

White Paper XXII

Psychoenergetic Science Applied to Information Medicine

by

William A Tiller, Ph.D.

Introduction

The science of thermodynamics underlies all changes that occur in nature! For a specific system and situation, the detailed thermodynamic description tells us if the system is **in** equilibrium (so that no change should occur) or **out** of equilibrium (so that there is a **thermodynamic driving force for change** in a specific direction, i.e. with respect to one of the key thermodynamic variables, which may be many). Of course, for change to actually occur, the reaction kinetics for the process needs to be effectively non-zero.

In this White Paper we shall mainly use the Gibb's free energy, G, for quantitatively describing our thermodynamic picture where the various contributions to G in our normal reality (the U(1) gauge state) are given by

$$G_{U(1)} = PV + E_{U(1)} - T \left(S_{U(1)} - \sum_j I_j \right) + \sum_j \varepsilon_{F_j}^{U(1)} \quad (1a)$$

$$= \sum_j n_j^{U(1)} \psi_j^{U(1)}. \quad (1b)$$

Here, P=pressure, V=volume, E=internal energy, T=temperature, S=entropy, I=information, ε_f =energy change due to a field (electric, magnetic, gravitational, stress, etc), n=concentration of species and ψ =the thermodynamic potential per component of specific species. Since we will also be considering changes of gauge state and changes from our normal reality to higher dimensional realities, to altered states of consciousness, to subtle energies, to human intention as a serious thermodynamic variable, etc, we must ultimately consider the expansion of our thermodynamic descriptors beyond our traditional U(1) gauge state components to one that incorporates higher dimensional components as in

$$G_{H.D.} = \sum_k G_k = G_{U(1)} + G_{P.V.} \quad (2a)$$

$$= G_e + G_m + G_\epsilon + G_M + G_S + \dots \quad (2b)$$

with the accompanying analogues to Equation (1b). Here, $G_{U(1)} = G_e$ for our electric atom/molecule cosmos, $G_{p.v.} =$ for our physical vacuum (meaning everything else) = magnetic information wave domain stuff + emotion domain stuff + mind domain stuff + spirit domain stuff.

Information Theory

The main background for this White Paper comes from two books by Leon Brillouin^(1,2) with the second being somewhat less formal than the first but broader in philosophical perspective. My intent is to expand the area of application to future medicine, which I label as **information medicine**. In perspective, our dominant present medicine is **chemical medicine** (originally based on the belief that physical contact between a particular chemical and a bacterium was the active agent in the healing process). The actual process path would be via the E-TS contribution in Equation 1a. However, it has been more recently shown that it has been one or more emitted photons from the particular chemicals' electromagnetic (EM) radiation emission spectrum that is the actual killing agent of the bacterium. Thus, **energy medicine**, via the ϵ_f contribution in Equation 1a and the electric photons in 1b, is a more modern medicine. In the past decade or so, we have experimentally shown that the use of specifically imprinted intention host devices (IHD) from a deep meditative state can cause an effective thermodynamic driving force at a distance with significant therapeutic effects and this is expected to become a major future medicine via its action through the I_j contribution to Equation 1a. We label this **information medicine** and need to lay a useful information theory perspective to aid the new medicine's development.

The I_j contribution to Equation 1a acts to reduce the magnitude of the prevailing entropy and thus produce an **increase** in $G_{U(1)}$, which can then drive some natural process. In nature, entropy is directly connected to the number of **possible** changes that could occur at any moment as distinct from the probabilities of these changes (many use the metaphor "disorder" as a way to represent this). Perhaps the best formula to represent this was provided by Max Planck via

$$S_o = k_B \ell n P_o \quad (3)$$

Here, S_o represents the thermodynamic entropy of a physical system, P_o is the number of probable elementary complexions (uniquely distinguishable different states in the system, the constant, k_B is called the Boltzmann constant ($k_B=1.38 \times 10^{-16}$ C.G.S. units) and ℓn is the logarithm to the base e. Degrees Centigrade is used in C.G.S. units.

Suppose, as an example, we consider a gas in a container. It is composed of myriads of molecules moving ceaselessly about. At a given instant of time, we have no idea of the exact positions, speeds, internal energy states and directions of the individual particles so that the **microscopic** structure of the system is unknown to us. We know only the macroscopic values of pressure, volume, temperature and chemical compositions. Fortunately, we have developed specific instruments for measuring the time-average values of these parameters (but not the specific details re the distribution

of these molecules in space). It is on these bases that we compute the number of **complexions** of the system and thus its **entropy**, via Equation 3, as a function of time.

Every experiment conducted on the system yields specific information about the system. Consider this as a type of informational order in an otherwise chaotic system of gas molecules and has been labeled as the creation of **negentropy**. From such experiments we have recognized a type of equivalence between negentropy and information.

Brillouin provides a precise definition of “information” in the following fashion:

Let us consider a situation in which P_o different things might happen, and each of these possible outcomes have equal probability a priori. This is the initial condition in which we have no special information about the general problem ($I_o=0$). But circumstances may arise in which we may have some more precise definitions or measurements about a similar problem, and thus obtain a smaller number, P_1 , of equally probable outcomes. We state that the information, I_1 , in this problem can be defined by a formula

$$I_1 = K \ln(P_o / P_1) = K \ln P_o - K \ln P_1 \quad (4a)$$

where K is a constant depending on the units selected.

In problems dealing with telecommunications, it has been customary to use binary digits (called bits) and we use

$$K = 1 / \ln 2. \quad (4b)$$

However, when we are mainly interested in physical problems, we want to use similar units for information and entropy so we choose

$$K = k_B = 1.38 \times 10^{-16} \text{ C.G.S. units}. \quad (4c)$$

This choice of units enables us to compare information directly with entropy and thus thermodynamic free energy as in Equations 1. If we note that the ratio of Equation 4b to Equation 4c is very close to 10^{+16} , an extremely large number, it indicates that an enormous amount of information, measured in bits, is needed to yield any **practical** contribution to D-space thermodynamic entropy. However, nonetheless, the bottom line is that an information **increase** in a physical event represents an equal magnitude **decrease** to the system’s entropy!

Information Content in Empirical Studies

Let us suppose that we are experimentally measuring the diurnal variation of the pH (acid/alkaline balance) of **pure** water in equilibrium with air in a room at room temperature. How does one calculate the information content gained from such an experiment? The answer involves Equations 3 and 4a but what is involved in gaining such an answer?

First, the definition of pH is

$$pH = -k_B \ln_{10} (a_{H^+}), \quad (5a)$$

so we are looking at the magnitude of the chemical activity, a_{H^+} , of the aqueous hydrogen ion, H^+ for **pure** water, this involves the dissociation reaction of the H_2O molecule which is 7.0 at room temperature. However, when pure water is exposed to air, the CO_2 molecules present in the air dissolve into the water and, within a day, the pH decreases to about 5.6 (fairly acidic). This happens almost everywhere in the world because most environmental air has about the same CO_2 content. However, there is another caveat that must be introduced before we get back to the main theme of this section.

The chemical activity of a species is given by the product of two factors,

$$a_{H^+} = \gamma_{H^+} C_{H^+}. \quad (5b)$$

Here, C_{H^+} is the actual chemical concentration of the H^+ -ion in the aqueous solution and has only a local effect while γ_{H^+} is called the activity coefficient and has a non-local effect distributed throughout the volume of the aqueous solution. γ_{H^+} can be altered by processing the water in a magnetic field, vibrational field, oxygen content in the air, subtle energies etc, and combinations thereof. Thus, the **microstructure** of water in equilibrium with air, and thus γ_{H^+} , and thus pH, can be altered significantly by its physical treatment.

Returning, now, to our main theme, we will suppose that the experimental room exists at our normal state of physical reality, the U(1) EM gauge symmetry state where the $G_{U(1)}$ laws apply and we are approximating our task as the two-variable problem of mapping a_{H^+} as a function of time diurnally with the temperature changing in a typical diurnal cycle. We will consider two types of sensor probes, (1) a digital pH-electrode and (2) an analogue, litmus paper test. Over a 24-hour period, Figures 1a and 1b illustrate a relevant map of results for each sensor system.

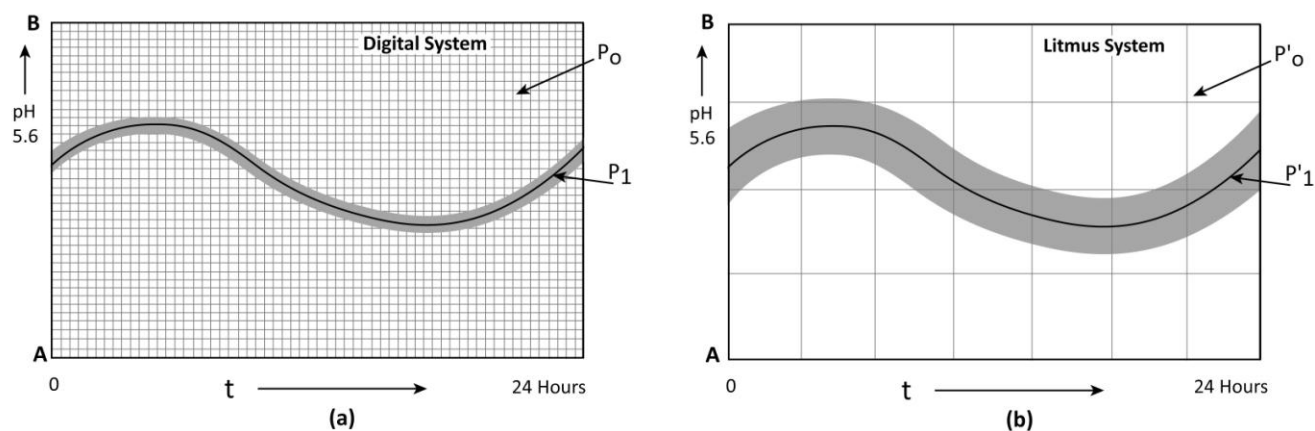


Figure 1a & 1b. The effective vertical dimension of the grid is equal to the accuracy of pH measurement of the probe system used (± 0.001 pH units for (a) and ± 0.1 pH units for (b)).

A two-dimensional map on a square piece of paper can be made by a printer which creates a set of sequential overlapping dots in some pre-programmed pattern onto the paper. The diameter of those dots

determines the coarseness of the imprinted pattern or the total number of distinguishable dots that can be placed on the page.

The gathering of experimental data on the measurement of pH from an aqueous solution as a function of time throughout one diurnal cycle (24 hours) can be thought of in the same way. In such a case, the size of the “dot” is determined by (1) the pH-measurement accuracy of ΔpH_M of the particular measurement system used and, (2) the average time required, τ_M , for that system to make a single measurement (the sampling time).

Thinking of a rectangular-shaped dot with one side being ΔpH_M in length and the other being τ_M , the dot area is given by $\tau_M \Delta pH_M$ and the maximum number of distinguishable dots, N, that can be placed on the page of total area “a” is just slightly less than $a / \tau_M \Delta pH_M$.

Figures 1(a) and 1(b) are just a qualitative illustration of size scale-differences that can occur between a digital pH-measurement system (a commercial pH-electrode and an analogue pH-measurement system (litmus paper). They are not correctly drawn to scale. Think of the central sine wave-shaped line as the actual recorded data (pH changes as the local temperature changes) in the form of overlapping single dots with the area of a single dot being given by $\tau_M \Delta pH_M$. The shaded area around this central line illustrates the “dot” size for the two measurement systems.

Using a digital pH-meter, the measurement accuracy can be $\Delta pH = \pm 0.001$ pH units while, for the analogue, the litmus paper system, it can't be much better than $\Delta pH = \pm 0.1$ pH units. This, then, leads to the graininess of the vertical scale. For the horizontal, time-scale, for the digital system it can probably be as small as, $\tau_M = 5$ seconds but, for the litmus paper system as large or larger than several minutes (in any sustained fashion, 300 seconds, over 24 hours). This creates the graininess along the time axis. Combining these two leads to the average two-dimensional graininess of $\tau_M \Delta pH_M$.

Using Equation 4, and the relative ranges, A to B for the total pH-scale and t_1 to $t_2 = \Delta t$ for the total time scale under consideration, then

$$P_o = (B - A) \Delta t / \tau_M \Delta pH_M \quad (5a)$$

$$P_1 = \frac{(B - A) \Delta t - \alpha (\Delta t \bar{w})}{(\tau_M \Delta pH_M)} \quad (5b)$$

where \bar{w} is the average thickness of the shaded zone and α is a geometrical factor (close to one) to account for the distance of total line length from Δt . For our example, $P_o/P_o' \approx 10,000$, $(\alpha \bar{w})_{dig} \sim 10^{-2} (\alpha \bar{w})_{lit}$, $\Delta \tau = 1440$ minutes. Let us choose $B - A = 5$ pH units $\bar{w}_{lit} \approx 0.2$ pH units and $\alpha_{lit} \approx 1.5$ leads to $P_1/P_1' \approx 1.5$ while $P_o \approx 9 \times 10^7$ pH.s units complexions. This leads to $P_o' \approx 9,000$ complexions but the ratio, P_o/P_1 is not very different than P_o'/P_1' so that the ΔI -value is only slightly different than the $\Delta I'$ -value for the two measurement systems.

There is, however, another important factor that needs to be taken into account when one is interested in the generation of negentropy from the creation of information. This is the expenditure of energy of any kind, ΔE_{EXP} , that is always involved in making a measurement and this, in turn, creates an **increase** in entropy, $\Delta S_{EXP} \sim \Delta E_{EXP}/T$, where T is temperature. Thus, what we actually have is

$$\Delta S_{INF} = \frac{\Delta E_{EXP}}{T} - \Delta I \quad (6)$$

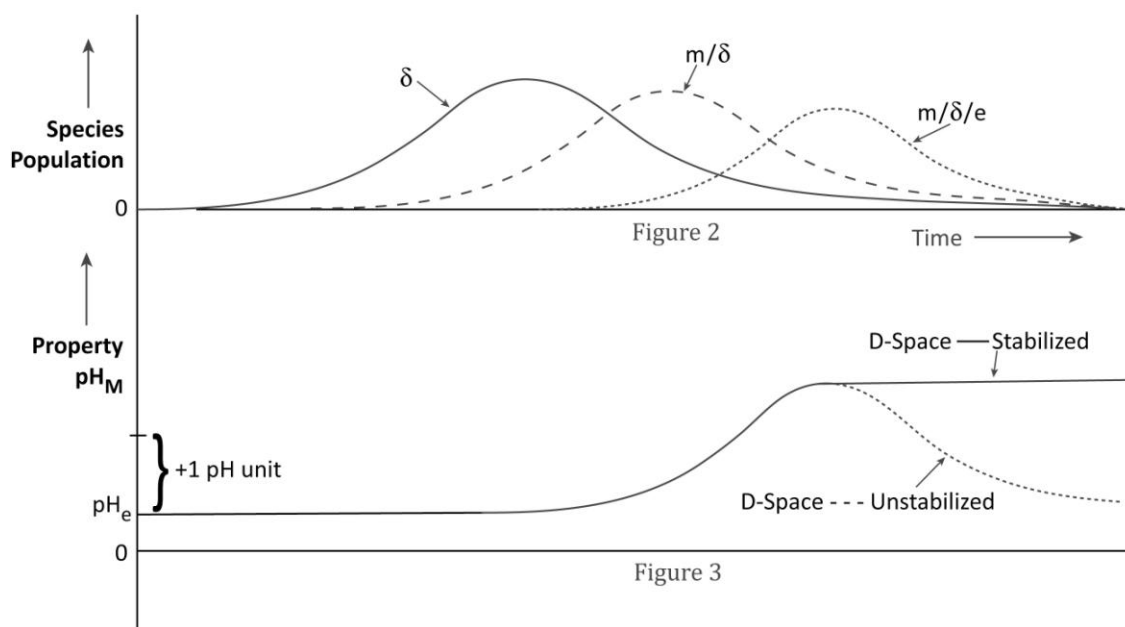
as our net negentropy contribution. For the digital system, it is quite possible that ΔS_{INF} (ΔS -information) is negative for our digital pH-measurements. However, for the litmus paper system, ΔE_{EXP} is so large compared to the negentropy contribution that ΔS_{INF} is strongly positive!

Expanding the General Perspective

1. If one reduces the sampling time of the measurement instrument and/or the measurement accuracy of the instrument, the unit grid area will decrease so P_0 and P_1 will both increase leading to no net change in ΔI . Thus, if ΔE_{EXP} does not change, ΔS_{INF} will not change.
2. When one makes simultaneous measurements using several different kinds of sensors 1,2,3... during the same experiment, the net $\Delta I = \Delta I_1 + \Delta I_2 + \Delta I_3 + \dots$, is enhanced because now, the single planar diagram of Figure 1 is replaced by multiple such planar diagrams as a function of time. Again we must be aware of the extra ΔE_{EXP} cost, and thus the net ΔS_{INF} change in running such an experiment.
3. When one considers the measurement of an electric field, $\underline{E}(t)$ as a function of time, now one must deal with the three perpendicular vector components, obtained by, at a minimum, measuring the electric potential, $\phi(t)$, at the 8 corners of a cube as a function of time and evaluating differences. This process significantly reduces the basic measurement accuracy in the determination of $\underline{E}_x(t)$, $\underline{E}_y(t)$ and $\underline{E}_z(t)$ compared to $\phi(t)$ at any (x,y,z) coordinate point. Thus, the information content inherent in a vector value relative to a scalar value is quite different. Correspondingly, the accurate measurement of tensor quantities encapsulates a huge amount of information. This is why such quantities are generally evaluated via the juxtaposition of mathematical theory with experimental measurements.
4. When one is performing experiments with intention host devices (IHD), the picture is even more complex. To simplify a little, let us consider an intention imprint to increase the pH of water at room temperature by +1.0 pH units with a digital pH-electrode instrument for measurement. Here, the expected process path with an imprinted and activated IHD is as follows:
 - (a) For simplicity, we will consider that the activated IHD generates a deltron flux, $F_\delta(t)$, only into the R-space aspect of the room
 - (b) This R-space deltron concentration, $C_\delta(t)$, grows in magnitude and reacts with the magnetic information wave population of the physical vacuum to form a population of R-space m/δ species, $C_{m/\delta}(t)$, with a D-space loss flux, F_{δ}^D ,
 - (c) This m/δ species, in turn, reacts with the D-space electric species to form an $m/\delta/e$ species (an SU(2) gauge species) in the e-species matrix

- (d) The domains of $m/\delta/e$ material continue to grow in individual size by the continuing generation flux of m/δ species.

The overall, idealized process of species creation and decay is as illustrated in Figures 2 and 3.



In Figure 3, two types of property change can occur. The desired result is the D-space-stabilized result rather than the unstabilized result where pH_M decays back to pH_e . We need to discover what we will call a “setting” agent where the kinetics of the decay process (the release of deltrons) is made to become so slow as to be essentially non-existent. Perhaps one could add an agent to the air at time τ^* , which would dissolve into the water and adsorb onto the SU(2) domain edges so as to eliminate their dissolution.

It is possible that, in general, one should expand Figure 2 to include an e/δ reaction simultaneously with the m/δ reaction. Ultimately, both lead to $m/\delta/e$ (or $e/\delta/m$) reaction that need to be stabilized.

In this particular case, obtaining ΔI is quite complex, in part because we do not yet know what values to use for K in Equations (4a) and (5a) and, in part because we don't know what kind of error bars to place on our sensor probes (if we have any such probes).

As a final example to illustrate what is involved in the evaluation of ΔI during subtle energy diagnostic tests, let us consider the use of “flower essences” for both diagnostic evaluation and

treatment (in part, somewhat similar to electrodermal testing with a Voll dermatron plus an array of nosodes).

References

1. L Brillouin (1962), Science and Information Theory, Second Edition (Academic Press, Inc., New York, NY).
2. L. Brillouin (1964), Scientific Uncertainty, and Information (Academic Press, Inc., New York, NY).