

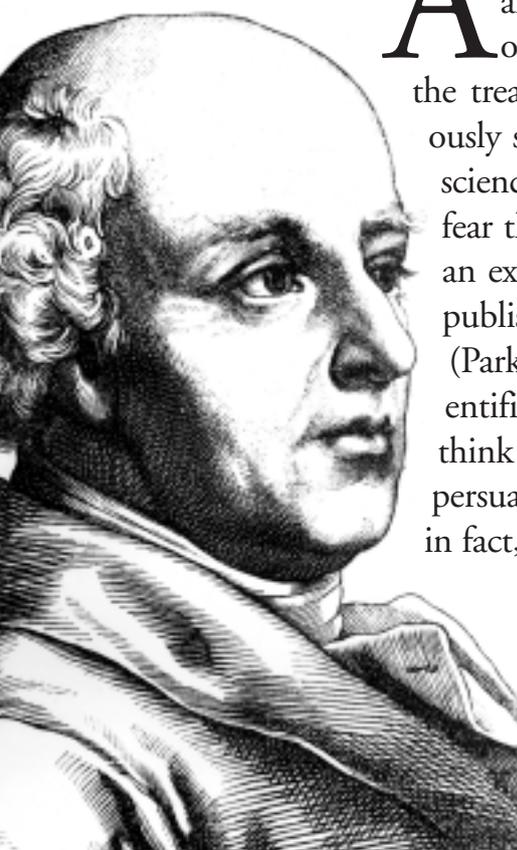


The Difference between Hahnemann and Darwin

In contrast to evolutionary biology, homeopathy is a closed, dogmatic system of fixed rules. Moreover, its basic tenet is an irrational tautology that lacks any factual basis.

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A “Special Report” published recently in *Nature* argued that Samuel Hahnemann’s famous Principle of Similars (“let like cure like”), which is based on the treatment of the sick with extremely diluted, vigorously shaken agents (so-called “potencies”), is a pseudoscience (Giles 2007). While that conclusion is true, I fear that this paper, which can be viewed as a sequel to an excellent review article on homeopathy and physics published ten years ago in the *SKEPTICAL INQUIRER* (Park 1997), will not convince all readers of the antiscientific nature of this alternative medicine. However, I think that the following additional arguments should persuade every open-minded person that homeopathy is, in fact, eighteenth-century quackery.



First, the claim of homeopaths that the extremely diluted remedy has an effect independent of the belief of the patient and practitioner has been refuted. This contention is based on the premise that the various potencies can be distinguished from one another. In a quantitative study, it was shown that two specific potencies, namely Natrium muriaticum 30C and Sulphur 30C, which are said to be very active and have strikingly different properties, were indistinguishable by an eminent homeopath. For identification of the potencies the practitioner was allowed to use all available methods, whether clinical, physical, or chemical (Roberts 1989).

Second, homeopaths usually argue that Hahnemann's principle has been corroborated by the treatment of animals with homeopathic medicine. In these trials, the nonhuman patient is not even aware of receiving any medicine, so the placebo effect can be discounted. But a recent article on homeopathy in veterinary medicine showed that this popular claim is false (Taylor 2005).

Third, modern homeopathy rests on the assumption that remedies retain physiological activity even when diluted beyond Avogadro's number (see figure 1), meaning no molecules of the active substance should remain ("high potencies," i.e., are "solutions without solute"). This "memory-of-water" or "imprint" hypothesis, which was discussed in detail by Park (1997), has recently been refuted. Using novel spectroscopic techniques, it was shown that water loses its "memory" of structural correlations within fifty femtoseconds (a femtosecond is 10^{-15} of a second), discounting any long-term "information storage" of former dissolved particles, as claimed by homeopaths (Cowan et al. 2005).

Finally, it should be noted that the tenets of homeopathy have not changed much over the past two hundred years. If Hahnemann had to pass an examination in homeopathic medicine today, he should have no problems answering most questions correctly. However, Charles Darwin would have no chance at passing an examination in evolutionary biology today, because our modern synthetic theory of biological evolution has developed far beyond his classical Principle of Descent with Modification by Natural Selection. Terms such as genotype, phenotype, germ-line mutations, etc., were unknown to Darwin, who used the methods of his time. Despite these restrictions, he raised many new, open questions and finally became the doyen of a new research agenda and scientific discipline (Kutschera and Niklas 2004).

In contrast to evolutionary biology, homeopathy is a closed, dogmatic system of fixed rules. Moreover, the basic tenet of homeopathy, "Nothing, dissolved in water, is more effective than water in which nothing is dissolved," is an irrational tautology that lacks any factual basis (see figure 2). Homeopathy must be regarded as a static, quasi-religious faith that has no place in any science curriculum.

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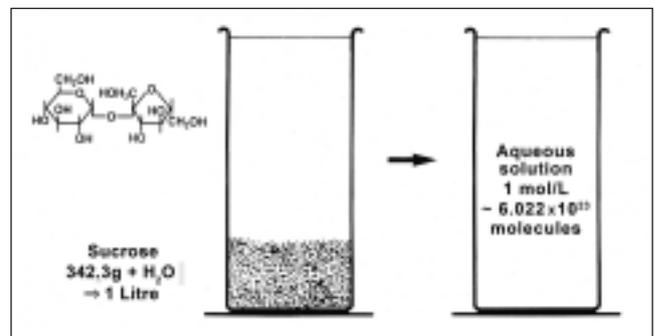


Figure 1. Illustration of Avogadro's number (N_A). A defined amount of sucrose (342.3g) is dissolved in pure water to give a volume of 1 Liter. This aqueous solution contains about 6.022×10^{23} molecules of sucrose (N_A).

The Avogadro number (or constant) is the number of "entities" (atoms or molecules) in one mole ($N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$). If a stock solution of $1 \text{ mol} \times \text{L}^{-1}$ of substance (for instance, sucrose) is diluted 24 times by a factor 1/10, no solutes remain in this "diluted solution" (i.e., "D 24" is pure water).

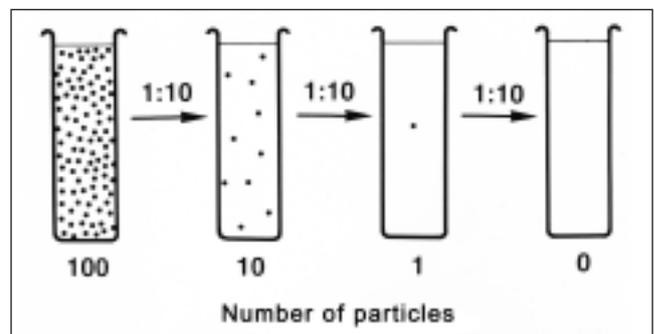


Figure 2. Dilution series. A concentrated solution is serially diluted by a factor of 10. After three steps, the number of particles per volume of water drops from 100 to zero (average value). According to one of the dogmas of classical homeopathy, this "solution without solutes" is supposed to exert a positive physiological effect on the bodies of animals, humans, and plants.

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