band, to settle what belongs only to the line and what is common to the surrounding ground ; marked structural changes, soaked layers, &c., can thus be identified.

Example.—A pupil taped up a site and sent me his measurements. He said rain and waist-high wet cabbages had been a handicap. The figures sent were—43-45ft., a little over 60ft., and the big one at 82ft. Results followed as the boring went down ; there were only three incidents in the borehole—boulder clay/dolerite change at 42ft. ; top of strong vertical cracking causing a sudden drop in water level at 62ft. ; base of this cracking at 84ft. ; then unfractured dolerite.

Under the circumstances not too bad. By depthing with the point well off the line it could have been established that 1 was common to the adjacent ground, while 2 and 3 were not. Further examination should have shown 1 as a change, probably with a narrow soak above it. The reaction should have been unbroken from 2 to 3, though there would be a good deal of variation in strength ; probably it was, but this was missed ; the conditions were adverse and the dowser may not have been on the look-out for such a thing. With another of his boreholes, a big open fissure, and a layer of soaked shale in very compact sandstone were similarly felt and depthed correctly. Again I had the figures before boring.

4. Within reason, the angle between " stream line " and " line out " is immaterial, and clay makes no difference whatever. Several examples of either could be quoted, but one combining both should suffice. The depth of a flat flow along a fault in chalk was carefully found at right angles, marked and taped—245ft. As the taping line was rough, a second visit was made. A flat taping line along a path at about 25 degrees was found, so the depth was again very carefully fixed, marked and taped—240ft. The correct answer eventually proved to be 239ft. The nature and exact depth of the flow (if it could be so termed, there was little movement) were beyond dispute as it was cut by a shaft. There was about 80ft. of bedded clay above the chalk. The taping error was 6ft. too much on the rough line, 1ft. too much on the smooth ; quite characteristic. Flat streams are taped to their bases, those in cracks to the peak of flow.

5. Changes and incidents are weak compared with flows. No mistake should be possible with a strong stream, but where flows are small, changes or incidents may be misread if skill or care are lacking. The dowser's range of sensitiveness is very great, and accommodates itself to what is arriving; hence where there are only small effects to be felt they may seem quite large. The expert dowser can judge relative sizes at once by feel, and assess values fairly well from strength and character; where stream bands coincide the relative sizes of flows at different levels can be gauged by the strength of their depth bands. The method of measuring flows cannot be dealt with here.

Proper analysis of the site takes time. The different intensities of the fields can be judged rapidly by moving through them with a light responsive rod; but sorting out details and accurate fixing cannot be hurried, and skill is necessary for correct interpretation.

The pupil to whom I have referred has been using these methods for nearly three years; a good and improving dowser, doing very well in a country notably short of water supplies. The overflow from one of his boreholes works a ram and supplies two farms up the hill; five of his close checks mentioned above with four of mine, add up to 949ft., the total error is well under 2 per cent.

SOME OF MY WATER DIVINING JOBS

By ELEANOR PEELE

It was in May, 1936, that a landowner and farmer asked me to investigate on his land for water, as he required a supply in several fields to be laid on for stock, to save the water carted daily, and commissioned me to find it for him. When I found indications of a strong supply, one of his men fetched a pick, and within a few minutes water started to gush out; now he has an adequate supply.

Soon after then I had an appointment to meet an agent on a large estate at Stratton Strawless. He said: "I have quite a lot of work for you, Mrs. Peele." First the water had failed to supply the Hall. After going steadily in various directions over gardens and through greenhouses and rough ground, I found a strong spring. The head gardener's house next, as a well there had been condemned some years before and had been filled in. Not knowing about that, I discovered running water present quite near, which he thought extraordinary. A little way off led us to the Hall Farm, as they were short; I found indications of a strong spring. A distance of a mile away eight cottages had no water. I discovered a convenient spot, and found the usual indications of an excellent supply.

This agent commissioned me two years ago to find water on the estate, as the tenant had a pump both inside and out, but no water; he had to carry water a quarter-of-a-mile when, quite unknown to them, there was a plentiful supply near their own doorstep. When I indicated the spring, the agent was delighted and said: "Now do not let me hear about water again."

In October an engineer was asked to sink a well at Shottesham. He was very anxious for me to be commissioned first, as he had sunk a well on another estate when I located the spring, and suggested it to the agent of the estate; so I was met in Norwich and taken there. After prospecting (it was a dreadful, windy day), I eventually found a strong spring, to their satisfaction.

Next appointment: A large supply was required for house and yards at a big farm, to be worked by engine power, at Scoulton. I found they were using an old well with shallow water. After walking about I traced a strong spring only 10 yards off the old well, which would give 100 gallons per hour at 40ft. depth and much to the surprise of the contractor I gave the width as 4ft., which he measured with his foot rule. Then I said to him: "Hold one end of my twig with your left hand and take hold of my left hand, and I will take the other end of the twig in my right." Then when the stick moved up, my end broke! Nothing happened to his. He could not understand it at all and thought

it very strange, and knew there was no trickery. I also let him hold the fork of the twig when I was over the spring of water, and of course he could not hold it down and stop my power of water divining. Regarding that Scoulton supply, I was asked to send in a report to Oxford of my findings to Franklin and Jones, which I did. Also in October a retired gentleman living at Cromer bought land at Cawston to have houses built upon, and asked me to go over with him. He was delighted when I found a good supply. He had had two houses built and a well sunk (where he wished it to be), but got no water. He said to me : " If I have it made deeper can't I have some water there ? " I said that it would be a waste of good money, as there were no springs anywhere near.

In my early days of water divining I was asked during the Great War to find water for many people, but I only practised privately, as Diviners were looked upon with ridicule and criticised by sceptics.

Once in 1920 I suggested to a large landowner that a strong spring existed where he wanted a house built, but he laughed at me. The house was built, but after a few years it was damp, the stoves all rusty and the wife suffering from rheumatism. A fire broke out near, but there was no water, though there was a flow of 2,000 gallons per hour in the ground nearby.

SOME MENTAL AND PHYSICAL DIVINING REACTIONS

By EVELYN M. PENROSE

Following a brief resumé of an Empire Broadcast reported in "The Listener," the President of the B.S.D. has written to me to ask if I will elucidate further the different sensations I experience when divining for oil, minerals and water.

Not only do I feel that this is a very difficult thing to put into words, but I feel rather diffident of talking at any length about something that is so intangible and individual, especially after a recent experience with a group of scientists to whom I was asked to lecture.

After saying that the explanation now usually accepted of Divining and Diviners is that water, minerals and oil give off different waves, probably of electric or magnetic origin, and that Diviners were human radio receivers, who were tuned in to these waves and able to pick them up, I was informed that no such waves were known to science, and therefore they could not be accepted as existing.

I mildly pointed out that there must be hundreds and thousands of waves as yet unknown to science, but without result. After some discussion, I was told I might call them "emanations," for which gracious permission I am afraid I did not feel duly grateful.

What the aforesaid scientists would say to "individual reactions" caused by different substances I hardly dare to think!

However, as far as I am concerned these different effects or reactions which I experience are of the greatest use in my work.

Starting with water. Water has a clean, fresh, mental reaction, when pure, and I feel as if all the veins in my body were filled with little electric sparks, gold in colour.

When water is impure and unfit for human consumption, I get the mental impression that all the electric particles are lead-coloured, and I also get a bad taste in my mouth and a nasty smell in my nose. An easy way of verifying if water is good or bad is to hold one's arms and hands out in front of one, avoiding all tension, and move slowly over the surface of the water source. If the water is bad one's left hand is drawn down and one's right hand is forced up, and vice versa for good water. Hard and soft water can be ascertained in much the same way. Though water divining is tiring, water is the least tiring of all substances to work for, and I find it the least interesting.

Oil (petroleum and gas) on the other hand, is the most tiring. Also oil smells and tastes so horrible when one is working on it, and is so exhausting that I am sometimes violently physically

sick, a condition which occasionally I have not been able to stop without the help of a doctor. Even on the finest day in Canada with a brilliant sun overhead I seemed to be working in a thick slimy fog which remained until I was a considerable distance from the oil reservoirs.

With oil I always feel as if my veins were filled with thin silver-lead needles about an inch long. These are so real to me mentally that I can tell I am on oil without putting any other test to it, all of which sounds so fantastic that one cannot expect other people to credit it.

Oil gives such a powerful shock to the system that I have been thrown off my feet by it, and been almost paralysed up my left side (the left side seems more affected by oil than the right) when working on a strong oilfield.

The exact opposite of oil is diamonds. Here one has a sense of extreme purity and cleanliness and a feeling of exhilaration. Also I get a particular motion of the pendulum (or hands) making a square cross, N. to S and W. to E. The serial number is one.

But for sheer happiness and well-being give me tin. I do not consider myself an emotional person, but a tin field makes me want to shout for joy and happiness.

Wolfram treats me rather like a terrier would treat a rat. I am thrown about and shaken when over a strong lode, especially when working with bare hands and no tools, and am nearly swung off my feet and bounced up and down in a manner which becomes painful, and I am sure must be ludicrous to onlookers! It is not malevolent like oil, but in contacting wolfram I have the impression of such a primitive and unbridled force that one cannot use or control it, it just controls me.

Possibly the fact that wolfram (Fe Mn) WO_4 is an extremely magnetic metal, and needs machinery with powerful magnets to deal with it, may have something to do with its powerful effect on the diviner.

Silver and copper are actually acutely painful to me to work on. I remember the first time I walked over the surface of a silver mine in Canada. I let off a yell of pain and fear. I thought I had trodden on a rattlesnake. It was as if a red-hot knife had been driven into my foot.

Copper has much the same effect, but is often accompanied by a queer taste in the mouth.

By far the most difficult substance to work for is gold. Gold is like a mischievous sprite; it is happy and good-tempered, but will fool you every time if you aren't careful.

In fact, gold is the Puck of metals.

Knowing nothing of electricity I don't know the right terms to use, but if a vein is broken by a fault (which it generally is, as gold is nearly always found in badly faulted areas) the two divided ends of the fault will "spark across" the fault to each

other, making it very hard to detect this false " sparking across " from the real vein itself. This difficulty led me into serious consequences in the gold rush in British Columbia in 1934 before I discovered it.

Other diviners speak of deceptive phantom images thrown off by gold, and I strongly advise only divining for it in the early morning or evening, if possible, or, better still, on a wet day. The sun overhead produces a feeling of confusion and uncertainty, and gold then becomes more " Puckish " than ever.

There is, I believe, still a good bit of controversy in England as to the value and dependibility of divining on maps and plans. My personal experience is that their value is incalculable. I found them particularly valuable when working on vast tracts in Chili ; looking for water on dry farms (estancias).

On maps I experience the same sensations that I get on the ground itself.

On one occasion when drawing a water map, I went on to draw a number of irregular circles, which meant nothing at all to me except that I found my lips were very salt to the taste.

In passing the map over to the owner and saying that I did not know in the least what I had drawn, he explained that they were small dry saline lakes, and that as they were on his old home he could vouch for their positions being correct.

The map was roughly drawn on a used sheet of blotting paper in a dentist's waiting room in Canada, and the property was " somewhere in the U.S.A." (but I do not yet know where !).

Map making is still in its infancy, but it is already becoming possible to work from the surface (*i.e.*, the face of the paper) down into the earth below, mentally, of course, and tell something of the strata lying between the surface and the substance sought for, also it is possible to tell whether a district is badly faulted by first rubbing the hands on the surface of the map, and to find out valuable information of the district by this method.

The future development of map divining and its uses seem to me to open up such vast possibilities that they are almost staggering.

DOWSING IN THE ARGENTINE

By Captain F. L. M. BOOTHBY, C.B.E., R.N.

In a recent report we had an interesting account of dowsing experiences in the Deccan, where a vast eruption of basalt has provided radioactive conditions that are notorious. In the Sierras de Cordoba similar conditions exist, and the geologically recent uprising of the Andes in addition to other earth movements has contorted the strata to a surprising extent. I propose to follow the example of the writer of the Deccan report, and give my experiences here, and hope that dowsers in other parts of the world will do the same for the benefit of future travellers interested in our art.

I propose to deal with the matter under three headings—Oil, Minerals and Water.

Oil.—I put oil first, as it is by far the easiest " target " for the dowser. The equipment used consisted of a rod of copper tube for use alone, and a whalebone rod, using a sample of oil obtained from Hardstoft in England (where I went to " calibrate " myself and rods over oil before leaving home) in a small glass tube. In due course this sample was lost, but kerosene lubricating oil, or even coal, was found to be efficient as a sample thereafter. Without a sample the whalebone rod is useless over oil, but it is very necessary as a check on a copper rod. I have a friend in England who is an experienced oil engineer, and has seen the rod used with success over oil in the East, who, before I sailed, gave me a brief description of the anti-clinal formation which is most favourable for oil. In the Province of Buenos Aires and in the Chaco I never met that formation, but in the northern part of the Sierras de Cordoba, a beautiful inverted trough-shaped formation was encountered—apparently covered with granite, which gave the correct indication for oil. Triumphantly I wrote home to my friend, and received a " damper " in reply which may be summarized as follows—" Don't be a fool—use your head! What do you think would happen to oil that came in contact with red-hot granite? " By the time that reply came I had made friends with the manager of a gold mine, a Señor King (he had a British grandfather) who spoke little English, and I less Spanish, but we managed to get along with the aid of signs and a dictionary. I told him of the check I had received, and took him off to show him the rock formation under which the dowsing rod so strongly indicated oil. As soon as he saw it he said the rock was not granite, though it looked like it. He had drilled through it, and it was hard for a few inches, soft for a few feet, and then you came to limestone.

Since then Señor King and I have covered many hundreds of kilometers by car looking for oil. The procedure is as follows :—

I get out of the car, and, holding the copper rod, beat with my foot at about intervals of a second. Based on Hardstoft experience one beat is equivalent to about 300 feet. The rod may turn after 10 beats for example. The car is then driven along the road for about a mile and the process repeated. If the indications come through at a less number of beats we know we are approaching the summit of the anticline, and continue on our way. If the number of beats increases, then we know we are going in the wrong direction and the car is reversed. If there is no change then we are running parallel to the anticline, and the car is abandoned, and expeditions on foot made to the right or left until a change in the number of beats is obtained. In due course the summit of the anticline will be reached, when the beats will, in this district, be only two or three, indicating oil at no great depth. In some parts the anticline is clearly visible, and then the amount of dowsing work required is small, but in others it is quite indistinguishable at the surface, and one has to rely on the rod entirely.

The oil here can generally be traced from 30 beats to two or three, and down to thirty again on the other side of the anticline. Sometimes the rise on one side is steeper than the other, in one case where folds in the limestone in which the oil lies runs up against a mountain, it is vertical. Generally the rise is perfectly smooth and regular—you climb to the top of the inverted V and slide down the other side.

Once, however, the indications of the rod indicated an inverted W instead of a V. The ground was covered again—there was no doubt about it. Then I saw a green patch on a rock, and asked Señor King if it was copper. He said " yes," but so little that it did not matter. But it did. Discarding the copper rod I took the whalebone and the sample, and obtained the perfect inverted V formation again. Copper in the ground gave trouble on another occasion, but did not cause much delay owing to the previous experience. Dowsing for oil can be done from the car, beating on the floor boards, and is quite satisfactory when great accuracy is not required.

I had one other difficulty with the copper rod. Mine is bent into a loop with the handle portions at about an angle of 45 degrees to the main body. After making some hundreds of observations I found I was losing power. By this time the copper rod was burnished bright from rubbing about in the back of the car, and I thought perhaps the virtue in the rod lay in the surface film. I re-annealed the rod with the blow lamp and let the surface get well oxidized again, but there was no improvement. Finally, I found that constant use had bent the handle portion to almost a right angle to the main body—when the correct angle was restored the rod regained its old powers.

The dowsing indications for oil being so good it became worth while to see if the geological formation made the presence of oil likely. A study of Cunningham Craig's book on *Oil Finding*, and *Geologica Argentina* by Windhausen, made it clear that the conditions for oil were quite good, and small films of oil on the streams seemed to make it worth while to carry the matter further. An application was made for a concession, whereupon the Governor of the Province declared a Government monopoly in the district, and there the matter, and the oil, rests for the present.

As a corollary—sulphur and water frequently exist under oil. In Cordoba, if sulphur is used as a sample, response is invariably obtained from a greater depth than the oil—thus giving a guide to the thickness of the oil-bearing strata.

If chalk is used as a sample response will be obtained from a less depth than the oil indicating a limestone formation over it.

Metals.—In days gone by the Jesuits used to obtain gold from the Cordoba hills. They knew how to extract it by means of quicksilver, which they imported from Spain, and their old mill for crushing the ore in a stone trough full of the latter metal is still to be seen. The ore is of low grade on the average, but Indian labour costs little or nothing, and wherever seams of gold appear at the surface they have been worked. No deep boring has been done, and there are seams which do not show at the surface and are therefore untouched, and provide the dowser with his opportunity.

A mining concession where a number of surface veins had been worked by the Indians was obtained by a local millionaire, who imported some German engineers anxious to sell him machinery—which they did with great success—about half-a-million pesos worth. The millionaire also got an armoured car to carry the gold to the bank, and built a blockhouse on the mine to protect it with a machine gun, but never drilled a hole to see what he had really got. Now the manager of the mine carries to the Bank what gold he secures in the local bus, or even in my car. It generally consists of a slab the size of a saucer that goes in his pocket. The trouble is that with low-grade ore and highly paid labour it is not a business proposition. The mine, however, has possibilities. Some ore only gives three grammes of gold per ton, but patches giving 200 grammes have been worked—a very paying concern could be made of the mine if more ore like this could be found.

One of the Germans above mentioned was a dowser, and a very good one in the laboratory. I am told that three different metals could be concealed under a cloth and he could identify them all by the pattern his pendulum described. However, the pendulum is not a very practical proposition for field work, and he did not use serial numbers, which sometimes caused him to

confuse the ores. The manager of the mine, Señor King above mentioned, got me to trace some of the veins, and said that the course the German had followed years before and my course were identical. This German had reported that a place called Tanti gave very strong indications of gold, so I was taken there. The movements of the rod were very strong indeed, but the serial number proved to be 42, while the local gold veins (which contain traces of silver, iron, lead, &c., as well) is 13, and the purer alluvial gold in the sand of some of the streams only gives 20. The serial number 42 was found to be due to a rock, probably radioactive. Serial number 38 led me on a fool's dance lasting some weeks. On the gold mine there were some 16 veins giving serial number 13, some of which were superficial and therefore known, but there were also a few giving 38 about which nothing was known.

There was one vein that was being worked and the gold ore had given way to lead, and eventually they came to a bit of brown ore that answered the description of pitchblende. It was taken to the mining office and placed on a table and I was asked to try the rod over it—result serial number 38—radium in quantities in the mine—joy—wealth! A few days later I was prospecting in a stream when I came across a blue stone that I had never seen before—it gave serial number 38. It was also unknown in the mine. Assuming it contained radium it was desirable to find where the particular stone came from, and for two days I followed the stream till it dried. Then I followed the fragments of blue stone across country and found a quantity of it issuing from the base of a long extinct volcano. Later a mica, interlarded with a white and pink material which was found in the gold mine, was brought to me, and I was told the Germans had sent home six sacks of it for analysis labelled "plaster of Paris," so they must have found something peculiar about it—I found serial number 38!

Samples of the stones of this series were sent to the local photographer, who reported that they marked his plates. As a check they were sent to an amateur photographer, who reported that they caused no mark! To settle the matter Señor King lent me his "pitchblende"—which should mark any plate—but did not! I took the "pitchblende" home before returning it, and found the rod turned 11 times over it—the number for zinc. Chemical tests proved that the specimen was "black jack," or zinc blende. How had I come to make the error? I was soon to learn. One day Señor King said to me that the Germans had said that a small gold vein passed under his office. Would I look for it? I did. It was not gold, but a vein of series 38 rock, which passed under the spot on his table where I had tried the rod on the supposed "pitchblende." Now, before trying the rod over a sample, I test the ground first—it is sur-

prising how difficult it is to find a really undisturbed spot, especially in a house, with electric light, water supply and drains.

There is, of course some explanation of the 38 series of rock—four types of this are now known—and mica enters into all of them except the blue stone, which I am convinced is a form of Cordierite. Professor Joly's book, *Radioactivity and Geology*, gives it. Let me quote. "A remarkable phenomenon by which the presence of radium may be detected by visual observation occurs in certain rocks. In brown mica (most generally biotite), in cordierite, and in some other minerals, small, circular, coloured spots, known as pleochroic haloes, have long been recognized by petrologists. These coloured areas are invariably found associated with a minute, centrally placed crystal, either of Zircon, or more rarely of Apatite."

There is another radioactive element in Cordoba. Its serial number, mentioned before, is 42. It occurs in some white lava, causing black patches, in some quartz, with a brown stain on the surface, and in another rock. I do not yet know what it is, but guess at Thorium.

The most important thing that I have learnt in this part of the world is that when dowsing for metals the "depth lines" are constant and fixed for every ore, and give no indication how far from the surface it is.

I have tried the rod over—

Gold ore,	serial number	13	depth lines	5yds.	apart
Wolfram,	,,	12	,,	5	,,
Copper,	,,	5	,,	5	,,
Iron,	,,	6	,,	5	,,
Fluorspar,	,,	2	,,	5	,,
A mixed Nickel ore,	,,	14	,,	5	,,
Red Silver ore,	,,	11	,,	6	,,
Radium,	,,	38	,,	6	,,
? ?,	,,	42	,,	6	,,

These are all over ores in a natural state in the ground. When I say five yards between the depth lines, I mean five paces. The actual distance has not yet been measured with a tape measure. It may be that there is a difference of inches which may serve as a means of identification of the mineral in addition to the serial number—it is a matter that requires investigation.

It will be seen that all minerals tested had depth lines of five paces apart, except silver. Perhaps there was some radioactive material present in the mine—it is hoped to check this at a future date.

To obtain the depth of a mineral one must resort to raising and lowering the rod, as described by others. My top waistcoat button indicates about 100 feet, and a superficial vein turns the rod at about the level of my chin.

In the case of minerals the influence sometimes travels up an

inclined strata—or, shall we say, some of the influence? I learn from Professor Joly that all rocks are radioactive in some degree, and give off several "rays" and one "emanation," or gas. We would expect a gas to travel up between the layers of strata, and the rays to pass through them. If it is a gas that is affecting our rod we would get it to turn to one side of a deep vein in inclined strata. In Mager's book it is stated that the "influence" may blow down wind like scent from a hunted fox. I have not found this, but it is conceivable that it might occur when operating over radioactive water giving off an emanation. My personal experience here is that of following a vein of gold ore along the side of a hill and rounding a shoulder to find the ground cut away below me, exposing the vein, and a line joining the rod and the vein would have given inclination of the strata.

The question of how the mixing of metals affects their serial numbers is of great interest and importance. The local gold ore gives a serial number of 13. There is very little gold in it. There is always quartz, silver, iron and often lead in it. One seam with a little chromium in it reduces the number to 12. An ore, whose only *known* constituent is nickel, gives 14; nickel in the laboratory gives 11—what else can there be there? Mixing the powders of various minerals and then trying the rod over them would be interesting and useful work for someone who has the time and opportunity for it.

When working with minerals mine managers are anxious to have wide vertical seams indicated to them. There a difficulty arises. A seam may appear wide, vertically, but it may be a narrow one aslant. When dowsing for wolfram I found a seam that appeared to the rod to be some 2ft. wide. Actually it was about six inches and sloped. The ideal dowser would discover that one side of his supposedly vertical seam was deeper than the other, and make allowances accordingly. It would be interesting to hear if any of our members have attained to this perfection.

Water.—On the rich plains of the Argentine there is very little use for the dowser. The soil is alluvial, with occasional layers of "tosca," which is impervious to water. The "tosca" is formed by volcanic ash, deposited from time to time in the past, and compressed into a hard layer. If you do not like the water you find on one layer you drill down to the next. On the estancia on which I spent some months the water was full of minerals. The Government report on it concluded with "unfit for humans and plants, possibly fit for cattle." The humans adulterated it with the "Produce of Scotland," or of somewhere else, the plants wilted if watered with it, but it gave the cattle a thirst and a desire for the succulent alfalfa grass, on which they thrive and fatten exceedingly.

The alfalfa grass is causing trouble with the water supply, however. It sends its roots further down than any plant that has existed in the Argentine before, and draws on the water that supplied the superficial wells, which have to be continually deepened. There is a semi-artesian supply at 400 feet of purer water, which some wells draw on, and, according to my calculations, an absolutely pure supply at 2,000 feet—but few will have been sunk to that depth in this country.

In the Sierras, as in all rocky districts, the dowser is in demand. There is one at La Falda, where I had a house, who is good, but does not know about serial numbers. A seam of rock of the 38 series mentioned before has led the owner of a villa to sink a well to over 200 feet—every year he digs a bit more—without a hope. The well sinkers have brought a lot of the radioactive rock to the surface, so there is no doubt what has caused the trouble. There is much lava and igneous rock about, making the estimate of depth most difficult. I tested several wells in active use. In one the water was at three times the depth indicated by the rod—over twice was common—occasionally one is quite accurate. The *minimum* depth is all one can venture to indicate under these conditions. I am told that the local dowser, whom I have not yet managed to meet, does not use depth lines at all for his estimation, but the force of the pull on his hands. He seems to get fairly good results, and if it were not for the errors caused by radioactive matter his services would be in greater demand than they are.

A friend of mine who wished to sink a well in his garden got this dowser to select a site, and asked me to come and confirm it before starting work. The spring was there all right, but gave the reaction for copper instead of water. I thought he must have found a seam of copper, but the depth lines were 60 feet apart—with copper they are only 15. Also the direction of flow of the spring could be found in the usual way. The explanation was that the spring flowed from the direction of a large copper deposit now being worked a few miles away, which must have affected the water. As copper is not good for plants, that well site was abandoned.

On another occasion I took my friend, the manager of the gold mine, to show him where I thought a seam of gold was. Arrived on the site he said: "There never was gold in such a place." The night before I had been there, stepped out the depth lines to five paces, had let the rod count the serial numbers to seven, which include water, copper and iron, and being lazy or tired had stopped it there, gold being next on my list at 13, while for any radioactive material the depth lines would have been six paces apart.

Being pulled up like this, I repeated the tests, and got a serial number of 10—quite new to me. In the distance we could see

a factory where they bottle mineral water, and I proved to have hit on the spring supplying them. I now know four springs with serial number 10, two exploited commercially.

The Government analysis of this water shows that the only minerals are oxide of iron, .0018 grammes per litre, and oxide of aluminium, .0112 grammes per litre. There are slight traces of several acids—one would like to know how these very slight traces of foreign materials raise the serial number 3 of the ordinary water here to 10.

In conclusion, I have met a very good case of self-education as a dowser. When I first met Señor King, the manager of the San Ignatio mine, he could do nothing with the rod. He decided being a dowser would help him in his work, and after six months' steady application and practice he is good, and we can now take turns at driving the car, while the other holds the rod.

Might I suggest that the British Society of Dowsers might have a set of official standard rods, by which serial numbers, &c., could be measured? There will always be individual variation, but there is no reason for variation in the implements employed as well. If the rods were numbered, members writing articles such as this could clearly indicate the colour and size of instruments used. Personally, I use knitting needles when coloured rods are required, but I should prefer them to be flattened or of oval cross-section. The other rods I find needful are copper, aluminium and silver. Could not a small committee be formed to deal with the matter?

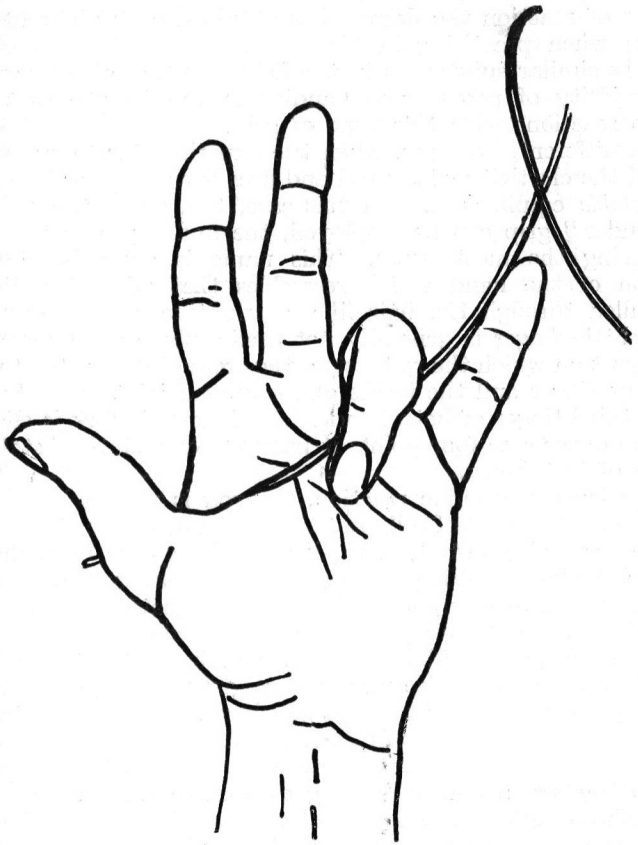
[The Editor would be glad to have opinions from members on the above suggestion.]

THE POINT OF BALANCE IN THE TWO-HANDED ROD

By HANS FALKINGER

A study of technical literature will show that sufficient attention has not been paid to the effective use of the two-handed rod in its capacity as a mechanical lever and indicator for revealing the minute and otherwise unnoticeable muscular twitches caused in man, in a manner as yet obscure, by subterranean deposits.

The non-critical layman, led astray by appearances, is inclined to assume that the reaction of the rod depends directly on the attraction or repulsion of the ore, and does not seek for a solution of the problem in the human organism itself. As a result of twenty-two years of study I have succeeded in solving the mechanics of the rod's movements.



The two-handed rod, which may be of natural wood, or of steel, whalebone, &c., is held either in the overhand or underhand grip, with the point in front. The grip is easier to learn than that of my one-handed balance-rod (see *B.S.D.J.*, Vol. II., 7), though the purely physical strain is much greater, especially after protracted use.

With the usual loose, simple grip, the rod is in *stable* equilibrium and only in the case of a small percentage of unskilled dowsers

will turn either up or down over hidden objects, and this it will do even when such objects are not being specially sought for.

To avoid misleading or purely accidental muscular reactions a proper mental attitude is essential—but within the limits of this article I cannot enter upon a more detailed explanation on this head. But it must be pointed out that the simple grip of, for the most part, an inelastic rod is used by many skilled dowsers to obtain graduated reactions, which means that the same varying degrees of reaction the dowser has obtained over different substances when practising in his house, are obtained over presumably similar substances in the field. But, as already stated, the majority of people who handle the rod for the first time get no reactions with this type of grip.

It is different, however, when the experimenter takes advantage of the elasticity of the rod and uses it as a spring in a state of *unstable* equilibrium. In this case, too, either the " over " or " under " grip can be employed, the under grip or " comb " grip being the most usual. This name is derived from the position of the hand which resembles that when the fingers are pulled through the hair like a primitive comb.

The little finger is generally not used ; there are four points of support on which the rod rests ; the crease between the thumb and first finger and the inside of the second joint from the end of the third finger of both hands. If the elastic fork is slightly strained over these four points it passes from a state of stability to one of instability.

To produce a genuine reaction, the rod is purposely allowed to approach the point of collapse. It is then in a state of agitation or " fluttering," and only a small muscular spasm is needed to cause a collapse. With practice the rod becomes an extraordinarily sensitive indicator. This grip naturally demands complete control of the vibrating rod. To the beginner an unintentional collapse would look like a genuine reaction and by auto-suggestion such false reactions might be repeated.

This grip can be learnt by most people after proper explanation and demonstration, and with it an astonishingly high percentage of successes over subterranean watercourses can be obtained.

Naturally the beginner, lacking experience, will not be able to estimate depth or volume ; and unfortunately it is just these two considerations which are of far greater importance than the mere location of water.

FURTHER EXPERIMENTS ON FRUIT TREES

By Lt.-Colonel A. B. CUNNINGHAM, C.B.E., D.S.O.

(*Continuation of article in B.S.D.J.* II, 14, December, 1936).

The early experiments started with "medicine" and then proceeded to "food. In practice, this is putting the cart in front of the horse, as it is safer to build up the patient, if very ill, before causing the discharge of unhealthy matter.

As nature makes such strenuous efforts to survive, even under adverse conditions, the fact that a tree indicates a request for food is really an intimation that the tree is living on reduced or unbalanced rations. This has been evident on trees that started growth and then could not carry on. The minimum amount must be either exceeded or given at frequent intervals ahead of demand and the interval reduced during the growing season.

Some climatic abnormality occurred after the trees showed signs of reviving animation with growth and buds and extended over a period of three and more months. This must have occurred over a large area, as it was noticed outside my property, and its effect was to stop or hold up further growth and repair. This proved to be the last straw for the "very ill." Many of these had tested as still alive up to where branching started, but this junction seems to offer great difficulties to the ascending sap. The three-branch IXL almond tree has had one branch, which continued to test as "dead," removed, and a new branch, thrown out from the repaired main stem, is replacing it. This new branch, which now draws its nourishment from a healthier part of the tree, shows a foliage much superior to that on the original branches, which are still undergoing repair. The discharge has now appeared thirty inches higher up one old branch.

The younger peach trees show healthy foliage free from peach leaf curl; and gumming has ceased practically everywhere.

Apples and plums are showing greatly improved foliage and blossom.

Another "sample" that should be included in the medicine box is water! Originally I thought some of the illnesses might have been due to excess watering, so this was considerably reduced. Later, however, some trees showed signs of distress, and finally indicated they were suffering from thirst.

Where trees have been re-grafted and, in consequence, have two graft junctions, it may be found that each portion wants different treatment.

In the previous article I suggested that this "want" method might be of service to the medical fraternity.

I have tried the method on myself with some success; individuals can find out if any of their main organs require certain medicine.

When testing yourself it is necessary to face South, so that you are between your pendulum and the North.

Courses for senior officers should include instruction in this method! "A (pendulum) stick in time saves mine!"

Gyrations are shown over the correct medicine, when wanted, by day and by *night*, showing that the human body is conveniently independent of the hours of active radiation.

I must now refer to the interesting article "Some Notes on Earth Radiation," by H. O. Busby (*B.S.D.J.*, 14, December, 1936, page 279), and the results of my attempts to investigate this subject.

Earth radiations appear to have a definite connection with ill-health (such as "yellowing") in trees and also on the medicine requested.

Every coffee tree tested that was afflicted with "yellowing" was found to be in a band or very close to a band of earth radiation. The converse was not correct: Healthy trees were found growing on bands of radiation. This may indicate that certain varieties are resistant to earth radiation or that the radiations only affect trees when they are in a weak state due to some cause such as overbearing.

Gyrations due to earth radiation with the pendulum held over the coffee tree were converted to oscillation, and vice versa, showing that each was unfavourable to the other.

These yellow coffee trees asked for paraffin near the ground line, but did not want this medicine as soon as an iron rod, stuck into the ground near the tree, had drawn off the earth radiation. A similar result occurred with Purple Granadilla (Passion Fruit), which wanted copper sulphate.

These two examples tend to prove that earth radiations are harmful and that the request for certain medicines is to assist towards counteracting their effects unless these radiations produce false or partly false readings.

Requests for food were not affected whether or not the iron rod was in position, but hitherto I had not had to consider my position in relation to the tree under test. Now, with vertical iron bands erected, I was unable, with some citrus trees, to get any "food" reading unless the tree was between me and the north and I faced northwards.

The new procedure suggested is firstly to remove earth radiations by putting up permanent posts at suitable intervals, whether they are wanted or not, as this is a simple operation and may considerably reduce the labour necessitated by applying medicines; secondly, "feed the brute"; and thirdly, apply medicines.

Dowsing results are dependent on the influences that come from the North Pole and these influences are very intermittent. It is necessary to emphasise these two points, as they may help to explain and solve many of the apparent "failures" that are

apt to occur. I have continually found it essential to face northwards and keep the object between me and the north, especially with indoor experiments.

When seeking earth radiations I found it necessary to move on an East-West line. Gyrations obtained in this direction changed to oscillations when I turned round so as to face northwards or southwards. Although these earth radiation bands appear to run in any direction can this association with East-West in any way account for a hostile effect causing distortion in the North-South influences ?

The relationship claimed between a tree and its " green manure " has been substantiated by means of colours and magnetic angles. The procedure is described for the benefit of those who may wish to extend the experiments.

Mager's octagonal rosette (North, Violet ; North-East, Blue ; East, Green ; South-East, Yellow ; South, Red ; South-West, Grey ; West, Black ; North-West, White) is correctly oriented with violet at the north and red at the south. For brevity the object (seed, fruit, &c.) to be tested will be called X. The container portion of a wooden match box has been found suitable for holding small seed.

The operator sits on the south side of the rosette facing north and the pendulum is held just clear of the south (red) end of the rosette. X is placed on violet and moved from that to blue and so on round the rosette. It is desirable, after placing X on a new colour, to touch both hands together to help to eliminate any previous influence. Normally the pendulum will gyrate anti-clockwise, but with X on a certain colour permanent oscillation will be produced ; this may occur on more than one colour.

The colours by means of which oscillation resulted are the *related* colours of X (Tomato, blue and yellow ; Apple, blue and white ; Sunflower, yellow and grey ; Barley, grey and white ; Strawberry, violet and white ; Lentil, blue and grey, &c.).

Assume X is a tomato and remove it from the rosette. Take a small piece of blue cloth and also of yellow cloth and roll these together. Hold the two-colour roll over the pendulum stick between the thumb and forefinger so that nothing except the roll is in contact with the stick. If the correct colours have been ascertained anti-clockwise gyrations will be shown when the pendulum and colour roll are held over the tomato.

Consideration will now be given to angles. A circle (7½in. radius is convenient) marked in single degrees (North 0°, East 90°, South 180°, West 270°) on a paper or cardboard chart is correctly oriented by placing an object at the centre of the circle and revolving the chart until anti-clockwise gyrations are obtained on the circumference at 0° and 180° (clockwise gyrations will then be obtained at 90° and 270°) ; *also* on moving the pendulum

direct from North to South oscillations will be shown (from South to North clockwise gyrations).

There is a children's game which usually opened with the question : " Animal, Vegetable or Mineral ? "

" Minerals " I find between North 0° and East 90° ; " Vegetable (or Agriculture) " between South 180° and West 270°. A few tests seem to indicate " Animal " as being between West 270° and North 0°. That allocates three quadrants, but what could the fourth be ? As paraffin and petrol produce gyrations in this fourth quadrant it seems likely that East 90° to South 180° may be " Mineral Oils."

If the above is correct the four-quadrant picture becomes :— Left semi-circle (North-West-South) " ANIMATE ORIGIN " (Animals and Agriculture) ; Right semi-circle (North-East-South) " INANIMATE ORIGIN " (Minerals and Mineral Oils), or in other words " The Quick " and " The Dead."

Incidentally, it upsets the expression about " going West ! " Dead products such as vegetable oils, leather, horn, &c., have animate origin.

Everything on earth is included in the quadrants, so everything will have its particular angle from Magnetic North.

For agricultural purposes only the quadrant South 180° to West 270° is required and need be marked in single degrees.

It is convenient to put the quadrant chart near and alongside the rosette and retain your position with these two things between you and the north.

X is placed at the centre of the circle and pendulum gyrated over it first with both hands in contact and then with the right (pendulum) hand alone. This operation is desirable to eliminate trouble from residual charges and to absorb a charge from the object X under test. Move the pendulum (with colour roll) with a very slight but frequent anti-clockwise gyratory movement between South 180° and West 270° along the circumference of the circle, degree by degree. At some degree a definite gyratory movement will be obtained and will be maintained even with both hands in contact. It may be found easier to pick up this angle moving from West down to South than from South up to West.

This point at which gyration is obtained is the individual or characteristic angle for X (Tomato 190°, Apple 206°, Sunflower 206°, Barley 228°, Strawberry 236°, Lentil 258°, &c.).

A conical wooden golf tee (painted black) suspended by a short black thread from a small black stick forms a light and convenient weight for a pendulum. The point of the cone facilitates the reading of the degree angle. A suspended length of 3in.-4in. of thread is sufficient.

Gyration at the correct angle will be shown also (*a*) without the colour roll, (*b*) with the colour roll placed on top of X at

the centre of the circle. Oscillation will occur when, with X at the centre and the pendulum gyrating on the circumference at the correct angle, the forefinger of the left hand is placed on the colour roll which has been put outside and away from the chart.

These various checks should be repeated on another day as a help to ensure reliable results ; even after all this some objects under test show a feminine tendency to " change their mind ! "

With nothing at the centre of the quadrant, if X, which may be anything, is held in contact with the pendulum and these are at the correct circumferential angle for X no gyration will occur, but if the pendulum traverses a circumferential path anti-clockwise (even one turn is sufficient) gyration will be shown at the proper angle ; with clockwise gyration this does not happen.

This is the action on liberation of a carrier pigeon, which must have a fairly retentive charge from his home loft as " sample." As he circles anti-clockwise around his point of release he must receive a signal at some circumferential point due to his " loft " charge, and this he checks by many circles.

This point of signal and his point of release give him a departure bearing and as long as he remains on this bearing it is probable he continues to receive some form of signal ; when he gets off his line the signal will cease, so he has to move back on to his bearing. At night the signals are probably too weak for the normal bird (a super-sensitive one may make an attempt at it) so he waits till next day.

As the birds fly long distances and may be delayed by storms, Nature provides that the " loft " charge will continue to be effective for at least a fortnight. This would explain why, when birds are re-settled in a new locality, they have to be kept confined for a fortnight to three weeks in order that they may be freed from their old loft charge and absorb the new loft charge. If they are released too soon they are likely to re-appear at their former loft.

Having myself gone quite off my " line " I must get back to it !

Among a group of people when a lull occurs in conversation someone usually says " It's twenty past or twenty to the hour " ; when doing these indoor tests periods of inactivity frequently occur and gyration is not obtained even over the object under test. These cessations of radiation want watching to avoid misleading conclusions, and occur during the hours of most active radiation.

Having described the procedure for obtaining colours and magnetic angles, the results for the trees and " green manures " shown on page 291, *B.S.D.J.* 14, December, 1936, are now tabulated.

Subject.	Green Manure.	Colours.	Angle Degrees.
Coffee	Castor	White	236
		Yellow	236
Plum ... } Loquat }	Linseed...	Blue and Black ...	236
		Grey and Green ...	236
Apple	Sunflower	Blue and White ...	206
		Grey and Yellow ...	206
Almond } Loganberry }	Canadian Wonder Bean	Green	202
		Black	202
Fig	White or Yellow Maize	Grey	198
		Blue...	198
Pear	Barley	Blue and Yellow ...	228
		Grey and White ...	228
Walnut ...	Black Algerian Oats ...	Violet and Grey ...	204
		Red and Blue ...	204
Peach	" White " Oats ... (variety not known)	Violet and Grey ...	204
		Red and Blue ...	204

Deductions from the above are (1) the subject and its " green manure " have the same magnetic angle, (2) the colours are diagonally opposite, and (3) varieties of the same genus may not be interchangeable as " green manures " ; a peach wants " white " oats and not Black Algerian Oats, and a walnut wants Black Algerian Oats and not " white " oats.

Further results obtained show that (4) the subject will produce gyration over its " green manure " and the opposite will not occur—there is no mutual gyration—and (5) varieties of the same genus have the same angle and colours ; two oats (as above) four varieties of lupins and two of granadilla gave the same results in their respective categories.

The symmetrical results permit of these five conditions being accepted as " Laws."

Mutual gyration has been observed between Peach and Walnut, which have the same angle and the same colours (204 ; violet and grey) ; between (Himalayan) Blackberry and Pawpaw (206 ; violet and green) ; between Apricot and Onion (220 ; green and grey). Four growing peaches, which wanted neither food nor medicine, caused the pendulum to gyrate over a walnut : with the forefinger of the left hand on the walnut the pendulum gyrated when held over the peach tree. Similarly a growing walnut tree, which also neither wanted food nor medicine, caused the pendulum to gyrate over two varieties of peach.

As food and medicine are eliminated this mutual action of gyration seems likely to be merely a confirmation of the correctness of their angles and colours.

The original discoveries of " green manures " by direct readings were mainly due to accidental and favourable fortune. To continue in that manner would lead to few results after immense labour.

By tabulating systematically results of everything that can be obtained further " green manure " relationships have been established. When two objects appear on the tabulated list with the same angle and opposite colours they immediately become suspect of being a " green manure " pair and can be tested accordingly.

The following have emerged from the tabulated results :—

Subject.	Green Manure.	Colours.	Angle.
Onion & Shallot Apricot	Brussels Sprouts ...	Green and Grey ... Black and Blue ...	220 220
Vine (Grape) ...	Radish	Blue and White ... Grey and Yellow ...	230 230
Potato	Pea	Violet and Grey ... Red and Blue ...	260 260

While a great deal of care has been given to get results as correct as possible there are many factors which may produce errors. Some results which seemed quite definite at the time were revised after further tests.

There is one factor which may produce variations between experimenters, and that is that there is no " Mager's Rosette " of standard colours. Some readings look as if the object did not quite agree with a colour ; the colour was near, but not exactly what was wanted. This was noticeable with my yellow, which is " lemon " coloured.

The result was nevertheless recorded, as it may provide sufficient guide for the time being. Some results were recorded before the various checks were evolved.

While actual scientific field experiments is the correct manner of proving the value of any of these results and so of transferring them from an amateur to an authoritative and professional basis, there are certain aspects which can be mentioned. There are many places where artificial fertilizers are very expensive to employ ; waste land can be made use of on which to grow the particular green manure required, possibly as one crop in a rotation. In orchards " green manures " are often turned in, but they are more than likely of a variety which, while beneficial, may not be as good as the one suggested by this method. Certain

waste products of farms, instead of being put in a general compost heap, of which use may not even be made, can be more effectively employed by being given to the particular growth to which they are suitable. With the change to mechanical power more difficulty exists in obtaining animal manure. It is probably agreed that the continual application of artificials may have finally a harmful effect on the soil.

Nature, in providing this relationship between a tree and a particular "green manure," is certain to have some definite object in view, which may be that of developing in the tree greater resistance to disease.

The colours related to a plant may have a bearing on the experiments that are being conducted at experimental stations of germinating seeds under coloured glasses.

ANGLE INDEX.

Angle.	Subject.	Colours.	Gr'n. Manure Pairs.
180			
181			
182			
183			
184			
185			
186			
187			
188	Cocoanut	Blue and Red	
189			
190	Celery	Violet and Grey	
	Tomato	Blue and Yellow	
191			
192	Artichoke (Globe)	Green	
193			
194			
195			
196	Spinach	Yellow and Grey	
197			
198	Fig	Grey	..... GM
	Maize...	Blue	
199			
200			
201			
	Loganberry	Green	
202	Almond	Green	..... GM
	Canadian Wonder Bean ...	Black	
203			
	Asparagus	Green and Grey	
	Walnut	Violet and Grey	
204	Black Algerian Oats ...	Blue and Red...	..... GM
	Rhubarb	Yellow and Grey	
	Peach	Violet and Grey	
	"White" Oats	Blue and Red...	..... GM
205			

ANGLE INDEX (*Continued*).

ANGLE.	SUBJECT.	COLOURS.	GR'N. MANURE PAIRS.
	Apple	Blue and White	
	Sunflower	Yellow and Grey	.....GM
206	Blackberry (Himalayan) ...	Violet and Green	
	Pawpaw	Violet and Green	
	Ootanashi Bean	Black and White	
	Cotton	Blue and Yellow	
207			
208	Parsnip	Red and Grey	
209			
210	Hazel Nut	Yellow and Grey	
211			
212	Lupin	Violet and White	
213			
214	Cherry	Green and Grey	
215			
216	Peanut	Violet and Grey	
	Pyrethrum	Violet and Yellow	
217			
	Gooseberry (Cape)	Red and Grey	
218	Cabbage	Yellow and Grey	
	Sugar...	Green and Yellow	
219			
	Apricot	Green and Grey	
220	Onion and Shallot		
	Brussel Sprouts	Blue and Black	.....GM
	Chillie	Red and Grey	
221			
222	Mint	Blue and Yellow	
223			
224	Vegetable Marrow	Green and Grey	
225			
226			
227			
	Tree Tomato	Blue and White	
	Beetroot	Red and Grey	
228	Lettuce (Cabbage)	Green and Grey	
	Pear	Blue and Yellow	
	Barley	Grey and White	.....GM
229			
	Carrot	Red and Grey	
230	Vine (Grape)	Blue and White	
	Radish	Yellow and Grey	.....GM
231			
	Broad Bean	Grey and Black	
232	Eucalyptus	Red and Black	
	Garlic	Yellow and Grey	
233			
234	Orange	Yellow	
	Gram...	Violet and Blue	
235			
	Plum	Blue and Black	
	Loquat		
	Linseed	Green and Grey	.....GM
236	Strawberry	Violet and White	
	Coffee	White	
	Castor	Yellow	.....GM

ANGLE INDEX (*Continued*).

ANGLE.	SUBJECT.	COLOURS.	GR'N. MANURE PAIRS.
237			
238	Cauliflower	Grey and Black	
	Rubber	Blue and Red	
239			
240	Spinach Beet	Blue and Yellow	
241			
242			
243			
244	Banana	Violet and Black	
245			
246	Wheat	Blue and Green	
	Granadilla	Blue and Yellow	
	Wineberry	Violet and Grey	
247			
248			
249			
250	Lemon and Lime	Red	
	Vetch	Violet	.....GM
251			
252			
253			
254			
255			
256	Pimento	Yellow and Grey	
257			
258	Quince	Violet and Blue	
	White Runner Bean ...		
	Lentil	Blue and Grey	
	Simsin	Violet and Black	
259			
260	Turnip	Green and Grey	
	Potato	Violet and Grey	
	Pea	Blue and Red...	.....GM

SUBJECT INDEX.

NOTES AND NEWS

We much regret to record the death, on February 18th last, of Colonel Carl Beichl, of the Austrian Engineers, after an operation (carcinoma of the stomach and liver). He worked as a water diviner for the Austrian forces during the Great War with excellent results and, as recorded in the last Journal, one of his wooden divining rods is preserved as an exhibit in the Army Museum at Vienna. For his services the Emperor awarded him the Knight's Cross of the Order of Francis Joseph. In many cases he was able to indicate not only the exact spot where water was present, but also the depth, the amount of the current, the chemical composition and temperature. He specialised in the investigation of thermal springs and published a map of the underground thermal waters of Vienna in the *Allgemeine Oesterreichische Chemiko-und Technike Zeitung*, No. 9, 1927. A book embodying the result of his investigations is to be published shortly.

Colonel Beichl devoted his latter years to the study of so-called earth rays, supposed to be due to underground currents of water and the cause of cancinoma and other diseases, and continued to reside in a room under which a strong current was flowing. It is no exaggeration to say that he sacrificed himself in the cause of science.

* * * * *

As reported in the *Yorkshire Observer* of February 23rd and several other papers, the body of Samuel Buck, a mill worker, who had been missing from his home at Yeadon since January 15th, was found floating in the water at the disused quarry at Fountain Crossroad on February 21st.

The police had been assisted in their search by Mr. H. E. Scott, B.S.D., of Bradford, who, using a cap of the missing man as a sample, had been led first to Yeadon Dam and eventually to the quarry, where a heap of clothes was found. Dragging operations, even after some of the water had been pumped out, had been unsuccessful.

As reported in the *Yorkshire Observer* of April 19th and 26th, Mr. Scott assisted the police in the recovery of the body of William Joseph Burkill from the River Calder. Mr. Scott first followed a trail to the point where Burkill's clothes had been found, a distance of about two miles. He then traced the body to a spot within half-a-dozen yards of the place where the body was eventually recovered.

Mr. Scott has assisted the police in searching for missing people on several previous occasions, one of which was recorded in *B.S.D.J.* 12.

According to the *Evening Standard* of March 11th and other papers Mr. John Henry Bailey, who has just retired from his post as Sanitary Inspector to Cranbrook Council, is a successful water diviner, and frequently made use of his powers in the course of his duties, one of his locations being a well 95 feet deep at Goudhurst.

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According to the *Belfast News Letter* of March 26th the Dungannon Rural Council are employing a water diviner to find water at Drummuck.

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According to the *Mercury and Herald* of April 9th the Towcester Council are to employ a water diviner to find a supply of water in Blisworth Parish.

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On February 20th the *Popolo di Roma* published some interesting notes by Mario la Stella on the practical results obtained by the use of the "geo-voltometro," the well-known electric instrument invented by the Italian engineer, Cav. Alberto de Vita.

It depends for its action on the alterations of equipotential lines of underground strata, which are recorded on electric indicators, the alterations corresponding to faults or underground water, whether streams or sheets.

Some months ago the Royal Thermal Institution of Salsomaggiore, desiring to locate underground deposits of liquid iodides for the production of iodine, entrusted Cav. de Vita with the task of selecting the spots where boring should be carried out.

After several days of intense search with his instrument he indicated four spots on which bores were immediately begun.

The results quickly confirmed de Vita's forecast. He had asserted that oil would be met in some of the bores, and oil was, in fact, struck in well No. 23 at a depth of 280 metres and was being pumped at the rate of four tons per day.

Considering the difficulties encountered hitherto in the location of underground oil deposits in the Italian peninsula and the enormous expense incurred on "wildcat" boring, the speedy and successful result of Cav. de Vita's efforts is highly satisfactory.

REVIEWS

APPLIED GEOPHYSICS.

By H. Shaw, D.Sc., A.R.C.S., F.Inst.P.

Published for the Science Museum, South Kensington, by H.M. Stationery Office; price 2s.

This most instructive book of 102 pages is described on the title page as "a brief survey of the development of apparatus and methods employed in the investigation of subterranean structural conditions and the location of mineral deposits."

We must begin by challenging certain remarks about the divining rod. "Even now, however, its use has not been entirely discontinued, and the divining rod, as well as other similar unscientific devices, is frequently and quite erroneously regarded by some as a geophysical instrument." So far from its use being not entirely discontinued, the divining rod or other dowsing instrument is more frequently used to-day than ever before, and it is probably no exaggeration to say that the location of water by dowsing in some part of the world is a matter of daily occurrence. The divining rod in itself is obviously not a geophysical instrument, but the human body is the oldest of all geophysical instruments, and the divining rod is but one of several forms of indicator.

But to return to the apparatus: There are four main methods of geophysical survey—the magnetic, gravitational, seismic and electrical, the latter being subdivided into (*a*) The Spontaneous Polarization Method, (*b*) Equipotential Methods, (*c*) Resistivity Methods, (*d*) Electro-magnetic Methods.

The Magnetic Method, the oldest of these, depends, as its name implies, on the response of a magnetised needle to its surroundings. As a result of instrumental improvements it has now become possible to locate not only highly magnetic bodies, but also, under suitable conditions, less strongly magnetic minerals, such as certain iron silicates. Hidden tectonic structures such as faults, anticlines and synclines can be detected when the differences between the magnetic susceptibilities of the various rock masses are not too small. The magnetic method is the most rapid and least expensive of all geophysical methods.

The Gravitational Method depends fundamentally on the observation of variations in the earth's gravitational field. The earliest instrument used for this purpose was a pendulum, but owing to its limited sensitivity some form of the Eötvos torsion balance is now commonly used. "The main requisite for a successful application of the gravity method is the existence of a density difference between the various minerals and rocks that are in contact, and it is evident that the greatest success

may be expected where large bodies of very high and very low density occur comparatively near to the surface."

The Seismic Method is based on the fact that when an earthquake occurs two distinct types of elastic waves are set up, one parallel and the other perpendicular to the direction of the propagation. Artificial earthquakes are produced by blasting with powerful explosive, and observations are usually made by a number of seismographs located at different distances. Elastic waves travel through different rocks with different velocities and are refracted when passing from one medium to another of different velocity. A simple form of seismograph consists of a base or support which, when in operation, is kept in rigid contact with the earth, an inertia mass connected to the base by some kind of non-rigid suspension and a means of recording the relative motion between these two component parts. Electrical types of seismographs have been developed principally in the U.S.A.; in them a small coil of wire is caused to move in a strong magnetic field, giving rise to small electric currents which are recorded and measured by means of an oscillograph. "The seismic method of survey is most useful over areas in which the geology is comparatively simple and in which a medium of high elastic wave transmission velocity lies beneath one of low velocity."

Of the electrical methods, the Spontaneous Polarization Method makes use of the fact that small electric currents are produced naturally by certain ore deposits and circulate continually in their vicinity. With a galvanometer for the exact determination of potential equality, a potentiometer for measuring potential differences and two non-polarizable electrodes effects have been observed up to 400 millivolts at 100 metres. This method is inexpensive and rapid in operation, but is limited in application to the location of readily oxidisable minerals such as pyrites, metallic sulphides, anthracite and certain carbonates.

Equipotential Methods are based on the observation of the distortions caused by good conductors in a uniform electrical field and on the resulting deformation of the equipotential surfaces. An artificial field is created in the earth by means of two electrodes spaced a considerable distance apart and through which an electric current is suppled to the ground. Lines of equal potential are then traced out on the ground and their shape compared with the perfectly symmetrical distribution resulting from the passage of a current through homogeneous ground. The shape of these equipotential lines is modified by the presence of ores, which are better conductors than the surrounding media, good conductors being indicated by a spreading apart of the lines in the field. The latest instrument is called the "Ratiometer."

Resistivity Methods consist in measuring the mean resistivity of the ground to gradually increasing depths in order to locate

ore bodies. Early efforts in which two electrodes only were used were not reliable, but in 1916 the problem was solved by placing four-point electrodes along a straight line, passing a current between the two outer electrodes and measuring the potential difference between the inner pair. In this manner the resistivity could readily be determined.

Electromagnetic methods are probably the most important used in geo-electrical prospecting. One such, known as the capacity method, consists in examining the change of frequency of the oscillations induced in an aerial when in the presence of a conductor. It was used in 1914 to determine water levels in South-West Africa.

There is a reference to the wireless method patented by Chapman and Franklin in 1930, but the newer instrument now used by Mr. T. Bedford Franklin (B.S.D.) is so changed that it hardly resembles the old at all and actually works on different principles.

Other modern electro-magnetic methods are based on the induction of currents in conductors under the action of alternating magnetic fields.

A method patented by Galla in Germany consisted essentially in examining, by means of search coils, the direction of maximum intensity of the magnetic field by passing an alternating current of 500 cycles through the ground by means of electrodes about 100 yards apart.

The minerals which may be located by means of electric methods mostly possess a high metallic lustre such as pyrites, chalcopyrites and arsenical pyrites, but beds of clay and areas impregnated by saline waters give as good indications as ore bodies.

The book ends with a list of 150 exhibits, including ten plates of illustrations, under the four main headings, beginning with the Terrella which was introduced by William Gilbert in 1600, and used by him in researches on terrestrial magnetism.

There appears to be no apparatus designed expressly for the location of underground water, though one reads of an instrument which has been employed lately in Rhodesia for that purpose with considerable success.

One cannot help comparing some of the delicate and costly instruments described in this book, limited as they are in the extent of their application, with the self-adjusting human instrument, which, when equipped with a trained intelligence and supplemented by an eighteenpenny whalebone indicator, can produce more comprehensive results with greater speed and accuracy and at much smaller cost.

A.H.B.

LE FLUIDE VITAL GUÉRISSEUR.

By C. R. Pollak, *Maison de la Radiesthésie*, Paris.

The author of this little book of some 80 pages is President of the Swiss Radiesthésie Association. It is the result of 20 years' experience of his system of healing.

In 1910 he discovered that by contact of his hand he was able to relieve pain at the price of temporary suffering on his part.

From this beginning he gradually developed a system of diagnosis and healing, described in detail, by which he has been able to effect a large number of cures, sometimes on subjects who had been considered incurable.

By way of theory the author postulates the existence of a vital fluid circulating in the human body, and it is the absence or irregularity in the flow of this fluid which is the primary cause of disease.

Defects of this kind can be revealed by the pendulum and rectified by the laying on of hands, which causes a transfusion of this fluid from the operator to the subject.

The author surrounds his practice with a refinement of theory which seems hardly justified by the apparent simplicity of the well-proven facts of healing by touch.

THÉORIES ET PROCÉDÉS RADIESTHÉSIQUES.

By René Lacroix-á-l'Henri, Henri Dangles, Paris.

This book is in some sort a continuation of the *Manuel Théorique et Pratique de Radiesthésie*, by the same author, which was reviewed in *B.S.D.J.*, II., 10 (December, 1935).

It deals rather with the mystical aspect of dowsing than with practical dowsing in the field, and the ordinary water diviner need not expect to find in its pages much which will assist his dowsing technique.

Part I., 50 pages, discusses such abstruse matters as the ancient Chinese symbols, the Yn and the Yang, the Pakoua, Egyptian magic, &c.

Part II., 80 pages, includes such subjects as injurious rays, mental orientation, therapeutics, dowsing on plans, the auras.

Part III., 37 pages, includes chapters on astrology and occultism, and is suitably headed "on the confines of radiesthésie."

The book is well written, but should be of more interest to the student of magic than to the practical dowser.

A.H.B.

ZEITSCHRIFT FUR WÜNSCHELRUTENFORSCHUNG.

(November, December, 1936; January, February, March, 1937).

November.—Under the title "The Diviner's Rod as an Aid in Historical Research on Sea and Land," Herr Rudolf Brunneman describes experiments made by him from a small boat near Cape Arcona. He marked by buoys the approximate points at which he found reactions, and describes seven cases, in which five showed objects of interest.

Dr. Kurt Osswald reviews a paper by Dr. Friedrich Lautenschlager (Experiments on the biological influence of the so-called earth rays affecting the diviner's rod, *Biologisches Zentralblatt*, Leipzig, 56, 7/8, 1936, pp. 23). The experiments, like those carried out at Zürich by Dr. Jenny seemed to show, among certain varieties of animals, a preferential selection of places outside "zones of reaction." This was particularly notable among white mice, guinea pigs and rabbits; but the behaviour of the household mouse was not so obviously selective.

Dr. Osswald agrees with Dr. Lutenschlager that the case for the so-called "earth rays" has not been conclusively proved; but he points out the agreement between these and other observations in Germany and Switzerland. He has great praise for the careful manner in which the experiments have been carried out.

Dr. Raoul Braun-Fernwald writes his usual report on the diviner's rod abroad. This month a short account is given of certain work carried out in Czecho-Slavokia, with a synopsis of the results, under four headings, by Professor Birk. There does not seem anything particularly new in these conclusions.

Dr. Braun-Fernwald also reviews the September number of the journal of the British Society of Dowsers.

Dr. W. refers to observations made by Dr. Riegler (Bad Aussee) which the latter has communicated to an Austrian medical journal. Dr. Riegler thinks that he has shown a connection between the moon's phases and periodic fluctuations in cases of goitre and other swellings. His idea seems to be that the periodic fluctuation of "the waters which are beneath the earth" causes a similar periodic change in the atmospheric ionisation, which finally gives rise to changes in the intensity of the particular diseases in question.

Dr. Kurt Osswald refers to a series of lectures given throughout Germany by Herr Gubisch, whose mission appears to be to warn the public of the dangers of overconfidence in clairvoyance and thought reading. Dr. Osswald says that though he does not agree with all that Herr Gubisch says, yet that it would do many dowsers good if they could attend a course of his lectures.

An interesting account is given of an instrument devised for the measurement of the force of gravity. The apparatus is

very simple, depending on the pressure of a column of mercury upon a volume of gas, the changes in which are measured by a thread of mercury in a capillary tube. The apparatus is extremely sensitive to changes in temperature as well as those in gravity, and it has to be kept at constant temperature. It is said that fluctuations of 1/3,000 of a degree centigrade cause movement of the thread. In view of this extreme sensitiveness it is difficult to believe the claim brought forward in the original article (from *Natur und Kultur*) that the apparatus can be satisfactorily handled by unskilled workers.

Dr. Raoul Braun-Fernwald reviews two books, one from Czechoslovakia (F. Jelinek) and the other from France (Dr. Jules Regnault).

December.—Dr. Beyer makes a plea for the inclusion in the Four Year Plan of a scheme for investigation by dowsers in such parts as the deep plains of N. Germany, whose geological mapping is singularly difficult and expensive.

The editorial staff republishes a paper by Professor Dr. Sommer, which was originally printed in the *Zeitschrift* of 1923.

Dr. Sommer thinks that the action of the rod is upon those nerves and muscles which are similar to those used by birds in flying, and that " we have before us a kind of primeval motor action, which has been preserved in man, by heredity, from primeval times."

Dr. Braun-Fernwald reviews work in France, and includes a brief account of the proceedings at tne International Congress at Nice.

Finally is published an account of an authentic case of discovery of water by a dowser in a position which had been condemned both by a geologist and by a hydrologist. The results were so striking that with some justice the article is headed " A Field Day for the Diviner's Rod " (ein Paradefall der Wünschelrute).

January, 1937.—With this number the *Zeitschrift* begins a new volume, No. 18.

The first article is by Dr. Beyer, who continues his argument for the assistance of dowsing in the Four Year Plan. In the article in the December number he suggested the help that might be given by the diviner's rod to geologists, in areas which were largely overlaid by superficial deposits, and in which little exploration had been done. In this short note he develops his theme, in a further suggestion, that dowsers could also work as willing assistants under the direction of geologists, in areas of which something was already known.

A short review of publications and work in England and France is given by Dr. Braun-Fernwald.

Dr. Fr. Wetzel refers briefly to investigations by Dr. Theo. Lang at Munich into the causes of goitre and cretinism. According

to Dr. Wetzel, Dr. Lang is of the opinion that " the intensity of the radioactive emanations from the ground, and the electric tension of the air (Luftaufladung) play an important part in the development of endemic goitre." Dr. Wetzel thinks that we have here a new theoretical vindication of the supposition that there are pathogenic zones which a practised, sensitive and discriminating dowser can detect.

A contributor, writing over the initial F., gives an account of attacks made by Professor Miescher, and Dr. Schaaf, of Zürich, as well as from other quarters, upon Dr. Jenny's work with white mice. Dr. Jenny's criticisms of his opponents' work are also given.

Dr. Frank Wetzel writes of a success in the detection of a leakage of water, and a contributor, W., is justly indignant at the apparent attempt of a S. German paper to bring politics to bear against dowsing.

This number also contains a review of a book by Dr. Alfred Roux, *Vérités sur le Diagnostic Radiesthésique Médical*. The reviewer says that the book is so attractively written that it might be of interest even to opponents of its views.

February.—Dr. Raoul Braun-Fernwald refers to certain cuttings from the newspaper *Le Petit Havre*, sent to him by M. Pierre Cody (Ing. Pierre Cody, le Havre). M. Cody claims to have proved, by physical means, an abnormal ionisation of the air over spots which had the reputation of being danger zones for cancer. He states, also, that a marked improvement was obtained by the placing of lead plates beneath the beds of sufferers from various diseases.

Dr. Braun-Fernwald also publishes, in the same article, some notes by Professor Deslandres on Cody's observations. He thinks that the investigations are worthy of attention, particularly since they have been controlled by such a renowned savant as Prof. Deslandres. He thinks, moreover, that they are of all the more importance, in view of a recent publication by Dr. H. Beitzke, Professor of pathological anatomy at Graz University (*Wiener klinischer Wochenschrift*, Jan. 8th, 1937, p. 26). Dr. Beitzke refers to the fact that, out of 16 cases of spontaneous cancer among 450 mice, 13 occurred among those who were caged over a subterranean water course, while only three occurred among the controls, whose cages were not over the watercourse.

(Dr. Braun-Fernwald does not mention how many mice were in the control cages and how many over the watercourse).

Professor Beitzke has also referred to a statement by Dr. Hecht (*Monatschr. f. Krebsbekpfg.* 3, 33, 1935) that in 12 houses with frequent deaths from cancer the results of dowsers were tested with physical apparatus, with complete agreement.

Ing. Volker Fritsch gives a brief account of dowsing investigations on the Winaritz mountain near Prague. Unfortunately,

only a few dowsers appeared to take part in the work, and the results do not seem to have been very conclusive.

Herr Hans Muthreich, of Berlin, gives an account of the actual use of the diviner's rod in the detection of the exact spot at which an electric cable was broken.

Dr. O. describes an actual success by an experienced dowser, after a less experienced man had failed. He gives this example of complete success (with the double compass in the hands of an expert) as a lesson :—

1. To dowsers that they shall not try to run before they can walk.
2. To employers that they shall only give their contracts to men of proved worth.
3. To geologists and hydrologists that they shall get the help of dowsers in places like the N. German plains.
4. To the physicists that they shall not too hastily condemn the use of the double compass and of instruments devised for the help of dowsing.

He thinks that all tools need practice, and that no apparatus, method or machine should be condemned merely on theory.

Dr. Braun-Fernwald has translated an extract dealing with dowsing from Sir J. J. Thomson's autobiography (*Recollections and Reflections*. G. Bell and Sons, London). Dr. Braun-Fernwald observes that Sir J. J. Thomson's remarks show that the credit of the diviner's rod is growing in England, and that this is certainly due to this Society, and its President.

In reference to a suggestion by Sir J. J. Thomson, that it might be of interest to see whether a dowser could detect a strong pencil of γ rays Dr. Braun-Fernwald remarks that in 1920 he made some experiments with radium, under Professor Hess. He found that "the most active radium preparations enclosed in thick-walled glass vessels had less effect on him than had weaker preparations in thin-walled vessels. He believes that the rays which act on the dowser differ from all the known α, β, γ and δ rays, but that further work must be done before it can be decided whether they are related to neutrons as Professor Deslandres thinks. According to his own experience a part of the active rays are diverted by a magnet, so it really does seem as if they possessed an electric charge.

Space is given to a statement by a journalist, to the effect that radioactivity is so great in one part of Abyssinia that photography is impossible, as all the plates are spoilt.

The number concludes with two reviews, the first by Dr. Raoul Braun-Fernwald of a book on the determination of sex, in which the author, Dr. Regnault, mentions the use of the rod and pendulum, in the determination of the sex of an unborn child. The majority of the rest of the book seems to be outside the scope of dowsing.

The second review is by Dr. F.W., of a book by Dr. Nippoldt, late Director of the Magnetic Institute of Berlin University. This work (*Erdmagnetismus, Erdstrom und Polarlicht*, does not deal specifically with dowsing; but the reviewer thinks that much useful information might be obtained, by a careful study of the chapter on regional disturbances (örtliche Störunsgebiete) and their geological and physical causes.

March, 1937.—The first ten pages of this number are taken up by a synopsis, compiled by Dr. Kurt Osswald of the more important German literature on dowsing for the year 1936. He has not published the names of every book which has been written purely in opposition to dowsing, as he does not think that there is much to be learnt from all of them. He has, however, included all books which he thinks may be of use, regardless of whether they run counter to his own views or not. In all he gives a list of 33 books.

Herr Johann Meyer describes some observations on ants. He says that the ants make their journeys within zones of influence, and he believes that they build their heaps within the zones so that they can find their way back from their journeys.

Over the initials F.W. appears a short note, accompanied by two aerial photographs. These pictures show differences in vegetation, which the contributor believes are clearly due to subterranean water channels.

Then follow, with several notices and reviews, the notices by F.W., and the reviews by W.

F.W. wants such of his readers as may have a new encyclopaedia carefully to read the article on the diviner's rod and to submit their opinion to the *Zeitschrift*. He fears that some of the writers who contribute notes on dowsing to the great lexicons may show bias and confusion of thought.

The reviews are of pamphlets on cancer by Josef Bodden and by Dr. Mannlicher.

The number concludes with the official notices of the Reichsverband, among them an obituary notice containing no less than four names, among them that of Colonel Carl Beichl, of Vienna.

It is of interest to note that a small local group of members held a meeting in February at Halle, and that there will be a meeting of the same local group in May in Bernburg.

C.S.T.

END OF VOLUME II.