

Homeopathy – How It Works and How It Is Done

Cyril W. Smith

cyril.smith@which.net

Chapter 4 Theory

4.1 The Descent from Orthodoxy into CAM

It is first necessary to establish some sort of ordering for my application of physics to CAM. In the 1970's, my laboratory in Salford University was concerned with measurements of the dielectric properties of liquids. This was mostly on such substances as transformer insulation oils and related chemicals, but I also had a medical electronics activity in which we were applying dielectrics techniques to biomolecules. In an abstract for a conference in 1975, I wrote that I would discuss the effects of electric and magnetic fields on the dielectric properties of enzymes. Shortly before the conference, my student reminded me that we had not done any of the magnetic measurements which I had included in the Abstract for completeness. I replied that it would not take long because biomolecules were non-magnetic and there should not be any magnetic effects but, we had better make certain. To our surprise, we found a reduction of about 40% in the permittivity and loss for humid enzymes in strong magnetic fields. Thus began the fall from orthodoxy.

This result was of immediate interest to Professor Herbert Fröhlich at nearby Liverpool University. He told me that the crucial experiment would be to measure the magnetic susceptibility. We did this and found a diamagnetic susceptibility which was 10^4 times higher than it should have been but which disappeared at a critical magnetic field strength. Diamagnetism can only arise from the equivalent of a short-circuited loop carrying a current which does not decay. This implied the occurrence of some sort of superconductivity effect which must be concentrated in small superconductive regions associated with the lysozyme¹.

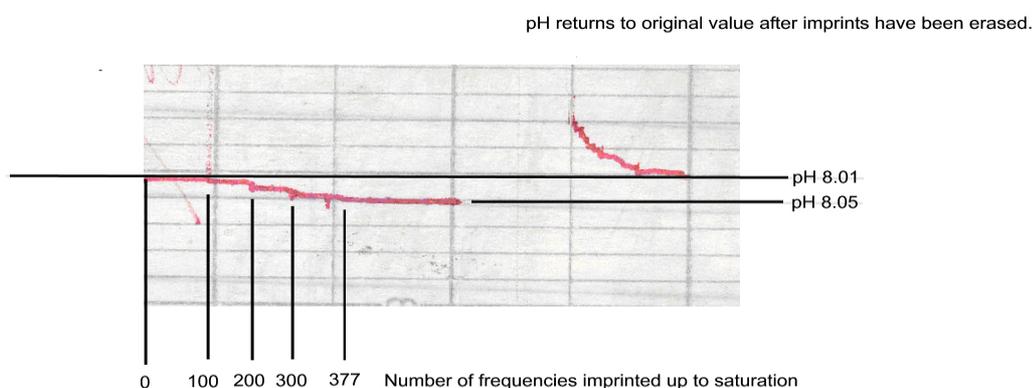
This was our first evidence that we were dealing with coherence and long-range order. Fröhlich was always careful to point out that superconductivity is a phenomenon of coherence and not directly of low-temperature. If the enzyme-water system could acquire the necessary coherence, it could have some of the properties of a low-temperature superconductor although not necessarily the zero electrical resistance because the superconductivity might be restricted to isolated domains. A low-temperature analogy for this would be droplets of superconducting mercury dispersed in liquid helium rather than some zero resistance mercury metal.

This result suggested the possibility of observing Josephson effects which would give rise to the emission of coherent electrical oscillations or to frequency-voltage interactions determined by $2e/h$ (twice the electronic charge \div Planck's Constant {twice because paired-electrons are involved}) $\simeq 500 \text{ MHz}/\mu\text{V}$.

¹ Ahmed NAG, Calderwood JH, Fröhlich H, Smith CW (1975) Evidence for collective magnetic effects in an enzyme: likelihood of room temperature superconductive regions. Phys. Lett. **53A**:129-130.

The chart recording in Figure 8 shows that the pH of a solution of sodium hydroxide at pH 8.01 increased to pH 8.05 at memory saturation which occurred after 377 separate frequencies had been imprinted. Erasure returned the pH to the initial value. An increase in pH corresponds to the removal of H⁺ ions. The change in pH confirms that the number of protons involved in pH change per frequency imprint is equal to the number needed to generate the local magnetic field to satisfy proton-NMR conditions independently of the imprinted frequency. Thus, imprinting a frequency into water creates proton coherence which stores that frequency.

Figure 8
Changes of pH on imprinting frequencies and reversibly on erasure
(Chart speed: 10min/div)



Conclusion

In his paper, “Quantum Mechanical Concepts in Biology”¹⁸ Fröhlich got it exactly right even in his first words, “Quantum Mechanics - Biology”. He considered quantum mechanical concepts on a macroscopic scale with superconductivity a consequence of coherence - not of low temperature, of magnetic flux always being quantised and the possibility of the Josephson effect giving a frequency to voltage inter-conversion. The involvement of the magnetic vector potential is implicit in the wave equations which it enters like the chemical potential although he did not specifically discuss the possibility of living systems being sensitive to it.

¹⁸ Fröhlich, H. (1969) *Quantum Mechanical Concepts in Biology*, in ‘Theoretical Physics & Biology’, Marois, M. (Editor). Amsterdam: North-Holland, pp 13-22.

In this Chapter, I have tried to show that living systems are sensitive to magnetic fields and photons at the single quantum level and that enzyme chemistry applied to living systems can differ significantly from regular chemistry even down to the DNA level. I have shown that cells can emit highly coherent oscillations at the time of cell division which are not present during the other parts of the cell cycle and which are coherent down to the level of quantum fluctuations. Dielectric measurements on a frequency imprint in water do not fit with random photons and therefore must also have coherence determined by quantum fluctuations and by implication so must all homeopathic potencies. The conclusion must be that Nature is working with a frequency precision of the order of parts per million.

A basic mechanism is postulated by which any frequency can be retained in water and in which fits experiments with reasonable approximation. The indefinite retention of frequency imprints is needed by any theory of potentiation because of the observation that one of Hahnemann's original potencies was still clinically provable 150 years after he had prepared it.

There is no point in doing clever mathematics if there is no first-order theory that gives a reasonable fit to such numbers as can be obtained by experiment – the Bohr model of the atom (1913) had to come before the Schrödinger Equation (1926). Since Nature seems to be using frequencies in such an extremely precise manner that all the related chemical and physical parameters may well be involved with similar precision in living systems. The Table in the Appendix provides a useful chart for comparing the different ways in which frequency and energy have been considered by the different disciplines.

Appendix 1

Electromagnetic Radiation and Energy

Radiation	Frequency Hz	Wavelength m	Wave Number cm ⁻¹	Quantum Energy eV	Chemical kJ/mole (kcal/mole)	Thermal K	Energy Joules
Ionizing	3×10^{15}	100 nm	100,000	12.4	1088 (260)	130,000	2×10^{-18}
Ultraviolet – visible	10^{15}	300 nm	30,000	3.7	360 (86)	43,000	6×10^{-19}
Infrared	$10^{14} - 10^{13}$	3 μm – 30 μm	3,000 - 300	3.7×10^{-1}	36 (8.6)	4,300	6×10^{-20}
Sub-mm	10^{12}	300 μm	30	3.7×10^{-2}	3.6 (0.86)	430	6×10^{-21}
Thermal	7.5×10^{11}	400 μm	23	2.5×10^{-2}	2.7 (0.65)	300 (27°C)	4×10^{-21}
mm	10^{11}	3 mm	3	3.7×10^{-3}		43	6×10^{-22}
cm	$10^{10} - 10^9$	3 cm – 30 cm				4.3	
RF	$10^8 - 10^6$	3 m - 300 m					
Audio	$10^4 - 10^2$	30 – 3,000 km					
Flicker	10^1	30,000 km					
Telluric	$10^0 - 10^{-3}$						

- Spectral power density (watts per cycle of bandwidth) = joules.
- Water absorption band approximately 2×10^{10} to 10^{14} Hz.
- Dielectric dispersions (Hz):
water relaxation (γ) $\sim 10^{10}$, proteins (β_1) $\sim 10^6$, Maxwell-Wagner (β) $\sim 10^4$, ions & membranes (α) $\sim 10^1$.