‘The search for a black cat in an unlit room, where there is no cat at all’: Investigation by the Royal Netherlands Academy of Sciences into dowsing and earth rays

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Jan Guichelaar[1]

'The search for earth rays is like the search for a black cat in an unlit room, where there is no cat at all'. Those were, according to a newspaper article,[2] the words of Jacob Clay during a press conference on 13 May 1954, on the occasion of the publication of the Report of the Committee for the Research into the Dowsing and Earth Ray Problem of the Royal Netherlands Academy of Arts and Sciences. After World War Two, the members of the Academy were acutely aware of alarming national and international developments outside their studies and laboratories.[3] In several committees they analyzed relevant economic and social problems and tried to come up with answers.

A particularly colourful problem, which has barely been addressed by historians so far, was the growing popular fear of earth rays. In the 1930s and 1940s, an alarming belief in earth rays, and in the possibility to destroy these rays by means of so-called protection boxes, had taken a firm hold on part of the Dutch population. The Royal Netherlands Academy formed a Committee to establish the scientific validity of such earth rays and of dowsing, a method used to detect them. The Committee's Report, written under the guidance of the Amsterdam Professor of Physics, Clay, was devastating for the believers.

Some historical remarks[4]

Dowsing is done with a dowsing[5] rod, usually a Y-shaped hazel twig, but bent rods made of metal or other elastic material are also used. The two ends of the Y are grasped firmly and the rod is put under tension. Holding the rod in this way, the dowser walks across the terrain, or through a building, searching for water,

metals, lost objects, or even bodies. The rod then dips down above the right spot. The usual explanation for this phenomenon is that the rod is under tension and in unstable equilibrium, so it is moved by an unconscious thought that causes a tiny muscle action.

It seems that dowsing rods have been used for thousands of years, at first as divining rods to tell the future. Even some passages in the bible seem to hint at dowsing. The first written sources referring to the practice date from the fifteenth century. In the mining industry in the Harz mountain range in Germany, dowsing rods were used to find metal ores that were thought to attract the rod. In later centuries, their use spread, first to England, to find water, and later throughout Europe. The church was not happy with dowsing activities, believing it to originate from the devil. Yet, from the eighteenth century onwards, dowsing became a respectable profession.[6]

At the beginning of the twentieth century, the theory became fashionable that the rod was attracted by electromagnetic rays or rays of a different origin. No doubt these ideas were inspired by the discovery of electromagnetic and radioactive rays, as described by scientists during the second half of the nineteenth century (by H. Hertz, J.C. Maxwell, W. Röntgen and A. Becquerel, to mention a few).

In Germany, Gustav Freiherr von Pohl hypothesized that subterranean water emitted radiation that caused the rod to move.[7] He also believed that these rays (*Erdstrahlen*) were the cause of diseases, in particular of cancer. Von Pohl put on the market the first protection boxes: wooden boxes with pieces of metal inside. According to Von Pohl, research with rods showed the effectiveness of these boxes, because the rod did not move in the vicinity of a box, while there was a definite deflection before the box was placed.

The Netherlands followed Von Pohl's example. Johannes G. Mieremet (1885-1967), who had started off as a pianist but continued his career as a magnetizer, took courses with Von Pohl and learned the ins and outs of earth rays, becoming a dowser in his own right. He founded the First Dutch Office for Soil Research by Dowsing against Health Damaging Earth Rays (*Eerste Nederlandsch Bureau voor Wichelroedebodemonderzoek tegen Gezondheidschadende Aardstralen*). Mieremet made a fortune on the sale of so-called PoVerNi protection boxes.[8] They were a big success and he even placed boxes in the Concertgebouw, the concert hall of the Concertgebouw Symphony Orchestra, and in Soestdijk Palace, the home of the then Queen Juliana. The contents of the boxes consisted, as Mieremet informed Van der Tweel, of metals used in the aviation industry; some combinations prevented accidents, he claimed.

In 1949, the Dutch geologist Solco W. Tromp (1903-1983) published Psychical Physics a thick book of more than five hundred pages on dowsing and related phenomena.[9] Tromp had studied geology in Leiden and had worked for oil companies in Indonesia and Egypt, where he became a Professor of Geology at the

Fouad I University. Three hundred pages in this magnum opus deal with a myriad of electrical and magnetic phenomena, formulae, small investigations, and details in connection with chemicals, radioactive materials, the atmosphere, plants, animals, humans, and diseases. To enhance the scientific reliability, an appendix contains a nearly complete survey of all known electrical and magnetic physical laws. The book mentions experiments by J. Wüst and J. Wimmer from 1934, who believed to have demonstrated that an unknown (earth) radiation existed of a wavelength between 1 and 70 cm. They even claimed to have measured interference patterns behind a metal plate with a small hole in it. Tromp did not think much of this theory and stuck to his own 'field theory', in which he supposed that the rod movement was generated by the hand muscles. According to Tromp, the nerves of the forearm were influenced by electromagnetic phenomena and potential differences, with muscle contractions as a result. Tromp also gave a long list of reasons why a rod experiment could go wrong: variations in conductivity of the hands, soles and clothing, the earth's magnetic field, living organisms in the vicinity of the dowser, and the like. This offered him the opportunity to discard any experiment whose results did not corroborate his theory. He also noted that Mieremet had no knowledge of physics, so he could not be a trustworthy investigator. Tromp, like some other dowsers, saw no use at all for protection boxes.

There was, of course, serious criticism from scientific quarters. One scientific claim was that the dowsing rod should not be in direct contact with the dowser, to prevent conscious influence on the rod. In the Thirties there had been extensive experiments in Germany, which did not show any connection at all between the presence of water and the movement of rods, nor did they show differences in rod movements, with or without the presence of a protection box. In the Netherlands, a seller of protection boxes said to the Court, after charges had been brought against him: 'Your Honour, it is a fraud.'

Formation of the Committee for the Research into the Dowsing and Earth Ray Problem[10]

Curiously enough, the formation of the Committee for the Research into the Dowsing and Earth Ray Problem originated from a request by Tromp to establish a laboratory for psychical physics in the Netherlands. On 30 June 1948, while still a Professor of Geology in Egypt, Tromp requested that the Minister of Education in the Dutch Government, J.J. Gielen, study his memorandum about such a laboratory [30/06/48;A]. On the condition that the government would guarantee his appointment for a period of five years and provide him with the necessary financial support, Tromp was even prepared to give up his position in Egypt. He had already published extensively in the field of psychical physics, for example a work entitled 'The religion of the modern scientist', and his book on divining phenomena was to appear shortly. The Minister of Education forwarded the letter

to the Royal Netherlands Academy of Arts and Sciences, requesting that the Academy look into the matter [21/07/48;A]. It would be interesting, the Minister wrote, 'to gain insight, with purely scientific methods, into phenomena that, until now, were not thought to be accessible for physical observation'. Though not intending to provide financial means, he was curious about the opinion of the Academy. In August, a Committee for preliminary advice was installed: the Academy members on the Committee were Bernardus Brouwer (1881-1949), Director of the Central Institute for Brain Research (*Centraal Instituut voor Hersenonderzoek*) in Amsterdam, the physiologist G.G.J. Rademaker, and the physicists J. Clay and C. J. Gorter [23/08/48;A]. Chairman Brouwer wrote that some of Tromp's ideas were worth investigating, but that the project contained so many heterogeneous elements that it was not advisable to establish a separate laboratory [22/10/48;A]. In the meantime, a new Minister of Education had been appointed: F.J.Th. Rutten. He was informed and agreed [29/11,11/12/48;A] to the plan to explore the matter further. The Committee members may, however, have regretted their remark on 'ideas worth investigating', because in the same letter the Minister posed the question: 'which, then, are these subjects being considered for investigation?' He wrote that he would appreciate more information on the issue, as would his colleague, the Minister of Social Affairs. Perhaps Clay had already shown some interest in the matter, since he was asked by the Secretary of the Physics Department of the Academy to write a new report [20/12/48;A]. He was appointed to be the new Chairman of the Committee. In January 1949, the Academy informed the Minister of Education that an investigation into dowsing rods and earth rays would be worthwhile. The Minister agreed [29/07/49;A] and the Ministries of Social Affairs and Education were to share the costs.

For the 'field work' an Executive Group needed to be installed, with the young Professor of Theoretical Physics, Sybren R. de Groot, as its Chairman. De Groot (1916-1994) wrote his dissertation at the University of Amsterdam under Gorter, so Gorter probably proposed him as the chairman. The Executive Group also needed to appoint an experimental physicist, a biologist, a medical doctor and a parapsychologist as members. Once the members' names and a work plan had been received, the Ministerial subsidy decree would follow [29/07/49;A].

It would take two full years before the definitive Committee and Executive Group were formed. One of the bones of contention was the inclusion of a parapsychologist, which the Secretary for Education wanted. A reason for this was perhaps that Tromp's Study Society for Psychical Research (*Studievereniging voor Psychical Research*) had promised financial support [04/10/49;A]. The Academy adamantly opposed the appointment of a parapsychologist.

De Groot acted decisively and proposed the (regular, not 'para-') psychologist G.E. Euwe as a member. He hoped to receive the approval of Tromp's Study Society for Psychical Research, in order to salvage the promised financial support. The Study Society objected, and instead it proposed Dr. W.H.C. Tenhaeff (1894-

1981) [17/10/49;A] who became the first Professor of Parapsychology at the University of Utrecht, in 1953. The Chairman of the Study Society, H.Th. Fischer, wrote to the Minister of Education and stressed Tenhaeff's competence, but, after several discussions, he agreed that Tenhaeff would be unacceptable to the Academy. In the end, it turned out that the Study Society would not pay [07/11/49; A] and that it had established its own Executive Group for research on the dowsing rod problem, with Board member F.A. Heyn as its Chairman. The Academy asked the Minister of Education to drop the condition of including a parapsychologist. In that case De Groot was willing to lead the Executive Group, consisting of experimental physicist Van der Tweel, microbiologist T.Y. Kingma Boltjes and psychologist Euwe [21/11/49;A]. The work plan (probably drafted by De Groot) was, in brief:

Literature study;
Research in the basement of the church in the Friesian[11] village of Wieuwerd;
Experiments with dowsers;
Further investigations as a consequence of the obtained results, if necessary.

The basement of the small church of the Friesian village of Wieuwerd contained some seventeenth century corpses that were mummified by dehydration, as a result of a continuous draught. According to dowsers, the mummification process was a result of the presence of high intensity earth rays in the church.

Still, the Minister of Education did not give in and proposed Heyn as an additional member [04/01/50;A] of the Executive Group. Although he was a Board member of the Study Society, Heyn was also a respectable nuclear physicist. On the part of the Academy, there was no objection to appointing him, but Heyn himself refused [18/01,24/01/50;A].

The Academy members believed, probably from the beginning, that nothing of serious scientific value could follow from their research into dowsing and earth rays, and inclusion of a parapsychologist would only lead to lengthy and useless deliberations. In Clay's view, too much time had already been lost – more than a year of writing letters had passed – and he recommended that they began the actual work. Later on, even The Dutch Patent Office showed an interest in the upcoming research in connection with patent applications for protection boxes and other means of protection against earth rays [19/01/51;A].

At long last, the Executive Group was able to make a start, as Clay wrote to the Academy [03/08/50;A], and De Groot received the message [30/10/50;A] that including a parapsychologist was no longer necessary and that the subsidies were forthcoming. The activities had already started a year earlier, according to De Groot, but had come to a standstill for lack of funding [4/11/50;A]. During the entire investigation process, the difference between the Academy Committee and the Executive Group was not all that clear. De Groot acted as the Secretary of the

Academy Committee and also as the Chairman of the Executive Group [07/12/51; A].

Membership and changes in the Academy Committee and the Executive Group

The Academy clearly took its task seriously: almost all of the Committee and Executive Group members were established, highly reputable scientists in the fields of science that could be useful for the research at hand.

Clay (1882-1955) studied physics in Leiden and finished his dissertation there in 1908, under the guidance of the low-temperature expert Kamerlingh Onnes.[12] His interest in cosmic radiation led to his discovery of the latitude dependence of the intensity of cosmic rays. In 1929, he became Professor of Experimental Physics in Amsterdam.[13] In view of his knowledge of radiation, appointing Clay to the Academy Committee was an obvious choice. Clay, for that matter, had already had contact with a dowser, who visited him in the Physics Laboratory (*Natuurkundig Laboratorium*) in Amsterdam in 1947 and explained the workings of a dowsing rod to him [25/06/47,T][14]. Rademaker (1887-1957) wrote his dissertation in the medical sciences on muscle tone, knowledge that was relevant for dowsing. In 1928 he became Professor of Physiology in Leiden. Gorter (1907-1980) finished his dissertation in Leiden in 1932, and became Professor of Physics in Amsterdam in 1940.[15] In that same year he became a member of the Academy. De Groot was one of his first students. Kingma Boltjes (1901-2000) was Professor of Microbiology in Amsterdam.

Van der Tweel[16] (1915-1997) obtained his doctorate in Amsterdam in 1956 and became Professor there in 1963. Already before finishing his doctorate he was appointed Director of the Laboratory for Medical Physics (*Laboratorium voor Medische Fysica*). His combined physical and medical knowledge made him suitable to be a member of the Executive Group. In the course of the investigations, Van der Tweel became an increasingly central figure in the Executive Group. He became the de facto Secretary of the Academy Committee and the Chairman of the Executive Group. Over the course of time, the role of De Groot, as far as it appears from the archives, definitely became less prominent. At the time of the final reports, De Groot was no longer mentioned at all.

Marcel Minnaert and Siegfried T. Bok also became members of the Academy Committee in 1950, and in 1951, W.R. van Wijk (1905/6-1967) was appointed, as Gorter had left the Committee. Minnaert (1893-1970) was Professor of Astronomy in Utrecht and had specialized in the physics of the sun. He was considered an expert in special physical phenomena, due to his famous books Physics of the Open Field (*De natuurkunde van 't vrije veld*). Bok (1892-1964), who was Professor in Leiden and eventually became Director of the Netherlands Central Institute for Brain Research (*Nederlands Centraal Instituut voor Hersenonderzoek*), had stimulations

and reflexes as one of his fields of expertise. Van Wijk was Professor at the Laboratory for Physics and Meteorology of the Agricultural University in Wageningen (*Laboratorium voor Natuur- en Weerkunde, Landbouwhogeschool*). Towards the end, J. Veldkamp (1909-1994) also joined the Committee. As Director of the Department of Geophysics of the Royal Dutch Institute for Meteorology (*Koninklijk Nederlands Meteorologisch Instituut* (KMNI)), he investigated the earth's magnetic field. The administrative secretary to the Committee was Mrs. N. de Raadt.

Agricultural Group

A second research group was formed in Wageningen, the seat of the Agricultural University, because large numbers of dowsers were active in the agricultural sector and many farmers hired them and bought protective equipment against earth rays. Members of the Agricultural Group were A.J.P. Oort (1903-1987), C.K. van Daalen (1884-?), who acted as Chairman, S.F. Kuipers, the Group's Secretary, and J. van der Grift. Oort was Professor of Plant Diseases at the Agricultural University and Van Daalen, as Inspector of Agriculture, was a Government official. This article focuses in particular on the results of the research carried out in Wageningen.

Main elements of the investigation

Literature and external contacts

The Committee, or one of the active Executive Groups, did a thorough research job, starting out according to the work plan drafted by De Groot. Existing literature was studied extensively and contacts were established with foreign scientists. Most publications from Germany and Switzerland reached unambiguously negative conclusions regarding the validity of dowsing rods and the existence of earth rays. In an extensive article Prof. F. Michels from Wiesbaden stated that, already at the beginning of the seventeenth century, research had led to the conclusion that a dowser could make his rod move at will.[17]

The Committee regularly received requests for information about its work, for example from the Periodical for Social Medicine (*Tijdschrift voor Sociale Geneeskunde*), which was interested because of its fight against quackery [22/10/52;A]. Regularly, the Committee received letters from citizens: requests for information on the trustworthiness of dowsers hired, and even letters from desperate people, who had manifestly been deceived. A few examples: A man from Haarlem, who had had his home measured by Mieremet, later came into possession of a similar report made for the house's former inhabitants that was completely different [22/01/49;T]. A pregnant woman had to move house, according to Mieremet, or the child would come to great harm. The couple followed Clay's advice: do not move, there is no danger at all. They had a healthy baby and Clay was overjoyed [13,14/

11/49,9/02/50;T]. The dates of these letters show, by the way, that Clay did not feel the need to wait for the results of the investigations: he already knew it was all quackery.

In 1950, Clay and Van der Tweel wrote an extremely critical review in the Dutch Journal for Medicine (*Nederlands Tijdschrift voor Geneeskunde*)[18] of Psychical Physics, Tromp's then recently published book (previously mentioned in the section *Some historical remarks*) in which he tried to provide a scientific basis for some most bizarre phenomena: homeopathic potions with a dilution of 10-32, feeling the 'aura' of a human being with a rod, the influence of planets on capillarity, a tiny ball on a short rope being capable of determining the sex of an unborn child, or, in the case of diseases of determining the exact dose of a medicine. They felt that publication of books of this kind needed to be opposed with all efforts. In a different review of Tromp's work they wrote: 'A worthless book. Food for superstition.'

The vault in Wieuwerd

In the Friesian village of Wieuwerd, eleven coffins with mummified corpses were discovered in 1765, in the crypt of the Reformed Church. At present there are only five coffins left. The lugubrious reason for this is believed to be that drunk youngsters from the area, or students of the University of Franeker considered it brave to return to their comrades with parts of mummies as trophies.

Many dowsers claimed that the mummification of these corpses was the result of a high concentration of earth rays. Investigations in 1951 by Executive Group members Kingma Boltjes and Van der Tweel in Wieuwerd revealed, in the first place, that there were no conditions present in the crypt that impeded the growth of micro-organisms. Furthermore, they established by means of a number of experiments that dehydration by draught alone was sufficient to explain the mummification process. They carried out experiments with pieces of raw meat in pipes through which stronger or weaker air streams flowed as a result of orienting the pipes in different directions. Without a sufficient air flow the meat would rot, whereas mummification would take place when the air-flow was sufficiently strong. No additional causes, such as earth rays, turned out to be required for the mummification process: a clear application of Ockham's razor.

Experiments with dowsers

Even before the Executive Group had begun its investigations, Mieremet had already visited Clay and Van der Tweel at the Physical Laboratory in Amsterdam. Within three quarters of an hour Mieremet had managed to detect beams of earth rays in a number of completely different places. In the same laboratory, Van der Tweel and Euwe had already performed experiments with a number of dowsers, who all claimed to be able to detect magnetic fields and radioactivity. Their results were no different from those achieved by purely guessing.

The aim of the main series of experiments was to reach controlled and reproducible results. Most of the dowsers were honest men, completely convinced of their gift of detecting earth rays. They cooperated con amore with the members of the Executive Group. Under the guidance of Van der Tweel and Kingma Boltjes, a number of experiments were done in a 30-metre long corridor in the Laboratory for Microbiology in Amsterdam (*Laboratorium voor Microbiologie*). Lines with intervals of 1 metre were drawn on the corridor floor. The dowsers walked up and down the corridor a few times and the points at which their rod turned were duly noted. Even in these simple experiments considerable differences were noted between walks, with respect to the points of rod action. There was no clear reproducibility. Some dowsers made their rods move at cracks in the floor, so they could easily remember the places of rod action during the following round. A few dowsers were prepared to walk the corridor blindfolded, using a rope on the floor to feel the middle of the corridor. Their results were even worse. A third experiment was done in a closed moving cart. By means of different accelerations during the first few seconds, followed by a constant speed along most of the corridor before braking, experiments could be done with different constant speeds unknown to the dowsers. Only one dowser was prepared to sit in the cart. There was no reproducibility at all when the rod movements along the corridor were compared at different speeds. Kingma Boltjes and Van der Tweel were very probably convinced beforehand that no proof whatsoever of the special faculties of the dowsers would follow from their experiments. They appear to have had a jolly time, although, during their experiments, they had to keep a straight face and keep themselves from bursting into laughter sometimes.

These experimental results, however convincing, did not put a stop to the dowsing practices. According to the Committee's Report, not a single dowser stopped his activities as a result of the experiments, even after having admitted their complete failure. In fact, it was even worse: In spite of their failure, some dowsers now advertised their services in the press, using the factually truthful phrase that their dowsing work had been 'scientifically examined'.

The tedious process of writing the Reports of the Committee and the Agricultural Group

The Committee Report

Just as the formation of the Committee and the Executive Group had been tedious, so was the process of writing the Reports in a form that was accepted unanimously by the members. In June 1953, Clay wrote to the Academy that all the work had nearly been completed [8/06/53;A]. However, the Agricultural Group was not ready, which caused delay. Moreover, the research by Heyn, of the Study Society for Psychical Research, appeared to have led to different results, but

effective contacts proved impossible. Another reason for delay was the Committee's decision to investigate a new type of textile – with the brand name parabeam – that supposedly protected against earth rays. The manufacturer postponed the investigation again and again. Eventually, the manufacturer took the material off the market, after the Committee's actions had provided its management with better insight. [28/01/54;A].

In all, it took much time to send the first draft of the Committee Report to the members. Minnaert, who was perhaps the only member to take the work extremely seriously,[19] was angered by the delay. His anger was probably caused in part by Van der Tweel's refusal to visit yet another dowser in the city of Helmond (in the South of the Netherlands), because he believed it would not lead to anything new. Minnaert was of the opinion that the investigation had to be completely unbiased. He advised Clay to withhold the regular fee for Kingma Boltjes and Van der Tweel, as long as they did not do their work properly [19/09/53;T]. Eventually, the draft Report of the Committee was distributed for comments. Minneart reacted in a letter to Van der Tweel [6/11/53;T]. He agreed with the contents, but objected seriously to the form of presentation. He was of the opinion that, to avoid the impression of prejudice, the report should start with a description of the experiments, followed by the results, instead of starting off with the results. He also noted shortcomings in the list of documentation and literature. At the end of November, the Committee met to discuss a revised version [28/11/53,07/01/54;T], a meeting at which Van Daalen from the Agricultural Group was also present. Minnaert was ill, but his suggestions were followed, for the most part. A day before the meeting he sent Clay a supplementary proposal to invite Mieremet for another set of experiments [27/11/53;T], whose results, in his words, could create trust in science and could only reinforce the negative Committee conclusions. Mieremet, as the best-known dowser, would be the right candidate for these experiments. The proposal by Minnaert, who was full of praise for the Committee's work, was directed against Van der Tweel, who considered any further investigations nonsense. Another round of remarks was decided upon, but even the next version [05/02/54;T] could not satisfy Minnaert. As he wrote to Van der Tweel, he had insurmountable objections to the fact that the results were mentioned before the experiments [09/02/54;T]. Van der Tweel must have exploded with anger and wrote back immediately. Again and again everything had to be changed, Van der Tweel complained to Minnaert. In a letter to Clay on the topic, he maintained [11/02/54;T] that the Report should stay as it was. After all, at an earlier stage even Minnaert himself had argued that readers should be able to gain a general impression without having to read the entire Report [10/02/54;T].

In the end, Van der Tweel sent Minnaert the final version of the Report by way of Clay. Minnaert made a last attempt to influence the order of the Report, this time writing directly to Clay 'not to start by trumpeting the results' [20/02/54;T], but without success. In the final Report the four main conclusions appeared pro-

minently on the first page. Later in his life, Van der Tweel would recall Minnaert's stubbornness, in spite of his enormous admiration for Minnaert's many talents, saying: 'But basically he was not responsive to arguments: he could not accept being contradicted.'[20]

The Agricultural Report

Contrary to the original plans, no joint Report by the Committee and the Agricultural Group was ever written. The Report from Wageningen was so different in purpose from the one written in Amsterdam that Van Daalen proposed to publish the two Reports separately. He had written his Report more as reading matter for farmers [04/11/53;T] than as a report on research. Chairman Oort sent the Wageningen Report to Clay with a request for critical remarks [01/03/54;T].

Another reason to publish separately was the fact that Wageningen was definitely later than Amsterdam, and there was considerable pressure to publish the Committee Report as soon as possible. Already in 1952, Clay had aired very negative opinions in the press, claiming that the powers of dowsers were based on fiction and the workings of protection boxes on superstition, as Van Daalen wrote to Van der Tweel [11/03/54;T].[21] That had caused one of the dowsers to refuse further cooperation. Others were only persuaded to cooperate by not mentioning the Academy as the source of the assignment. In the end, the Agricultural Report, with some changes at the request of the Amsterdam Committee, appeared around June 1954, not all that much later than Clay's. The conclusions were also completely negative [02/05/54;T]. The Report advised farmers to take no notice of the hypothetical earth rays that had never been demonstrated to exist.[22]

Meanwhile, the lengthy procedures had led to changes in the Wageningen Group: new members were F.W.G. Pyls and D.A. de Vries. The Agricultural Report would also appear as a publication of the Royal Netherlands Academy of Arts and Sciences, but not until Professors D. van Dantzig and J. Hemelrijk, from the Mathematical Centre (*Mathematisch Centrum*) in Amsterdam, were asked to take a thorough look at the statistical calculations [14/07/54;A]. This caused Van Daalen, the Group's Secretary, considerable annoyance as he expected unnecessary theorizing and more delay. He turned out to be right: correspondence about it went on well into 1955, even after the Committee had formally been liquidated. This statistical check is remarkable, especially given the fact that, in its own Report, the Committee had not used a single statistical calculation.

Conclusions of the Reports

The Amsterdam and Wageningen Reports were both published in the Reports of the regular Sessions of the Department of Physics of the Royal Netherlands Academy of Arts and Sciences.[23] As mentioned earlier, the Committee Report was made public during a press conference on 13 May 1954. Its four main conclusions were:

Not in a single instance during the investigations did the dowsing rod prove its validity as a means of discovery of known or unknown phenomena;
The existence of so-called earth rays has, in no case, been demonstrated or even made plausible;
Convincing evidence has been presented of the uselessness of the examined apparatuses for the destruction of the so-called earth rays, or for the neutralization of their influence;
It is desirable that the government offers protection against the activities of manufacturers of so-called anti-earth ray apparatuses, in particular if these activities are in the field of medicine.

In the concise survey by the Agricultural Group in Wageningen of the results of the research into the importance of the dowsing rod for agriculture, the final conclusion consisted of a recommendation to farmers, horticulturists and foresters. They were advised not to take any notice of the hypothetical earth rays, which had never been demonstrated, and not to attach any value to:

Dowser research;
The use of protection boxes;
Removal of earth rays from estates and buildings.

Both Reports agreed in their negative conclusions regarding the existence of earth rays and protection appliances. M.W. Woerdeman, Secretary of the Department of Physics of the Royal Netherlands Academy of Arts and Sciences wrote a letter to the Minister of Education [24/03/54;T] stating that there was definitely a question of an 'evil' and that the government should take a 'militant attitude' in this respect. The Committee was willing to create extensive publicity about these abuses in the press.

Nevertheless, among considerable parts of the population the publication of the Reports did not succeed in diminishing the belief in earth rays to negligible proportions. On the contrary: as was mentioned earlier, dowsers quite frequently advertised their services as having been the subject of scientific research. The Committee was well aware of this fact. At the end of the Report the Committee wrote that a great number of people would probably persevere in their belief in dowsing rods and earth rays, in spite of all scientific evidence against it. Still, the Committee did not consider it sensible to put more time into research.

Rounding off the activities by the Committee

Formally the Committee had already been liquidated on 27 February 1954 [05/06/54;A]. At the beginning of 1955, Van der Tweel wrote a report on the final activities of the Committee and the Executive Group [30/03/55;A]. These ongoing ac-

tivities consisted of contacts by Minnaert and Van der Tweel with Mieremet about his publication on Geiger-Müller counters, the publication of the final Report of the Agricultural Group, and activities to spread their results in agricultural circles.

At Clay's request, the Committee's administrative secretary, Mrs. De Raadt, settled the Committee's financial matters. Once her report was finished, she sent it to Clay – who had meanwhile fallen ill – wishing him a quick recovery. (Clay died in 1955). In the financial report she writes that the two main investigators, Kingma Boltjes and Van der Tweel, each received a fee of 500 Dutch guilders every six months, and Mrs. De Raadt herself received 250 guilders. Van der Tweel had also asked for 250 guilders for car expenses for a visit to Helmond, possibly, among other things, to pay for the visit to the dowser that Minnaert had suggested.

Later developments

One week after the press conference about the Committee's Report, serious allegations by Tromp appeared in the press against the 'thoroughly biased' Committee.[24] Tromp's anger was directed in particular at Committee Chairman Clay and investigator Van der Tweel. They were accused of already having expressed themselves negatively about dowsing and earth rays before the formation of the Committee in 1948: they had spoken of 'absolute nonsense'. Though – on the basis of research – Tromp had come to the conclusion that protection boxes were useless, he was convinced of the existence of the rod reaction. In addition, he still had a bone to pick with them after their scathing reviews of his book that had appeared in 1949. He also wrote an extensive complaint to the Royal Netherlands Academy of Arts and Sciences, stating that their method was bound to lead to negative results, that they had never done any field research, and that the Report was all rubbish [20/05/54;T]. Tromp was also angered by the fact that he, who had done research in the field for so long, had not been involved at all in the Committee's research. Van der Tweel considered it appropriate to write a reaction to the Academy: the Committee and Executive Group had decided, right at the beginning, not to contact Tromp at all [24,26/06/54;T,A], and he had no intention whatsoever of doing so now.

Mieremet was also quick to respond to the Committee's results. He gave a press conference that was reported in the *Algemeen Handelsblad*. Van der Tweel was enraged by the newspaper's conclusion that the final word about earth rays had not yet been said. 'As if it is a debate between equivalent parties,' he fulminated in a letter to the Royal Netherlands Academy of Arts and Sciences [28/05/54;A] in which he asked the Academy to request a rectification by the newspaper.

Even worse was the criticism by O.J. Cleveringa (1919-1979), a former Inspector of Agriculture [13/12/55;A]. After his retirement from the Ministry of Agriculture he sought publicity as a full-blown supporter of the earth ray theory.[25] Through

his private research he had come to the conclusion that earth rays could be measured accurately and were the universal cause of all diseases of soil, plants, animals and human beings. The completely opposite conclusions by the Committee clearly resulted from their rationalism and from being completely alienated from nature. The personal incompetence, and perhaps even the untrustworthiness and dishonesty of the Committee and Group members were obvious, according to Cleveringa. He tried to prove his point by noting that 'man should be born a researcher', and that 'being appointed as a researcher is not enough'. He went on to remark that the investigation was the 'worst botch-job' in years that he had seen 'being served by the rationalistic kitchen'. Apparently, the Committee did not respond to his complaint: some of its members must have thought that, in the end, the battle against stupidity is a hopeless fight.

There were other reactions as well. J.P. Schravendijk wondered in the 10 November 1954 issue of the Journal of the Society against Quackery (*Orgaan van de Vereniging tegen de Kwakzalverij*) what effect might be expected from the Report. At an auction, Van Schravendijk had bought a Poverni protective box and, after opening it, he found only a piece of zinc, a few frames glued to the sides and three crossed copper wires. This was hardly a convincing apparatus to effectively protect against supposedly dangerous rays. Yet, the newspaper articles that had been published until then, led him to the preliminary conclusion that the public took little account of respectable research on this topic: there was a negligible difference between the content of the articles before and after the Committee Report. As a matter of fact, the huge press coverage appeared to create even more interest in the working of earth rays. Van Schravendijk was planning to write a dissertation about the spread of the belief in earth rays, together with the Professor of Press Sciences in Amsterdam, S.K. Baschwitz. He wanted to explore the opinions of the Dutch by means of a questionnaire, and corresponded with the Committee [15/04,17,20,27/11/53;T] to discuss it. After the initial objection that dowsers might use the investigation for their own publicity, the Committee supported Van Schravendijk's subsidy request, which, in the end, was unsuccessful [07/01,20/02/54,30/03/55;T].

Even the Dutch Prime Minister, Willem Drees, showed a professional interest. He had received questions from members of the Dutch Lower House (*Tweede Kamer*) about protection boxes after Van Daalen, from the Agricultural Group, had testified at the Leeuwarden Court. Van Daalen asked the Academy to send the Prime Minister personal copies of the two Reports [25/04/55;A], which had already been sent to the Government earlier.

Abroad the Report also aroused some attention. In a letter to the Royal Netherlands Academy of Arts and Sciences, the Minister of Foreign Affairs conveyed information from the Dutch Ambassador in Budapest that the so-called 'Eötvös pendulum' could track minerals and oil. The Academy forwarded the information to its Departments of Physics and Geology [01/09/54;T]. Loránd Eötvös (1848-

1919) had experimented extensively with the earth's gravity field and he was able to measure tiny differences in the strength and direction of the field at great depths. Differences in density pointed to rock formations or oil supplies. These measurements could be replicated and were no dowser nonsense, but part of reliable physical science.

Minnaert defended the Report against a critical paper by the geologist F.J. Faber. In the weekly The Engineer (*De Ingenieur*), he claimed that, although the investigations by the Clay Committee had been performed correctly, even they did not offer definitive proof that earth rays did not exist. According to Faber, the question of the existence of earth rays still remained unresolved, even after the Report. Minnaert showed in his reply[26] that with this type of reasoning you could question the existence of all kinds of made-up rays, such as 'Sirius rays, meteor rays, or copper rays'. Then you could demand scientific research to prove the rays' existence, and as long as it was not proven definitively, the question would remain unresolved.

In 1962, there was commotion again. The Dutch Journal of the Society against Quackery (*Orgaan van de Vereniging tegen de Kwakzalverij*) wrote that the dowser Johannes Bron had sold more than 1200 protective boxes for sometimes as much as 2500 Dutch guilders apiece.[27] On 1 July, he was planning to destroy the mummified corpses in the church in Wieuwerd with a bombardment of electrons. In an interview the now retired Secretary of the Agricultural Group, Van Daalen, looked back on the history of the Committee.[28] He said that he was not prepared to go to Wieuwerd, because 'nothing, absolutely nothing' would happen there. Eventually the 'bombardment' was called off.

Concluding remarks

In all, the activities of the Committee and Executive Groups had taken more than six years. A fair proportion of that time had been spent assembling the three groups, and writing, checking, and cross-checking the Reports. The quality of the investigations was of a high scientific standard. In retrospect, it may be considered a great advantage that no parapsychologist was taken on board as a member of the Executive Group. The investigations would probably have been slowed down indefinitely by differences of opinion about scientific values and standpoints.

Of many, if not all, of the members of the Committee and the Groups, it is evident that, beforehand, they believed that dowsing, earth rays, and protection devices belonged to the domain of quackery. Yet, they did their research according to proper scientific standards. As mentioned earlier, Kingma Boltjes and Van der Tweel must have had hilarious moments when the dowsers, with or without blindfold, on or off a trolley, thought they repeatedly measured earth rays in different places. The meetings at which the Reports were discussed must also have

had their moments of hilarity. On the other hand, some members must have cursed the earlier quoted remark by Brouwer in a letter to the Minister of Education that some of Tromp's ideas were worth investigating. They surely felt that they had better things to do.

Admittedly, the results of the investigations by the two Groups did not have great influence in the end. Negative public remarks on earth rays and dowsers by Clay and other members, even before the research started, may have played a role. They may only have served to strengthen the impression among believers that the scientific establishment's attitude regarding parapsychological and supernatural phenomena was biased. Fact is that the belief by many people in such phenomena cannot be banished by thorough scientific research. Even now, in 2013, the Internet is rife with hundreds of sites where dowsers and connoisseurs of earth rays propose the dowsing of houses and offer help in curing almost every disease known to man. Very little seems to have been done with the advice of the Committee to the Government: to protect the public against dowsing activities, especially in the medical field. The responsible government officials apparently considered it an uphill battle that was bound to fail.

Personal note

With great pleasure I have agreed to the request to write a contribution to this farewell collection in honour of Anne Kox. Our friendship dates from 1969, when we shared an office in the Institute of Theoretical Physics, then located at Valckenierstraat in Amsterdam, where we were preparing for our final university examinations. We both wrote our dissertations with Sybren de Groot as our advisor. In recent years, Anne has advised and helped me several times with a number of investigations in the field of the history of science. I am very grateful to him for his support.

In 2009, a few folders with letters and documents from the legacy of Henk van der Tweel came into the possession of radiation physicist Henk Venema, via his colleague Jan Strackee, who wanted to throw the folders into the paper shredder. Venema has been my friend and fellow student in physics since 1964. After Venema died suddenly in 2011, his children gave the Van der Tweel folders to me, as well as a Mieremet protection box that Henk and I had bought on a beautiful day of cycling somewhere in the province of Drenthe, a trip accompanied by much laughter and beer. I had planned to write a summary of the activities of the Clay Committee and, as Ad Maas suggested, Anne's farewell book is an appropriate opportunity to do so.

Apart from some secondary literature, I have used the archive of the Committee at the Trippenhuis, the home of the Royal Netherlands Academy of Arts and Sciences in Amsterdam, and the Van der Tweel folders. Furthermore, I explored the archives of Clay and Kingma Boltjes in the North-Holland Archive in Haar-

lem, the Clay Archive in the Museum Boerhaave in Leiden, and the archive of the International Institute of Social History (*Internationaal Instituut voor Sociale Geschiedenis* – IISG). These archives contained little additional information. I thank Ad Maas for his valuable suggestions, Godelieve Bolten of the North-Holland Archive, Joeri Meijer of the Academy, and Monique van der Pal of the International Institute of Social History for their help, Ria Koene for her textual improvements and for checking the English text, and Jan de Jong, a former student of Clay's, for a few reminiscences.

The closed wooden Mieremet box mentioned earlier, obtained through Mr. Bolt in Winschoten, measures 36cm x 21cm x 11cm. In the bottom, the following text has been burned: Serial number 220; Range 20 m; Type A1; POVERNI; Legally submitted No. 71168; Patent application pending No. 86764; J.F. Mieremet Wassenaar. When I opened it with a saw, it turned out to contain six small metal rods in wooden frames and eight small slabs, made of various metals (copper, brass, zinc) and synthetic (?) materials, measuring 3.5cm x 3.5cm. The box now sits on my desk to support the computer monitor, reminding me sometimes of the apocryphal remark by Niels Bohr to a colleague pointing in disbelief to a horseshoe hanging over the door to Bohr's room: 'They say it works, even if you don't believe in it.'

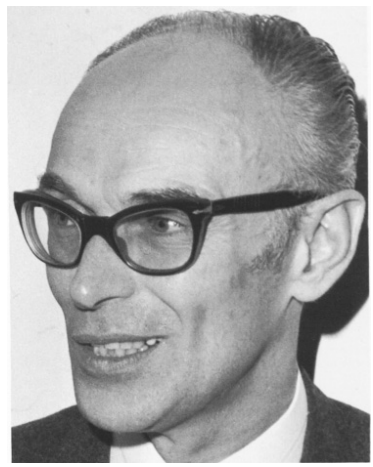

Fig. 1 – Sybren R. de Groot

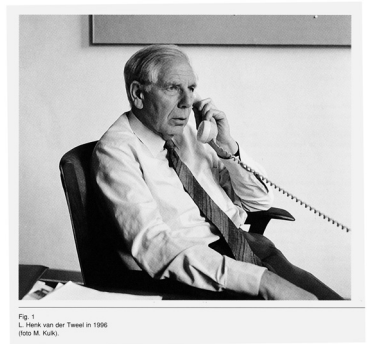

Fig. 2 – Henk van der Tweel

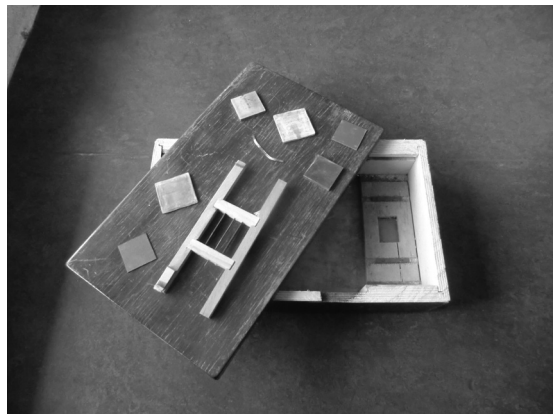

Fig. 3 – Poverni-box, opened

Notes

1. The basic material for this article consists of a folder with letters and documents from the archive of the Royal Netherlands Academy of Arts and Sciences and several folders from the personal archive of L. Henk van der Tweel [VDTW], in the possession of the author, which will be deposited in the North-Holland Archive (*Noord-Hollands Archief*) in Haarlem. Van der Tweel worked for Clay during the Clay Committee's investigations into dowsing. In the running text, references to these letters and documents are put between square brackets, as follows: [ddmmyy;A] or [dd/mm/yy; T], with 'dd/mm/yy' denoting date/month/year, 'A' the Academy archive and 'T' the Van der Tweel folders.
2. The Dutch papers *Algemeen Handelsblad*, 14 May 1954 [VDTW], *Nieuwe Rotterdamse Courant*, 14 May 1954 [VDTW].
3. Van Berkel (2011).
4. Gardner (1957), pp. 101-115.

5. Dowsing originally meant divining.
6. Gardner (1957), pp. 102.
7. Zorab, G. (1950), pp. 91. The parapsychologist Zorab (1898-1990) was the Secretary of the Dutch Study Society for Psychical Research. He was convinced that paranormal gifts moved the rods and believed that Von Pohl's Physical earth rays were a fantasy.
8. Potentiaal Verschillen Nivelleren (English: Levelling Potential Differences).
9. Tromp (1949).
10. Dutch: Commissie tot Onderzoek van het Wichelroede- en Aardstralenprobleem.
11. Friesland is a province in the Northern part of the Netherlands.
12. See also Van Delft is this volume.
13. Maas (2001); Maas (2005).
14. Letter of seed merchant N. Zwaan from the town of Enkhuizen.
15. Casimir (1983); see also Maas in this volume.
16. Strackee-Kater et.al. (1999).
17. Michels (1951), pp. 374-380.
18. Clay et.al. (1950), pp. 1661-1662.
19. Molenaar (2003), pp. 363-365.
20. Molenaar (2003), pp. 393-394.
21. *Algemeen Handelsblad*, 15 October 1952; Annual Report of the RNAS, 1951-52.
22. *Algemeen Handelsblad*, 3 June 1954 [VDTW].
23. Verslag van de gewone vergadering van de Afdeling Natuurkunde, 20 March 1954, volume LXIII, number 3 and 24 April 1954, volume LXIII, number 4.
24. *Algemeen Handelsblad*, 21 May 1954 [VDTW].
25. *Maandblad van de Vereniging tegen de Kwakzalverij* (Monthly of the Society against Quackery), volume 71, number 1, January (1956).
26. Minnaert (1955) [VDTW].
27. *Orgaan van de Vereniging tegen de Kwakzalverij*, 77, nr. 1 (1962).
28. Emeis jr. (1962).

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