

SUBTLE ENERGIES

A LIFETIME'S SCIENTIFIC QUEST

INTRODUCTION

Nearly 30 years ago whilst working as a research doctor, working on the development of the human tympanum, I became fascinated with the ideas of some of the greatest embryologists of all time, mostly from Germany. Some suggested that there was an unseen blueprint for any developing organism, which was somehow followed by an unexplained mechanism, but in those days, that was in the 1930s when these researchers were developing their ideas, these ideas seemed to be taken for granted. I became captivated by these ideas, and became interested in disciplines in medicine, or at that time in the area of alternative medicine, which looked at ideas of unseen energies, in order to diagnose and treat illness. This led me to Traditional Chinese Medicine and acupuncture in particular, and to a number of visits to China, and a complete immersion in the world of Traditional Chinese Medicine. The idea of subtle energy, Qi, which was supposed to flow around the meridians according to traditional Chinese theory, captivated me, and remains a central fascination for me both from a research point of view, and from the point of view of treatment. It is truly a lifetime's work, and I hope my tiny contribution so far has progressed this field a small amount.

Complementary and alternative medicine is full of ideas about energy. This is really a modern way of talking about Life Force, and was taken seriously by some scientists as recently as the twentieth century, but not since. Its origins are probably pre-historic, and it was generally held to be some kind of subtle substance or force which exists which is responsible for life. Its principle is often identified with the breath, because clearly when we are dead we stop breathing. There are various words which describe subtle energy, for example the Sanskrit word 'prana', in Traditional Chinese Medicine the concept of 'Qi', in acupuncture the meridians are supposed to carry Qi, flowing around the meridians in a particular sequence. Illness is thought to occur when blockage occurs in the flow of Qi, and from the point of view of acupuncture, needling around the areas which might influence this block will allow the Qi to flow again. Samuel Hahnemann enshrined this notion of subtle energy and homeopathy in the process of "dynamization". He implied that there was some kind of vital force in the non-material homeopathic remedy.

A whole range of therapeutic systems in CAM has used in various ways this idea of energy. Electrodermal testing is to some extent a way of measuring this energy, and is one area which interests me greatly from a therapeutic and diagnostic point of view. This involves placing medications to be tested in electrical circuit with a patient to determine what is the best choice of treatment.

The science behind subtle energy, in my view, is a big challenge to the biomedical model. The biomedical model with its increasingly rigid structures, such as the ubiquitous use of RCTs is ever more hostile to these ideas. Whilst on the opposite side from the complementary medicine practitioners, detailed questions about the nature and function of subtle energy produces confused ideas with little of it backed by experiment. There is no general agreement as to how it works and there are seldom any serious attempts to describe any scientific backing to these energies. There have been a number of attempts to update the concepts by reference to contemporary physics, and these have been successful in probably three groups worldwide. Conventional medical colleagues brush this off as pseudo-science. This is often in my experience a situation where the accuser has not looked at the science and does not anyway have any of the basic scientific background of physics and maths in order to understand it. There is an enormous existential terror amongst conventional doctors when confronted by these ideas and that in my view is what is so interesting about them, because they potentially open up a new world of understanding of the way living systems may work.

I have repeated work carried out by Professor Hiroshi Motoyama from Tokyo, looking at electrical changes over acupuncture points and have been able to show that these recordings are remarkably consistent, when looked at using a statistical technique which looks at similarities as opposed to differences, this is called the coefficient of variation. For example, doing a standard blood test like a haemoglobin with a split sample sent to two different laboratories, the results should have a coefficient of variation of 15% or less. If it is significantly less than 15% then this is a repeatable and stable result, inevitably they will not be identical. The coefficient of variation we have found on the electrical measurements of acupuncture points show coefficients of variation of an average of 6%. This is a truly remarkable result¹. My friend and long time scientific colleague, Glen Rein, has produced an important experimental study showing the existence of Qi². Professor William Tiller's work however stands head and shoulders above any group worldwide. Professor Tiller is emeritus Professor of crystallography from Stanford. He has been studying these areas for nearly 40 years, more or less as a research hobby before his retirement, but now on a full time basis.

Current scientific understanding of subtle energies

Bioelectricity is well-recognised at the cellular level in neurophysiology and at organ level in electroencephalography (EEG), and the electrocardiograph (ECG). However this form of bioelectricity is generally considered to be a by-product of biochemical reactions. With respect to electrodermal measurements such as the galvanic skin response (GSR), the signal is believed to primarily reflect sweat gland activity, regulated by autonomic nerves³.

Conventional electrodermal measurements are primarily used in the West in biofeedback. AC conductance is preferred for electrodermal measurements in clinical biofeedback, as this requires less care on the part of the clinician in order to secure optimal skin/electrode connection, and therefore is the easiest

measurement function to use. Some biofeedback machines use DC conductance, which involves the application of a DC voltage to the skin. DC conductance is used primarily for research applications in biofeedback, since extra care is required to maintain optimal skin electrode contact. Electrodermal equipment to measure acupuncture points and to put remedies in circuit to see if the readings change, use an applied DC voltage to acupuncture points in order to measure the DC conductance of current flowing through the meridian system. The input voltage from these devices such as the Voll Dermatron and the Vega test, are similar in magnitude to the normal voltage that exists between two acupuncture points⁴.

Various researchers have found that the electrical properties of acupuncture points can be characterised using either conductance or potential measurements^{5, 6, 7}. Generally speaking an acupuncture point is a discreet area of high conductance, low resistance and positive DC potential relative to the area immediately surrounding the point^{8, 9, 10, 11, 12}. It has also been shown that meridians in animals have unique electrodermal characteristics¹³.

The use of DC potential measurements in biomedical research goes back to the 1930s when Burr and Northrop¹⁴ first measured bioelectric changes during ovulation. Burr believed that DC biopotentials measure the fundamental global electrostatic field in the body generated by opposite charges of an electrical dipole^{14, 15, 16}. By examining the dynamic fluctuations in the DC recordings over time, Burr and Northrop¹⁴ and Ravitz¹⁶ showed that DC potentials are involved with morphogenesis, wound healing and a variety of disease states.

More recently, electrostatic fields in the body, as measured by DC potentials, have been shown to be involved with development^{17, 18} and regeneration of limbs¹⁹ and the healing of wounds and burns¹⁵.

Therefore in conclusion, the current understanding of subtle energies is that they are a bioelectrical phenomena. It is unclear as to whether they are totally internally generated, or have a primary existence of their own.

From a clinical point of view I became fascinated by electrodermal testing. I was responsible for bringing the Vega test over to England from Germany. I had also started studying with Reinholdt Voll and my first text book in acupuncture was largely devoted to a description of Voll's work²⁰. This was followed by a book on the Vega test²¹. All of these techniques had the unlikely idea that putting a remedy in circuit, in a glass bottle and therefore not in direct electrical contact with the circuit, would produce an impedance change (impedance is a combination of resistance and capacitive resistance) over the measured acupoint. I learned these techniques in detail, and began to use them extensively in clinical practice and found that they worked. I also found that it was possible to teach others how to use these techniques. Some were able to learn them but many were not. This struck me as curious, and I wanted to investigate as to whether this impedance to change could be defined objectively. I therefore spent a great deal of time working with an electronics colleague, and built a fast circuit measuring at

10mhz, and introduced remedies into circuit, with an electrode being placed over the acupuncture point, with a silver electrode firstly being placed over the acupoint so there was no artefact present due to pressure. Remarkable enough, I was able to show objective changes, and was able to convince the Patent Office of this and successfully registered a patent²². This was a big step forward, and in it I recognised that the whole process of electrodermal measurement was highly complex, and that different pieces of equipment measured in different ways.

In the late 1990s, together with my then partner Dr George Lewith, we decided to try a double blind, randomised study to see whether electrodermal testing could pick out patients who were dust mite sensitive on intradermal testing from those who were not. We had four testers, each used their own Vega test device, which was the device we were testing. The protocol was carefully designed. This study showed that the Vega test was ineffective at picking up those patients who had dust mite sensitivity²³. It might possibly be that this kind of design, and classical entanglement between the control group and the group being tested, may mean that this kind of study is not possible using electrodermal devices (see later).

Further insights into mechanisms of action of subtle energies

During the 1990s I became dissatisfied with electromagnetic explanations of subtle energies, as referenced in the first part of this paper. I read widely around this subject, and was most impressed by the work of Professor Bill Tiller. He convinced me that biological information is magnetically encoded, in the magnetic vector potential. This is represented in relevant equations by a capital A with a line across the top. It is one of those mathematical terms you have to have in the equation for it to work, but it is practically impossible to describe what it is, because essentially the magnetic factor potential is not like classical magnetism. All of this is built on the Aharonov-Bohm experiment, which in my view is a key thought experiment which in fact has been tested several times in practice and does work, which is relevant to subtle energies and the magnetic explanation of these energies.

Electrons, when they are observed as waves, behave like any other waves in that they can either be in or out of phase (or step) with each other. In the same way as light waves, they can be made to show an interference pattern with light or dark areas, depending on whether the waves reinforce or neutralise each other. This pattern will then change (or shift) as a result of any change in the phase relationship.

Aharonov and David Bohm proposed an experiment to allow two beams of electrons from the same source to pass around either side of a magnetic field, which was effectively enclosed in a very long solenoid. The theory predicted that, outside the solenoid, in the absence of electric or magnetic fields, there should still be a quantum potential field. The point is that when the solenoid is switched on, because it's very long, that means theoretically infinitely long, the electromagnetic field is very compressed within the solenoid and there is a field-free space outside of it, the only factor acting in this field free space is

the magnetic vector potential. This experiment was duly performed and expected results confirmed, by a number of investigators²⁵. What the experiment shows is that while the change of quantum potential cannot influence the “trajectory” of any individual electron, it can and does effect the phase relationships of the electrons to each other. In thus imposing, or altering, a pattern, the potentials may be seen more as information, rather than what we usually know as energy. This is an idea with far-reaching implications biologically.

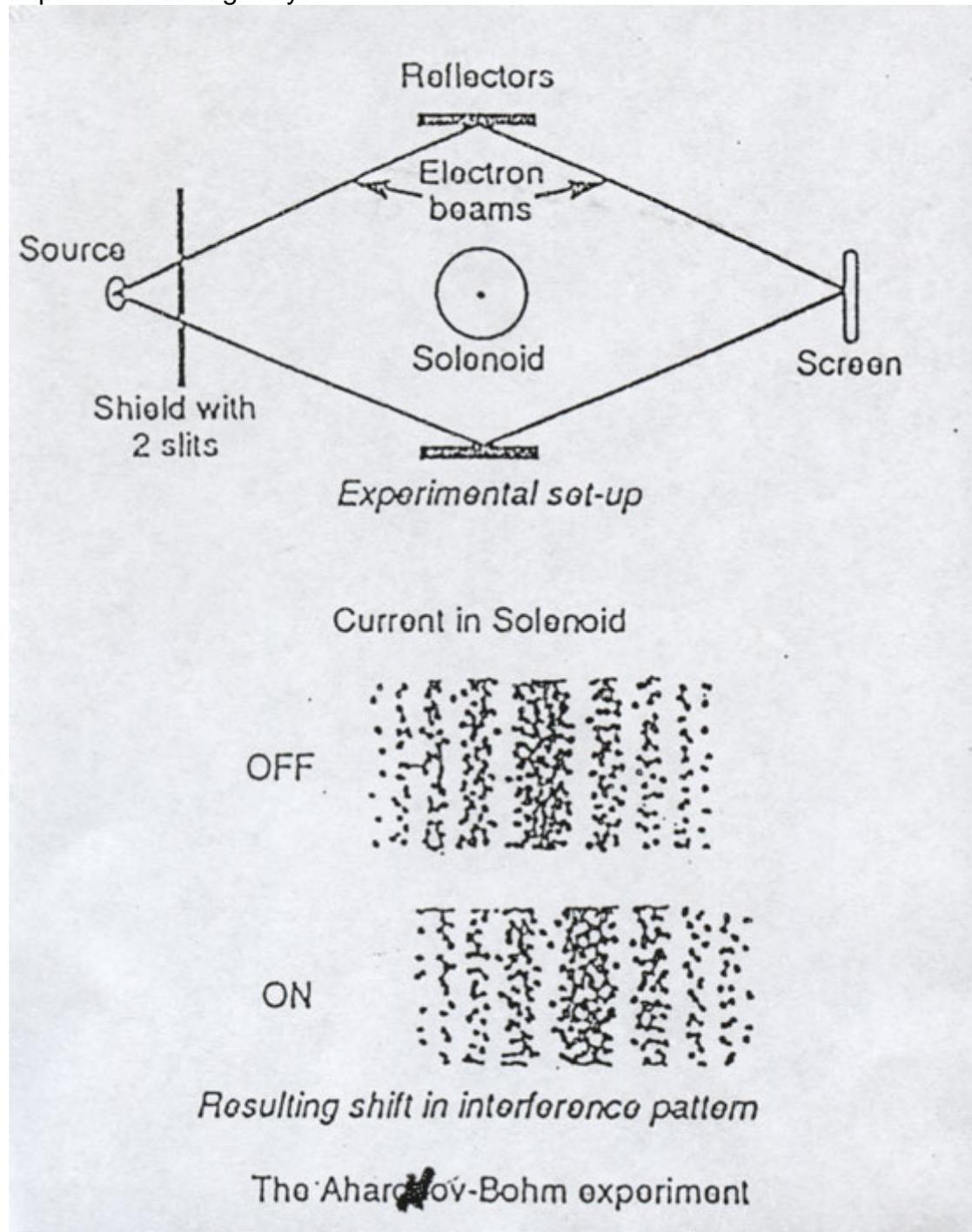


Fig 1
 What we do know is that the quantum potential is a vector potential field and is mediated by the magnetic vector potential.

Super-torroidal coils

I then became involved with a team from Russia, who had devised coils which are torroidal and, within a coil of 4 inches in diameter for example, nearly half a mile of wire could be wound. These coils were made in first order, second order, third order, fourth order coils in terms of the windings.

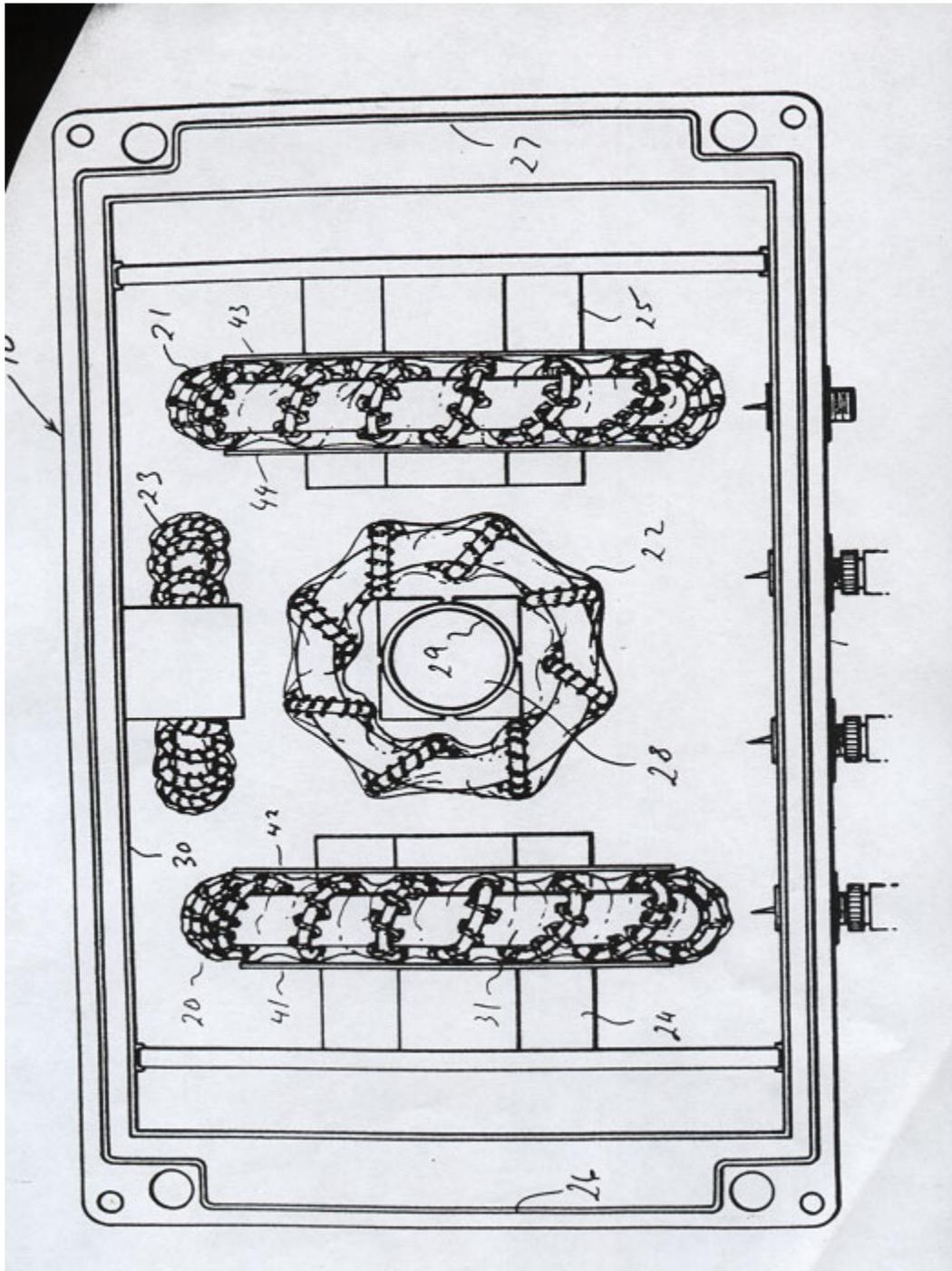


Fig 2

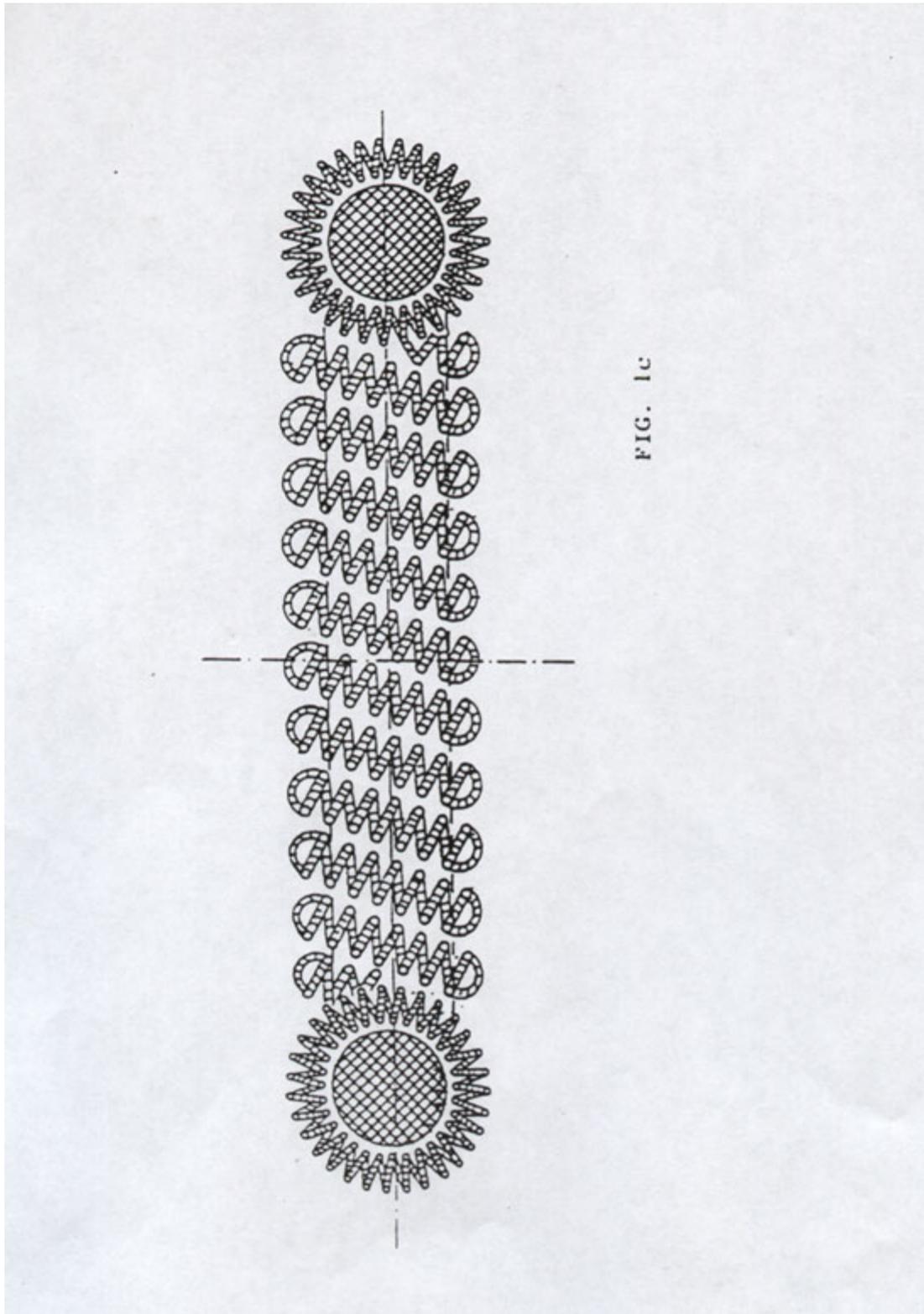


FIG. 1C

Fig 3

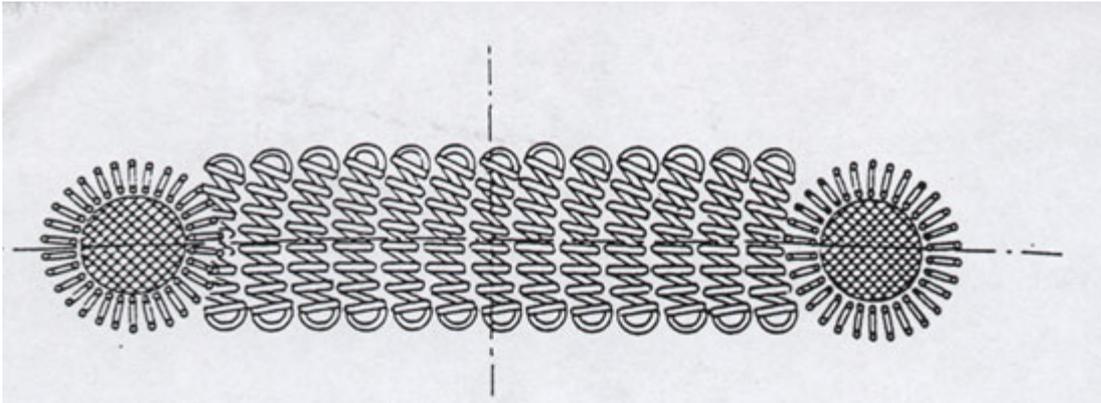


FIG. 1a

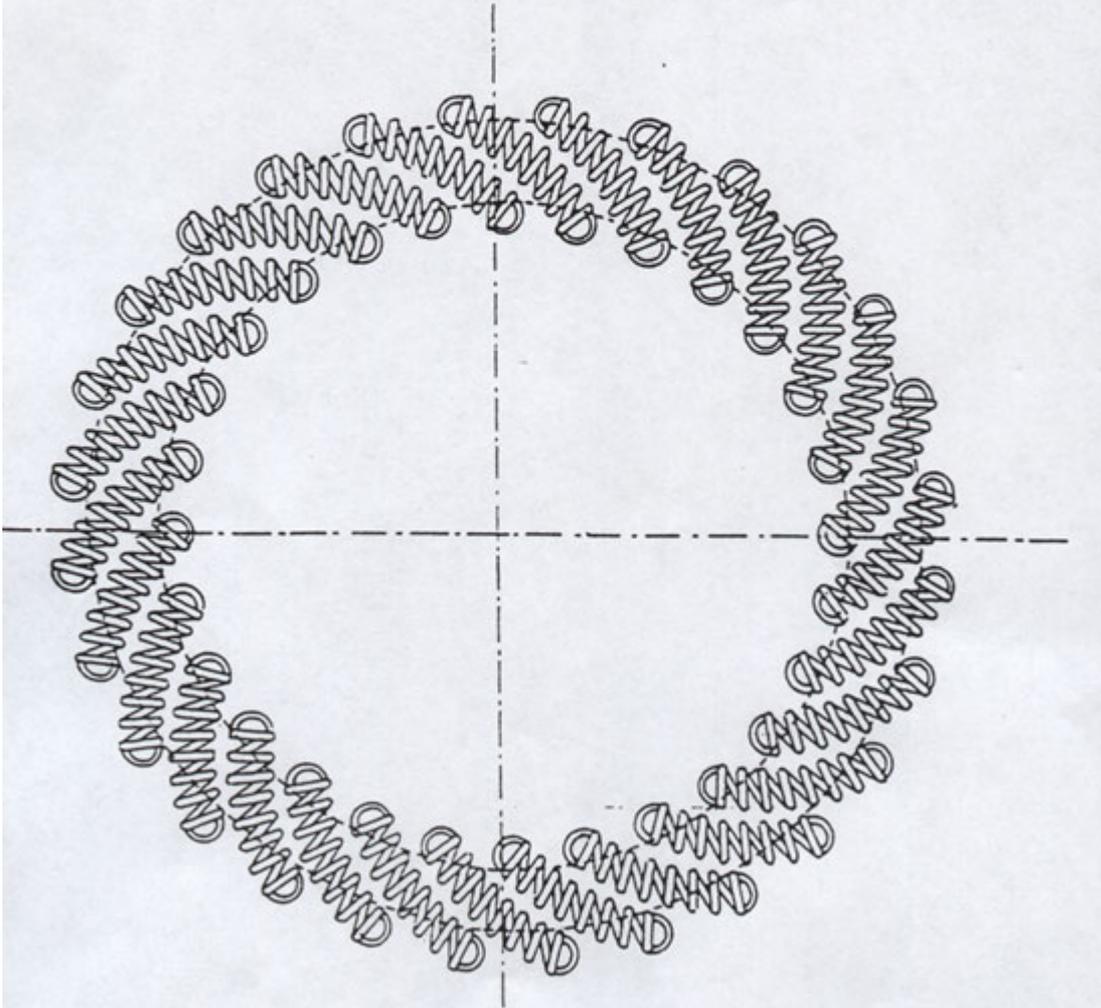


FIG. 1b

Fig 4

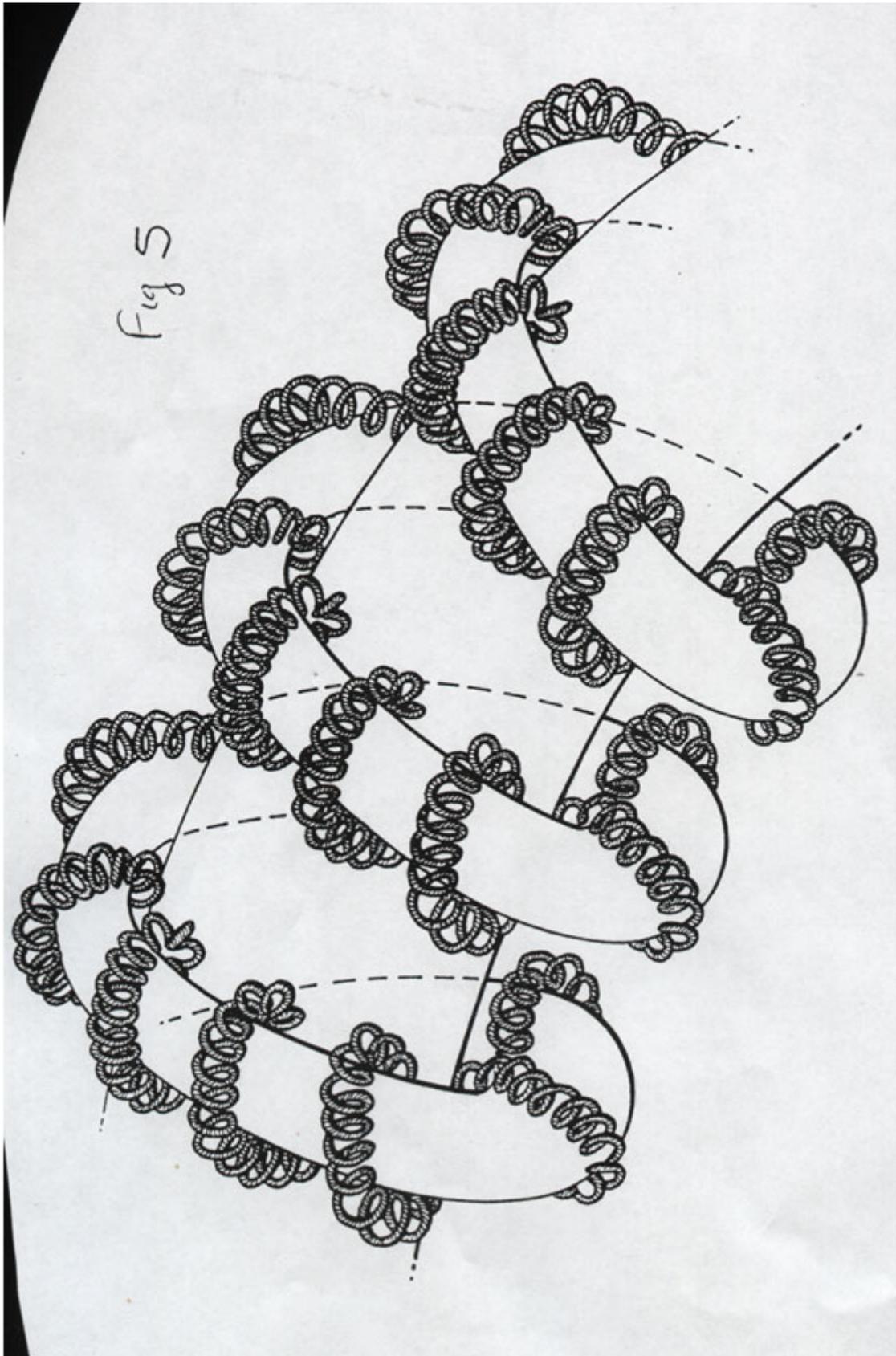


Fig 5

What interested me about these coils is that they reminded me of the windings of DNA, which is also wound torroidally. Also, a torroidal shape is essentially an infinitely long solenoid. Therefore it would make use of the

Aharonov-Bohm effect. In that case it might be possible to transmit information or indeed receive information in some way, which could have an objective effect. To that end, we drove the coils using a signal generator going at 1-3 ghz, and carried out an experiment at the Department of Haematology at the University of Cambridge, where we put a sample of the HIV virus in the centre of the coil, and then put culture dishes of HIV at a distance, to see whether we could stop the HIV replicating. In fact we were able to do that, and we have the result of that experiment in writing from Dr Karpas from the University of Cambridge Department of Haematology. He said the following: "The experimental studies and the effects on the Aids virus, HIV-1, replication showed that there was a tenfold reduction in virus production. This means that there was a 90% reduction in HIV-1 production, which can be considered as significant. In view of these results I would suggest that a small pilot clinical study could be planned. This could be justified not only because of the laboratory results but also because a few Aids patients have already been exposed in Russia and I was told that none experienced adverse effects." This was indeed a remarkable result. We attempted to repeat the experiment, but had problems in getting the signal generator to work. Our second experiment did not work, but we were able to selectively destroyed gramm positive bacteria at a distance. We were unable to do this with gramm negative bacteria. In the bacteria experiments we found something interesting in that if we drove the coil at low ampitude, then the bacteria would increase in replication, but if we drove it at higher ampitude then the bacteria would be destroyed. Due to lack of funding, these experiments were stopped, but we hope to continue them should funding become available.

Questioning research methodology

My involvement with research into subtle energies over many years has led me to look at the claim of science that it is dispassionate and totally objective. My suspicion about this claim arose from my immersion in oriental culture in the 1970s, and I noted that so far as Qi is concerned, the movement of Qi is affected by emotional, mental and spiritual aspects of life, but it also has physical outworkings. In Eastern culture the division between mind and body does not exist anything like as much as it does here. My question is, how does consciousness effect the apparently objective world, and this is an important driving factor in my current research in subtle energies (see later).

So, what about objective medicine and objective double blind, randomised controlled trials? Let's look at a drug which is now routinely given to anybody with a heart attack to dissolve clots, Streptokinase. Many studies have been done on Streptokinase, and as can be seen from Figure 6, only two have shown a significant effect, and the accumulated results from all the studies show little effect, yet it is now used routinely.

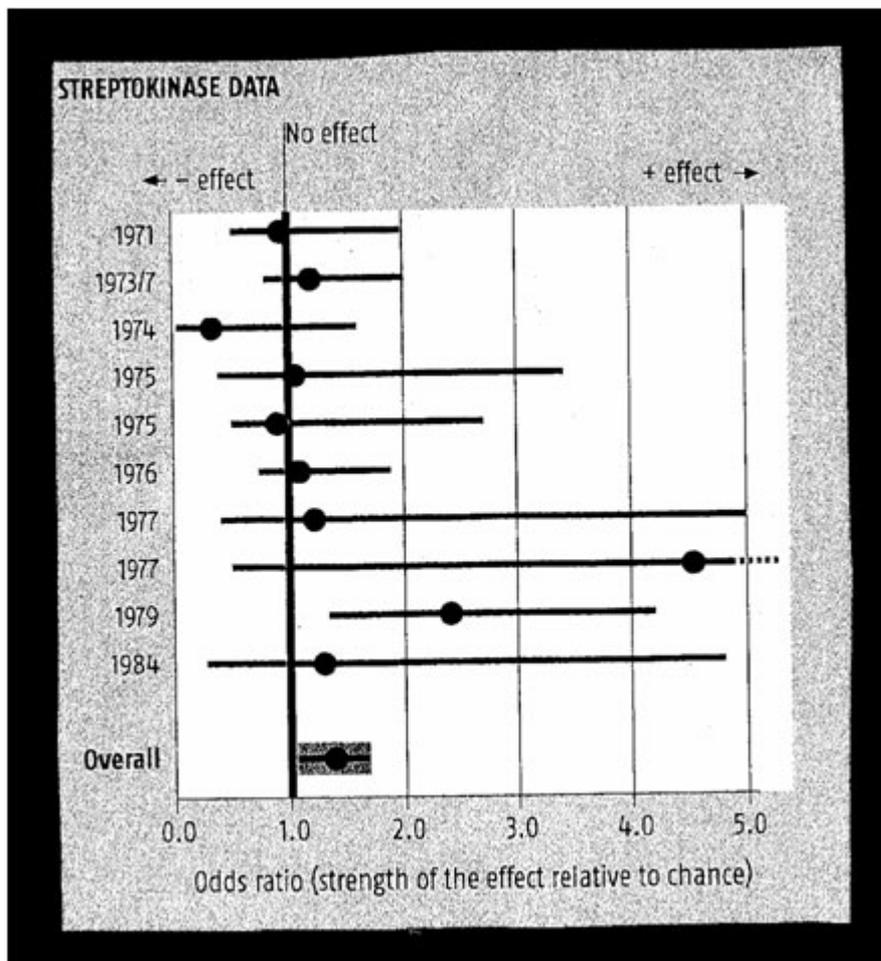


Fig 6

The point of this kind of study is that there is a believable mechanism of action of Streptokinase, otherwise the studies would not have continued as the scientists would not have believed in it. If this had been a study looking into some unusual phenomena, take for example homeopathy, then the trials would not have continued. So it's the scientists' belief in the first place which is primary.

Over the years, sociologists and historians have often pointed out the glaring disparity between how science is supposed to work and what really happens. While scientists routinely dismiss these concerns as anecdotal, subjective or plain incomprehensible, the suspicion that there is something wrong with the scientific process is well founded. Interestingly enough, the proof comes from rigorous mathematical analysis of how evidence alters our belief in a scientific theory. The starting point is a profound result derived independently by two mathematicians, Frank Ramsey and Bruno de Finetti in the 1930s^{24 & 25}. Ramsey died at the age of 26, in 1930, yet in spite of his short life he became one of the greatest Cambridge philosophers, while also making the most profound and original contributions to logic, mathematics and economics. They showed that you can assign a number to the woolly concept of belief using ideas drawn from probability theory, and they proved that your faith in the theory can be quantified objectively on a scale ranging from near zero for disbelief to near one for certainty. They then went on to show that scientific

reasoning is logical provided that in the first place your beliefs follow a rule known as Bayes' theorem. Bayes' theorem is widely used in probability theory²⁶, and shows how the chances of an event happening change in the light of developments, in other words, in response to accumulated evidence. So the outcome is simple, just take the original level of belief and multiply it by the strength of the new evidence, and this is known as the likelihood ratio. This gives a relative probability of getting such evidence if the theory is true, compared to if it were false. The likelihood ratio is larger for findings consistent with theory, thereby boosting your levels of belief in it, therefore subsequent trials of any particular theory would be more likely to be successful. The key is belief in the basic theory. Now this comes as a real problem in subtle energies, because there are several competing theories, and therefore two different research groups, both carrying out meticulous work, could and often do come up with completely opposite results, because in the first place their belief system across both groups is not consistent.

Each week we read research journals which publish hard evidence to support a host of theories and treatments backed by statistical arguments for taking it seriously. Bayes' theorem implies that this whole process is nothing more than an elaborate attempt to dodge the subjectivity at the root of every scientific result. The work of Bayes, Ramsey and de Finetti would imply that it may well be that consciousness affects so-called objective outcomes, and objective outcomes don't really exist.

The press however portray science as objective because it makes us all feel more secure (my view). Recently in medicine there has been a scandal concerning Dr Andrew Wakefield regarding his research on autism and MMR vaccines. He has been pilloried by the press, medical and lay. I quote from a letter published in the Sunday Times²⁷, from Dr Wainwright who spoke at our last conference: "Robert Sandall's excellent article on Andrew Wakefield and MMR (magazine last week) illustrates how heretics, despite often doing good science, continue to be persecuted by the scientific establishment. The public (helped by programmes on the so-called 'public understanding of science') continue to believe that science is somehow aimed solely at the pursuit of the truth. Unfortunately, recent emphasis on competition for research funding and bureaucratic nonsense like the Research Evaluation Exercise, have led to increasing corruption in science.

As a result, decisions arrived at by the scientific majority are just as likely to be influenced by greed and power as in any other walk of life. The public would be more willing to listen to the views of the scientific majority, as aspired by the government, if they could be confident the system respected the views of minorities and protected them from ridicule and loss of career progression." Maybe after all Bayes was right!

This leads me on to Wainwright's Law, which was published in The Times Higher Education Supplement²⁸. It is as follows:

HIV Heretics

Although the evidence in favour of an association between HIV and Aids looks convincing (Books, *THES*, July 7), we know from history that in science the big battalions are often wrong.

For example during and after the 1918 influenza epidemic (which killed 50 million people) most authorities were confident that flu was caused by the bacterium *Bacillus influenzae*. But there was a growing minority of microbiologists who suspected the disease might be caused by a filterable bacterium or by a true virus. These dissenters were marginalized and ridiculed.

A similar situation occurred in the history of stomach ulcers and gastric cancers. Before the 1980s nearly every gastrologist could confidently state that ulcers were caused by stress, and yet a few years later a bacterium (*Helicobacter pylori*) was shown to be the true cause of this disease.

In both cases, the experts used the most up-to-date methods and were happy to ridicule anyone who took an opposing view – yet in the end they were plain wrong.

Such examples are so common that there appears to be a “law” operating, namely that when an idea supported by an establishment majority is criticised by a knowledgeable, persistent minority it is usually the minority view that eventually prevails.

The “law” seems to operate because establishment scientists have everything to gain (honours, grants, promotions) from continuing with their views, even when evidence indicates they are wrong. The minority dissenters, on the other hand, who are often ridiculed, gain little from maintaining their views. The degree of persistence often provides a good test of whether a minority view is likely to be correct, since when the dissenters realise they are wrong, they usually quietly fade away. But if a knowledgeable minority maintains its criticisms over a long period it is usually shown to be right.

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There are hopeful signs from the scientific establishment, particularly a paper written by Professor Rose, an eminent scientist and head of the Open University’s brain and behaviour research group. He received this year’s Edinburgh medal at the Edinburgh Science Festival for his work²⁹. He argues against the cult of the expert in science. He says that scientists don’t like confessing to uncertainty, and that the media tend to treat science as monolithic, speaking with one voice, when doubt, uncertainty and the clash of competing paradigms are the stuff of scientific advance. What is needed from our scientific communicators is to “take courage, get critical and do not be

over-awed by authority". This statement is particularly relevant for this difficult and controversial area of subtle energies. The scientific establishment would argue that subtle energies are so strange and anomalous, that proof of their existence demands extraordinary evidence. They do not apply this to their own hypotheses, and when looking at these areas, they will apply their own alternative hypotheses, and according to the work of Bayes, will almost certainly come up with opposite results to a team working with what may be a more correct hypothesis. So where's the objectivity?

Current research directions

I have watched with great interest over many years the work of Professor William Tiller and his group in California. Professor Tiller looked at simple electronic devices which he called 'intention imprinted electrical devices'. These devices were 'imprinted' by imprinters who are trained in meditative techniques. In practice this involves the imprinter, who is chosen as somebody used to spiritual practice, particularly in the meditative area. He or she holds the device in their hands, and focuses on specific intents in their mind, attempting to imprint this intent on the electrical device. In practice, this only takes a short period of time, twenty minutes to half an hour. He describes this as a unique human-consciousness-induced processing procedure. Intention-imprinted devices and unimprinted devices were studied extensively over a three year period. The target materials selected for these studies were:

1. Water
2. A liver enzyme – alkaline phosphatase
3. The main cell energy storage molecule ATP
4. Living fruit fly larvae

The imprinted devices produced robust and repeatable effects on all of these systems, which is statistically significant ($P < 0.001$). This is indeed an extraordinary result. The effects on water were to produce an oscillating changing ph, in some cases extending over half of a ph unit, the ph of the water in the test near to the imprinted device oscillating over several hours over this ph range.

These papers show a remarkable entanglement process occurring between the treatment devices and the placebo, and this occurred at vast distances between the sites, in some instances 2,000 miles. This new data shows that human consciousness, at least under some conditions, can strongly influence well designed target experiments of physical reality. This entanglement is a classical type of entanglement between laboratories of large or small size. This implies that double blind studies may not work and that placebo and treatment in a medical experiment are mathematically connected in a precise way. This kind of entanglement seems to be most marked in any therapeutic discipline which involves subtle energies, which is a large percentage of complementary and alternative medicine therapies. In my view this work, which has been impeccably conducted to the highest scientific standards, is of great importance. This may perhaps be why the paper we did on the Vega

test and house dust mite testing didn't produce a significant result, maybe because of entanglement between the placebo and the testing group.

In order to achieve these results, Professor Tiller has found that laboratory space needs to be "conditioned", and in the scientific sense this means moving the laboratory space into a higher gauge symmetry organisation of the space. This seems to depend on 4 main factors:

- a. History of the local space and objects of local space.
- b. Intentioned imprint and charge from any intention imprinted electrical device.
- c. The consciousness and biofield of experimenters or of the people occupying laboratory space.
- d. The level of potentiation of the measurement equipment in the space.

All of these factors are central to the way complementary therapists view their practices and also it is what makes them so different from the way conventional doctors operate their kind of practice.

The presence or not of high gauge symmetry space is done by measuring pH in water, over several weeks, and also temperature (independent of outside and inside temperature and weather conditions and of the use of fans in the internal environment). This determines whether the space is conditioned. In the space we have chosen for this in our Hampshire practice, by such measurements we have found it to be classically entangled with Professor Tiller's laboratory in Stanford, California. Also we do not have an intention imprinted device from California yet in order to condition the space. This is a remarkable example of classical entanglement, occurring over several thousand miles, and it was not what I was expecting to find.

Hopefully in another few years' time I can give you an update of my ongoing fascination and work in the area of subtle energies. I hope you've enjoyed what I've had to say.

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