SHORT PAPER

Impossible measures, Contonian appearances

Interpretation of the effect of high dilutions by building the Feynman measure in the real numbers of Levy and in the Solovay theory

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Abstract *A protocol showing the β^- activity of high dilutions of nitric acid is described. It is given a physical mathematical frame founded on a an approach of quantum relativistic field based on the theory of Solovay (ethers theory, remanent wave).*

I. Wave β^- in the living organism

Let us remind you that wave β^- is the wave aspect of electron, namely free electrons.

The presence of such a wave in living organisms may be highlighted by the β^- autographies of the human finger, for instance (Conte and Lasne, 1996; 1999).

It is important to stress this fact, because we have proved that highly diluted preparations are acting essentially though β^- radiations.

This is the beginning of a frame in which this activity will be described and predicted. In this paper, we will therefore build this physical-mathematical frame.

II. Experimental protocol for high dilutions (Hahnemann protocol)

Let us remind you that the Hahnemannian protocol is as follows.

We take a number N (corresponding at the CH) of test tubes, the initial O tube containing a solution (in water for instance) of a product (10 percent of HNO_3 for instance) and the others containing pure water and then we put 1 percent of the O tube in the 1 tube, then we make a succussion, which is a regular agitation by means of vibration, then we repeat the steps of 1 percent dilution and succussion, until the stage N: in the N tube, we obtain a CHN dilution.

After 12 steps, which corresponds to CH12 in the Hahnemannian scale, we reach the Avogadro ampere number, which is $6{,}023 \times 10^{23}$.

Then the probability of the presence of a molecule of the initial solution (nitric acid for instance) is almost zero.

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Our purpose is now to describe an experimental protocol to highlight the β^- activity of a Hahnemannian dilution.

III. The experimental protocol for β^- activity of a Hahnemannian dilution

We shall consider two series of 14 test tubes, 14 if we want to reach CH14. We have two initial test tubes which contain for the first series a dilution at 10 percent of nitric acid in water and for the second series only water (the water is from the same origin). The Hahnemannian protocol for the two series is made.

At each step, a sample is taken and put in a β^- measurement apparatus (a photo-multiplicator) with only one window of measurement. The β^- activating is therefore counted in pulses per 10mm for the first and second series. The result is drawn in Figure 1.

In Figure 2, three results are treated by means of Contonian statistics (Conte *et al.*, 1994). Actually, we calculate the area under the two experimental curves, growing with the CH parameter. Figure 2 has the shape of two segments, the series proceeding from nitric acid solution being above the other segment.

For each straight line, we measure its slope, which provides two numbers H_1 and H_2 being the Contonian frequencies (Conte *et al.*, 1994; Berliocchi, 1994).

Then we compute the coupling constant $\frac{H_2}{H_1}$. If H_1 correspond to the initial presence of nitric acid, $0 < \frac{H_2}{H_1} < 1$. This experiment has been performed many times by Lasne, in his laboratory of radio isotopes in the Edouard Herriot Hospital in Lyons (Conte *et al.*, 1996).

The coupling constant is reproductively invariant if the chemical physical parameters are invariant, i.e.:

- Initial water identical.
- Concentration in nitric acid at the beginning the same.
- External physical parameters identical (such as temperature).

We now develop the physical-mathematical frame in which these experiments and measurement have been performed.

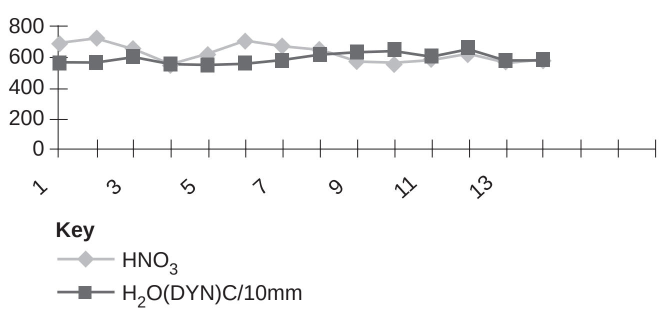

Figure 1.
Graph of experimental protocol

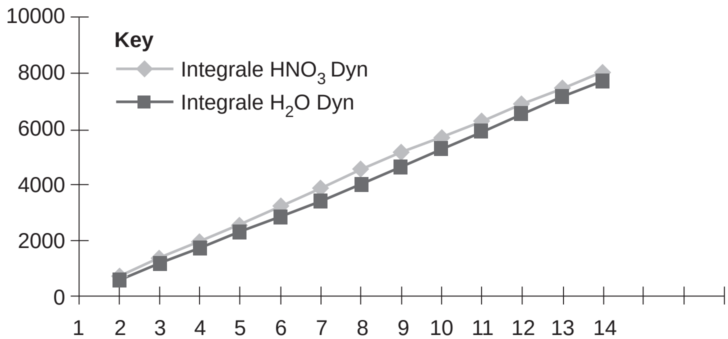

Figure 2.
Experimental graphs

IV. The physical-mathematical frame – the tools of ethers theory

Preliminaries mathematic and logic

(1) *Free groups*: A free group is built by letters $g_1, g_2, \ldots, g_n$ (which can be finite or infinite) and letters meaning the inverses g_i^{-1}, introducing only defining relations $g_i \cdot g_i^{-1} = 1$. The elements of free group (or "words") have a reduced writing $g_{i_1}^{a_1} \ldots g_{i_k}^{a_k} (a_1 \ldots a_k \in Z^*)$, which is the writing of minimal length (Encylopedia Universalis, 1974).

(2) *The real numbers of Levy*: is a model of real numbers where the two following axioms are valid:

- Every real function of real variable is Lebesgue measurable.
- Continuous choice axiom.

It is clear that Levy numbers are different from "usual" real numbers, because of functions like the Vitali function:

Take the additive real group IR and quotient it by the rationas Q.

Choose one element (and only one) in each class, by the choice axiom. We obtain a set of real numbers which by Lebesgue measure has to be 0 and infinity.

(3) *The Solovay theory* (Solovay, 1970). In this theory, the axiom that every real function of the real numbers is Lebesgue-measurable is valid, but not the continuous choice axiom; only the so-called innumerable dependent choice, which enables us to do successive choice innumerably, each new choice being dependent of the finite preceeding choices. The Vitali function, for instance, does not exist in this theory.

We now give the two theorems which enable us to use these theories.

Theorem of Levy. The consistency of the model of Levy numbers is equivalent to the existence of inaccessible cardinal.
Theorem of Solovay. The coexistency of the Solovay theory is equivalent to the existence of an inaccessible cardinal.

Recalls (Schoenfield, 1967): an inaccessible cardinal is a cardinal β which verifies the property that is a cardinal α is less than $\beta 2^a$ is less than β and if x is a set smaller than β, $U_n(x)$ is smaller than β (U_n is the union of elements of x).

The set theory ZF, with this axiom, is called ZFI. It is stronger than the ZF+ choice axiom (ZFC) because if the theory ZFI is valid, it is possible to prove that ZFC is consistent, which is impossible by the Gödel incompleteness theorem (Schoenfield, 1967).

V. Building of impossible means and ether in the Levy and Solovay theories

(1) *Definition 1*: An impossible means on a Polish compact is a non trivial measure invariant by the action of the homomorphism of the compact, in the Levy theory.

Such a measure is called impossible because it is easy to show that such a measure cannot exist in the usual real numbers, even for a simple example such as the torus.

In the Levy numbers, it is not very difficult to build such a measure, by using stopping times, on the space of words of a free group which are compacted by the homomorphisms into finite groups.

(2) *Definition 2*: An ether is a precompact group in the Solovay theory, with a right invariant metric. Building a non trivial ether is rather difficult. It is done in our book (Berliocchi, 1994). Here follows the statement of our main theorem.

Theorem: If X is a Polish compact and if it exists in a subgroup of the group $G(X)$ of homomorphisms of X which permutes the points of X then there exists a continuous homomorphism of the group $G(X)$ into an ether which is non trivial. This kind of homomorphism is called an appearance.

(3) *Definition 3*: A Contonian appearance is a homomorphism of a continuous curve F (t) in the group of homomorphisms of a Polish compact X into an ether.

(4) *Definition 4*: An appearance of Heisenberg is a non-trivial appearance of the anticommutation relations $U_t V_{t'} U_{-t} V_{-t'} = e^{itt'}$ in the group of unitary operators in a Hilbert space.

(5) *Definition 5*: A Courrege appearance is a non-trivial appearance of the Poincaré group (which is generated by the Lorentz group preserving the Lorentz metric $C^2 t^2 . - \sum_i X_i^2$ and the translations in the Minkovski space time).

These definitions are necessary for our purpose, which is to build the Feynman measure (Collins, 1984; Feynman and Hibbs, 1965) for the quantum field in a case which is meaningful for the interpretations of the properties of high dilutions.

VI. Building of the Feynman measure in quantum field theory

(1) Position of the problem (Collins, 1984; Feynman and Hibbs, 1965)

The problem of defining the quantum field when the associated action of the field is where $A \rightarrow S(A)$ where A is a function on the space-time can be solved by using the "Feynman measure" $[dA]$ by calculation of the chronological products or Green functions:

$$G_n(x_1, \ldots, x_n) = \int e^{iS(A)} A(x_1) \ldots A(x_n[dA].$$

The mathematical problem is essentially that the "Feynman measure" is not a measure in the general case in the mathematical sense.

But the definition of Feynman measure is possible in the Ethers theory as follows, even for q space time with singularities of the kind encountered in the high dilutions effects interpretation.

(2) Building a Von Neumann measure for the Feynman measure in the ether theory

Definition: A Von Neumann measure on an ether is a means on the almost periodic functions on the ether (Yoshida, 1968).

So, if the action of the quantum field is of the form:

$$\int \left[(\frac{\partial A}{\partial t})^2 - \sum_{i=1}^{3} \frac{\partial A}{\partial x_1} + \frac{m^2}{2} A^2 + g \frac{A^4}{4!} \right] dt dx_1, dx_2 dx_3$$

We can, as done in Berliocchi (1994), build appearances of Heisenberg and Courrege in such a manner as the Von Neumann means on the ether in the range that leads to the properties required for the "Feynman measure", especially if it provides a field satisfying the field equation.

(3) White holes in relativistic quantum field theory

We consider a cone of future in the Minkovsky space-time and a free particle with the Lagrangian density:

$$\int \left[\left(\frac{\partial A}{\partial i} \right)^2 - \sum (\frac{\partial A}{\partial x_i})^2 + \frac{m^2(x,t)}{2} A^2 \right] dt dx_1 dx_2 dx_3$$

where the function $m(x, t) = 0$ in the cone of future of point 0 and $m(x, t) = m$ otherwise. We have now the theorem:

Theorem: The relative quantum field defined by the Feynman measure in the ether theory is nontrivial in the future cone of point 0.

Definition: Such a quantum field is called the remanent wave of a white hole.

VII. Interpretation of the experimental results on the β^- radiations in the high dilutions

(1) Possibility of a theory of "water memory" in the Levy real numbers
Theorem 3: The Brownian motion has a limit at infinity in the set of Levy real numbers (so it has a kind of "memory").

(2) A more powerful tool: the use of Contonian appearances
Historically, the behaviour of high dilutions was first predicted in terms of Contonian appearances, which leads to Lasne's experiments to highlight the so called "remanent wave" (quantum field in a white hole) with the suggestion of Conte to look at the β^- domain.

The two integrals of section III are interpreted as Contonian appearances of a quantum field in the relativistic field theory, the quantum field of a white hole (remanent wave) by writing:

$$e^{iH} \int^{XdC} = K(e^{iA})$$

where H is the Contonian frequencies, X the measured β^- radiations C the CH and A the quantum field, K a Contonian appearance.

Roughly speaking, the Hahnemannian protocol leads to white holes by disappearance of molecules of the initial solution by successive dilutions and the succussions create complex structures of white holes which cannot be overlooked though the speed of light is very high (so the future cones under consideration are very fine). So the remanent wave can be highlighted by its β^- emissions.

The remanent wave can also be highlighted by NMR measurements (see the experiments of Lasne (Conte *et al.*, 1996)). Historically Lasne made these kinds of measurements before the theory of the remanent wave but the treatment of his results is clear only by means of Contonian statistics in the remanent wave theory.

In this theory, we take the same kind of exponential to interpret his results by the way of Contonian frequency.

We draw your attention to the fact that the Contonian frequency H is measured with all the accuracy of tools of measurement (NMR or photo-multiplicators for the β^- radiations) and when the experiments are reproduced, we obtain the same values.

VIII. Further problems

(1) Finitary incompleteness
Solovay theory by the way of ether theory leads to a paradox called finitary incompleteness (Berliocchi, 1994): it is impossible in this theory to say if a point is outside or inside the frontier of a part.

Giving an answer to this question leads to a contradiction, because it supposes the use of the continuous choice axiom to define the model of the real number associated (Schoenfield, 1967; Berliocchi, 1994), which is prohibited in the Solovay theory. Further, we prove that the Solovay theory is a limit theory (Berliocchi, to be published).

(2) In our next book

From the same authors (Conte *et al.*, 1999) on high dilutions, we show that the *CH* parameter corresponds to an entropy, such that the succussions are also a source of entropy, which enable us to define intrinsic Contonian frequency. So, we will be able to anticipate precisely the actions of high diluted preparations on living organisms, and therefore perform experiment *in vitro* to lead to homeopathic drugs.

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