tation were caged in groups of 5 each with free access to food and water. Each animal was weighed and killed by an overdose of ether. Seminal vesicles were quickly dissected out, weighed and homogenized for enzyme assay. Acid phosphatase (EC 3.1.3.2.), alkaline phosphatase (EC 3.1.3.1.), β-glucuronidase (EC 3.2.1.31.; β-GLR) and glucose-6-phosphate dehydrogenase (EC 1.1.1.49.; G6PD) were assayed as described earlier[3,4]. Proteins were determined according to Lowry et al.[5]. Results were analyzed for significance using Student's t-test[6]. Values of $p < 0.05$ were considered significant. Small pieces of glands were also fixed in Bouin's fluid for routine histological examination.

A progressive decline in the weight of seminal vesicles was found over the 6-week period of castration (table). The protein content showed a significant decline only at 4- and 6-week postcastration terms. G6PD activity decreased significantly already after 7 days, maintaining the reduced value almost constant over the following 2 weeks. Thereafter it declined further, reaching almost 1% of the control value. β-GLR activity decreased at 1-week postcastration term. It increased at 2-week postcastration term and decreased again to reach nearly 20% of the control value. Acid phosphatase activity showed a significant decline only during the first week of castration. Subsequently it rose and maintained the control range. In contrast, alkaline phosphatase activity did not manifest any influence of castration. The weight, protein content, β-GLR and G6PD were significantly increased at 5 µg DHT/day. Except for β-GLR, the stimulation was greater (almost 5-fold) at the higher dose level (50 µg DHT/day). The 2 phosphatases did not show any change in their activity in the androgen-replaced castrated mice. DHT-induced stimulation of organ weight, protein, β-GLR and G6PD was almost nullified by the simultaneous injections of CPA. A histological examination of the seminal vesicles showed that castration caused a progressive atrophy of the gland and a gradual disappearance of the seminal plasma. Androgen therapy induced tissue hypertrophy and increased secretion of seminal plasma. These effects were inhibited by CPA. The present results confirm those of Neumann[2] and Luttge et al.[7] as far as the histology and organ weight are concerned. The present data also indicate that β-GLR and G6PD activity in the seminal vesicles is under the control of androgen.

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PARAPHYSICA

Editorial remark. In a past paper the author reported about experiments to map fields of physiologically effective stimuli of an unidentified nature and natural origin. The present contribution attempts to produce stimuli with similar physiological effects by well defined and well located artificial sources. This complementary report might be of general interest in view of the assumptions of practising sourcerers about the external agents they are looking for. The author seems critical enough not to imply the unproven identity of the natural and the artificial sources which produced the similar stimuli.

H.M.

Experimental investigation of the perceptibility of the artificial source for the dowsing agent. Progress report

A.M. Comunetti[1]

Gempenstrasse 13, CH-4104 Oberwil (Switzerland), 1 August 1978

Summary. An artificial source for dowsing experiments is described. Investigations on the perceptibility of this source by turning on and off the water flow gives significant statistical results. The experiments for locating the source compared with blank experiments equally reveal perceptibility. An unexpected hysteresis in the reactions is observed when changing the source conditions in time and space. The behaviour of the sensitivity of the operator is deduced from many locating experiments.

In a first paper[2] we reported on the experimentally established spatial distribution of the reaction locations over natural reaction zones in buildings, and started to discuss the influence of the sensitivity of the operator on the location of the reaction. It resulted from many experiments that the rod, wand or fork (or pendulum) is merely an indicator of an unconscious muscular reaction of the operator, and that this indicator instrument is individual as long training had been done with it. The paper concluded with the statement that the dowsing reaction was due to an unknown agent which, for convenience, had been called D-agent (D for dowsing). This statement is justified when taking into account the large spectrum of observations in this field.

Remarks concerning the possible nature of the dowsing agent. Different investigators[3-6] demonstrated a local correlation between reaction zones and disturbances of the magnetic field of the earth; they were even successful in producing the unconscious muscular reaction by induced variations of the magnetic field or by electromagnetic waves[7]. But even if such stimuli produce a reaction similar to that observed in a zone over a ground water stream, it cannot be concluded that the stimulus of the latter must be of the same nature. Repeated tests with our operators revealed no sensitivity to disturbances of the magnetic field. However it seems possible to train an operator to respond to various known stimuli.

W.A. Tiller[8] and A.M. Comunetti[2] plead for an unknown agent as the cause for the dowsing reaction. But before projecting any hypothesis, we need more and well founded knowledge of the reaction fields originating from 'natural' sources.

Project. We therefore aimed to get more details on the reaction field in the vicinity of a signal source, and tried to set up an artificial source for the D-agent, by imitating nature. The expected advantage of such a source was a greater independence of environmental (out-door) conditions and a narrow zone that would permit a coarse location of a supposed sensor in the operator's body. The operating conditions should be easily controllable, at least the on-off state.

Coarse description of the source and previous tests. The basic idea for the construction of an artificial source was to imitate nature, in our case natural water veins. We used glass pipes 2 m in length and 5 cm in diameter, some of them filled with sand, one without sand. These pipes could be connected in series or parallel by means of rubber pipes, this in various geometric configurations, but most often lying parallel near to each other. The water flow was up to about 10 l/min. In the case of parallel pipes, all flow directions, unidirectional and bidirectional, were tested. Many previous tests were done in a 1-story building with the glass pipes lying on the wooden floor about 0.5 m above natural ground. These tests showed that operator RU got signals over the sand filled pipes, but no signal over the empty pipe, this generally when water was flowing. Operator TR, on the contrary, had no signals inspite of repeated trials, inspite of his seeing the pipes and knowing the water was running. The same happened to the operator KO. After placing a 10-15-cm-thick layer of ordinary sand on the pipes, both operators, KO and TR, independently got signals. The idea of putting appropriate material over the tubes resulted from Abbot Mermet's book[9] which states: 'The deeper the water vein, the sharper the signal'.

Experimental facilities. The above-mentioned pipe set-up, called source, was intended for use in conjunction with a facility permitting different kinds of tests. In a large, empty

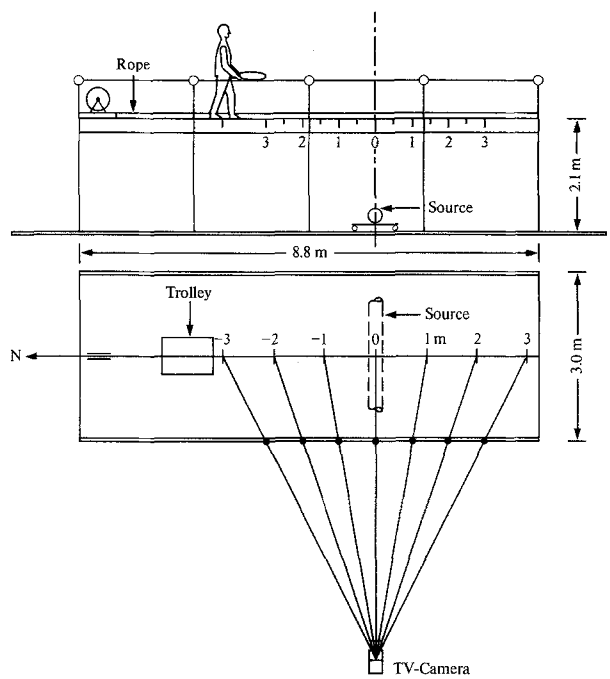


Fig. 1. Facility for dowsing experiments with an artificial source.

Fig. 2. 'Tuning-in' of an operator, showing the increase of sensitivity. Short, heavy bars represent the locations of individual reactions; the arrows the average reaction locations with their standard deviations for left-to-right and right-to-left walks. The operating conditions are specified in the adjoining table.

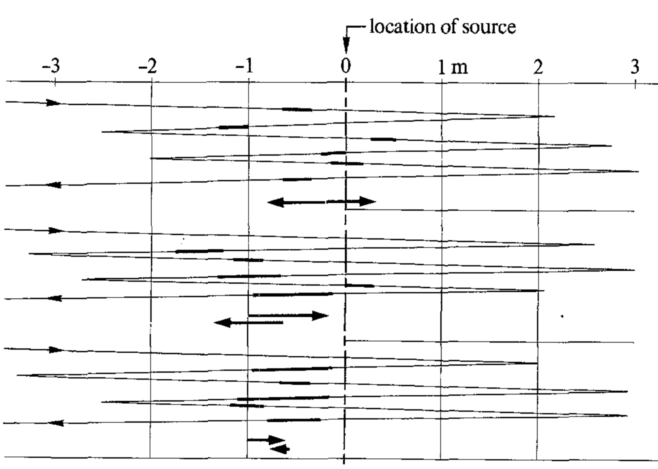
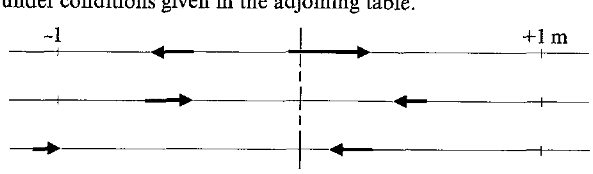


Fig. 3. Comparison between the reaction locations of different operators under conditions given in the adjoining table.



DATE 1975			SOURCE 4 pipes filled with sand				OPERATOR	conditions				REACTION			
day	month	hour min. starting time	bare	overlaid with sand	aluminium sheets		name	on foot	blinkers	blindfolds	on trolley	series desig.	no. of crossings	sensitivity S	quality Q
02	05	0851		+			ER	+		+			6	+0.7	4.1
		0854		+						+	+		6	+0.5	5.2
		0857		+						+	+		6	-0.2	6.5
12	03	1516		+			TR	+		+		①	20	+0.6	7.8
		1530		+			ER	+	+			②	22	-1.0	13
		1552		+			RY	+		+		③	10	-1.2	19

room of a factory building of Hoffmann-La Roche in Sisseln, we looked for an area relatively free from reaction zones. This building was a heavy 4-story iron frame construction with provisional wooden floors. The area chosen for the setting up of the experimental facility was relatively undisturbed, for the operators TR and RU. Figure 1 shows this facility consisting of the wooden platform, the source arrangement and the video recording system. The platform was about 9 m long and 3 m wide. The artificial source below the platform, invisible for the operator, could easily be displaced. The operators moved on the platform along the midline in both directions, when on foot and blindfolded (by means of a gas mask with completely blackened eye glasses) they were guided by means of a rope between the ankles. The severest blindfold experiments were done with the operator sitting or standing on a remote-controlled cable trolley. To permit the operator the use of his personal indicator instrument without any modification for recording purposes, all scenes were recorded by a video system and interpreted after completion of the experimental program.

Experiments and results. The first program step with this facility was to test the system operator-source by the question whether the water flow was on or off. For these tests the operators walked freely without any constraint on the platform, they even knew the location of the source. The water, ordinary tap water, was turned on or off upon decision by tossing a coin for each trial. The intervals between the trials were between 2 and 4 min but fixed within 1 series. The following table gives the results of all test series of this type. N represents the total number of trials (except 11* which is a series of 11 consecutive trials out of 20).

1975 Day	Month	Start-time (h)	Operator	No. N of trials	No. n of correct answer	Probability of observation
6	2	14.14	ME	11	10	0.006
8	3	09.54	RU	10	7	0.17
		10.46		10	9	0.011
12	3	11.20	ME	10	9	0.011
		14.01		10	2!	0.055
22	3	11.06	RU	10	6	0.37
12	4	10.05	RU	10	5	0.63
19	4	10.00	RU	11*	10	0.006

The last column gives the probabilities for n or more correct guesses if $n > 6$ (n or less correct guesses if $n < 5$), with the hypothesis $p = \frac{1}{2}$ for the outcome of a single trial. By applying the common rules of discrimination, the random-guess hypothesis $p = \frac{1}{2}$ can be rejected with small risk. In the course of these experiments, particularly during the normally preceding training series, we learned that the lapse of time between turning on the water flow and the appearing of the reaction was from seconds up to 10 min. This urged us to abolish conditions deviating too much from those existing in nature, where reaction zones are rather stationary with slow changes of the intensity.

Experiments with continuous water flow. Figure 2 reflects typical observations of a training series with the stationary source at position 0.0 m. In the given example, the source consisted of 4 parallel, sandfilled pipes with horizontal, equidistant (8 cm), vertically superimposed axes. The water flow was stationary and alternating in direction from one pipe to another.

Fig. 4–6. Average reaction locations and their standard deviations indicated separately for left-to-right and right-to-left walks (arrows) under the conditions specified in the adjoining table.

Fig. 4

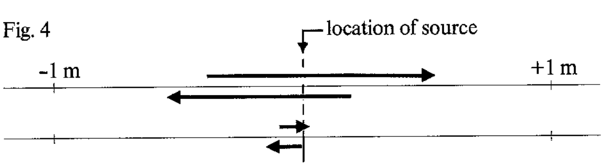


Fig. 5

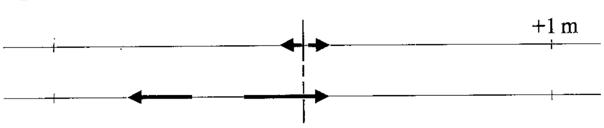
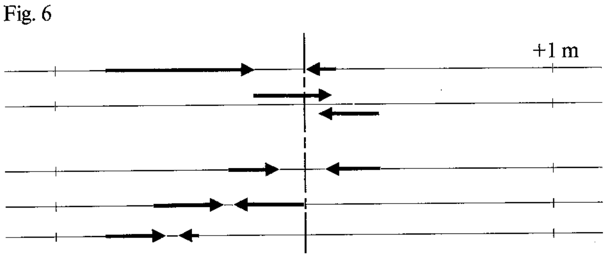


Fig. 6



DATE 1975			SOURCE pipes filled with sand					OPERATOR	conditions				REACTION			
day	month	hour min. starting time	bare	overlaid with sand	aluminium sheets	water running	water shut off	name	on foot	blinkers	blindfolds	on trolley	series desig.	no. of crossings	sensitivity S	quality Q
24	03	1426	+			+		ER			+	+	①	10	+0.4	2.5
12	04	11--	+		+	+		RU			+	+	②	10	+0.05	18
17	04	10--	+		+	+		ER			+	+	①	12	+0.1	38
17	04	1015	+		+		+ (at 1014)	ER				+	②	14	+0.6	13
02	05	0910	+			+		ER	+	+			①	8	-0.7	5
		0925		+		+			+	+			②	10	-0.1	11
		0958		+		+			+	+			② b	10	-0.4	9
		1014		+	+	+			+	+			③	10	-0.3	8
		1025	+			+			+	+			① b	10	-0.2	13

The graph shows the entire training series at the beginning of a test program (figure 6) obtained with the blindfolded operator ER on foot, standing and sitting on the trolley. This series during the 'tuning-in' period of the operator shows the progressive increase of the sensitivity by the gradually appearing shift of the reaction spots from apparent retardation to apparent anticipation[2].

Trying to get numerical values for the sensitivity of the operator and the quality of detecting, the following procedure had been adopted: The operator crosses successively in opposite directions the vertical plane of the (narrow) source, getting reactions in the vicinity of the latter. The distance between the reaction spots of 2 successive reactions from opposite walk or travel directions is defined to be positive when the 2nd reaction occurs after having passed the previous reaction spot; negative if it occurs in anticipation of the proceeding one. The arithmetic mean of these distances, S, and the inverse of the standard deviation of this mean, Q, are considered as characteristic numbers for the sensitivity and the quality of detecting:

$S > 0$: retardation, low sensitivity,
$S < 0$: anticipation, high sensitivity,
$Q \equiv \left| \frac{\sqrt{n}}{\sigma} \right|$: measure of quality

Investigating the perceptibility of our artificial source, we learned more about the reaction space in the vicinity of this bare source. Different tests were done repeatedly and with different operators. Figure 3 shows an experiment with the described facilities and the operators TR, ER, RY. The source, consisting of the 4 superimposed pipes with boxes ($16 \times 16 \times 64$ cm) containing quartz sand on the top, was located at 0.0 m. The operators walked blindfolded on the platform trying to locate the source position. The operators normally walked straight ahead until they were told to return; the return point was chosen arbitrarily by the experimenter. The mid points of the arrows represent the arithmetic means of the reaction spots from all walks in the direction of the arrows, the lengths of which represent the standard deviations of the means. The average of the left-to-right and right-to-left means (not shown in the figures) sometimes was significantly out of the vertical of the source. This can equally be deduced from figure 5 series ② and figure 6 series ③ and ①b. The reason of this is not understood yet. The high fidelity of refinding the reaction spots, however, expressed by series ② and ③ from figure 3 seemed somewhat suspicious and we therefore enhanced shielding against possible orientation aids.

Figure 4 shows the result of an experiment conducted under much more severe conditions: both operators, ER and RU, standing blindfolded on the trolley which was activated by the experimenter. Source arrangement for series ①: 4 sand filled pipes alone; for series ②: the same 4 pipes with aluminum sheets on both sides of the pipes reaching from these up to the platform. We conclude that visual orientation and subconscious estimation of distances cannot be accounted for in explaining dowsing perceptibility of the artificial source.

Figure 5 shows an experiment with operator ER. The first series is merely a repetition of series ①, figure 4. The source arrangement differs by now added aluminum sheets on both sides of the pipes. The operator is blindfolded on the remote controlled trolley. The 2nd series was obtained with the same source arrangement but with the seeing operator after shutting the water flow across the pipes. The experiment shows the dying-away effect by the much larger fluctuations of the reaction locations, probably due to the weakening intensity of the dowsing agent. The experiment equally reveals the remarkable reliability of an operator without prejudice: the relatively strong shift of the reaction locations appeared in spite of the operator's optical recognition of the source location.

A glance on figures 3, 4 and 5 reveals in addition to the above-mentioned, occasionally observed large deviations of the average reaction locations from the vertical above the source position, the fact that the reactions may occur either before (figure 3, ② and ③) or after (all others) the crossing of the average reaction locations. Whether the reactions occur before, at the moment of or after crossing the average reaction locations, is a function of the operators' sensitivity which usually changes in the course of the experiments as outlined above.

In order to obtain some information concerning the effect of source arrangements, some experiments were performed. The results are shown by figure 6. Series ① was obtained with the sand filled pipes alone, ② with overlying boxes filled with quartz sand; ②b is a repetition some half-an-hour later, ③ a series after adding 1-mm-thick aluminum sheets on each side of the pipes 16 cm apart; ①b finally is a repetition of series ①. The aluminum sheets seem to have no influence on the locations of the reactions. The values S of the average sensitivity during each series and the quality numbers Q are given in the corresponding table. These numbers emphasize the reality of the observed shift of the locations of the averaged means which occurred after 10.00 h.

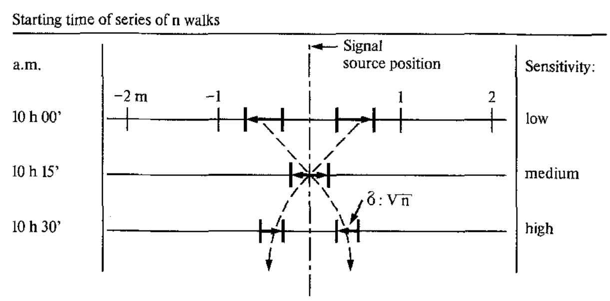


Fig. 7. Development of an operators sensitivity at the beginning of his dowsing action.

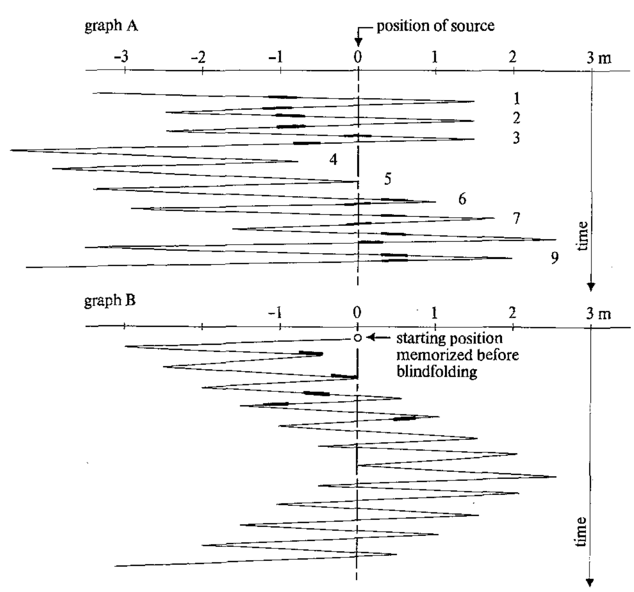


Fig. 8. Graph A: Operator ER blindfolded on trolley with rod (17 April 1975). Graph B: Operator ER blindfolded on trolley without rod, trying to guess the moment he passes the starting position (11 June 1975).

The observation of the development of the sensitivity of the operator in the course of the experiments are summarized in figure 7. Such observations had been made many times with different operators. They normally were a 'by-product' of planned investigations.
To exclude an unconscious guess of the source position, we performed some blank experiments. During these the operator was on the trolley without his divining rod and the source was inactive. Before putting on the blindfold, the operator was shown an arbitrarily chosen location he had to remember. He then tried to guess the moment he was passing the imagined location on the moving trolley, which he would indicate by rising a hand. Such blank experiments were made with 4 operators. Figure 8 shows 2 diagrams obtained with operator ER: on top a real experiment with the rod from April 17, 1975. This experiment equally shows the 'tuning-in' of the operator who performed some 15 min later the excellent series given by figure 5, ①. At the bottom, a blank experiment from June 11, 1975. The absence of guesses - the operator declared complete loss of orientation - did not permit to evaluate numerical values.
Such blank experiments with operators on foot revealed for some operators a remarkably precise guess. Therefore only trolley test experiments for locating of an unknown source position were accepted.
Why did we not change the position of the source under the platform? Initially it was intended to do so, permitting the operator to work without any hinderances such as blindfolds or trolley travelling. We observed that when the operator initially located his reactions at A, in or near the perpendicular of a given source position, then, after changing the latter in a direction and amount unknown to the operator, he normally first detected the old reaction place A which then gradually shifted to a new place A' within 5-15 min, the difference A-A' reflecting the displacement of the source in direction and amount. This phenomenon was repeatedly observed with different operators. From this observation it follows which sort of difficulties we encountered in realizing the very first program step with the platform facility and the artificial source.
Conclusions. Do the described experiments answer the question of the perceptibility of the artificial source? The experiments of the type 'water running or not' can be regarded as statistically confirmed proofs. The risk of being wrong in rejecting the pure random hypothesis with $p = 1/2$ is very small.
The experiments of locating the source position have to be divided in 2 categories: a) Variable source position; operator working without constraint. In many series the average locations of the reactions corresponded within the statistical fluctuations with the vertical of the source position. Moreover many other observations revealed systematic deviations of the average location which, nevertheless, was seemingly correlated with the source, for a displacement of the latter reflected in a progressive, finally equal shift of the average location of the reactions; retardations of up to 15 min have been observed. The behaviour of a hypothetical D-field around our surface source might indeed considerably differ from such a field of a deeply buried (natural) source.
b) Fixed source position; operator blindfolded on trolley. These series intended a closer approximation to natural conditions of the source (stable in space and time). The results from blindfolded, trolley-travelling operators were compared to pure guessings under similar conditions but without rod and with inactive source, thus discriminating between a D-detecting capability and an orientation capability. The perceptibility of the source and detection of its environment was documented by reproducible reactions in the vicinity of the vertical of the source, the statistical fluctuations of the reaction locations being small compared to those of the guessing series.

1 Acknowledgments. The author expresses his gratitude to the pharmaceutical company Hoffmann-La Roche for supporting this project, particularly to Prof. Dr A. Pletscher, the operators mentioned by the code names TR, RU, ER, ME, KO, RY and others, and all persons who contributed to this investigation.
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PRO EXPERIMENTIS

A new simple assay for total blood lipids by refractometry

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Summary. A fast simple method for assay of total blood lipids has been devised by precipitating blood proteins with methanol and extracting lipids into diethyl ether. The change in refractive index of the methanol-ether due to dissolved lipids is measured in a refractometer.

The hyperlipaemias are a common group of disorders occurring in the general male population of the United Kingdom at a frequency of about 16% (hypertriglyceridaemia 14%, hypercholesterolaemia 2%)[1]. The importance of the hyperlipidaemias is based on epidemiological studies showing them to act, like hypertension and diabetes, as major risk factors for the development of coronary and peripheral arterial disease[2-4].
Because of the high incidence of hyperlipaemia in the general population a simple screening procedure suitable