SCIENTIFIC BASES OF DYNAMIZATION

DR. R. R. SHARMA*, M.SC., PH.D. (London), M.A.M.S., Chandigarh

INTRODUCTION

Homoeopathy has stood the test of time as an *art* of healing but is yet to receive a scientific recognition. Governmental patronage in some countries and ban on its practice in others represent only the public demands and not the views for or against its scientificity. Mere assertions that the law of similars is based on observations is not sufficient for Homoeopathy to be accepted as a science.

From allopathic standards, all homoeopathic medicines are micro-doses and placebos. Therefore, there is a need even today to establish scientifically that these medicines do act curatively. It is also needed to explain established homoeopathic laws from scientific theories. This may necessitate concepts which are new even to the present day sciences. We have to agree that facts of observation do not become unscientific only because contemporary sciences cannot explain them, but demand a revision or extension of the scientific theories, instead.

This author, in his earlier publications[1-5], tried to unify the biological phenomena in health, disease and cure in an attempt to rationalize various homoeopathic prineiples, but the process of dynamization has yet to be recognized and explained as significantly different from simple dilutions. The present paper would fulfil this need. *It would introduce some entirely new scientific concepts which will have implications in physics, chemistry, biology and in medicine.*

Subsequent paper would use this theory to explain the mechanism of action of homoeopathic medicines and the principles of Homoeopathy, xenobiology[3], ultramicroxenopathy[4] and of unified therapeutics[5], afresh.

DO HIGH POTENCIES REALLY ACT?

Controlled experiments and statistical analyses are needed to answer this vital question adequately.

Double blind drug trials are difficult to plan because of the need for individualised holistic diagnosis in Homoeopathy. Therefore, this author [6-8] has been interested in those cases which could serve their own controls and were adequately worked out with scientific laboratory tests. These fall into three categories: (a) Diseases, which under the modern scientific medicine are considered incurable, for example, liver biopsy proven Indian childhood cirrhosis; (b) Chronic diseases, which did not respond adequately even to long treat-

*Associate Professor and Head, Department of Biophysics, Post-graduate Institute of Medical Education & Research, Chandigarh-160 012.

ments under modern medicine, such as labyrinth vertigo[8], general spondylosis[7], migraine, trigeminal neuralgia, psoriasis, etc.; (c) Diseases, for which surgery was indicated, for example, spondylosis[1], solitary thyroid nodule[1], prolapse uterus in third stage[1]. Homoeopathic drugs in centesimal poteneies of 30, 200, 1000 generally and up to CM (1 lac) occasionally were used for these treatments. The probability of finding even one molecule of the original drug in the patient dose at these potencies is zero as shown by calculations in the following section:

Sankaran[9] on p. 49, eites W. B. Jackson as having followed up 1200 cases of cancer for 12 years and finding a recovery rate of 92% with homoeopathic treatment. Most of these cases are reported to have been declared 'hopeless' by their non-homoeopathic physieians earlier.

Because of the need to know, for homoeopathic diagnosis, the mental symptoms, the feelings and sensations and the modalities of aggravations and reliefs, it is difficult to conduct controlled animal experiments However, we have created diabetes mellitus in rats with intraperitonial injections of 125-150mg/kg Alloxan. In the group of those diabetic rats, which were treated with 30c Alloxan prepared through sequential dynamizations, the blood sugar returned to normal values whereas in the untreated group the blood sugar showed a gradual rise, a no-fall, or a significantly delayed fall. Results will be published separately.

Sankaran[9] and Dutta[10] have reviewed the results of experiments on gninea-pigs, fruit flies, other animals (like cats, rabbits, rats, mice), plants, seeds and enzymes to prove that homoeopatbic drugs in centesimal potencies of 30, 200, 1000 do act as expected.

These results are consistent with and corroborative of the huge mass of persuasive clinical observations collected independently by a large number of homocopaths all over the world during the past nearly two centuries. *Therefore, we must accept with Hahnemann[11] that homoeopathic medicines do act even in high and highest potencies.*

What is the probability of finding a molecule of the original drug in the patient dose?

HIGH POTENCY AND AVOGADRO'S LAW

According to Avogadro's law the number of molecules in a gram-mole is 6.022×10^{23}. Further calculations have shown that the probability of finding one molecule of *Natrum muriaticum* (NaCl, mol. wt. 58.46) in the patient dose is about 1 in 10^{11} at centesimal potency 30, 1 in 10^{111} at 200 and 1 in 10^{2011} at 1000. For any substance, this probability is inversely proportional to its molecular weight. Thus the probabilities for *Nat. mur.* are 3 times those for *Natrum sulphuricum* (Glauber's salt Na_2SO_4, $10H_2O$ mol. wt. 178.05) and 2.7 times those for Alloxan (mol. wt. 160.09). In these calculations it has been assumed that the volume of the patient dose is the same as that of the starting crude drug from which high potencies are raised.

These illustrative figures indicate that it is quite improbable to find any molecule of the original drug in the patient dose at routinely employed potencies of 30c, 200c, 1000c and higher.

But even then these medicines do actually act, and act according to the law of similars which implies that the biological properties of the original drug used in 'proving' are the same as those of the dynamised high potency used in treatment. *Therefore, the process of dynamization, which is unique only to Homoeopathy and has never been used anywhere else so far, is not simple dilution but somehow induces the diluent medium (water, alcohol, lactose) to acquire and retain those chemical and biological properties of the original drug molecule, which are necessary and sufficient for mediation of the drug action.*

How to explain these phenomena scientifically?

EARLIER EXPLANATIONS

(1) Hahnemann's term 'minuteness of dose' derives from the concept of dilution which, as shown above, is not the right explanation. His term 'potency' connotes *spiritual* dynamization and the smallest particles of the drug substance, through the mechanical actions of trituration and succussion, are supposed to be subtilized into 'spirit like medicinal power' which, in itself, is beyond our senses. This metaphysical explanation cannot be tested. Moreover, it is not consistent with the atomic and molecular theories of matter and hence not acceptable to the scientists.

(2) Roberts[12] reviews a number of possible pointers from modern physics but finally leaves dynamization as an unsolved problem and a challenge for the homoeopathic physicist.

(3) Dutta's[10, 13] formation of 'micro-isotopes' of the original drug substance from nutrinos, electrons and positrons is not tenable because the life of an electron-positron pair is no more than a split-second and the nutrinos and positrons do not arise without the basic nuclear reactions. The impacts of dynamization are too feeble to disrupt the nuclear forces. Moreover, the mechanism of assembling the micro-isotopes to acquire the properties precisely of the original drug is not clear and plausible.

(4) Barnard[14] does not explain how the 'solvent polymers' acquire the properties of the original drug and how they cross the cell membrane and blood brain barrier, in an intact form. The similar arguments[15] apply against the 'micro iceberg' postulated by Rawson[16], and against the molecular associations due to electric dipoles proposed by Kumar and Jaisal[17]. None of these hypotheses can explain the homoeopathic laws and mechanism of drug action.

(5) Rawson's[18] analogy is not correct because the micro impurities in semiconductors do not transfer their chemical properties to the 'doped' material.

(6) Gibson's[19] theory of 'cavitation' does not explain any homoeopathic principle.

(7) Nuclear magnetic resonance studies by Smith & Boericke[20] and Laser Raman spectrometry by Boiron & Vinh[21] are really interesting but the authors also believe in molecular associations of the type postulated by Barnard[14] and do not explain the mechanism of dynamization and of drug action. It will be shown later in the paper that these results provide experimental support to our new theory, however.

Thus, no completely satisfactory scientific explanation of the effects and mechanism of dynamization is available in the published literature. A fresh search is therefore justified.

ELECTRONIC BASES OF CHEMICAL AND BIOLOGICAL SPECIFICITY AND OF POSITIVE RECOGNITION

The periodic classification of elements and the theories of valeney and chemical bonds are based on the electronic structure of atoms and molecules. These theories have successfully explained the kinetics of chemical and biochemical reactions and the structure of chemical compounds including the biological macromolecules of proteins, enzymes, nucleic acids, lipids, carbohydrates, etc. However, they have conspicuously failed to explain the basis and mechanism of the biological specificity and positive recognition*. All biological phenomena are mediated through biochemical reactions but we do not know, how the biological systems recognise and differentiate Na^+ from K^+, how some inducer (like lactose) is recognized so that the enzymes (β—galactosidase etc.) induced (in E. coli) metabolize the inducer, how an antigen is recognized such that the elicited antibody binds the antigen specifically and, how a homoeopathic drug is recognized such that the clinical signs and symptoms elicited during proving and treatment are characteristic of it.

In the opinion of this author the flaw lies in the fact that these theories have considered only the *number* of electrons participating in the formation of chemical bonds and have not given due importance to the role of their *characteristic energies* exchanged during the chemical and biochemical reactions.

It is known that an atom (molecule) emits light of frequency n when the *'optical electron'* falls back from a higher energy state E_1 to low energy state E_2 such that $E_1—E_2=hn$, where h is the Planck's constant. The optical spectrum of any atom (molecule) is specifically characteristie of that atom (molecule) and of its particular energy state because the higher and lower energies of the spectrum producing electrons are uniqnely defined. That is why the spectra of no two different atoms (molecules) or, of the same atom (molecule) in no two different energy states, are identically the same. Further, it is also

*For a substance, say B, the discriminatory system during a negative recognition has only to indicate that it is *not* B, but for positive recognition it has to decide that the substance *is* B *positively* and nothing else.

known that those 'optical electrons' which are responsible for producing the optical spectrum are also the *'valency electrons'* taking part in chemical and biochemical reactions to exercise the chemical and biological properties. Therefore, the basis of chemical specificity as well as of biological specificity, must be the energies of the valency electrons in the relevant states of the interacting atoms (molecules) before and after the chemical or biochemical reaction.

The actual energy of a chemical bond depends not only on its nature but also on the ambient environment of its location within the molecule. For example, a study of the absorption spectra shows[23] that the C-H bond appears at 3.4 μm in aliphatic compounds and at 3.25 μm in aromatic ones.

As a generalization of these concepts it might be stated that the exact chemical and biological properties of any atom or molecule are determined by the number of chemically active electrons, their characteristic energies exchangeable during chemical interactions/reactions, by the ambient electronic environments around the location of every such electron within the molecule, and by the extent of electron sharing or transfer between interacting atoms or molecules. Here the term 'chemically active electron' refers to the electron which takes part in chemical reactions/interactions, irrespective of whether it is activated or not. The number, energy and intramolecular location of the active electrons may be different for different type of reactants/reactions and different ambient conditions like pH.

It is clear from above that mere mention of the number of the chemically active electrons is not sufficient and adequate for specifying the biological properties. Exchangeable energies associated with these electrons are also very important. For manifesting its biological properties the atom or molecule in question should bind with an appropriate molecule of biological importance which may be an inorganic ion or an enzyme, receptor, carrier protein, nucleic acid, etc. The chemically active electrons of the biological molecule are thereby engaged through chemical bonds. This suggests that the biological properties of a substance A could approximately be mimicked by another substance B which, somehow, could provide the same number of chemically active electrons associated with the same exchangeable energies as A and could thus compete for and 'mask' the chemically active electrons of the concerned biological molecule.

This leads to the suggestion that the molecules of diluent medium for homoeopathic medicines (milk, sugar, water, alcohol) are induced through the process of dynamization to acquire the same number of chemically active electrons with the same associated energies as available in the original drug molecule.

Let us see how it can be possible.

RESONANT PROMOTION OF LONE FAIR ELECTRONS IN R-O-H GROUP(S) OF DILUENT MOLECULES DURING DYNAMIZATIONS

Readers would appreciate that the common factor of all the indifferent media, for preparing high potencies through dynamization, namely, water, alcohol, and lactose, is the R-O-H group in their molecules. Here R stands for H, CH_3 CH_2, or the lactose residue. The number of R-O-H groups in a diluent molecule is one for alcohol, and many for lactose. Water has one R-O-H group and two O-H bonds. But every R-O-H group contains two lone pair orbitals: one with two 2s electrons and the other with two 2p electrons from oxygen atom. And there are no definite higher energy orbitals vacant for these electrons to go to, on activation.

The forceful dynamization processes of trituration and impacted succussions bring the outer electron sheath of a drug molecule repeatedly in close proximity of the outer electron sheath of a diluent molecule. This induces resonant perturbations in the R-O-H lone pair orbitals of diluent molecule whose one or more electrons, as the need may be, are raised to energy levels equal to those of the chemically active electrons in the original drug molecule. Thus-induced diluent molecule then joins the original drug molecule in inducing other diluent molecules to be raised to the same energy level and to resonate with one another. This process is restarted and repeated every time a new higher potency is raised when the inoculum, from lower potency, comprising original drug molecules and/or promoted diluent molecules, initiates the process. The number/proportion of the promoted molecules will increase with the strength and duration of dynamization process. But the de-excitation effect of other discordant diluent molecules cannot be ruled out, of course.

We propose to call this phenomenon as the *'resonant promotion'* of the concerned orbitals, electrons, R-O-H groups, molecules, or of the diluent medium. The use of this term is justified because in the earlier scientific literature 'promotion of electrons' to higher vacant orbitals has been used to explain the variable covalency of sulphur and phosphorus. Here we are explaining the variable energy states and the two cases are similar in effect. The concerned orbitals, electrons, R-O-H groups, molecules or medium will be spoken of as having been *'resonantly promoted'* or simply 'promoted'.

It will help visualization of the mechanism of the proposed phenomenon of resonant promotion of lone pair electrons if one appreciates that the spins of the two electrons in the pair are mutually antiparallel. The spin of the chemically active electrons in the drug molecule would therefore be parallel to one electron of the pair and antiparallel to other. It is known that the electrons with parallel spins repel each other and those with antiparallel spins attract each other. The electron with parallel spin would be repelled and raised to higher energy state *in resonance with the perturbing electron of the drug molecule* because there is no definite vacant higher energy orbital available and the electron, in a way, is free to rise to any new energy state.

The other electron of the pair will remain in the original orbital having definite energy. When the inducing electrons of the drug molecule are more than one, the same number of the lone pair electrons in the hydroxyl (OH) groups of the indifferent diluent medium are resonantly promoted through the processes of dynamization. So that the promoted medium can mimic the chemical/biological properties of the drug. This argument is supported by wave mechanics as follows.

The solution of the Schroedinger's wave equation[23] for an electron of mass m free to move over a certain distance L gives the expression for the total energy E as

$$E = n^2 h^2/8mL^2$$

where n is an integer and h the Planck's constant 6.626×10^{-27} erg-sec. This shows that more we confine the electron—as in allowed definite atomic orbitals—the bigger the gap between successive energy levels. When the freedom of the electron is increased—as for the lone pair electrons here, because there are no definite vacant orbitals available—the levels become more and more closely spaced. This allows for the adjustment of resonant energy of the promoted lone pair electron very close to that of the inducing electron in the original drug.

These new energy states of the diluent molecule would be stable and thermodynamically allowed because they would tend to reduce the lone pair-lone pair orbital repulsions and equalize the four sp^3 hybrid orbitals. The bond angles and bond lengths would get adjusted to every new equilibrium state and remain so indefinitely.

The proposed meehanism therefore is plausible. It has vast potentialities and can make available, one, two, three or four electrons from the two lone pair orbitals of every R-O-H group, with requisite energies, for entering into covalent or coordinate bonds, and to approximately mimick the biological properties of a large number of drug molecules, one at a time.

Let us now see whether these ideas are supported by practical observations and experimental results.

SUPPORTING EXPERIMENTAL EVIDENCE

(a) *Biological*: Our controlled experiments with Alloxan induced diabetes in rats have shown that the blood sugar in the diabetic rats treated with unsuccussed 100^{30}fold simple dilution of Alloxan continued to rise as in the untreated group. In contrast, the group treated with dynamized 30c Alloxan showed a gradual fall in blood sugar towards normalcy. These results along with the law of similars support the theory that dynamization induces the diluent medium to acquire, retain and manifest biological properties of the original drug. The explanation and deduction of the law of similars will be taken up in a subsequent paper.

(b) *Physical*: (i) The nuclear magnetic resonance (N.M.R.) spectrograms

of sulphur tincture to 30X reported by Smith and Boericke[20] show a significant difference in the spectra of the hydroxyl (OH) group of the succussed dilutions of sulphur when compared to the alcohol controls. There is little if any change in the CH_3 and CH_2 alcohol groups. These results support our theory that hydroxyl (OH) group is the seat of appropriate modifications during the process of dynamization.

(ii) Laser Raman spectrometric investigations of Boiron and Vinh[21] have shown that for 1CH *Kalium bichromicum* ($K_2 Cr_2 O_7$) the spectrum of alcohol disappears almost totally when that of the potassium bichromate appears. Here[21] the ratio of the number of *Kali. bichromicum*, molecules and alcohol molecules is 1 to 500. This shows that the alcohol molecule has so changed as to produce a Laser Raman Spectrum of *Kali. bichromicum*.

Sankaran[9] on p. 24 cites the French physicist Gustave de Bon as having demonstrated that sodium chloride in 1M potency (equivalent to 100^{1000} fold dilution) when sprayed into vacuum produced the sodium spectrum.

These results support our theory because, as also discussed above, the spectrometric properties, like chemical and biological properties, are always mediated through the valeney electrons and their characteristic energies.

(c) *Chemical*: Various potentialities of the lone pair electrons of oxygen and nitrogen atoms can be appreciated from the following examples:

(i) The HCl forms the hydrate H_3O, HCl (m. p. 15.3°C) where the lone pair electrons of O atom enter into covalent bonds with both H and Cl by accepting an electron from H and donating one to Cl, and then sharing them. Similarly the lone pair electrons of N atom(s) in ammonia (NH_3), hydrazine (H_2N-NH_2) and in hydroxylamine (HO-NH_2) are utilized to form salts by addition of whole acid molecule through covalent bonds and not by replacement of the acid hydrogen.

(ii) In the complex ion $(Ag\ NH_3)^+$ one of two lone pair electrons and in $(Zn\ NH_3)^{++}$ both the lone pair electrons are utilized.

(iii) The H atom of OH group is widely known to form hydrogen bonds with lone pair electrons of the O and N atoms in biological systems and in making associated water clusters.

All these cases illustrate the immense potentialities of the lone pair electrons to assume varied roles as required by our theory of the resonant promotion of lone pair electrons of OH groups in the diluent media through dynamization.

OTHER OBSERVATIONS EXPLAINED BY THIS THEORY

This theory can easily explain the following observations:

(1) The use of milk sugar initially, water during intermediate stages and alcohol in last stages of raising high potencies is justified as all of them contain the necessary R-O-H groups. Moreover, lactose is readily soluble in water but not in alcohol and water is readily soluble in alcohol, recommending and supporting the conventional sequence of lactose-water-alcohol for raising potencies, particularly of those drugs which are not soluble in water

and/or alcohol, as well as for those, like sodium chloride and hydrochloric acid, which get ionized when dissolved in water. Finally the alcoholic dilutions are *absorbed* as a thin film over the surface of the sugar globules, and also *absorbed* within the mass. New hydrogen bonds are formed in both cases to prevent evaporation.

(2) The ceramic of mortar and pestle used for triturations and the glass of succussing vials, do not induce their properties in the diluent media because they are chemically inert and do not have any chemically active electrons for resonant promotion of the diluent medium.

(3) Inert substances like Lycopodium and carbon manifest drug power on dynamization because then the gross clusters break down and the chemically active electrons of the molecules get exposed to promote the R-O-H groups of the diluent medium.

(4) The homocopathic *Natrum muriaticum* excercises deep medicinal power in spite of the plentiful Na^+ cations already present in the body because the Na^+ ions are kept mostly outside the cells by the sodium-potassium pump. The solid sodium chloride exists as a mixture of NaCl atom-pair and Na^+Cl^- ion-pair and is triturated with lactose to prepare low decimal potencies. Thus promoted hydroxyl (OH) groups of lactose, on impacted succussions, promote the water molecules which then promote the alcohol molecules to produce high potencies of *Nat. mur.* The promoted molecules of water and alcohol are not affected by the Na-K pump and can therefore readily cross the membranes to act intracellularly and within the central nervous system.

(5) Crude drugs cannot be detected in high potencies by those methods which require the kernel of the original molecules. For instance, both *Natrum muriaticum* (NaCl) and *Argentum nitre* ($AgNO_3$) in high potencies exhibit their respective biological properties because their valency electrons have resonantly promoted the alcohol molecules. But they do not form a precipitate of AgCl when mixed together because the kernels of their respective molecules are not present in high potencies.

POTENCY PROBLEM

The probability of finding a molecule of crude drug in the patient dose is less than one for 10c and higher potencies. The majority of the crude drugs, available in low decimal potencies, would find it difficult to cross the cell membranes and blood brain barrier. These would therefore act mostly extracellularly and outside the central nervous system. But the molecules of water and alcohol resonantly promoted by them will have no such difficulty and would act throughout the body without restriction. The analytical review and practice recommendations made by Kanjilal[25] in this regard are therefore interesting and consistent with our theory.

CONCLUDING REMARKS

(1) Readers would appreciate that these explanations are free from the

conceptual difficulties created by Avogadro's law because the chemical and biological properties of the original drug molecules in high potencies are mimicked by all the 'promoted' diluent molecules which are plenty in number.

(2) As a result of the dynamization processes, the indifferent medium, and not the crude drug, gets potentized and acquires the essential medicinal properties of the drug substance.

(3) Therapeutic potential of the rare and/or unstable xenobiotics could be preserved as high and highest potencies because the latter are long lived and stable and can be prepared in large quantities.

(4) The following new scientific concepts have been introduced:

(a) Electronic basis of chemical specificity, of biological specificity and of positive recognition.

(b) Resonant Promotion of lone pair electrons.

These have far reaching implications in physics, chemistry, biology and in medicine.

(5) Electron spin resonance spectrometric investigations are being planned to find out whether the spins of the lone pair electrons get unpaired by dynamization or not. That is, whether the promoted molecule acquires some properties of a free radical or not.

Subsequent[26] paper would use the theory of this paper to explain the mechanism of homoeopathic medicines and the operative laws and principles of Homoeopathy, xenohiology[3], ultramicroxenopathy[4] and of unified therapeutics[5], afresh.

ACKNOWLEDGEMENTS

The author is sincerely grateful to his colleagues in his department for their scientific discussions on the manuscript.

REFERENCES

1. Sharma, R. R. (1977): 'A Unified Theoretical Approach to Homoeopathy, Immunology and Raja Yoga and Its Consequences', *Transactions of the 32nd International Homoeopathic Medical College, New Delhi*, pp. 73-85; (*Ind. J. Hom.*, June-July 1980).

2. Sharma, R. R. (1979): 'Scientific Bases of Homoeopathy: The Concept of Vital Force as Molecular Mechanisms Basic to Profound Homoeostatic State', THE HAHN. GLEAN. 46 (2), 52-63 (*Ind. J. Hom.*, Aug.-Sept. 1980).

3. Sharma, R. R. (1979): 'Scientific Bases of Homoeopathy: Homoeopathic Drug Proving and Materia Medica as New Science of Xenobiology', THE HAHN. GLEAN. 46 (3), 100-107 (*Ind. J. Hom.*, Oct. 1980).

4. Sharma, R. R. (1979): 'Scientific Bases of Homoeopathy: Operational Laws of Homoeopathy as Comprising New Science of Ultramicroxenopathy', THE HAHN. GLEAN. 46 (4), 156-165 (*Ind. J. Hom.*, Nov. 1980).

5. Sharma, R. R. (1979): 'Bases of A New Indian System of Comprehensive Therapeutics, *Navayurved*', THE HAHN. GLEAN. 46, 348-360.

6. Sharma, R. R. (1980): Personal View, *Ind. J. Hom.* 4 (2), 71-74.

7. Sharma, R. R., and Taneja, G. P. (1978): 'Surgery Avoided by Homoeopathy in A Case of General Spondylosis', THE HAHN. GLEAN. 45, 129.

8. Sharma, R. R. (1979): 'A Case of Chronic Aural Vertigo Treated' by Homoeopathy', THE HAHN. GLEAN. 46, 566-568.

9. Sankaran, P. (1970): *Some Recent Research and Advances in Homoeopathy*, Homoeopathic Medical Publishers, Bombay.

10. Dutta, A. C. (1979): *Homoeopathy in the Light of Modern Science*, Dhanbad.

11. Hahnemann, S. (1842): *Organon of Medicine*, 6th ed., 2nd Indian ed. (1968), Calcutta, Roy Singh & Co.

12. Roberts, H. A. (1942): *The Principles and Art of Cure by Homoeopathy*, Swatantra Playing Card Co., Delhi.

13. Dutta, A. C. (1976): 'Experiments with Inorganic Nutrients in Homoeopathic Dilution on Plants and Existence of Micro-isotopes, THE HAHN. GLEAN. 43 (10), 438-450.

14. Barnard, G. O. (1974): 'Microdose Paradox—A New Concept', THE HAHN. GLEAN. 41 (5), 209-217 (*J. Amer. Inst. Hom.*, July-Aug., 1965).

15. Koley, A. (1978): 'Over the Search for the Nature of Potentization', THE HAHN. GLEAN. 45 (1), 4-5.

16. Rawson, D. S. (1976): 'On the Nature of Serial Dilution and Succussion—with a Note on Homoeopathic Provings', THE HAHN. GLEAN. 43 (12), 538-544.

17. Kumar, A., and Jussal, R. (1979): 'A Hypothesis on the Nature of Homoeopathic Potencies', *Br. Hom. J.* 68 (4) 197-204.

18. Rawson, D. S. (1972): 'A Scientific Approach to Homoeopathy with Special Reference to Potentization', *Br. Hom. J.* 61 (2), 116-122.

19. Gibson, R. G. (1968): 'The Biological Significance of Succussion', *Br. Hom. J.* 57 (3), 157-163.

20. Smith, R. B. Jr., and Boericke, G. W. (1974): 'Modern Instrumentation for the Evaluation of Homoeopathic Drug Structure', THE HAHN. GLEAN. 41 (3), 99-119 (*Br. Hom. J.*, Oct. 1972).

21. Boiron, J., and Vinh, C. L. D. (1976): 'Contribution to the Study of the Physical Structure of Homoeopathic Dilutions by Raman Laser Effect', THE HAHN. GLEAN. 43 (10), 455-467.

22. Puri, B. R., and Sharma, L. R. (1980): *Principles of Physical Chemistry*, Vishal Publication, Jullunder.

23. Reid, C. (1957): *Excited States in Chemistry and Biology*, pp. 21-22, Butterworth Sci. Pub., London.

24. Prakash, S., Tuli, G. D., and Basu, S. K. (1950): *Advanced Inorganic Chemistry*, 3rd ed., S. Chand & Co., Delhi.

25. Kanjilal, J. N. (1980): 'Potency Problem' (Editorial), *Ind. J. Hom.* 4 (8), 313-314.

26. Sharma, R. R. (1982): Scientific Bases of Homoeopathy, Xenobiology, Ultramicroxenopathy, Unified Therapeutics, and More. THE HAHN. GLEAN. 49 (in press).