

## **Włodzimierz Klonowski**

Institute of Biocybernetics and Biomedical Engineering  
Polish Academy of Sciences, Trojdena 4, 02-109 Warsaw, Poland  
E-mail: mapletree@usa.net, wklon@hrabia.ibib.waw.pl

### **OMNIS FELICITAS EX FELICITATE: PHYSICALISTIC CONCEPT OF HAPPINESS**

*OMNE VIVUM EX VIVO* (life only from life) is the old Latin saying, we nowadays propose to formulate in a more direct way: "Life is a sexually transmitted terminal disease". But the idea of everlasting *Life*, penetrating the whole Universe, may be traced back from the old Greek philosophers, like Empedocles from Agrigentum, originator of the theory of temperaments, to the twentieth century holists, like Adolf Meyer-Abich (cf. Ługowski 1987).

The opposite, materialistic point of view, that life has emerged from inorganic matter, tries to explain the origin of life. Manfred Eigen's theory of hypercycles (cf. Eigen & Schuster 1979) has been considered to be a good explanation. But as noticed by Polish SF-author and philosopher Stanisław Lem (1995), hypercycle itself is not something which could emerge just "falling from heaven" – hypercyclic reactions, moving on and on thanks to a steady input of energy, had to be brought into existence by "something" we still know nothing about.

Another often asked question: what is the *purpose of life*? Here comes the concept of *Happiness*. Epicure considered happiness to be the purpose of *human life*. Similar ideas were presented by several eighteenth century philosophers. Utilitarians, like Jeremy Bentham and John Stuart Mill, preached "utility principle" – that a human action is right if it leads to gaining of the largest possible amount of happiness (cf. Popkin & Stroll 1993). Also Jean-Jacques Rousseau said that happiness is the purpose of human life. Immanuel Kant maintained, that anxiety to be happy is the only real purpose of life of *all rational beings*. This idea was extended in the twentieth century by Karl Popper, who said that the driving force for *any living system*, from amoeba to man, is an anxiety to be more happy (Popper 1983).

But if Life is everlasting and penetrating the whole Universe, so should be Happiness. So, we propose to extend the concept of Happiness to *any sys-*

tem, including non-living ones. Since elementary particle physicists have introduced Strangeness, Charm, etc. we propose to introduce a new quantity named *Happiness*, a universal characteristic of any system. Conservation of Happiness would then express a general feature that a system may become more happy only at a cost of other systems which simultaneously become less happy.

All conservation laws known up to date would be just special cases of the *General Conservation Law (GCL) – the Happiness Conservation Law*. Unification of mass and energy conservation laws in Special Relativity Theory has only been the very first step towards GCL.

The total Happiness of any system,  $H$ , is the sum of different kinds of happiness

$$H = \sum a_i H_i \quad (1)$$

where  $a_i$  are constants depending of the units chosen. We propose as the unit of Happiness 1 Popper, which is equal to the amount of Happiness gained by 1 kilogram of hydrogen (deuterium) when converted into helium; it is equal to the absolute value of the amount of energy liberated in this process

$$1 \text{ Popper} = 6.467 \cdot 10^{16} \text{ J} \quad (2)$$

One ought to stress, however, once again that energy is only a special case of Happiness; moreover, different kinds of energy are, of course, equivalent to different kinds of Happiness. The system composed of 2 protons, 2 neutrons and 2 electrons has more Happiness (is more happy) if these particles form one atom of helium than if they form two atoms of deuterium. This simple example illustrates also the fact that any element of a system may gain Happiness (become more happy) only by interactions with other elements in the system. The copies of a system differing only by interactions between the composing elements, will be called *patterns*. So each pattern of a given system usually has different Happiness.

While a system gains Happiness by evolving from one pattern into another, other systems interacting with the system under consideration necessarily lose their Happiness by changing their own patterns. When the system of protons, neutrons and electrons of total mass 1 kg changes its pattern from one composed of deuterium atoms to another composed of helium atoms, it gains by definition 1 Popper of Happiness. Simultaneously, patterns of other systems it interacts with are destroyed, their Happiness necessarily diminishes – a hydrogen bomb well illustrates this example.

In the case under consideration the gain of Happiness equals the decrease of energy, that is

$$\Delta \text{Happiness} = -\Delta \text{Energy} = \Delta \text{Neg-energy} \quad (3)$$

by analogy with Information being Neg-entropy in the Informational Thermodynamics.

Analogies with thermodynamics are, however, much more profound. We introduce *Free Happiness* also called *Gratefulness* ( $G$ ), being the analogue of Gibbs free energy, *Selfishness* ( $S$ ), being the analogue of entropy, and *Temperament* ( $T$ ), as the analogue of temperature. These quantities are interrelated through the equation

$$G = H - TS \quad (4)$$

Any irreversible process makes the Selfishness to increase and Free Happiness to decrease. Happiness flows from systems with high Temperament to systems with low Temperament.

An equation like Eq. (4) may be written for any considered kind of Happiness,  $H_i$  [Eq. (1)]. Each  $H_i$  has corresponding kind of Gratefulness,  $G_i$ , and Selfishness,  $S_i$ , as well as the Temperament,  $T_i$ , coupled to it

$$G_i = H_i - T_i S_i \quad (5)$$

and from Eqs. (1) and (4) one has for the total Gratefulness of any system

$$G = \sum a_i G_i = H - \sum (b_i T_i)(a_i S_i) \quad (6)$$

where constants  $b_i$  depend on the choosing of units of Temperament,  $T_i$ . We propose as the general unit of Temperament 1 Klou. For convenience, if  $H_i$  is thermal energy, the Temperament,  $T_i$ , should become identical with absolute temperature; for this special case  $b_i = 1$  (while temperature is measured in Kelvins) and 1 Klou becomes identical with 1 Kelvin. Again, however, since thermal energy is only one special kind of Happiness, absolute temperature is only but a special case of Temperament. The unit of Selfishness is, of course, 1 Popper/1 Klou.

We propose to call the science of Happiness and its transformations *Cheermodynamics*. *Three Laws of Cheermodynamics* may be formulated as follows:

*First Law (Happiness Conservation Law, General Conservation Law):* The total amount of Happiness in any closed system,  $H_c$ , remains constant:

$$H_c = \text{const} \quad (7)$$

In particular, the total amount of Happiness in the Universe,  $H_u$ , remains constant.

*Second Law (Law of Increasing Selfishness):* Any irreversible process in a closed system makes the total Selfishness to increase; in a reversible process the total Selfishness does not change:

$$dS/dt \geq 0 \quad (8)$$

*Third Law (Unattainability of Zero Temperament):* A system with Temperament equal to zero does not exist and must never be built up:

$$T > 0 \quad (9)$$

It follows from the Laws of Cheermodynamics that the amount of Free Happiness in the Universe diminishes with time. In a closed system Happiness may flow from one subsystem to another, depending on gradients of Temperaments. One kind of Happiness may be transformed into another even in a closed system as long as the Laws are fulfilled.

From Eqs. (1)-(3) if  $H_1 = \text{Energy}$  one has  $a_1 = (6.467 \cdot 10^{16})^{-1} = 1.546 \cdot 10^{-17}$  (if energy is measured in Joules); similarly, if  $H_2 = \text{Mass}$  (in kilograms) one has  $a_2 = a_1 \cdot c^2 = 1.392 \cdot 10^4$  where  $c = 3 \cdot 10^8$  m/sec. is velocity of light.

We also introduce the notion of a Happiness flux,  $\Phi_H$ , defined as the amount of Happiness flowing through a hypersurface surrounding the system under consideration; influx is assumed to have positive sign, outflux ( $\Phi_H$  which decreases Happiness of the system) – negative sign. Under sufficiently small gradient of Temperament, Happiness flux is regular ("laminar"). If the gradient of Temperament increases more and more, the Happiness flux becomes turbulent, and one observes non-equilibrium phase transitions, in social sciences known as revolutions. Each system shows some *Specific Happiness* and characteristic Happiness Capacity, and under given equilibrium conditions, while submitted to a flux of Happiness, attains well determined Temperament.

Any system evolves or changes in such a way to minimize possible loss of happiness. This phenomenon will be called *Laziness*. For example, a man who became less happy because he had to do his own washing (this way making a woman more happy), because of Laziness, invented automatic washing machine, to minimize outflux of his Happiness. So, it is Laziness which is the driving force of systems' self-organization and/or adaptation (in social sciences called *Progress*). Ability of easy adaptation, i.e. sufficiently high Laziness, is more important for system surviving than stiff adjustment to some strictly defined conditions. That is why *chaotic systems*, which adapt extremely easily, are so important – *it is healthy to be chaotic*.

Laziness results from Happiness outflux, i.e. from Temperament *non-equality*. If the social utopists had known Cheermodynamics (or, at least, classical Thermodynamics) they would have understood that a system in which all elements are equally happy ("everybody has enough") may only be metastable and so may exist only for a very limited time period. *Non-linearity* is also very important. Under quite broad range of conditions a system which have more Happiness still gains more, at the expense of another system which have less Happiness. Such phenomena are well known in physics; if one connects together two balloons – one inflated to be like an apple, another like a small water melon – the bigger takes out the air from the smaller one which collapses; it is so because the volume-pressure characteristics for air closed in a balloon is non-linear (Giebułtowiec 1998). It is also well known that

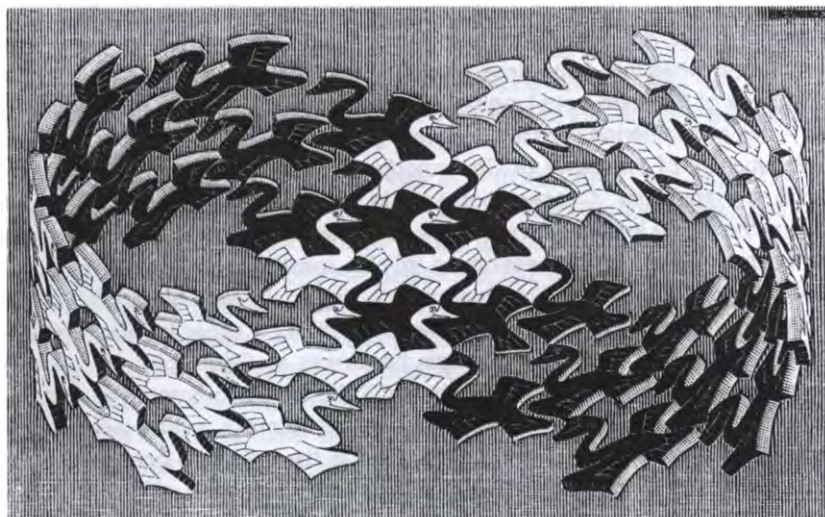
a small dose of a drug or radiation may have completely opposite effect than a greater dose, e.g. small amount of alcohol acts as a stimulator (increases Happiness) while in a large dose alcohol is poisonous; similarly, exposition to low doses of radiation from lung fluoroscopy reduces incidence of breast cancer – this phenomenon is called *hormesis* (Klonowski 1998).

*Non-locality of the Laws of Cheermodynamics* may be of extreme importance. If Happiness Conservation Law is true only locally, even if "locally" means the whole known Universe, one may imagine the existence of another, transcendent system, possessing an infinite, inexhaustible amount of every kind of Happiness, called God (materialists, especially Marxists, prefer to call it Nature). In such a case there are two possibilities – either to "steal" Happiness from another system or to obtain happiness as God's "gift" (or to loose happiness because of God's "punishment"). So God can create (or destroy) matter, energy, etc. in our Universe, as well as to make a man more happy without making other men less happy. God is the only non-local source (or sink) of Happiness and may cause the total Happiness in our Universe to increase or to decrease – in such a case the Laws of Cheermodynamics, in particular the First Law, are true only locally in time and space. In such a case the *arrow of time* could depend on the sign of the change of Happiness of the whole Universe and could change from one time epoch to another or even from one part of the Universe to another one.

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The idea of patterns composed of interacting elements has found its expression in graphic art, especially in pictures created by a famous Dutch-born artist Maurits Cornelis Escher (1898-1972), who was fascinated "with the enigmatic laws governing the world around him" ("M.C. Escher" 1995). His "Swans" shows a continuously changing pattern of interacting elements forming the symbol of infinity,  $\infty$ . Like uroboros, a serpent biting its own tail, these "happy birds" symbolize the idea of movement and continuation, of autodynamics and emergence, as well as self-generation and self-consuming powers of life. Uroboros as depicted by Escher (see this volume, p. 18) also resembles rather the symbol of infinity than a circle.

The concept that Happiness is conserved have been present in the belles-lettres and drama. "True happiness is always stolen from somebody" – says contemporary French author Marc-Gilbert Sauvajan.



M.C. Escher "Swans" © 1998 Cordon Art B.V. – Baarn – Holland. All rights reserved.

So, the idea *OMNE VIVUM EX VIVO*, or its more contemporary formulation *OMNE SYSTEMA E SYSTEMATE* (system only from a system) may be, and should be complemented by saying: *Happiness only from Happiness – OMNIS FELICITAS EX FELICITATE*.

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