

# Quanta and Coherence Effects in Water and Living Systems

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## ABSTRACT

**Objective:** To review the progress the author has made over the past 5 years in understanding coherence effects in water and living systems using quantum mechanical models.

**Background:** The implications of existing theoretical work on water are discussed.

**Methods:** Available techniques for the measurement of frequencies imprinted in water are described or referenced.

**Results:** The importance of frequency is shown in respect of the understanding of the mechanisms of homeopathy, acupuncture and how bioinformation may be stored in water and also in respect of chemical and electrical sensitivities or hypersensitivities; hypersensitivity being that degree of sensitivity that seriously interferes with normal functioning.

**Conclusion:** Water and living systems have macroscopic quantum properties that can give rise to a memory for frequencies, long-range effects, and entanglement between separated systems.

## INTRODUCTION

This paper reports on the progress since my 1997 presentation to the Center for Frontier Sciences, Temple University, Philadelphia, PA, in which I addressed the question, “Is a living system a macroscopic quantum system?” (Smith, 1998). I concluded with a summary of evidence in support of my hypothesis that the microscopic effects of quantization of energy and momentum at the atomic level extend into the macroscopic domain showing long-range order effects outside classic physics, which are nonlinear, discontinuous, and describable in terms of a wave function or order parameter. These are strong effects, but they only weakly couple to electromagnetic fields and thus the systems behave as if at a low temperature; the vector potential appears to be the coupling pathway. The experimental evidence suggests that the important features to be looked for are:

1. Water and living systems sensitive to a single quantum of magnetic flux (2.07 fWb).
2. Living systems interacting with external electromagnetic fields so as to involve the Josephson effect and its conversion factor 500 MHz/ $\mu\text{V}$  in respect of either applied voltages or applied frequencies.

3. The Aharonov-Bohm effect observed through a sensitivity in water and living systems to the magnetic vector potential and its effect on the phase of the wave function.
4. Water memory for frequencies should be a phase coherence phenomenon.
5. It should be possible to control chemical reactions *in vitro* and *in vivo* through the interaction of the magnetic vector potential with the chemical potential.

### *Magnetic flux quanta*

From measurements on more than 1000 cultures of *Escherichia coli* (Aarholt et al., 1981) grown in a range of alternating magnetic fields, mean generation time variations were found corresponding to integral changes in the number of magnetic flux quanta linking an individual bacterial cell during division. The *F*-ratio test indicated a probability of less than 1 in 2 million that these were chance effects.

### *Josephson effect*

In 1962, Josephson suggested that quantum tunneling across “weak-link-junctions” between two superconductors could give rise to anomalous nonohmic voltage-current re-

lationships. This prediction applies beyond the special case of low-temperature superconductivity to separated but highly correlated discrete regions in general. Experimental evidence for such effects in living systems has been presented and discussed by Del Giudice and coworkers (Del Giudice et al., 1989).

### *Aharonov-Bohm effect*

Because a magnetic field is only to be found in closed loops, it is a mathematical necessity to have a related quantity called the magnetic vector potential in the direction of the current giving rise to that magnetic field. Aharonov and Bohm showed that it acts on the phase difference between two matter-waves and suggested an experiment to prove that this was observable by physics. This was subsequently demonstrated through electron beam interference, most convincingly at Hitachi Research Laboratories, Tokyo, Japan (Tonomura et al., 1986). The present writer has demonstrated this effect for coherence propagating in water (Smith, 1995). An introduction to quantum fields in the natural healing process has been published by Rein (Rein, 1998). The concept of vector potential is introduced in *The Feynman Lectures on Physics* (Feynman et al., 1970).

A toroid contains the magnetic (B)-field within its ring but gives a magnetic vector potential (A)-field in the surrounding space. This A-field interacts with the wave function, altering its phase. If there are bioeffects, they are unlikely to be the result of the weak electric and magnetic fields remaining.

One researcher who tried an A-field in experiments involving abnormalities in fruit fly embryos wrote, "The results with the toroidal coil are quite tantalizing. Despite the fact that the magnetic field is negligible, significant increases in abnormalities are found over the matched controls . . . ." (Ho et al., 1994).

### *Water memory*

Water memory is the basic phenomenon of homeopathic preparations (Schiff, 1995). The writer has summarized the phenomena associated with water memory and the techniques available for writing, reading, and erasing frequencies therein (Smith, 1994).

Tiller has discussed many aspects of water memory and structure as well as healing and intentionality (Tiller, 1997) and the imprinting of electronic devices by healers (Tiller et al., 2001). Oschman gives a comprehensive account of aspects of energy medicine including the Healing Touch and water effects (Oschman, 2000).

Elia and Niccoli (1999) have used the sensitivity of a continuous-flow steady-state heat-of-mixing reaction to detect by microcalorimetry information in dilute solutions. It also will detect frequency imprinted water. A further paper has been accepted for publication.\*

A recent mainstream physics paper (Scully et al., 2003) may provide the link between the thermodynamics of heat-of-mixing and the informational content of the dilute solutions. Here, the addition of a quantum coherence term to the classic Carnot Heat Engine cycle provides a new parameter (information) that can be varied so as to increase the radiation temperature to enable work to be extracted from a single heat bath now containing a novel form of matter retaining some quantum coherence now being referred to as phaseonium.<sup>†</sup> Currently, the emerging view is that memory in living systems, DNA, and water is quantum holographic and syntactic with the information encoded in phase and operations being modeled on computer rewrite systems.

Rey has applied the techniques of thermoluminescence to the study of ultra-high dilutions of lithium chloride and sodium chloride. It was found that even at dilutions beyond Avogadro's number, the light was specific to the original solutes (Rey, 2003).

Prangishvili and coworkers (Prangishvili et al., 2000) have developed a special two-beam laser system for DNA research. These experiments encountered a phantom-DNA or space-memory effect whereby a subsequent measurement appeared to incorporate the measurement of the contents of the previous cuvette in addition to the current one (Gariaev et al., 1991).

This apparatus was also able to make frequency measurements on homeopathic potencies, platinum D12 being used as an example. This author prepared and then measured this potency by dowsing and obtained frequencies in agreement. He subsequently found that the light output from a light-emitting diode (LED) divided into two orthogonally polarized beams, passed through frequency imprinted water, and then recombined in a photodiode connected to a narrow-band amplifier would correctly measure the frequency imprinted into that water.

### *Chemical reactions*

Critical values of weak magnetic fields were found to affect the *lac operon* system of *E. coli* as measured through the rates of  $\beta$ -galactosidase synthesis. The transcription of the  $\beta$ -galactosidase is controlled by a repressor protein which binds to a specific site on the DNA (Aarholt et al., 1982). Exposing lysozyme solutions to magnetic fields or to radiofrequency fields was found to change the enzymatic activity; the addition of a competitive inhibitor increased the effects (Shaya and Smith, 1977). Subjecting milk (Lubec et al., 1989) or rice (Omura and Losco, 1993) to microwave cooking affects the amino acid isomerization, the L-state being converted to the D-state.

\*Elia V, Niccoli M. New Physico-Chemical Properties of Extremely Diluted Aqueous Solutions. *J Thermal Analysis & Calorimetry*, in press.

<sup>†</sup>6th International Conference on Computing Anticipatory Systems 2003, Liège, Belgium.

## DISCUSSION

*Theory of coherence*

In so-called classical physics the atoms and molecules of matter are considered to be completely confined within their locality in space and time and move along some well-defined path. In quantum physics, both matter and electromagnetic fields are regarded as quantum fields that are regarded as quanta that fluctuate in both space and time and have a phase that determines how different simultaneous paths of a quantum particle must be superimposed. There is only a probability of finding the state of a given particle. It is fundamentally impossible to have complete and simultaneous knowledge of both the number of quanta and their phase—this is the so-called wave-particle duality of quantum physics (Del Giudice, 1993). In physics, a field usually means a region where a mechanical force acts on a physical object. In mathematics, a field is interpreted more as the field of view of a camera or binoculars looking at some array of scalars or vectors in space and time.

In 1995, Giuliano Preparata published his book *QED Coherence in Matter* (Preparata, 1995). This was the first systematic attempt to consider the full implications of quantum-electrodynamical (QED) interactions in condensed matter (i.e., everything that is not a gas or a vapor) that could result in the development of long-range forces acting over distances far exceeding chemical bond lengths and give rise to spatial domains within which all atoms and molecules oscillate in-phase with an endogenous coherent classic electromagnetic field. When there is a strong coupling between the matter quantum fields and the electromagnetic fields, domains of coherence appear spontaneously and are of a size determined by the wavelength of the particular molecular spectral line involved. This electromagnetic field then becomes strong and is trapped within the coherence domain by total internal reflection.

In liquid water at ambient temperature (300 degrees Kelvin) the coherent fraction is 28%, the rest is incoherent and this determines the thermodynamic properties. The coherent fraction decreases to zero at boiling point (Del Giudice and Preparata, 1994). These coherent domains may be conceived as an array connected by Josephson-like mechanisms forming a long chain of Josephson junctions capable of supporting soliton propagation.

At this point, it is necessary to say something about the concept of coherence. A number of pendulum clocks with all the pendulums swinging exactly together in position and time are coherent. For an ensemble of a large number of coherent particles the phases of their individual quantum fields<sup>‡</sup> and the particle numbers are related by the Heisenberg uncertainty relationship, so that if the number of par-

ticles is fixed there must be an uncertainty in their phase relationships and there cannot be perfect phase coherence. If the involved particle numbers are not fixed, there can be perfect coherence and the wave function becomes a description of the collective behavior of the ensemble of particles that in this case is completely specified by the classic Maxwell electromagnetic field. In 1923–1924, De Broglie first showed that matter had wave properties as well as particle properties.

Coherence is a fundamental property of a quantum field in which coherent quanta give rise to an order extending over a long distance within which there is a finite probability of finding the system in this order-related state.

The interaction between the matter quantum field and the electromagnetic radiation field ensures that the coherence is exchanged. Preparata used Feynman's "Path Integral" approach in which time intervals are divided so that calculations can be made in classic space for each time interval. The result is an infinite number of superimposed classic pathways by which a system may change its state. There is only a probability that any one of these will have been taken. The process of making a measurement determines which of the superimposed pathways is actually measured. Planck's constant is the demarcation between classic and quantum behavior.

When there are two or more particles superimposed so they are acting as a single system as in the above coherence domains, there is only a probability of each being in a particular quantum state or place. This quantum phenomenon was named entanglement by Schrödinger in 1935 (Schrödinger, 1935) in his discussion of a paper by Einstein and colleagues (Einstein et al., 1935) who argued that quantum physics was incomplete if it allowed the existence of entanglement or nonlocality phenomena (Aczel, 2002). In this condition, spatial separation or position is no longer significant. If this phenomenon extends to living (quantum) systems, it may be relevant in respect to distance healing and map dowsing. The meaning of entanglement within a coherent system still needs to be investigated, particularly what happens beyond the confines of a coherence domain.

Preparata showed that the QED theoretical method gave insights into the mechanisms for many phenomena in condensed matter including: superfluidity in helium, electron plasmas in metals, the Mössbauer effect in  $\gamma$ -ray emission, superconductivity, neutrinos, gravitation waves, cold fusion, ferromagnetism, crystals and colloids, and most importantly in the present context, water.

Preparata showed that liquid water, similar to all other QED coherent matter systems, consisted of two distinct interspersed phases. The possibility of ice/water type mixtures had been speculated upon by Röntgen a century earlier (Röntgen, 1892). QED analysis showed that water has an incoherent phase in which the water molecules behave like a gas and that this is packed into the spaces between domains of coherent water molecules 75 nm in size. Within

<sup>‡</sup>Quantum field describes the probability of finding the system in a given state within space and time.

these coherence domains, all the water molecules are in a coherent oscillation in-phase with the large classic electromagnetic field coming from water molecules oscillating between their ground state and an excited state at 12.06 eV. This is the line in the photoabsorption spectrum of water vapor that gives the smallest critical density of water vapor from which a coherence domain may develop. This QED theory accounts satisfactorily for many of the physical properties of water including its critical volume, specific heat, boiling temperature, latent heat of vaporization, low-frequency dielectric constant, and the density anomaly of ice at freezing point.

A particularly important consequence of coherence in water that came out in the many discussions between this author and Emilio Del Giudice is the multiple-frequencies-effect. In free-space, the velocity with which electromagnetic radiation travels (the velocity of light) is constant. The usual equation is frequency  $\times$  wavelength = velocity. Within a coherent system, the constant parameter becomes its coherence length. This makes velocity proportional to frequency.

For a system that consists of many coherence domains coupled together, one velocity is the velocity of light in free space (300 Mm/s). There is no refractive index effect reducing the velocity because the radiation does not interact with individual molecules, it only interacts with an entire massive domain. Another velocity is that with which the coherence propagates through the domains; this is of the order of meters per second because of the interaction with massive domains. Coherence propagates by diffusion (just as heat, which is disorder, propagates along a saucepan handle). Because it is likely to be nonlinear diffusion, coherence should be able to propagate as solitons.

The velocity of coherence propagation was first measured in 1934 (Wüst and Wimmer, 1934) using a time-of-flight method with mechanical relays to chop the coherence. This author (Smith, 1994) adopted a similar method but used FET devices obtaining for example, as a velocity for coherence in a mineral water 2.6 m/s and along a human leg 6 m/s.

The multiple-frequency effect implies that chemicals that have spectra ranging from the far-infra-red to the ultraviolet can interact with technological frequencies (and vice versa) that are lower by the ratio of the velocities (m/s to Mm/s).

## METHODS

### *Electrically hypersensitive patients*

The author commenced cooperation with an allergy clinic in 1982 (Smith et al., 1990) to assist with their electrically hypersensitive patients. To be able to diagnose electrical sensitivity in patients with multiple sensitivities required a room that was clean to operating-theater standards in respect to chemicals and particulates, lit by daylight, and as free as

possible from electric and magnetic fields. The patients were tested using electrical oscillators to give controlled frequencies with fields typical of those to be found in the environment, particularly near televisions and computers. Frequency turned out to be the relevant parameter once some intensity or field threshold had been exceeded. The clinical symptoms were the same as those triggered by the patients' chemical or particulate allergens. The autonomic nervous system is the first to become compromised.

This technique fit well with the allergy provocation/neutralization tests and therapy being used in the clinic. It was used in double-blinded trials at the Environmental Health Center in Dallas, TX (Rea et al., 1991), which finally achieved 100% reactions to that frequency to which each subject was most sensitive and 0% responses to placebos.

In the course of this clinical work, some extremely electromagnetically hypersensitive patients were encountered. These patients could not tolerate testing in the proximity of any electrical oscillator. Some even react to a passive electrical resonator. Cardella and coworkers (Cardella et al., 2001 and 2002) have shown that exposing water to a passive resonant circuit is sufficient to imprint its frequency into the water and of course living systems.

In general, these patients had ongoing multiple chemical sensitivities and their chemical and electrical triggering and neutralization were interchangeable. If their chemical sensitivities could be removed, the electrical ones usually went also.

A more patient-friendly method of testing is to get patients to imprint their body frequencies into water. For this a thick glass test tube (typically 100 mm  $\times$  15 mm with a rubber bung similar to that used to contain blood samples but not heparinized) is half filled with water from any source that the patient can tolerate. The patient holds it in a clenched fist with the bottom end projecting slightly and gives this end a sharp rap in a wooden surface, but not so hard as to break the glass. This is a succussion and the water takes an imprint of the body frequencies at that instant. It may be clinically desirable to take an imprint from both left and right hands.

The above is an outline of one convenient method; there is much more detail to be considered in a clinical situation. To protect against frequency contamination by handling and the electrical environment between imprinting and measurement, the tube is wrapped in aluminium foil; it can then be sent through the mail in a padded envelope.

These imprints seem to be permanent unless overwritten or erased. It may be remembered that Hahnemann's original potencies were found to be clinically effective 150 years after he had prepared them.

These frequency imprints may range from millihertz to gigahertz. The author has had to develop the technique of dowsing to measure imprinted frequencies (Smith, 1994) remote from hypersensitive patients in order to be able to specify neutralizing frequencies for their reactions.

*Frequency measurement by dowsing*

Measurement by dowsing is no more subjective than early investigators describing what they saw through a microscope or telescope. The author is seated at a table facing the tube of imprinted water, which is resting between the hands and arms (facing West gives best sensitivity). Being left-handed, the author uses the left hand to hold the pendulum and the right hand to tune the frequency source. Where possible the writer prefers to use a toroidal coil fed from the electrical oscillator.

A dowsing technique that leaves one hand free is essential for these measurements. The pendulum can be any small weight suspended from a length of dental floss (no twist spun in) to provide a period of about half a second. Its movement is sensitive to muscle tremor, and when the oscillator excites a resonance in the water the pendulum indicates this with a recognizable response after much practice. The frequency is read off the oscillator dial.

Instead of using muscle tremor for dowsing, Omura and coworkers (Omura et al., 1991) developed the opposed finger/thumb muscular strength test as a sensitive measurement method which they call the bi-digital O-ring test (BIDORT). This test can also be done single-handedly, the index finger nail is tensed against the pad of the thumb as if trying to flick something off. It flies off the thumb when something is sensed. This technique complements and even predates the present author's dowsing work. The free hand is of course needed to adjust apparatus, to sense the patient's body field or other signal source. This test uses a muscle strength response as in the deltoid muscle test.

Having developed these dowsing techniques for clinical frequency measurement, this author has gone on to apply them to research into water memory, homeopathy, and acupuncture while continuing efforts to develop a reliable, wide-band and inexpensive instrument for such measurements.

Successful instrumentation requires that frequencies imprinted into water be converted into oscillations of a classic electromagnetic field. It has been demonstrated in principle (Smith, 1994) that this is possible but the signals obtained were almost at noise level. Repeatability was difficult. The ghost effect that plagued Gariaev (Gariaev, et al., 1991) may have contributed. Furthermore, the range of frequencies that could be measured was limited by technical considerations of the kilohertz region while dowsing showed that living systems were using frequencies from at least millihertz to gigahertz (Smith, 2003b).<sup>§</sup>

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<sup>§</sup>Smith CW. Notes for presentations: "The Diagnosis and Therapy of EM Hypersensitivity" and "EM Fields in Health, in Therapies and Disease." 18th Annual Symposium on Man and His Environment, June 8–11, 2000, Dallas, Texas.

*Frequencies and water*

The various methods available to imprint a frequency into water, read it, and erase it have been described elsewhere (Smith, 1994). Bioinformation appears to be coded as a frequency of alternating magnetic vector potential. Imprinting a frequency into water (or living systems) may be performed by proximity, contact, succussion, vortexing (the direction of rotation is significant), applying the field of a permanent magnet or an alternating magnetic (B) field at any frequency less than that being imprinted. Figure 1 shows the strength of B-field needed to potentize water at the frequency of the A-field.

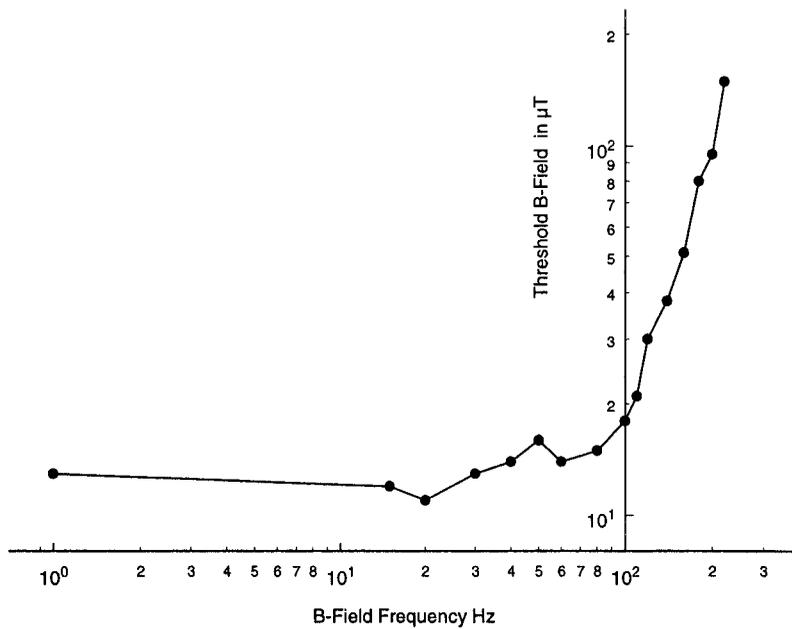
Bioinformation can be transmitted on a light or laser beam, or even over the internet (Benveniste, 1993). It also can be stored on a CD (Senekowitsch et al., 1995). Coherence on a light beam seems to travel in either direction. In laser acupuncture, the therapist picks up the patient's stress traveling back along the beam.

A water imprint (or a homeopathic potency) is erased by removing the geomagnetic field. This can be done by placing it briefly inside a steel box and closing the lid (be careful not to store potencies in steel filing cabinets or cupboards). Heating above 70°C will change the imprint so that the body does not recognize it; certain frequencies can also hide or recover such information.

The technique for imprinting the frequency on an acupuncture point into water is to take a pipette with a fine tip containing water, place the tip on the acupuncture point so the water makes contact, and bring a permanent magnet up close to effect the imprint. Remove it and measure the pipette.

A toroidal-shaped piece of ferrite material (with no coil winding) placed between a homeopathic potency and water will pick up all the frequencies from the potency and copy them into water if any one of the above three items is succussed. Succussion is not a shock wave or turbulence phenomenon in water but is something fundamental happening in space and time. A single toroid copy is phase-inverted in the sense that hyperactive frequencies become hypoactive and vice versa. A second toroid placed next to the first will reinvert and yield an exact copy of the original potency into the water.

A sequence of seven unidirectional electric pulses will also effect a copy. For example, these might be the dial-up pulses on a phone or pulses radiated from a computer or calculator. This seems to be an electric potential effect rather than an electric field or magnetic vector potential effect. Seven unidirectional pulses are needed; six is not enough. This implies that binary 0–7 is involved in information storage. The voltage threshold is low enough and the frequency range sufficient to consider the possibility that a train of seven nerve impulses could do this. An extension of this technique enables the arithmetical operations of addition, subtraction, multiplication, division, and raising to a power to be performed on a frequency imprinted into water. It also



**FIG. 1.** Threshold B-field as a function of frequency for imprinting water from an A-field at 100 Hz. In each case, the frequency imprinted is that of the A-field, not the B-field.

enables a homeopathic potency to be copied at a different potency value (Smith, 2001).

## RESULTS

### *Oscillations in living systems*

One result of measuring frequencies imprinted in water and living systems was the finding that the chakras and acupuncture meridians had characteristic endogenous frequencies. Surprisingly, these span the spectrum from  $10^{-4}$  Hz to  $10^{+11}$  Hz. Table 1 lists typical endogenous frequencies for the classical acupuncture meridians by way of an example. The frequencies for the chakras and Ting points of electroacupuncture are listed in Smith, 2003a and Smith, 2000 (see footnote § on page 73). Two bands of frequencies are found, these are a consequence of the multiple-frequency-effect in coherent systems. The high-frequency band corresponds to the coherence propagating at the velocity of light; the low-frequency band corresponds to the coherence propagating at a few meters per second. The ratios of the corresponding endogenous frequencies in the high- and low-frequency bands are remarkably constant. Taken over all the acupuncture points, these ratios have standard deviations of a few percent and for corresponding high- and low-band frequencies their paired-values correlation coefficients better than 0.999.

The frequencies imprinted into water by living systems normally have a slight quasiperiodic fluctuation if the system is healthy (Smith, 1995). These are of the order of an hour in humans and approximately 25 minutes in *Acetabu-*

*laria*. They can become entrained and synchronized by exogenous frequencies from electromagnetic sources, by homeopathic potencies, or the frequency signatures of chemicals capable of H-bonding with traces of water usually present. As an example of this effect, Table 2 shows entrainment of the heart meridian in a person close to an oscillator for approximately 1 minute; the entrainment had ceased about 5 minutes later. Note that both frequency bands are affected in proportion even though only the high-frequency band was entrained. The other couples through the multiple-frequency effect.

The lowest, highest, and alternate frequencies speed up these quasiperiodic fluctuations by a factor of approximately 10. These are the frequencies that are therapeutic or hyperactive in the clinical context. They also can be used to synchronize the quasiperiodic fluctuations of two living systems (e.g., tadpoles) or to synchronize the body fields of persons who otherwise have incompatible frequencies and trigger hypersensitivity reactions in each other (e.g., a mother who cannot nurse an infant).

The remaining frequencies completely stop these quasiperiodic fluctuations for as long as they are applied. They also happen to be hypoactive or stressful in respect to being likely to trigger hypersensitivity reactions. It is most unpleasant to be in the presence of one's own hypoactive frequency; there is a strong urge to switch off or get out.

The preparation process for histologic microscope slides of body tissues leaves sufficient trace water behind for frequencies to be measured. The paired-values correlation between the frequencies measured on the meridians and those measured from slides of the corresponding human target or-

TABLE 1. TYPICAL ENDOGENOUS FREQUENCIES ON ACUPUNCTURE MERIDIANS SHOWING THE WIDE RANGE ENCOUNTERED

Meridian	Point measured	Frequency	
		Low-band frequency	High-band frequency
		Hz	MHz
Lung	Lu1	0.48	24
Large intestine	LI1	0.055	2.7
Stomach	St45/right	0.044	22
Stomach	St45/left	0.44	2.2
Spleen	Pn1	0.055	2.7
Heart	He9	7.8	380
Small intestine	SI1	0.025	1.2
Urinary bladder	BL67	5.5	270
Kidney	Ki1	0.00095	0.047
Pericardium	Pe9	0.25	13
Sanjiao (TW)	TW1	6000	300,000
Gallbladder	GB44	0.05	2.5
Liver	Liv1	4.8	240
Du Mai (GV)	GV14	4.3	149
Ren Mai (CV)	Ren24	14	730

Note that the stomach meridian is anomalous. Its frequencies differ by a factor of 10 as measured on the left and right feet respectively and the ratios differ by a hundred, however their geometric mean fits the ratio. Omitting the stomach meridian, the mean ratio of high-band to low-band frequencies is  $4.88 \pm 0.42 \times 10^7$  ( $\pm 8.6\%$ ) and the paired-values correlation coefficient 0.9953. This is not quite as good as given by the Ting points.

gan tissues was 0.9783 for the low frequency bands and 0.8583 for the high-frequency bands. The mean high to low ratio for the slides was  $4.86 \pm 0.15 \times 10^7$  ( $\pm 3\%$ ).

Acupuncture meridians are seen as channels of coherence set up in the presomite stage of the embryo. As the organism develops, more cells acquire this coherence until a chain of coherent cells links the acupuncture points to the target organs (Smith et al., 1987).

Frequency measurements also showed that when an acupuncture point is pressured or needled, its endogenous

frequency becomes imprinted into water held on the opposite side of the body. In the case of acupressure this change only lasts for a few minutes after the acupressure ceases. This suggests that the therapy of acupuncture represents the synthesis of the equivalent of a homeopathic *similium* from the endogenous frequencies of the various meridians needed. The choice of points on the meridian to be needed determines what part of the body will receive therapy.

It was found that mentally concentrating on healing can move the pericardium meridian at Pe9 from its endogenous frequency of 0.25 Hz close to a healing frequency of 7.8 Hz. It seems likely that healers have the ability to adjust the frequencies of their meridians to what they sense to be the needs of the patient.

It eventually became possible to recognize which of a patient's acupuncture meridians were under stress by comparing the frequency measurements on water imprinted by the patient with the already known endogenous frequencies on the meridians. Stress here means being likely to trigger a hypersensitivity reaction or lead to illness. There was good correlation between the chemical frequency signatures of chemicals found in the toxic body load of patients and their body field frequencies which showed up as being hypoactive and representing a stress (Smith, 2003a).

### Oscillations of aqueous systems: Frequencies and water

Measurements of the chemical frequency signatures of the n-alkanes containing traces of water led to the consideration that the far-infrared rotational spectrum of water

TABLE 2. FREQUENCY ENTRAINMENT OF HEART MERIDIAN

Exposure frequency	He9 high band	He9 low band
MHz	MHz	Hz
No Exposure	382	7.768
260	382	7.718
<b>270</b>	<b>270</b>	<b>5.245</b>
<b>370</b>	<b>370</b>	<b>7.652</b>
<b>390</b>	<b>390</b>	<b>7.864</b>
<b>400</b>	<b>400</b>	<b>7.933</b>
<b>450</b>	<b>450</b>	<b>9.830</b>
<b>480</b>	<b>480</b>	<b>7.657</b>
500	382	7.660

Entrainment (shown bold) of the endogenous high- and low-band frequencies of the heart acupuncture meridian to an oscillator as measured at He9 after 1 minute exposure. Relaxation was more or less complete approximately 5 minutes after each exposure. The mean ratio of high-band to low-band frequencies is  $5.08 \pm 0.47 \times 10^7$  ( $\pm 9.3\%$ ) and the paired-values correlation coefficient is 0.7888 showing the effect of entrainment.

must be involved because this is where the n-alkanes have a spectrum. There are hundreds of spectral lines in the far-infrared rotational spectrum of water. The lines selected for these calculations were those that become highly coherent when pumped in a water vapor laser. The frequency differences between the spectral lines of the n-alkanes and these water lines correlated well with the measured frequencies.

It was then postulated that in the absence of any n-alkane, the same effect might be taking place between these same rotational spectrum lines in water. This was again confirmed by frequency measurements. When a frequency is imprinted into the water, two sidebands appear: one above and one below the water line by amount equal to the imprinted frequency.

In a quantum system, the process of measurement affects what is actually measured. While one frequency is being measured in water, other frequencies are not available for measurement as is found if a second oscillator is used in an attempt to measure another frequency. This effect also occurs when measuring homeopathic potencies and chemical frequency signatures.

The effects of serial dilution and succussion can also be followed by frequency measurements. In general, the resulting frequency is the original one multiplied by the dilution factor. There are exceptions; for example, 5-fold dilution potentizes to the same frequency as a 4-fold dilution and a 7-fold as a 6-fold. Other dilutions, notably 11-fold and 13-fold to 19-fold, result in completely blank potencies. Clearly, care is needed when doing decimal potentizations not to hit 11-fold accidentally.

A toroid seems to provide a necessary entanglement between the quantum states of the potency and those of the medium into which it is being copied. A potency can be copied into water up to a distance of approximately 28 m from the toroid but there must be a pathway through air of normal (UK) humidity; air in a plastic bag containing silica gel as a desiccant will not transmit potentization.

Interaction between two aliquots of frequency-imprinted water or homeopathic potencies can be detected by dowsing for the resonance of one aliquot in the presence of the other out to distances of several meters. Interaction between a pair of frequency-synchronized tadpoles can be detected out to more than 10 m. The medium must be in optical contact with the toroid and the potency. These interactions must depend on an exchange of biophotons because if an opaque screen or a yellow or red filter is placed in the optical path, all such interaction is lost (Smith, 2003).<sup>§</sup>

### *The environment*

This author has written a chapter on the “Effects of electromagnetic fields in the living environment” (Smith, 2002). These included frequency-resonance effects in simple structures. For example, a rod in a coherent system has its resonance frequency proportional to its physical length, which dif-

fers from musical instruments where the larger the instrument, the lower the pitch. Perhaps this is the reason that DNA needs to be so long. The frequency measured also depends on its compass orientation. The magnetic vector potential associated with the geomagnetic field runs east-to-west and is a reference vector for any living system that can sense it.

Geopathic stress has health implications that may be related to frequencies present on an Earth stress line as described by dowsers (Smith, 2003b). The frequencies vary with seismic conditions, may affect hypersensitive persons, block medication or therapy, and increase risk of illness. Measurement of these frequencies is made by dowsing over a stress line with an oscillator in the manner used for frequency measurements in water. The endogenous frequency of the nerve degeneration meridian (27 kHz) could be entrained by natural atmospheric radiation (“sferics”), which are bands of radiofrequencies in this region emitted from the upper atmosphere and that are dependent on gravitational and solar fluctuations. These can have significant *in vivo* and *in vitro* correlations (Hoffman et al., 1988; Vogl et al., 1991).

Looking at a flashing light of any frequency above 0.05 Hz but below 47 kHz can give a response at any acupuncture meridian within entrainment range, even at frequencies outside persistence of vision. The only meridians with endogenous frequencies outside this range and thus not likely to become involved are small intestine (SI1) and skin degeneration (Sk1).

## CONCLUSIONS

It can be concluded that water and living systems have macroscopic coherent properties that are quantum mechanical in origin. These properties can give rise to memory for frequencies, long-range effects, and entanglement as originally defined by Schrödinger. They contribute to an understanding of the physics underlying homeopathy, acupuncture, and electrical and chemical sensitivities/hypersensitivities. In a recent guest editorial (Smith, 2003b), this author wrote “Environmental medicine and alternative and complementary medicine need each other.” They also need physics—quantum physics.

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