

## A MATHEMATICAL EXPLANATION OF THE PROCESS OF POTENTISATION

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Historically, the major bone of contention between Homoeopathy and Allopathy has been the use of microdilutions, also known as potentisation; indeed, nowhere else do the two disciplines disagree so radically. Homoeopaths, distinctly in the minority, and struggling for acceptance, are ridiculed as prescribers of placebo and are systematically excluded from the benefits of the medical industry, such as hospital practices and medical insurance coverage. Their documented cures are, as often as not, ignored by the allopaths; this is not unexpected, for if the data were looked at and found unimpeachable (which I believe they are) the entire basis of medicine, scientific, social and economic, would have to be drastically reordered. Of course, science has been reordered before, and the social aspects of medicine are in a constant state of flux; but Homoeopathy's most adamant foe remains the multi-billion dollar drug companies, whose purse-string strangle-hold on the American consumer shows no sign of slacking.

Let us look first at the two differing ideas of the process of dilution. For allopaths, dilution acts as a buffer for the pharmacological action of the medicines (the only action they recognise), most of which, in crude form, are poisonous. Consequently, there is a point where further dilution interferes with the pharmacological action of the substance, decreasing its efficacy more and more until what remains is nothing more than the vehicle of dilution. An easy analogy can be made to cooking; watering down a broth weakens but does not alter the flavor in any substantial way.

Homoeopaths, on the other hand, believe that dilution of a substance alters its nature qualitatively as well. More than mere buffering, dilution dissolves chemical bonds (an action requiring considerable energy), causing marvelous changes in the energy structure as well as the aforementioned commonplace changes in the physical state. Analogies do not spring to mind as easily for this model, nor does it appeal to the reasoning mind. It seems, moreover, that one is asked to believe in a miracle at the atomic level which has no parallel in grosser material existence. To this I would say that the age of miracles is not past; we have merely grown accustomed to them.

So here we have two diverse theories, one simple and reasonable, the other intuitive and appearing vague. What possible advantage is there in the acceptance of the latter? The best advantage available: the latter explains data that directly contradict the former model. What of its affront to familiar logic, and its imprecise form? That is as much its nature as our limitation, and it will take on more form to the mind before I am through.

Let us look at some of the data of experiments involving micro-dilutions (dilutions past 24x). These dilutions should not contain any atoms of the original substance, statistically, since in any gram of substance there are only  $6.12 \times 10^{22}/K$  molecules, where K is the atomic weight. All of the following experiments were summarised in James Stephenson's work, 'A Review of Investigations into the Action of Substances in Dilutions greater than  $1 \times 10^{24}$ .' *AIH Journal*, Nov. 1955. Many interesting and remarkable results will not be quoted here, as they are not germane to the question of the mechanics of microdilution.

In 1928, H. Junker tested the effects of certain substances in extreme dilution on paramecia. Among the substances were atropin sulfate, caffeine, orange juice, lemon juice, cocaine sulfate, sodium salt, octyl alcohol, potassium oleate, and nonylic acid. He used dilutions up to  $10^{27}$  or 27x, and found, instead of strictly decreasing sequences of effectiveness, as dilution increased, sinusoidal curves, rhythmic alterations of high and low efficacies. Much of the experimentation deals with macrodilutions, but significant changes were noted for orange juice 26x, sodium salt 26x, octyl alcohol 24x and 25x, potassium oleate 26x, and nonylic acid 24x and 27x.

In 1930, W. Persson investigated the effects of dilutions up to 120x on the rate of fermentation of starch by ptyalin, using *Lycopodium elavatum*, *Pulsatilla nigricans*, Hydrocyanic acid, *Strychnos nux vomica*, *Gonobobus condurango*, and other substances. Again, sinusoidal data curves arose with maximum effects at 15x, 25x, 45x, 65x, 95x, 110x and minimums at 6x, 20x, 35x, 55x, 85x, 105x, 120x. Using dicerent substances, Persson repeated this experiment in 1933, again producing sinusoidal data, and in 1938, using a similar experimental outline, found sinusoidal curves while investigating the effects of dilutions of various substances on rates of hydrolysis of glycogen by a frog muscle preparation and a beef heart preparation.

In 1952, A. Gay and J. Boiron, found that dielectric indices are specific to substance and strengthen and weaken in intensity sinusoidally as dilutions increase, confirming prior findings.

The word sinusoidal, one could not help noticing, appears in regard to all experiments. The implication is inescapable; dilution creates a regenerating system of dynamic rhythms, instead of the linear fading one would expect from the allopathic model. This establishes that energy specific to the remedy remains though no molecules of the substance are present. Moreover, this energy is offered in pulses, like breaths or heartbeats.

How is such a system possible? I forward that the molecules of the vehicle of dilution have trapped this energy, which the molecules of the remedy emitted during the chemical reaction of dissolution. Being in the energy state, we can easily assume even distribution of the curative agent after each ditution and succession.

How does the energy of a remedy, freed from its original physical vehicle, act as a cure? I would give as an analogy that the energy is like a herald,

signalling the presence of a substance, and upon ingestion, the organism, in its manifest levels, begins the series of actions necessary for removal of the intruder. But, of course, no physical intruder (or exceedingly little, in the lower potencies) has entered the system, and this series of actions (symptoms triggered by the remedy) instead work to clean the system of the already present ailment, whose similarity to the symptoms of the remedy determine the choice of curative agent. This unifies all of Hahnemann's postulates, showing that potentisation can be proven essential to its two universally accepted predecessors, the law of similars and the law of the totality of the patient. It is interesting to note that in mathematics, Euclid's geometry and Cantor's set theory both contained a last postulate which others (Lobachevsky and Cohen, respectively) proved to be independent of the preceding. The interdependence of Hahnemann's three postulates only further affirms his great mastery.

So, taking well-documented data, we have a model which indicates that homoeopathic potentisation is well-founded. And yet, our model is still incomplete. Hahnemann stated that a remedy became stronger as it was diluted more and more, which is so against reason as to sound absurd. Can this be so? With a few assumptions the answer is yes.

The title of this paper would indicate that this was to be a mathematical discussion, and yet no real mathematics has been forwarded. Actually, I would argue that even this introduction has been mathematical in nature, if one thinks of mathematics as relationships between concepts. We have been discussing models of nature's actions, which is to say attempting to put into thought the essentials of a system which, in its totality, may be incomprehensibly complicated. This is the true work of mathematics—the study of crystalline forms of thought, and their many-faceted implications.

Let us characterise the amount of energy being given off by a dilution as a damped vibration, oscillating to lower and lower levels as dilutions increase, but never reaching equilibrium and stopping. An equation for such a function would be of the form  $k \cdot e^{-mx} \cos(px)$ , where  $k$  is the energy inherent in the system,  $m$  is the rate of decline,  $p$  is the period between successive maxima,  $e$  is the marvelous transcendental number 2.71828.....and  $x$ , as usual, is the variable of dilution. The amount of energy is decreasing; how can less energy be more effective? Consider that the curative function is actually a function of time as well as energy, and that since the first derivative (the rate of change) is decreasing as well, the higher potencies should have longer durations at lower levels. As long as the level is detectable by our body's warning systems, the same symptom series should be activated. Indeed, higher levels of energy could effectively flood these sensory devices, causing a tolerance of the intruder if it appeared substantially lower in amount than at ingestion, which of course would be the case in the early oscillations. If the  $m$  in our function were equal to  $(-\log x)/x$ , the function would equal  $k \cos(px)/x$ , which would say that, as time went on, each successive maxi-

mum, though smaller than the preceding, would be relatively nearer to its predecessor, since  $\frac{n}{n+k}$  (k constant) gets arbitrarily close to 1 as n becomes infinite. In other words, higher potencies would oscillate many more times than lower potencies before the detection systems of the body would be satisfied that the intruder (not truly physical any more) had been sufficiently reduced from the amount present at ingestion. Hence, even though less energy should be present in higher potencies, this model would state that higher potencies, by virtue of their longer duration, would indeed have the greater curative powers attributed to them by Hahnemann.

In conclusion, I must remark that a model should explain old data as well as it can and should be updated and improved by the new data of experimenters assuming the model's rough conformity to nature. A model is not immutable truth, but an assumption of the shape of truth by study of the subtle clues truth leaves in its wake. More data is always needed to hone our understanding of the relationships between dilution, succussion, and effectiveness, between patient and remedy, between remedy and health of mind and body; as we find essential notions by making valid assumptions, we can employ the infinitely useful tools of mathematics to make precise these divine secrets, forming a holistic and scientific basis for the discipline of Homoeopathy.

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and the Ananda Bazar Group of journals led by Shri Ashoke Kumar Sarkar helped the Congress by donating large sums of money to meet the expenses for organizing it.

On the 26th and 27th December 1979, a homoeopathic seminar was held at the National Institute of Homoeopathy. Dr. Jacques Imberechts was the principal speaker on that occasion.

Besides the scientific sessions a number of HMAI meetings were held synchronizing the Congress. Elections were held for the various offices of the Central Executive Committee of the organization. Dr. Jugal Kishore was elected the President and Dr. Prodosh Majumdar Secretary General for the next term from 1979 to 1981. Drs. M. P. Arya, P. Vishnu and S. P. Chatterjee were elected Joint Secretary Generals. Dr. J. N. Kanjilal was made President of Honour for life.

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