



THE CURVE OF THE HUMAN PHENOMENON ^[1]

The Relationship of Pierre Teilhard's Concept of Radial Energy to
Physics, Consciousness, and The Psycho-Social, and
Some Practical Applications of His Thought

By


Darden H. Dickson

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¹ Teilhard, Pierre (1955). French Edition: *Le Phénomène humain*, Seuil, France, 1955; English Edition: *The Phenomenon of Man*, Bernard Wall, London, England, 1959.



The Reverend
Pierre Teilhard de Chardin
SJ



Born 1 May 1881
Orcines, Puy-de-Dôme, France

Died 10 April 1955 (aged 73)
New York City, US



“The true *physics* is that which will, one day, achieve the inclusion of man in his wholeness in a coherent picture of the world.” — Pierre Teilhard de Chardin

“... [N]umbers of pure scientists ... are inclined to consider [Pierre Teilhard’s] body of work as lying outside the domain of science.” — George, Andre (1966).
Teilhard de Chardin Album, Pilgrim of the Future.

“I think it important to point out that two basic assumptions go hand in hand to support and govern every development and theme. The first is the primacy accorded to the psychic and to thought in the stuff of the universe and the second is the ‘biological’ value attributed to the social fact around us.



“The pre-eminent significance of man in nature and
The organic nature of mankind;
These are two assumptions that one may start to reject,
But without accepting them,
I do not see how it is possible
To give a full and coherent account
Of the phenomenon of man.” — Pierre Teilhard de Chardin

“Evolution has changed its face; it is now psycho-social.” — Pierre Teilhard de Chardin

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PREFACE

This small book begins with a short paper by the author, first published in 1983 in the Netherlands in *The Desire to be Human*, entitled “Radial Energy and the First Principles of Science. This is an introduction to Pierre Teilhard’s concept of radial energy and F.S.C. Northrop’s work in the Department of Philosophy at Yale University and his doctoral thesis, “The Problem of Organization in Biology,” taken under Lawrence J. Henderson, Professor of Biologic Chemistry at Harvard.

Teilhard’s concept of radial energy and the *unitary electro-magnetic field* of Northrop’s *macroscopic atom* are *congruent*. The experimental work of H.S. Burr and his colleagues at Yale University gives us experimental verification in biology of Northrop’s Macroscopic Atom and its unitary electro-magnetic and gravitational fields. The experimental findings are an electrical technique (the Burr-Lane-Nims technique) for the early detection of cancer and human ovulation. Therefore, Pierre Teilhard’s hypothesis of radial energy is verified.

It is known that paracrystalline materials (biological liquid crystals), the structure of which are influenced by electric and magnetic fields, make up the structure of the cell; that an electro-magnetic field is responsible for organization in living systems. If one defines cancer as an *organization anomaly* and ovulation as an *organizational change*, one can see why the Burr-Lane-Nims technique, which measured the potentials of the electric field component of a unitary electro-magnetic field was able to experimentally see the early detection of cancer and the early detection of human ovulation.

In addition, Pierre Teilhard posited a quantum of consciousness associated with the atom. A definition is given of the Law of Complexity-Consciousness which shows the relationship between organization and the level of consciousness and its application to psycho-social development. The importance of community is emphasized in fostering psychosocial development with urban planning given as an important tool for fostering community. Examples of future anti-entropic, model cities are given that will place human beings in a three-dimensional environment in order to foster community and human growth and development.

The limited surface of the Earth (a sphere) and the exponential increase in world population (now approximately 8 billion people) is causing a global compression, something we as human beings have never experienced before. We will need help in navigating this important phase in our development (prayer), and social stress will increase that will require us to think carefully about how we organize large populations.

Current social and economic problems are briefly covered in their relationship to lack of connections (community) and the lack of human anti-entropic systems, and a series of papers that apply the thinking of Pierre Teilhard de Chardin are added near the end of the book.

The importance of Christianity and love are introduced as key factors in implementing anti-entropic systems for the general welfare.

INTRODUCTION AND HISTORY

The research and thinking behind this work were done in academic isolation similar to Einstein's circumstances in writing his work on the Theory of Relativity while working at the patent office in Bern, Switzerland. I was an electronic/engineering technician by profession and specialized in medical applications.

I was introduced to the work of Pierre Teilhard de Chardin by my father who sent me a copy of *The Phenomenon of Man* (in French: *Le Phénomène humain*, *The Human Phenomenon*) for my twenty-seventh birthday in 1966. It took me reading the book *nine times* before I had some understanding of what Pierre Teilhard was trying to say. I don't know if it was the poetic-prose he used to summarize his thought, or just that I had similar interests in religion and science, or both, but over a period of a year, this work shifted my foundations in both these areas of study.

We begin by addressing Pierre Teilhard's concept of radial energy which he has been criticized for by the scientific community^[1]. With his important concept (hypothesis) of radial energy, he is dealing with *the first principles of science*. Here is where his work and that of F.S.C. Northrop at Yale University meet.

¹ Mortier, Jeanne and Auboux, Marie-Louise (1966). *Teilhard de Chardin Album*, Pilgrim of the Future, Collins, 1966 (Introduction by Andre George).

CHAPTER 1

TEILHARD'S HYPOSTHESIS OF RADIAL ENERGY

RADIAL ENERGY AND THE FIRST PRINCIPLE OF SCIENCE ^[1]

To begin a scientific dissertation on Teilhard's hypothesis of radial energy one needs to have an understanding of Einstein's ideas regarding energy. His famous equation, $\mathbf{E}=\mathbf{mc}^2$, implies the equivalency of energy and mass ^[2]. Less familiar to the general public are the ideas contained in another of Einstein's equations:

$$\mathbf{I}_4^4 = 3/4\rho\sqrt{\gamma} \text{ [*]}$$

[*In Einstein's papers, the letter I is from a German Gothic font.
(It makes for a much more aesthetically pleasing formula)]

This equation signifies that of the energy constituting matter, three-quarters is to be attributed to the electro-magnetic field, and one-quarter to the gravitational field ^[3].

The following is Teilhard's definition of radial and tangential energy as found in *The Phenomenon of Man* [with a scientific definition of energy in brackets]:

We shall assume that all energy [matter or electromagnetic and gravitational fields] is psychical in nature; but add that in each particular element this fundamental energy is divided into two distinct components: a tangential energy [electromagnetic and gravitational field] which links the element with all other of the same order (that is to say, of the same complexity and centricity) as itself in the universe; and a radial energy [an electromagnetic and gravitational field] which draws it towards ever greater complexity and centricity — in other words forwards ^[4].

Teilhard's statement that tangential and radial energy are found in each particular *element* needs analysis. There are simple and complex elements in a system. The word in the French edition (*Le Phénomène humain*) that was translated to mean element in English is *particule*. The general meaning of this word is atom (chemical atom), or molecule. One can only conclude that by element Teilhard meant *complex element* ^[5].

In Teilhard's definition tangential energy represents 'energy' as generally understood by science. But, what of radial energy? In his definition he attributed the source of radial energy to each particular element (complex particle), and in his description of the effect of radial energy he says that it draws that particle towards ever greater complexity and centricity. This increase in complexity and centricity, he says, augments radial energy which in turn forms a new arrangement in the tangential field. But a change in a physical arrangement requires the presence of a physical force. This physical force would have to be associated with radial energy.

In addition, since according to Teilhard's description the effect of radial energy is different from that of tangential energy the electromagnetic and gravitational field associated with each would have to be different. Can the nature of this difference be determined?

If we look at a tree, we see that it is *one*, yet, we know from our sciences that this tree is composed of *many* parts (billions of them) arranged in particular patterns.

Oneness and *manyness* are two basic characteristics of complex matter and of nature as a whole. Since these characteristics are attributed to complex matter, they can also be attributed to the gravitational and electromagnetic fields composing tangential and radial energy. The logical choices are oneness: radial energy; manyness: tangential energy. Teilhard states that these two energies interact yet are distinct or separate. How can we express in scientific terms these seemingly contradictory characteristics and still account for the fundamental unity of the universe?

An electromagnetic and gravitational field constitutes the energy making up the elementary particle (ἄτομος, atom, uncut, one substance with no parts) ^[6]. *Manyness* requires that an electromagnetic and gravitational field be attributed to each of the elementary particles. *Oneness* requires that an electromagnetic and gravitational field be attributed to a unitary physical object (ἄτομος, atom, uncut, one substance with no parts). The characteristics of separateness and interaction require that this physical object surround *all* the *elementary particles* and *their individual fields*. The simplest form that this object could take would be an immense, hollow, sphere with the unitary electromagnetic and gravitational field filling its interior ^[7].

¹ Dickson, D.H. (1983). “Radial Energy and the First Principles of Science, in “*The Desire to be Human,*” An International Teilhard Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attaché, British Embassy in The Hague, and by Dr. Robert Muller, Assistant Secretary General of the United Nations, Miranda Publishers, Wassenaar, Netherlands, 1983 (pp 92-94).

² Mass is defined in general terms as the quantity of matter which a body contains and matter as the substance of which a physical body is composed.

³ *The Principle of Relativity*, A collection of Original Memoirs on the Special and General Theory of Relativity, H.A. Lawrence, A. Einstein, H. Minkowski and H. Weyl, with notes by A. Sommerfeld, Dover Publications Inc., New York, 1952, General Publishing Company, Ltd., Toronto, Canada, Constable and Company, London, Chapter X, ‘Do Gravitational Fields Plan an Essential Part in the Structure of the Elementary Particles of Matter?’, A. Einstein, (p 198).

⁴ *The Phenomenon of Man*, Pierre Teilhard de Chardin, Harper Torchbook Edition, Harper & Row, New York, 1961 (pp 64-65); French Edition: *Le Phénomène humain*, Pierre Teilhard de Chardin, Editions du Suil, Paris, France; couverture rigide avec jaquette, éditions: France Loisirs de 1991, available from Amazon in the French language.

⁵ Note from the Author: I may have been mistaken on this point. A quantum of consciousness may be associated with the *electron* (the *atom* in the Greek sense of that word). The *proton*, the simplest case of organized complexity, would (in this model) be composed of *electrons* and the organized arrangement cause *an increase in consciousness*.

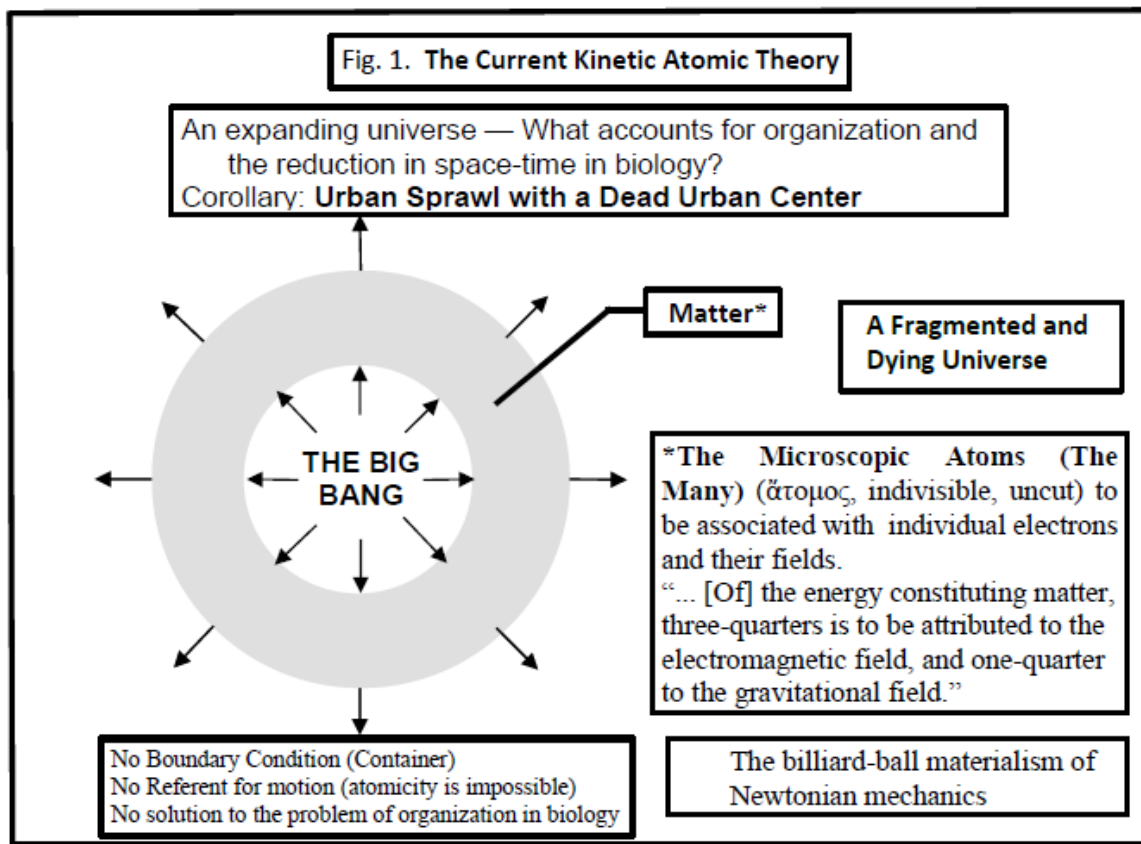
⁶ To be associated with the electron (Northrop).

⁷ Northrop, F.S.C. (1931). *Science and First Principles*, F.S.C. Northrop, Macmillan, 1931; Cambridge University Press, 2013 (available from abebooks.com). **Note:** This field would be most intense at the inner surface of the sphere and would decrease toward the center, just as the field extending out from the elementary particle is most intense near the particle and decreases with distance.

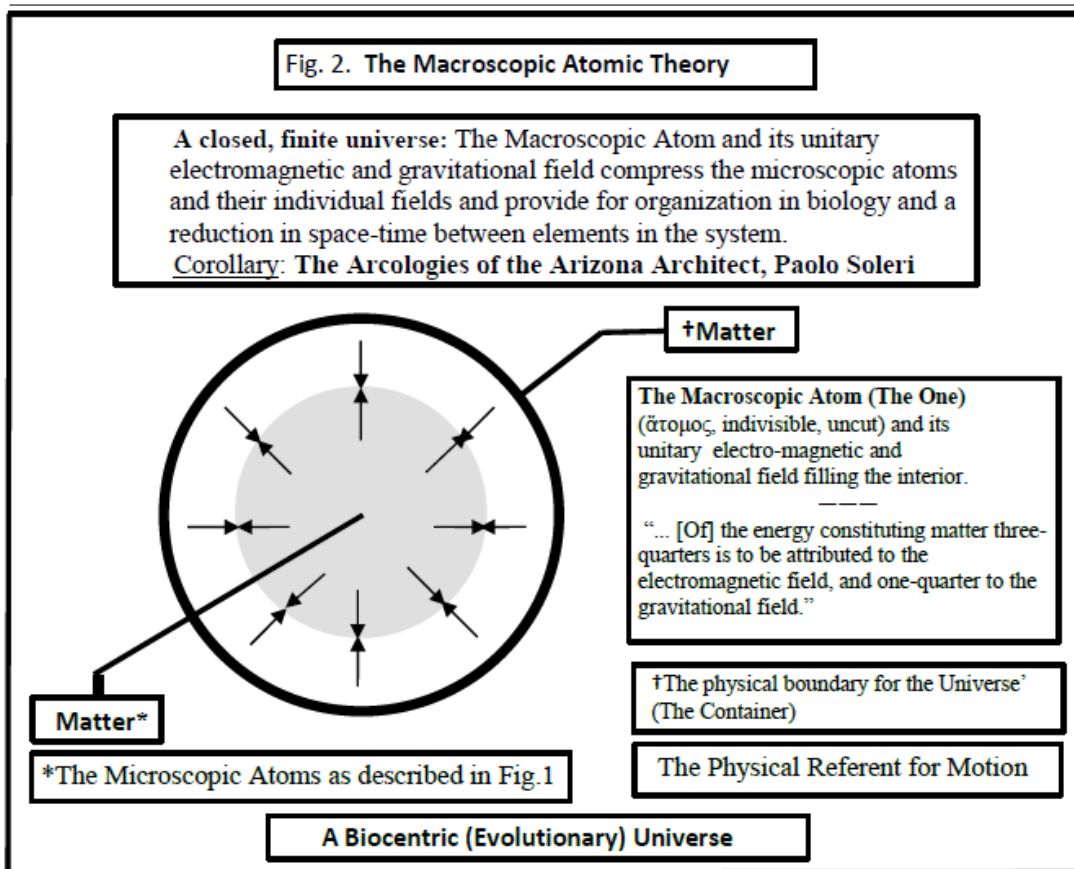
CHAPTER 2

THE KINETIC ATOMIC AND MACROSCOPIC ATOMIC THEORIES

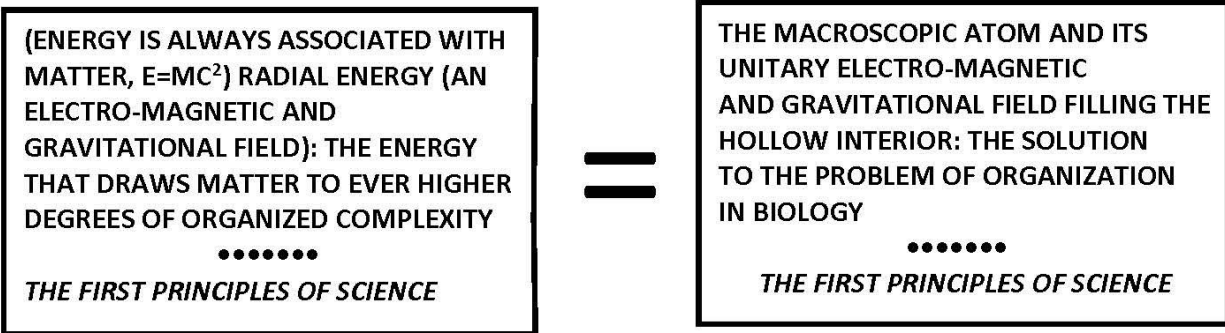
THE *MICROSCOPIC* ATOMIC THEORY



THE MACROSOPIC ATOMIC THEORY ^[1]



THE FIRST PRINCIPLES OF SCIENCE



A REFERENT FOR MOTION

Years ago, I used to drive through a car wash in which the car stood still, but the brushes moved over the surface of the car. What I noticed was a sensation that the car was moving.

There was no referent for motion!

Northrop brought this to our attention. He tells us that Einstein's theory of motion is false. That all the absolutes have been removed: absolute space, absolute time, and absolute space-time. There is no referent for motion! ^{[2] [3]}

If there is no referent for motion, we do not know where the microscopic atoms (elementary particles) are, nor can we differentiate between particles. Therefore, the current kinetic atomic theory, from a philosophical and scientific standpoint, *is not possible*.

Northrop solved this problem in his doctoral thesis, "The Problem of Organization in Biology." ^[4]

THE MACROSCOPIC ATOM

The Macroscopic Atom is the referent for motion that satisfies the removal of absolute space, absolute time, and absolute space-time. We know now, from a philosophical and scientific standpoint where the atom (elementary particle) is and we can therefore differentiate between particles (we know where each particle is). This is an important matter. The problem with Einstein's theory of motion has been resolved by an amendment in the form of an addition to the kinetic atomic theory.

Motion is not to be defined in terms of space and time, but space and time are relative abstractions from or relations between moving objects. Matter does not move in space and time, but microscopic particles which obey the principle of being move in the macroscopic atom which obeys the principle of being. Not only is motion more primary than space and time, but the notion of eternity, as defined by the principle of being, is more fundamental than the notion of temporality. When the full implications of this fact are grasped the whole complexion of contemporary thought and civilization will change ^[5].

How can we visualize this amendment?



Let us imagine a clear, plastic sphere. Inside this sphere is a chair. Sit yourself down in the chair. The sphere is becoming larger and larger. As it does, everything outside the sphere enters with you. Eventually, the sphere encompasses the earth, followed by Venus, Mercury, Mars, and the other planets, including our Sun. Next comes the Milky Way Galaxy, then Andromeda and all the other billions of galaxies in the universe.

How large, then, is our universe (what is its diameter)?

Let us try to make the calculations:

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

365.25 days = 1 year

Speed of light = 186282 miles per second

One light year (the distance travelled by light in 1 year) = $60 \times 60 \times 24 \times 365.25 \times 186282 = 5.8878 \times 10^{12}$ miles.

The diameter of the universe = 92,000,000,000 light years [6], or 92 billion light years, or 92×10^9 light years.

The diameter of the universe in miles = $(5.8878 \times 10^{12} \text{ miles}) / 1 \text{ light year} \times (92 \times 10^9 \text{ light years}) = 541.6776 \times 10^{12+9} \text{ miles} = 541.7 \times 10^{21} \text{ miles} = 541,700,000,000,000,000,000,000 \text{ miles}$.

The plastic sphere you are sitting in has reached the presently known limits of the universe. It is now 541.7 sextillion miles in diameter.

That is huge, to say the least! It makes one wonder why quantum physicists talk about ‘multiverses’. Isn’t this *a big enough one* to play in?

If we were travelling at the speed of light in a spaceship, it would take us 92 billion years to travel the diameter of the inside of this plastic sphere.

Now let’s replace this hollow, plastic sphere with Northrop’s amendment of a physical addition to the kinetic atomic theory, the **Macroscopic Atom**, which gives us, from a scientific standpoint, a referent for motion that corrects Einstein’s theory of motion in his Theory of Relativity.

Let’s take a look at its definition and properties.

The prefix **macro-** means very large in extent. Defining it as an **atom** in the Greek sense of that word, means that it is *indivisible* or *uncut* just as the **microscopic atoms**, the electrons, are. The prefix **micro-** meaning very small in extent. The combining form **-scopic** from the noun **scope** meaning *range*.

We know from our analysis above of elementary particles that the Macroscopic Atom would have an electromagnetic and gravitational field associated with it^{[7] [8]}. Since this atom is **one** and indivisible or uncut, this electro-magnetic and gravitational field would, of necessity, be a **unitary** field.

Let’s summarize: The **macroscopic atom** would be associated with the **one**; the **microscopic atoms** (the **electrons**) would be associated with the **many**; This solves the philosophical problem of the *one* and the *many* that the early Greeks failed to solve. This also solves *the problem of organization in biology*^[9] and *in the universe* since the Macroscopic Atom is the *physical boundary* of the universe.

Let us picture this hollow, physical spherical atom, the boundary of the universe, surrounding all the microscopic atoms. The many individual microscopic atoms have their *many* electromagnetic and gravitational fields; the macroscopic atom its *unitary (one)* electromagnetic and gravitational field. The two types of fields interact, *though the sources of these two types of fields are different*. This means the presence of a **compound electromagnetic and gravitational field**^[10] which fills the hollow portion of the Macroscopic Atom. We will come back to this *compound electromagnetic and gravitational field* later.

In meantime, it is appropriate to apply the model we have, so far, to the beginning of the universe in its simplest form.

To begin with, we have the *many* microscopic atoms (electrons) and their individual electromagnetic and gravitational fields contained within the hollow portion of the *one* Macroscopic Atom, the physical boundary of the universe, and its unitary electromagnetic and gravitational field. There is a resulting compound electromagnetic and gravitational field^[11] within the hollow portion of the Macroscopic Atom. As the result of the motion of the electron, which simply is^[12], we have light in the ultraviolet spectrum^[13] and the coming into being of the space-time continuum and the whole of creation.

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- ¹ Northrop, F.S.C. (1928). "The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity," *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928, (pp449-467).
- ² Northrop, F.S.C. (1928). "The Theory of Relativity and the First Principles of Science," *The Journal of Philosophy*, Vol XXV, No 16, August 2, 1928 (pp 421-435).
- ³ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931.
- ⁴ His doctoral thesis was taken under Lawrence J. Henderson, professor of biologic chemistry, Harvard University and his thesis, "The Problem of Organization in Biology" (1923) was deposited in the Harvard Library.
- ⁵ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p 123).
- ⁶ https://en.wikipedia.org/wiki/Observable_universe.
- ⁷ These fields are invisible and we understand the physical laws associated with them, but physicists *do not know what they are*. There is mystery in science as well as in religion.
- ⁸ $E=mc^2$, $I_4^4 = 3/4\rho\sqrt{\gamma}$.
- ⁹ F.S.C. Northrop's doctoral thesis, "The Problem of Organization in Biology."
- ¹⁰ This has implications for the curvature of light within the hollow portion of the Macroscopic Atom, and thus the doppler effect that is used in part as justification for the expansion of the universe.
- ¹¹ We do not have the mathematics for this, yet.
- ¹² Once we have motion (and there is room for an ontological, spiritual reason here), we have the existence of the space-time continuum.
- ¹³ Heisenberg, Werner (1953). *Nuclear Physics*, Philosophical Library, New York, First Greenwood reprinting, 1969 (pp 30-31)

CHAPTER 3

ALL THE LOGICAL POSSIBILITIES

THE REAL IS THE MATHEMATICAL

Professor Northrop took me into a Protestant chapel, one of two in the United States designed by the famous British architect, Christopher Wren, in Old Lyme, Connecticut, in the Spring of 1972. For me, it was like walking up the steps with Plato or Aristotle. When we got inside, he asked me how many people I thought the chapel held. I said, "About a hundred." He said, "Four hundred and fifty. The minister preaches the Holy Spirit, and the Architecture preaches God the Father." **The Real is the Mathematical** (geometry, Plato).

THE REAL IS BECOMING

The second basic philosophical idea in Northrop's *Science and First Principles* is: **The Real is Becoming** (Aristotle).

THE REAL IS THE PHYSICAL

The third basic philosophical idea is: **The Real is the Physical**. "This," Northrop says, "exhausts the logical possibilities." ^[1]

Modern science, according to Northrop, deals with *the real is the physical*, hence his solution to the problem of organization: the **Macroscopic Atom** and its **unitary electro-magnetic and gravitational field**, an amendment in the form of a *physical addition* to the current kinetic atomic theory, the *physical* boundary of the universe.

With the addition of *consciousness* as primary (Pierre Teilhard) ^[1], the author firmly believes that reality involves all three of the logical possibilities. Northrop adds *consciousness* near the end of his *Science and First Principles*, but does not give a place for it, or make it primary (above the three basic philosophical ideas).

CHAPTER 4

THE PSYCHICAL

CONSCIOUSNESS

It follows, since Pierre Teilhard says that all energy is *psychical*^[1] in nature, that all energy has *consciousness* associated with it.

Northrop associates the consciousness associated with the *Macroscopic Atom* with *God the Father*, and he associates the consciousness associated with *creation* with *the Son* (*Science and First Principles*). He says nothing about the *Holy Spirit*. I personally associate the Holy Spirit with the Unitary Electro-Magnetic and Gravitational Fields of the Macroscopic Atom.

Since consciousness can be experienced, this accounts for Taoism in China and a main tenant in Buddhism (see Northrop's *The Meeting of East and West*).

THE MYSTICAL

This is mystical and can only be experienced: panentheism (Mathew Fox): *God in all, and all in God*. *We do not know what electro-magnetic and gravitational fields are*. So, religion is not the only avenue for mysticism.

WHERE IS CONSCIOUSNESS LOCATED?

When I took an introductory course in philosophy at Tacoma Community College, the instructor told me that the philosophers do not know *where* consciousness is located.

Pierre Teilhard states in *The Phenomenon of Man* that all *energy* is *psychical* in nature. This is an important statement. Since the energy associated with *microscopic matter* and the *matter of the macroscopic atom*, it means that the electromagnetic fields of the *many* microscopic atoms and the unitary electromagnetic field of the *one* macroscopic atom have a *consciousness* associated with them^[2].

THE LAW OF COMPLEXITY-CONSCIOUSNESS

This is the basis for the Law of Complexity-Consciousness as described in *The Phenomenon of Man*. This law states:

The specific effect of an increase in organized complexity is an increase in consciousness.

—OR—

An increase in consciousness is the specific effect of an increase in organized complexity.

It means that every increase in organized [physical] complexity is associated with an increase in consciousness.

Just as with water there is a certain point, when heat is applied, where there is a change in state (the water changes to steam (a gas), so with an increase in organized complexity there are major changes in state. Two examples are the birth of the *biosphere*, the sphere of *life*, and the birth of the *noösphere*^[3], the sphere of *thought* or the birth of ideas.

Now we need to discuss the process of an increase in organized complexity with its correlative increase in consciousness, at the critical points mentioned in the examples above.

AN INCREASE IN ORGANIZED COMPLEXITY

As it stands, right now in our discussion, we have not discussed the simplest case of organized complexity, the *proton*.

The only possible source of the physical structure of the proton would be the ‘elements’ mentioned above at the beginning of things (creation). This would mean that the proton, from a physical standpoint, is somehow composed of *electrons* arranged in an organized, complex manner.

How can that be?

I have an electronics/engineering background. I have been taught that an electron has a *negative* charge and the proton a *positive* charge. This did not make sense to me. Then, while I was sitting on a bench at the south end of Lake Washington, near the Renton Boeing Plant, it finally became clear to me.

I remember reading about Michael Faraday’s comments concerning electric charges ^[1]. He said that there is no such thing as an isolated electric charge; there are only *potential differences between two points*. The current kinetic atomic theory (scientific paradigm) of isolated particles has conditioned us to think in terms of ‘*isolated charges*’ associated with *isolated* particles.

We now need to turn to a discussion of the structure of electromagnetic fields.

An electro-magnetic field has an *electric field component* and a *magnetic field component*. We need to focus, for the current discussion on the *electric field component*.

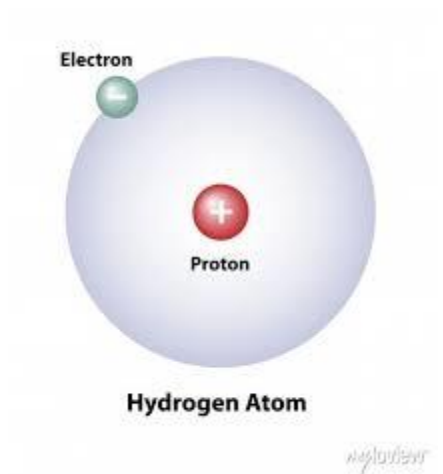
Let’s go back to our comment that an electron has a *negative* charge ^[4] and the proton a *positive* charge ^[5]. These charges are dc in nature. So, where do these charges come from?

There is only one possible source: the steady-state, *unitary* electro-magnetic field of the macroscopic atom. These field potentials do not change *because the macroscopic atom and its unitary field are not in motion*.

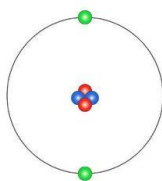
The difference in potential between the electron and the proton are derived, then, from the compound electro-magnetic field in the hollow portion of the Macroscopic Atom. Exactly how that occurs is not known, but it has to do with the interaction of the two kinds of fields. This explains the *apparent paradox* of a proton with positive charges composed of electrons with negative charges ^[6].

Following the *proton* is the next case of organized complexity ^[7], the *neutron*. To change a *proton* into a *neutron* it needs to capture an *electron*. This cancels the charge of the proton making the neutron, a neutral particle (with no charge) ^[8]. Neutrons can disappear through a process called neutron beta decay, transforming themselves into protons by emitting an electron (shedding a negative charge to become positively charged) and an antineutrino. *The number of protons* determines which chemical element it is in the Periodic Table.

The next stage of organized complexity is the formation of Hydrogen (${}^1_1\text{H}$), the first of the chemical elements ^[9] in the Periodic Table.



The next stage in organized complexity is the chemical element Helium (${}^4_2\text{He}$) which is the second element in the Periodic Table. Helium (${}^4_2\text{He}$) is composed of two *electrons* in orbit around two *protons* and two *neutrons*. There are eight other known forms (isotopes) of helium (He) (varying with the number of neutrons).

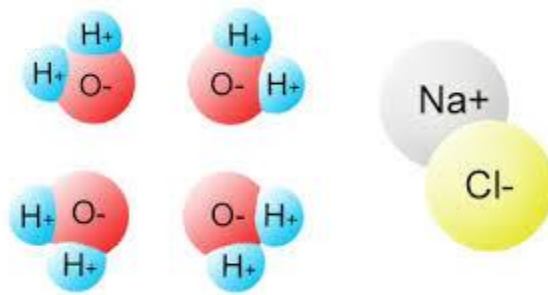


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There is a further increase in organized complexity as we go down the Periodic Table. The chemical element with the highest number of *protons* is the chemical element is Oganesson (Og) with 118 protons and 176 *neutrons* (in the most common isotope).

The next stage in organized complexity we see a major change: the elements are no longer *electrons*, *protons*, and neutrons. In the next stage in organized complexity we have *chemical elements* with *chemical elements*, the world of the *molecule*.

Let us pick water (H_2O), for an example. Water is composed of the two chemical elements: 2 chemical elements of Hydrogen (H_2) and 1 chemical element of Oxygen (O). Let us pick another example: regular table salt ($NaCl$). Table salt has one chemical element of Sodium (Na , a metal) and one chemical element of Chlorine (Cl , a gas).

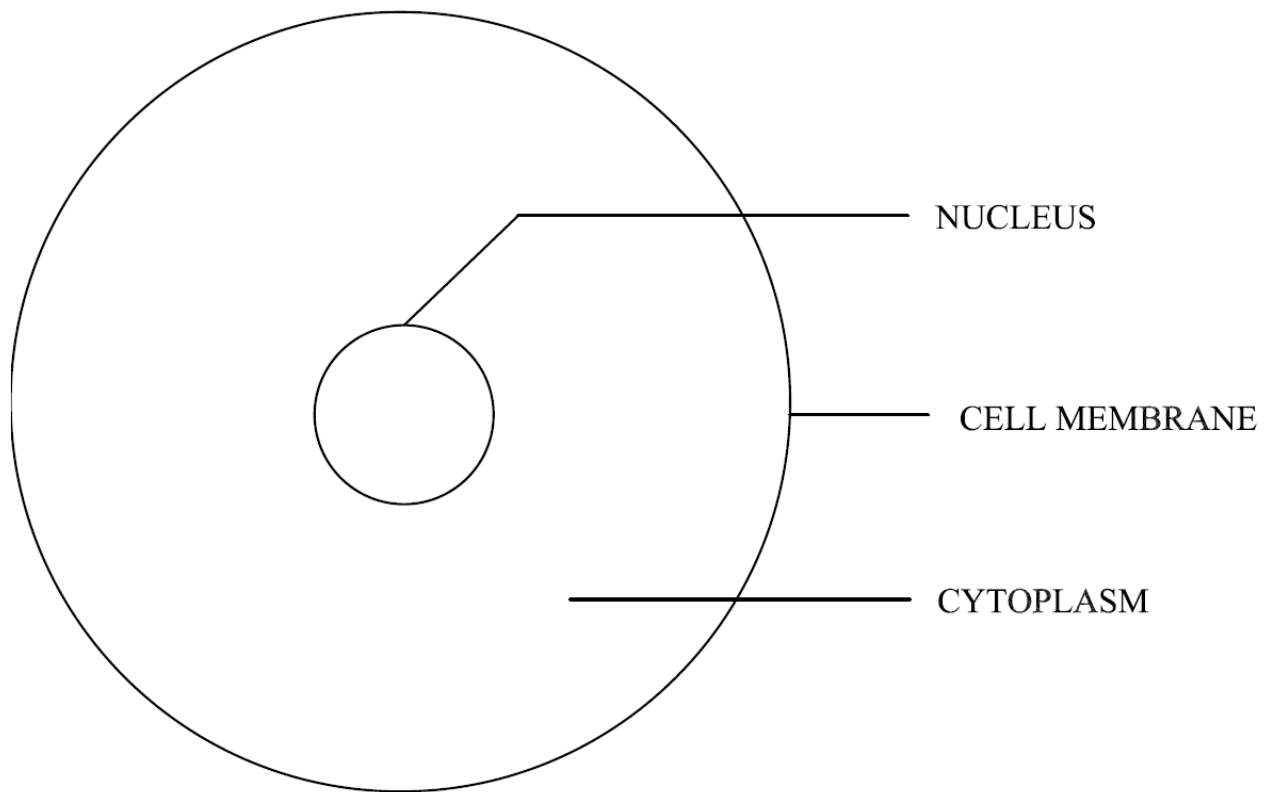


The next major stage in organized complexity is *the mega molecule: molecules with molecules*. A good example would be the structure of the most abundant protein in the human cell: *collagen* made up of molecules of the *amino acids* Glycine ($C_2H_5NO_2$), Proline ($C_5H_9NO_2$), and Hydroxyproline ($C_5H_9NO_3$), a metabolite ^[10] of Proline.

The next major stage of organized complexity are *mega molecules with mega molecules: the cell*. This constitutes a major change in organized complexity and initiates the beginning of the *biosphere*.

THE CELL

The next major stage of organized [physical] complexity is the *cell* and *one-celled animals*. Cells are the *elements* in *multi-cellular organisms*, up to an including the *human organism*.

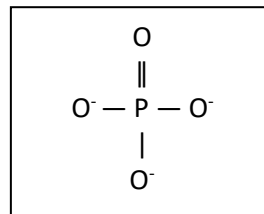


A SIMPLIFIED STRUCTURE OF THE CELL ^[11]

A. CELL MEMBRANE

a. Lipids

- i. A Glycerol Backbone [$C_3H_8O_3$]
- ii. Two Fatty Acid Chains (Hydrophobic) (General Formulae)
 1. Saturated [$CH_3(CH_2)_n COOH$] where $n=2-28$ (where n = an even number)
 2. Unsaturated [$CH_3(CH_2)_n CH=(CH_2)_n COOH$] (where n can be any integer)
- iii. A Phosphate Group (Hydrophilic) [PO_4^{3-}]



B. CYTOPLASM

a. Lipids

b. Proteins

i. Amino Acids

1. Alanine (Ala) $C_3H_7NO_2$
2. Arginine (Arg) $C_6H_{14}N_4O_2$
3. Asparagine (Asn) $C_4H_8N_4O_2$
4. Aspartic Acid (Asp) $C_4H_7NO_4$
5. Cysteine (Cys) $C_3H_7NO_2S$
6. Glutamic Acid (Glu) $C_5H_9NO_4$
7. Glutamine (Gln) $C_5H_{10}N_2O_3$
8. Glycine (Gly) $C_2H_5NO_2$
9. Histidine (His) $C_6H_9N_3O_2$
10. Isoleucine (Ile) $C_6H_{13}NO_2$ (L-Isoleucine, L-enantiomer)
11. Leucine (Leu) $C_6H_{13}NO_2$
12. Lysine (Lys) $C_6H_{14}N_2O_2$
13. Methionine (Met) $C_5H_{11}NO_2S$
14. Phenylalanine (Phe) $C_9H_9NO_2$
15. Proline (Pro) $C_5H_9NO_2$
16. Serine (Ser) $C_3H_7NO_3$
17. Threonine (Thr) $C_4H_9NO_3$
18. Tryptophan (Trp) $C_{11}H_{12}N_2O_2$
19. Tyrosine (Tyr) $C_9H_9NO_3$
20. Valine (Val) $C_5H_{11}NO_2$

- c. Carbohydrates
 - i. Monosacharides (Sugars)
 1. Deoxyribose $C_5H_{10}O_4$
 2. Glucose $C_6H_{12}O_6$
 3. Ribose $C_5H_{10}O_5$
 - d. Mineral Salts
 - e. Water H_2O (gel)

C. NUCLEUS

- a. Nuclear Membrane
 - i. Lipids
- b. Nucleolus (a spherical structure)
 - i. DNA $C_{15}H_{31}N_3O_{13}P_2$
 - ii. RNA $C_{27}H_{34}N_6O_{22}P_2$
 - iii. Proteins
- c. Chromatin Network
 - i. DNA
 - ii. Proteins
- d. Nucleoplasm
 - i. Nuclear Proteins
 1. RNA
 2. Proteins
 - ii. Nucleic Acids
 1. DNA
 2. RNA
 - iii. Proteins
 - iv. Enzymes
 1. Ribozymes (literally enzymes made of RNA)
 - v. Mineral Salts
 - vi. Water (H_2O)

¹ One of the earlier translations of *The Phenomenon of Man* says, "... all energy is *physical* in nature." Both are true since $E=mc^2$.

² Joye, Shelli (2018). *Ten Electromagnetic Field Theories of Consciousness*.

³ Teilhard, Pierre (1961). *The Phenomenon of Man*. The birth of thought (pp 163-184).

⁴ The charge on the electron is -1.6×10^{-19} coulomb, which is considered the basic unit of electric charge.

⁵ The charge on a proton is $+1.6 \times 10^{-19}$ coulomb.

⁶ Lerner, E. (1985). "The Case of the Non-Existent Quark—Experiments with Colliding Protons yield Inexplicable Results, Science Digest," August, 1985.

⁷ An increase in organized complexity.

⁸ Please keep in mind the influence of the current kinetic atomic thinking in our language.

⁹ Chemical elements are still called atoms i.e. an 'atom' of hydrogen. At one time in the history of science the contents of the Periodic Table were considered atoms in the Greek sense of that word: indivisible, or uncut. It wasn't until later that we found out that these 'atoms' were composed of *electrons*, *protons*, and *neutrons*. We need to update our terminology for important scientific and philosophical reasons. Hydrogen is formed from one *electron* in orbit around one *proton* (protium). There are two other forms (isotopes) of hydrogen: deuterium (with one *electron*, one *proton*, and one *neutron*; and tritium (with one *electron*, one *proton*, and two *neutrons* which is radioactive).

¹⁰ A metabolite is any substance produced during metabolism (digestion or other bodily chemical processes).

¹¹ The actual structure of the cell is much more complex. The purpose of this simplification is to show the few and different chemical *elements* that compose the *cell*. Because of the cells complexity, it is difficult to get a consistent list of chemical elements contained in it, but this gives us a general picture of its basic simplicity (*elements*) and *organized, physical complexity*.

CHAPTER 5

ELECTRO-MAGNETIC FIELDS AND BIOPARACRYSTALLINE MATERIALS

LIQUID CRYSTALS

What are the physical connections, then, between electro-magnetic fields and the physiology of the cell and the human organism?

Referring to the late Geheimrat Rinne's Report (page 1016 ^[1])

Mr. Bernal (Cambridge) said: I should like to say a few words of appreciation of this last paper of a great crystallographer. It is not given to many men at an age when most are content to rest on their laurels to open up a fresh field of scientific research, and to assess its importance with an intuition ahead of that of far younger men.

Rinne was not the first to see that liquid crystals had a bearing on biological problems, but I think he had glimpsed at the fundamental rôle they played, and understood the essential nature of the properties that enabled them to do so.

The biologically important liquid crystals are plainly two or more component systems. At least one must be a substance tending to paracrystallinity and another will be water. This variable permeability of liquid crystals enables them to be as effective for chemical reactions as true liquids or gels as against the relative impenetrability of solid crystals. On the other hand, liquid crystals possess internal structure lacking in liquids, and directional properties not found in gels. These two properties have far-reaching consequences. In the first place, a liquid crystal in a cell through its own structure becomes a proto-organ for mechanical or electrical activity, and when associated with specialized cells in higher animals gives rise to true organs, such as muscle and nerve. Secondly, and probably more fundamentally, the oriented molecules in liquid crystals furnish an ideal medium for catalytic action, particularly of the complex type needed to account for growth and reproduction. Lastly, a liquid crystal has the possibility of its own structure, singular lines, rods, and cones, etc. Such structures belong to the liquid crystal as a unit and not to its molecules which may be replaced by others without destroying them, and they persist in spite of the complete fluidity of the substance. These are just the properties to be required for a degree of organization between that of the continuous substance, liquid or crystalline solid and even the simplest living cell ^[2].

The 'cell surface complex' (Ambrose and Easty) is a useful term which is intended to include the outer coat, lipid layer and underlying protein components.the cell surface complex behaves as a functional component of the cell and ... its behavior depends on an interaction between assemblies of molecules showing liquid crystalline properties ^[3].

It is interesting to note the visual similarities between liquid crystalline materials and fractals shown in the important video tape, Fractals: The Colors of Infinity, narrated by Arthur C. Clarke ^[4].

Bioparacrystalline substances (biological 'liquid crystals'), then, make up the structure of cells. It is interesting to note here that "[Water] as a liquid is nearly inactive in chemical processes (Henderson ^[5]) and is pseudo-crystalline in structure (Fowler, Bernal ^[6]).

An acceptable nomenclature for the fine structural types can only be developed on a structural basis (Frederich Rinne):

- I. Basic Material
 1. Electrons
 2. Protons
 3. [Neutrons] ^[7]
- II. Basic Types: Leptons (fine, delicate)
 1. Atoms
 2. Molecules
- III. Complex Types
 1. Ataxy (irregular structure, fine)
Atactites
 2. Eutaxy (regular structure, fine)
 - a) Paracrystals
 - b) Crystals

The division of matter into gases, liquids, and solids does not accord with this classification. ^[8]

The only basic feature of colloids is that the size of the parts should lie between molecular and microscopic dimensions. ^[9]

EXAMPLES OF BIOPARACRYSTALLINE STRUCTURES

Some examples of paracrystals in biological systems are colloids, lipid drops, sperm, muscle fibers, and nerve formations.

Colloids—A further unusually important biological tendency of paracrystalline materials is the fine-structural mixture of many chemical substances in the colloid-submicroscopic micellar patterns. It is precisely on this account that a most important feature of many organic substances is obtained, *viz.*, their chemical complexity and high chemical lability. A large number of “biomolecules” or genes find their location within paracrystalline materials, and not least important, water also, somewhat as in the case of zeolites or albumen crystals. ^[10]

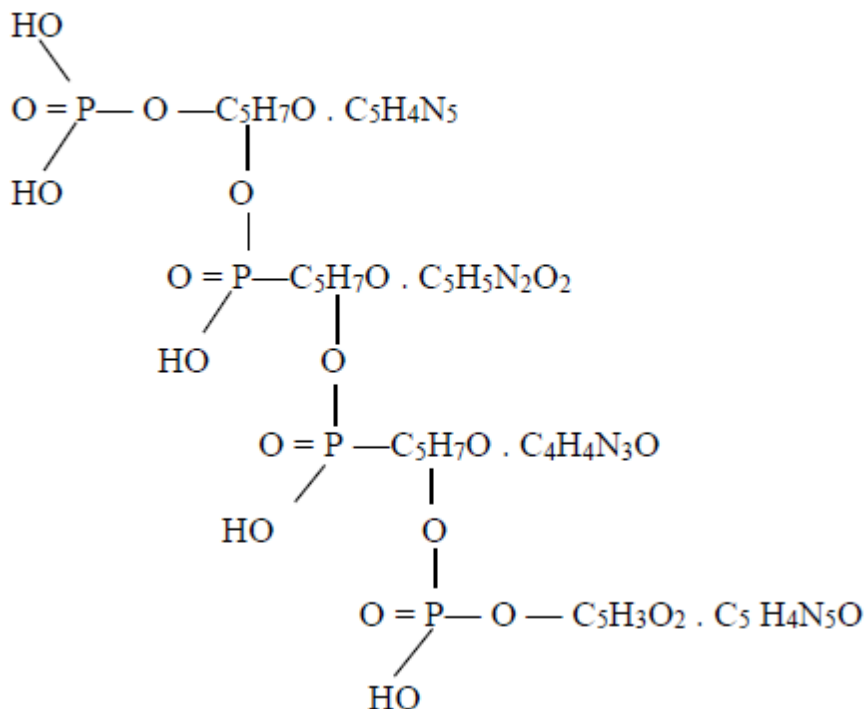
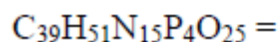
Lipoid Drops—In the case of lipid drops we are concerned with the cholesterin ester of fatty acids or with mixtures of these and triglycerides.Significantly their thermal behavior is analagous to that of many artificially prepared paracrystalline materials, i.e.

crystalline ↔ paracrystalline ↔ isotropic melt.

In General—The possibility thatparacrystalline states were widespread in biological material was reviewed by Needham, who drew an analogy between the development of a mesophase and the growth of limb buds and other organs in amphibia. Substances with paracrystalline or birefringent properties had also been noted in muscle, collagen, reticulin, adrenal cells, ovary, and other tissues, as well as in plant viruses. A leading crystallographer [Bernal] had already predicted that liquid crystals possessed properties essential for the organization of protoplasm. ^[11]

EXAMPLES OF STRUCTURAL FORMULAE FOR PARACRYSTALS

The following is the structural formula for an enantiomorphic liquid crystal and the zig-zag formula by Levene and London for thymonucleic acid ^[12]:



THE FORCES WHICH AFFECT THE STRUCTURE OF BIOPARACRYSTALLINE MATERIALS?

The forces which affect the structure of bioparacrystalline materials are electric and magnetic fields ^[13]. This would include electromagnetic fields (which have an electric and magnetic component), light (which is electro-magnetic in nature), and heat (light in the infrared spectrum).

Since bioparacrystalline substances (biological 'liquid crystals') make up the structure of cells ^[14], then the structure of cells and the structure of the organism itself is accounted for by the compound electromagnetic fields within the macroscopic atom. Since the human organism is contained within the hollow portion of the macroscopic atom, its compound field must be present in the human organism. The individual, *many* electro-magnetic fields of the electrons, the *microscopic atoms*, would be present in kinetic atomic matter and the *one* electro-magnetic field, the source of which is the *macroscopic atom*, would also be present, the source being *external* to the living organism.

EXPERIMENTAL FINDINGS

In 1935, F.S.C. Northrop and H.S. Burr published a paper proposing the connection between electro-magnetic fields and organization in biological structures ^[15]. In 1935-1936, Dr. Burr and his colleagues did the experimental work to confirm the theory ^{[16][17]}.

The findings were submitted in 1936 and published in 1939 ^[18], the year of my birth. What were those findings?

By the mere application of the electrodes of the apparatus to the rabbit, Burr, Hill, and Allen found in 1935 that the instant of ovulation, confirmed by immediate opening of the animal, exhibits itself in a sharp and marked deviation of the potential reading from the normal (Burr, Smith, Allen, '35).

In 1936, Burr, G.M. Smith and Strong found that strain differences between cancer-bearing and cancer-immune mice were accompanied by different systematic electrical field characteristics for the two strains (Burr, Smith, Strong, '36). Moreover, studies made during the major part of the life history of these mice showed definite correlations with growth, maturation, and senility. They found also, by taking frequent regular readings over 12 months, on mice known to produce cancer in that time, that potential changes occur not merely at the locus of the cancer but also in the systematic potential gradient of the organism as a whole. Moreover, these changes of potential difference increase in intensity with the appearance of the cancer, and enable one to detect the inception of cancer before its presence can be determined by any other means.

More interesting and important still, this association of potential changes with specific regions and processes of the organism is not a purely local phenomenon. No one would have supposed that the mere immersion of the end of a finger in each hand in a salt solution in which micro-pipettes [had been immersed] from the apparatus would reflect profound local alterations in the physiology of the organism such as those involved in the menstrual cycle. Nor would one expect that two electrodes placed on the two sides of the chest would exhibit cancer development at a distance at the far end of the body from the electrodes. Yet both these effects have been found in every case examined. The local potential differences and changes of potential differences are part of a systematic potential pattern of the organism as a whole.

Why were these findings not picked up by the scientific community?

Three reasons were given by two of Dr. Burr's colleagues:

1. Electronics was in its infancy at the time (Dr. Louis Langman);
2. Silver-silver chloride electrodes were difficult to manufacture (Dr. Louis Langman);
3. Vested Interests (Dr. Leonard J. Ravitz).

It is to be noted that the Physics Department and the Chemistry Department at Yale University manufactured the portable microvoltmeter and the silver-silver chloride electrodes which were not commercially available at the time.

Dr. Langman states in his book *Blueprint for Immortality, The Electric Patterns of Life* (London, 1972) that in the case of the electro-cardiogram science does not know *how* the electrical potentials are propagated because the signals travel faster than the nervous system can deliver them ^[19]. Nevertheless, we

use these measurements because they help in the diagnosis of heart problems. Why is it, then, that the Burr-Lane-Nims technique is not used by the medical community for the early detection of cancer and human ovulation?

Also, why was Northrop and Burr's paper, "The Experimental Findings of the Electrodynamical Theory of Life and an Analysis of Their Physical Meaning," not picked up by the Quarterly Review of Biology^[20] which published "The Electrodynamical Theory of Life" in 1935? Instead, the findings were presented to Growth Publishing Company^[21] in 1936 and published in 1939 (why the delay?). You would think that the State University of New York would have a vested interest in the findings. There is a story here for an enterprising journalist. The author is aware that the work of Dr. Louis Langman, Obstetrics and Gynecology at the New York University Medical School was working with Dr. Harold Saxton Burr in the detection of cancer in the female genital tract. When it came time for his grant to be renewed by the NCI, a Doctor from Mt. Sinai Hospital in New York who represented the NCI was sent over to interview Dr. Langman. He asked Dr. Langman if he knew the source of the potentials that he was reading with the Burr-Lane-Nims technique? He answered, "No." The Doctor recommended to the NCI that Dr. Langman's grant not be renewed. Dr. Langman's answer is understandable because it is not clear in the two papers referenced above what was the source of those potential was. You would need to understand F.S.C. Northrop's doctoral thesis^[22] and Northrop's work in *Science and First Principles*, 1931.

Dr. Burr uses terminology such as *potential gradients*, *polar differences*^[23] and 'the fields (or patterns) of life.'^[24] Dr. F.S.C. Northrop's contribution as co-author with Burr has been overlooked. Northrop used such terminology as *electric fields* ("... which exhibit a definite pattern of potential distribution as a whole,")^[25] and the *electromagnetic field*.^[26]

Burr belonged to the Section of Neuro-Anatomy, Yale University Medical School. Dr. Northrop belonged to the Department of Philosophy, Yale University. What brought the two together was experimental verification of Northrop's doctoral thesis, "The Problem of Organization in Biology." This doctoral thesis requires an amendment in the form of a physical addition to the current kinetic atomic theory. Northrop had brought the current first principles of science into question. Philosophy, Northrop says, can propose a solution to a problem in science, but it is science's responsibility to verify it.

Northrop's terminology was on the side of Einstein's physics.

Burr was interested in the morphology and growth of the nervous system. His terminology was on the side of *anatomy* and *physiology*.

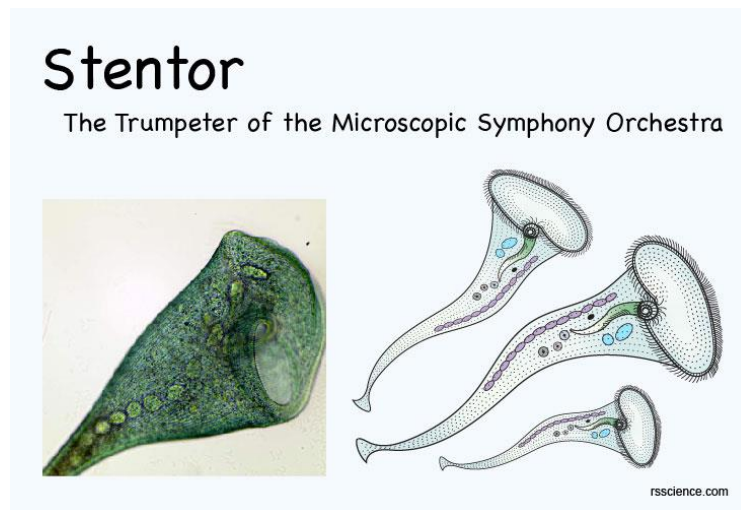
In order to have a complete understanding of this topic, one must also understand the role that *electromagnetic fields* play in the structure of the elementary particles (electrons^[27]). This is the work of Albert Einstein.^[28]

There are two types of *potential differences* associated with these fields: varying potentials associated with the *many* microscopic atoms, and the dc (steady-state) potentials associated with the *one* (unitary) electromagnetic field of the macroscopic atom.^[29] The steady-state potentials have nothing directly to do with chemistry. They are the potentials of the electric field portion of a unitary electro-magnetic field, *the source of which* is external to the organism being measured and emanates from the inner surface of the physical boundary of the universe, the Macroscopic Atom. In Northrop and Burr's work, the field is primary and acts like a Jell-O mold for the chemistry^[30]. The current kinetic atomic theory without the amendment in the form of a physical addition (the Macroscopic Atom) makes it difficult for scientists to realize the importance of the findings in Northrop and Burr's work.

We have a direct link, then, between organization in biology and the unitary electro-magnetic field of the Macroscopic Atom. This confirms Northrop's doctoral thesis, and gives the medical field the Burr-Lane-Nims technique for the early detection of cancer and human ovulation.

Since the work of F.S.C. Northrop in the first principles of science has been experimentally verified by Burr and his colleagues and re-verified for ovulation by Dickson in 1988 [1], we have a new scientific paradigm; and since Pierre Teilhard's concept of *radial energy* deals with *organization* in biology and with *the first principles of science*, radial energy in its physical aspect has been experimentally verified.

A ONE-CELLED ORGANISM



A one-celled organism [31]

The cell is a very complex, highly organized structure. But why are they a major stage in organized complexity? Remember that we associated the atom with a quantum of consciousness, and that consciousness increased with organized complexity? Well, with the advent of the cell a major phase change has taken place. No longer is physics and chemistry primary, but above these are the effects of an increase in consciousness. In other words, we have *the advent of life*, the *biosphere*.

One can see with the organization of the constituents of the cell, that things have become quite complex. One needs also to note that this produces an increase in consciousness (which is the result of an anti-entropic process), just the opposite of disintegration (which is an entropic process). The first two laws of thermodynamics need to be supplemented with a third law, the Law of Complexity-Consciousness [32].

What this means is that there are critical points in the development of consciousness associated with the degree of organized complexity.

THE NEXT STAGE IN ORGANIZED COMPLEXITY

The next stage in organized complexity is the multicellular organism (cells with cells).



The simplest case of multicellular ^[33] organisms: sponges.

THE NEXT STAGE OF ORGANIZED COMPLEXITY

In the human body, *cells* are the *basic elements*.



What is the level of consciousness associated with the organization of the nervous brain and spinal cord of a human being? By introspection, our consciousness is *reflective* in nature (we know that we know). We are persons.



Student college Brazil — Amigos em campus universitário

unsplash



Rawpixel.com



Photo: Reuters



Reddit

¹ Rinne, Frederich (1933). "Investigations and Considerations Concerning Paracrystallinity," *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 148, Sept. 1933, pp1016-1032; a: p1030; b: p1023; c: pp1023-1025; d: p1025; e: pp1025-1027; f: pp1027-1028; g: pp1028-1029; h: p1026).

² Bernal (1933). Mr Bernal's Statement, *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 140, Sept. 1933.

³ Ambrose, E.J., Osborne, J.S., Stuart, P.R. (1970). "Structure and Properties of the Cell Surface Complex," *Liquid Crystals and Ordered Fluids*, Edited by Julian F. Johnson and Roger Porter, Plenum Publishing Corporation, 1970, (pp 83-96; p 83).

⁴ Clark, Arthur C. (1997). "Fractals: The Colors of Infinity," narrated by Arthur C. Clarke, Newbridge Communications, Inc., 1997; video cassette (52 min) VHS. A discussion and computer-generated description of the Mandelbrot set, what it means, its internal consistency, and the revolutions in thought resulting from its discovery.

⁵ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (p 79).

⁶ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (a: p 79; b: p xx; c: pp72-126).

⁷ Added by the author. The existence of the Neutron was not discovered until later.

⁸ Rinne, Frederich (1933). "Investigations and Considerations Concerning Paracrystallinity," *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 148, Sept. 1933 (p1030).

⁹ *ibid.* (p 1023).

¹⁰ *ibid.* (pp 1023-1025).

¹¹ *ibid.* (pp 1016-1032).

¹² *ibid.* (p 1026).

¹³ "Contents," *Transactions of the Faraday Society*, Vol XXIX, Part 9, No 148, September 1933. Freedericksz, V, and Zolina V. (1933). "Forces Causing the Orientation of an Anisotropic Liquid; Zocher, H. (1933). "The Effect of a Magnetic Field on the Nematic State."

¹⁴ Ambrose, E.J., Osborne, J.S., Stuart, P.R. (1970). "Structure and Properties of the Cell Surface Complex," *Liquid Crystals and Ordered Fluids*, Edited by Julian F. Johnson and Roger Porter, Plenum Publishing Corporation, 1970, (pp 83-96; a: p 83; b: p 96).

¹⁵ Burr, H.S., Northrop, F.S.C. (1935). "The Electro-Dynamic Theory of Life," *Quarterly Review of Biology*, Vol. 10, 1935.

¹⁶ Northrop, F.S.C. and Burr, H.S. (1936). "Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning," *Growth*, Vol, 1, 1939 (submitted 1936) (a: pp 82-83; b: pp 78-88).

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- ¹⁷ It is also to be noted that this experimental work was to confirm Northrop's doctoral thesis, "The Problem of Organization in Biology." Northrop was in the Department of Philosophy, Yale University, and Burr was in the Section of Neuro-Anatomy, Yale University Medical School.
- ¹⁸ Northrop, F.S.C. and Burr, H.S. (1936). "Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning," *Growth*, Vol, 1, 1939 (submitted 1936) (a: pp 82-83; b: pp 78-88).
- ¹⁹ Potentials of the electric component of an electro-magnetic field travel at the speed of light.
- ²⁰ State University of New York.
- ²¹ Florida Southern College.
- ²² Northrop, F.S.C. (1928). "The Problem of Organization in Biology," Doctoral thesis taken under Lawrence J. Henderson, Professor of Biologic Chemistry, Harvard University, 1928.
- ²³ Burr, H.S. and Northrop, F.S.C. (1935). "The Electro-Dynamic Theory of Life," *Quarterly Review of Biology* Vol 10, 1935 (p 330).
- ²⁴ Burr, H.S. (1972). *Blueprint for Immortality*, The Electric Patterns of Life, Neville Spearman, London, 1972.
- ²⁵ Northrop, F.S.C., and Burr, H.S. (1939). "Experimental Findings Concerning the Electro-Dynamic Theory of Life, and an Analysis of Their Physical Meaning," *Growth*, Vol 1, 1939 (p 84).
- ²⁶ Northrop, F.S.C. (1928). "The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity," *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928 (p455).
- ²⁷ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p).
- ²⁸ Einstein, A (1923). "Do Gravitational Fields Play an Essential Role in the Structure of Elementary Particles of Matter," *The Principle of Relativity*, Einstein, Lorentz, Weyl, Minkowski, Dover Publications, Inc., 1952 (p 198).
- ²⁹ Northrop's solution to the problem of organization in biology solved the philosophical problem of the *one* and the *many* which the early Greek philosophers didn't solved.
- ³⁰ Burr, H.S. (1972). *Blueprint for Immortality: The Electric Patterns of Life*, Neville Spearman, London, 1972.
- ³¹ Tartar, Vance (1961). *The Biology of Stentor*. Dr. Vance Tartar, University of Washington, Department of Zoology, studied this organism for over forty years in his small, self-built lab on the coast of Washington State. He was also an artist.
- ³² The first law of thermodynamics: Energy can be neither created or destroyed. The second law of thermodynamics: For a spontaneous process, the entropy of the universe increases (for every synthesis energy is lost in the form of heat). The Third Law of Thermodynamics needs to be: The Law of Complexity-Consciousness, replacing the current Third Law of Thermodynamics and moving that one to the Forth Law: A perfect crystal at zero Kelvin has zero entropy. I would say as a layman that a perfect crystal at zero Kelvin is subject to being destroyed by the death of the sun and Earth. Therefore, it, also, is subject to disintegration and therefore entropy. It should be eliminated from the laws of thermodynamics.
- ³³ *Cells with cells.*

CHAPTER 6

The Birth of the Noösphere

Now we have the birth of thought, of ideas. *This is an entirely different level of being.*

Therefore, the physical *elements* in the *next* stage of *organized complexity* are *human organisms*. Because of reflective consciousness associated with the human person, the increase in organized complexity (*evolution*) undergoes a change in state: it becomes *psycho-social* in nature ^[1]. It has become a process of *persons with persons* producing a higher level of global consciousness ^[2].

THE APPLICATION OF THE LAW OF COMPLEXITY-CONSCIOUSNESS IN THE SOCIAL REALM



StockFree Images [3]

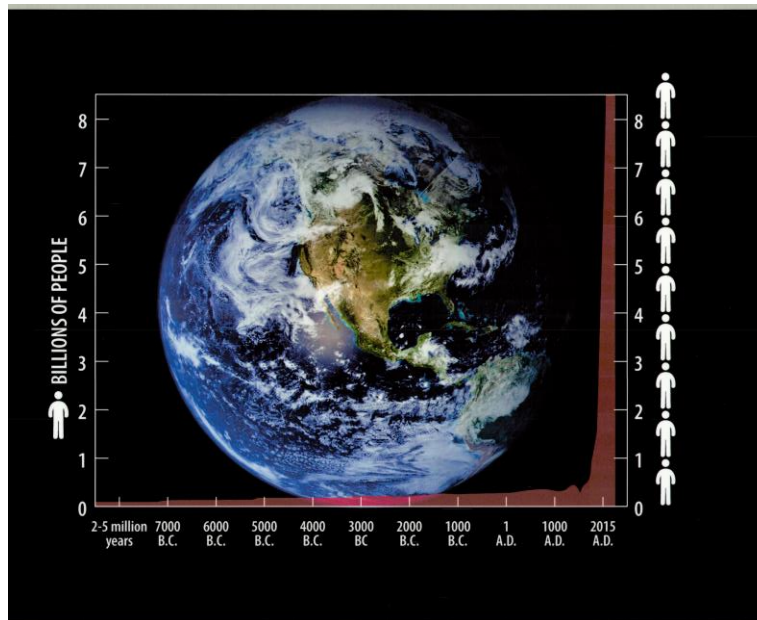
The growth in global consciousness will finally reach a climax where it escapes from the material complex ^[4]. This is the end of the evolutionary process and coincides in the author's view with the Second Coming of Christ ^[5].

The average lifespan of mammals is about one million years, so the future death of the sun and Earth are not a danger to us. By that time, consciousness should have separated from its material matrix. What we have left, in our own day, is the Anthropocene period (what to do about it), and our own private deaths which we know is inevitable (even though we may try to avoid thinking about it)

Knowing about our own mortality, should make us take stock of what we are doing in this world of ours. For example, we could set about giving our young people a biocentric view of the physical world in our educational system. This work has been done in the field of science and philosophy in academia as shown in this paper, but it needs to be distributed to our young people through the rest of the educational system.

With the focus on human growth and development, we also need to change the way we organize our manufacturing systems. Processes can be organized in *circles* or *spheres* so that no output of toxic materials to the environment is possible. This shows a respect for life which is connected intimately to the rest of the environment.

The limited surface of the Earth (a sphere) and an exponential increase in human population (which has reached over eight billion people, now, is causing a global compression. We have never experienced this on this scale before ^[6].



THE FOSTERING OF COMMUNITY

In addition, to fostering an increase in consciousness through *psycho-social development* we need to promote community. Señor Penñalosa, the former Mayor of Bogata Columbia, told me in a conversation I had with him at a conference on transportation in Seattle, Washington, that the mistake that was made in building Brazilia in South America was to fail to bring community into the new city ^[7].

This will require a new kind of city, a city in which the automobile and its road system are eliminated (which fragment the city and are anti-psycho-social). This process has already begun in the planning stages in the United States at Arcosanti, Paolo Soleri's urban laboratory, and is being implemented in the country of Saudi Arabia with its linear city on land and with its floating "turtle" city (by an Italian designer) on the water. Models for both these kinds of cities were made in the United States by the Arizona architect, Paolo Soler ^[8]^[9], who was born, raised, and educated (PhD in architecture) in Italy. South Korea and China are also working on similar projects. These ideas have not been implemented by the United States, and Paolo Soleri's work has not been supported by either federal or state funding.

The arcology ^[10] was born in the mind of the Arizona architect, Paolo Soleri. As you can see, the automobile, as we know it, would be obsolete. It is not needed within the arcology, nor for transportation between arcologies. This would free up an enormous amount of capital, labor and natural resources and reduce, enormously, the production of carbon dioxide. The automobile manufacturing facilities could be converted to the construction of arcologies and infrastructure projects to support the new urban infrastructures.

These 3-Dimensional, dense, highly organized urban infrastructures are self-contained. People would live, work, and play in them.

The time saved from not commuting can be spent with family, friends, hobbies, community, politics, the arts, education, and so forth.

Financial resources are saved in construction, heating, utilities, and upkeep that can be spend on education, healthcare, the arts, etc.

An arcology is also an environment for the rapid spread of ideas.

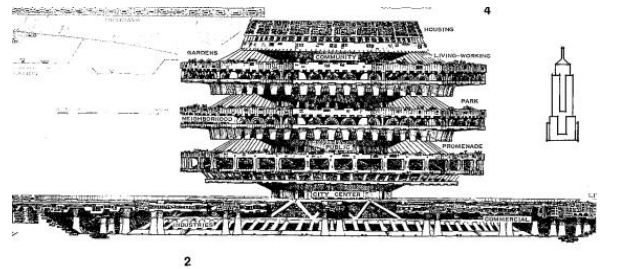
All in all, we are talking about fostering community and the future development and growth of human beings (an increase in psycho-social development).

From a business standpoint, the construction of urban environments would be an unending source of meaningful work. Both government and business could plan in such an environment.

Economics, in this case, becomes subordinate to human growth and development.

This will give us a future for ourselves (the gray-haired ones) and for all our young people.

Below is an example of a model arcology that would permit a construction in 'layers'. In other words, for the prototype the original design could be built to accommodate five layers, for a population of 100 each.



Babel IIB

This would reduce original construction costs and allow the project to be funded in sequence as the population increases.

Those in religion need to be leading in this effort, for we are talking about the fostering of community and psychosocial development. Operating in an anti-entropic environment where overhead costs are lower and time and distance are reduced frees up one's time and resources for more important things. It makes one less vulnerable to outside forces such as the cost of automobiles and insurance, automobile accidents, loss of communications, economic downturns, etc., and it would reduce loneliness, a pernicious problem in our current society^[11], and allow more resources to be devoted to education, health care, and for those in religion: missionary work.



Maglev — Transrapid International GmbH & Co. KG



Hexahedron, a 3-dimensional, highly organized urban environment (city/arcology), for a population of 170,000. (photo: Ivan Pintar)



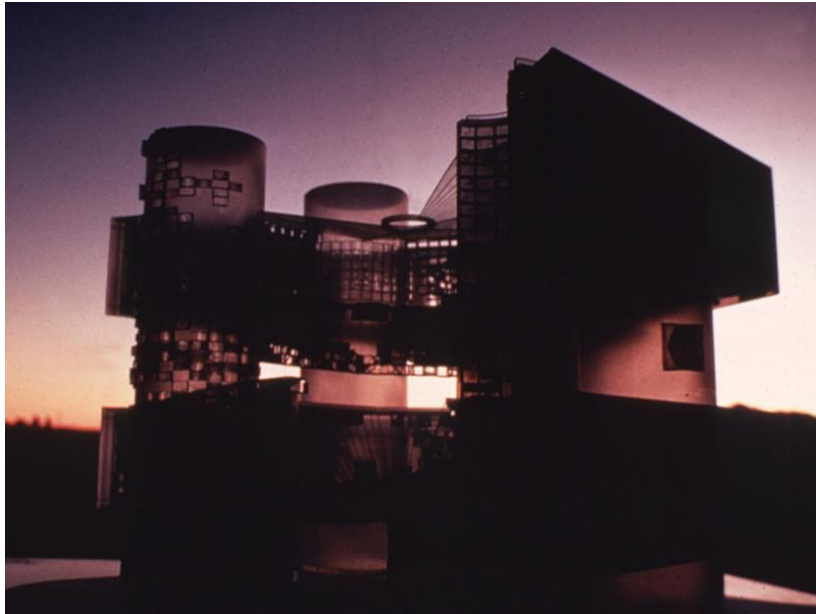
JR-Maglev-MLX01-2, China



Babel Canyon, population 250,000 (photo: Ivan Pintar)



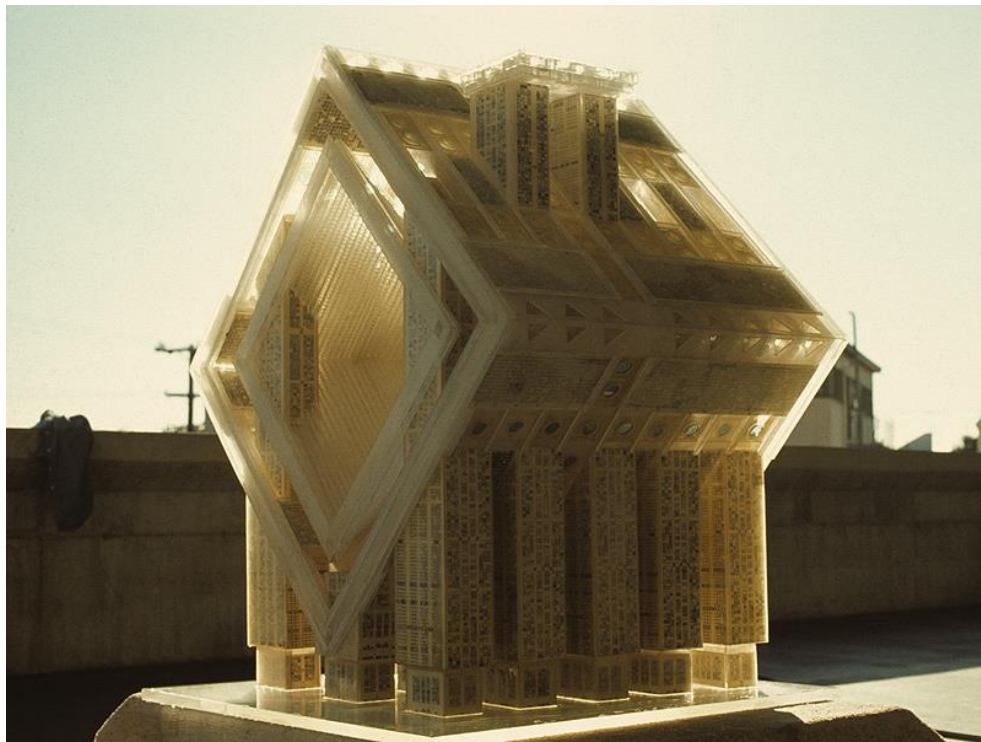
Xshanghai-maglev, China



Arcvillage Arcology, pop. 30,000 (photo: Ivan Pintar)



Shanghai-maglev, heading out of station, China



Arcube Arcology, pop. 400,000 (photo: Ivan Pintar)



Neom, Saudi Arabia

Google:

<https://www.architecturaldigest.com/story/saudi-arabia-building-100-mile-long-linear-city>www.parametric-architecture.com/Saudi-Arabia-“not-building-The-Line”-but-will-“create”-using-AI, 1 December 2022 - Serra Utkum Ik

Saudi Arabia is planning to build a three-dimensional, linear city similar to the idea proposed in the book *Lean Linear City: Arterial Acology* published in 2012 by Cosanti Press (www.arcosanti.org).^[12]

Saudi Arabia plans to spend \$100-\$200 billion on the project. There will be no cars and the attending streets with no carbon emissions.

ARCHITECTURAL DIGEST [13]

Saudi Arabia Building 100-Mile-Long “Linear” City

Stretching from the mountains to the Red Sea, “the Line” anchors the kingdom’s \$500 billion green city, Neom

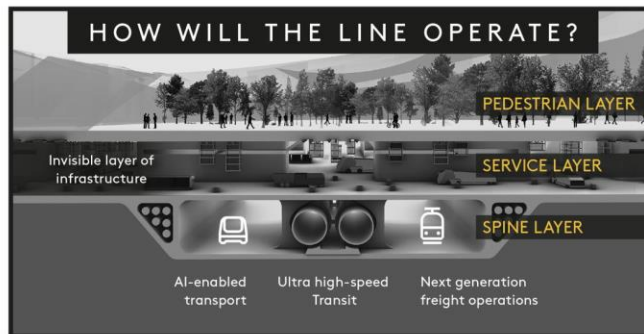
By Dan Avery

Saudia Arabia is planning to invest between \$100–\$200 billion to build a green oasis in the desert—a futuristic city with no cars, no streets, and zero net carbon emissions.

Announced this month by Crown Prince Mohammed bin Salman, “the Line” is a 106-mile-long belt of hyperconnected communities stretching from the mountains of northwest Saudi Arabia to the Red Sea.

But unlike the polluting metropolises of today, this city of 1 million will be powered by “100% clean energy,” with residents ferried about by “autonomous mobility solutions” and ultra-high-speed transit.

The Line is laid in three layers: a surface layer for pedestrians, plus two subterranean layers for transport and infrastructure. The design, says Bin Salman, will preserve 95% of the region’s natural environment.



A rendering of transport options in the Line, a new master-planned city in Saudi Arabia.
Credit: Architectural Digest, January 26, 2021

“Why should we sacrifice nature for the sake of development?” he said. “Why should 7 million people die every year because of pollution? Why should we lose 1 million people every year due to traffic accidents?”

Rather than one long development, the city is arranged as clusters of aggregated urban areas along a central “spine.” Schools, shops, and other necessities will all be within a five-minute walk, developers say, and “no journey will be longer than 20 minutes.”

Plans say artificial intelligence will improve daily life for residents and businesses alike, with a projected 90% of available data harnessed to enhance infrastructure capabilities. Developers predict the Line will generate 380,000 new jobs and boost Saudi Arabia’s GDP by some \$48 billion.



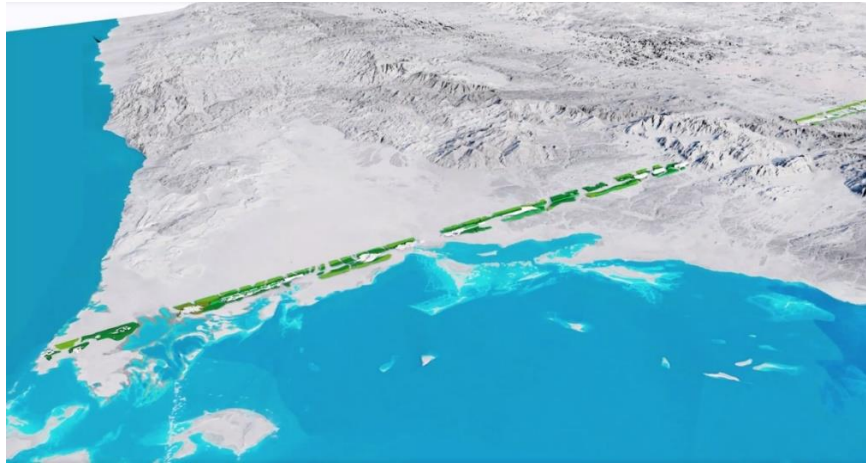
The Line is close to huge segments of the global population

Renderings have not been made available, though construction is slated to start in the first quarter of 2021.

The Line is envisioned as the first outpost of Neom, a \$500 billion 10,000-square-mile city-state being developed in Saudi Arabia’s Tabuk province near the borders it shares with Jordan and Egypt. (*Neom* is a portmanteau of the Greek word *neos*, or “new,” and *mustaqbal*, Arabic for “future.”)

Billed as a “living laboratory,” Neom is part of an ambitious plan to wean Saudi Arabia off oil dependency and transform the country into a tech hub, akin to Silicon Valley. It will incorporate towns, cities, research, education zones, and tourist attractions. According to *The Wall Street Journal*, confidential documents mention plans for flying drone taxis, a Jurassic Park–style amusement park with robotic dinosaurs, and the highest density of Michelin-starred restaurants, where, unlike the rest of the country, there is a proposal to allow alcohol would be served.

According to *The Wall Street Journal*, even the region's stark landscape would be transformed, with cloud-seeding machines, glow-in-the-dark sand, and a giant artificial moon that would light up every night.



A rendering of the Line, which showcases its distinctive linear form.

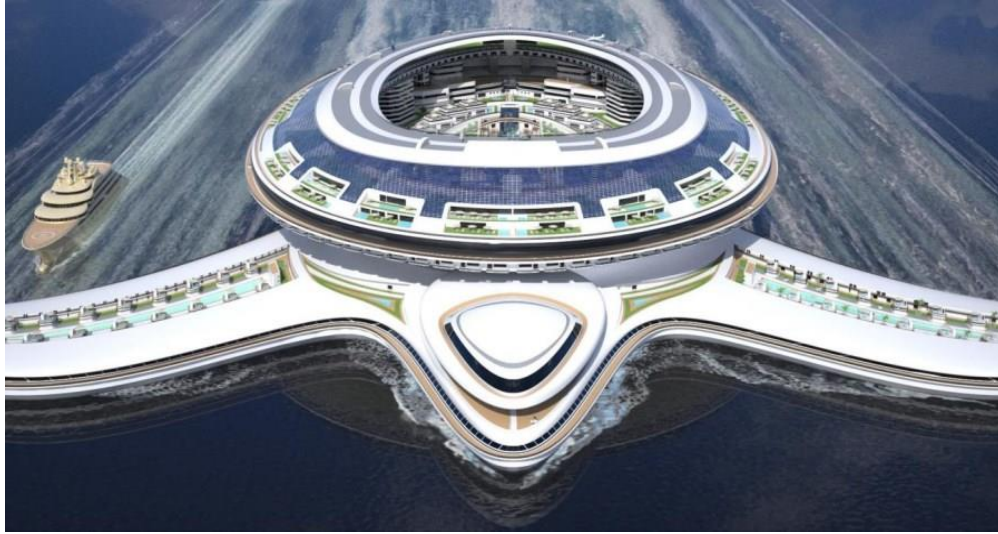
Credit: Architectural Digest, January 26, 2021

Touted as the “largest carbon-free system” in the world, the 16-borough city would lean heavily into solar power, wind farms, and emerging green technology that transforms water into oxygen and hydrogen.

“Neom is an accelerator of human progress and a vision of what a new future might look like,” according to a release. “It will be a destination and a home for people who dream big and want to be part of building a new model for exceptional livability, creating thriving businesses, and reinventing environmental conservation.”

Why should we sacrifice nature for the sake of development?” he said. “Why should 7 million people die every year because of pollution? Why should we lose 1 million people every year due to traffic accidents?”

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Pangeos, Saudi Arabia

[Google:](#)

<https://www.google.com/search?q=pangeos+%2B+saudia+arabia&oq=pangeos+%2B+saudia+arabia&aqs=chrome..69i57j0i22i30l2j0i390l4.15521j0j7&sourceid=chrome&ie=UTF-8>

https://youtu.be/XT_3YmlXvOI (Very nice video on YouTube)

GreekReporter.com Greek News Pangeos: Saudi Arabia's \$8bn Turtle-Shaped Floating City Pangeos: Saudi Arabia's \$8bn Turtle-Shaped Floating City

By **Alexander Gale**

November 19, 2022

Pangeos, the "floating city". Credit: Lazzarini Design Studio

Saudi Arabia has been proposed as a location for the construction of a massive turtle-shaped [yacht](#), dubbed Pangeos. If the project is constructed, it will become the [biggest sea vessel ever built](#), essentially a massive floating city.

Pangeos is named after Pangaea, a [supercontinent](#) that existed roughly two hundred million years ago.

The project has been [designed](#) and proposed by [Lazzarini Design Studio](#). The Rome-based company utilizes 3D technology to visualize designs and ideas.

The world's biggest yacht

The proposed dimensions for Pangeos are truly gigantic. If built, the vessel would be the largest ever constructed.

The current title holder for the [world's biggest yacht](#) is the German-built Azzam at 180.61 meters (595.55 feet) long. The [biggest sea vessel ever](#) constructed was the Seawise Giant, built by the Japanese firm Sumitomo Heavy Industries. Its length was 458.45 meters (1,504.10 ft).

The Pangeos would be even bigger than both of these giants. Its proposed dimensions are a length of 550 meters (1,800 feet) and a width of 610 meters (2,000 feet).

Staying on Pangeos

The massive sea vessel will function as a floating city. There will be enough space for hotels, shopping centers, parks, and other public spaces.

Lazzarini claims that Pangeos will be able to [accommodate](#) sixty thousand guests plus an unspecified number of crewmembers and staff.

On each side wing of Pangeos would be space for nineteen villas and sixty-nine apartments. Seventy-two terraces will be available on the rooftop shell. Some will have sea views whereas others will overlook the vessel's central port area.

Unlike a traditional cruise ship or yacht, the Pangeos itself would be the star destination. Powered by nine 16,800 horsepower HTS engines, the Pangeos is expected to have a top speed of just five knots (5.7 miles per hour/9.2 kilometers per hour).

The vessel's slow and steady speed is unsurprising given its great heft. Guests wishing to travel between the Pangeos and other locations will have the option to use either another sea vessel or aircraft. A port will be constructed on board for other boats and an "upper shell area" will grant access to flying vehicles.

Funding and Construction

Unsurprisingly, building a massive floating city is not expected to be cheap. Lazzarini estimates that an investment of [eight billion dollars](#) will be necessary for Pangeos to become a reality.

An NFT [crowdfunding initiative](#) exists as part of a strategy to acquire funding. Backers can pay with cryptocurrency for virtual space on Pangeos within the [metaverse](#).

Lazzarini says construction would take eight years. Finding a suitable space large enough for such a colossal construction project is a challenge in and of itself. Designers at Lazzarini have postulated that [Saudi Arabia](#) might be an appropriate location.

If the Saudi Arabian government agrees, a site at King Abdullah Port has been identified by designers as a feasible location for the mega-project.

Roughly one square kilometer of space in the sea would need to be dredged for construction to begin. A circular dam would be used to control water levels at the construction site.

For now, Pangeos remains very much in the conceptual phase. One day, however, construction of the futuristic floating city might begin in Saudi Arabia.



Oceanix Busan, South Korea

Google:

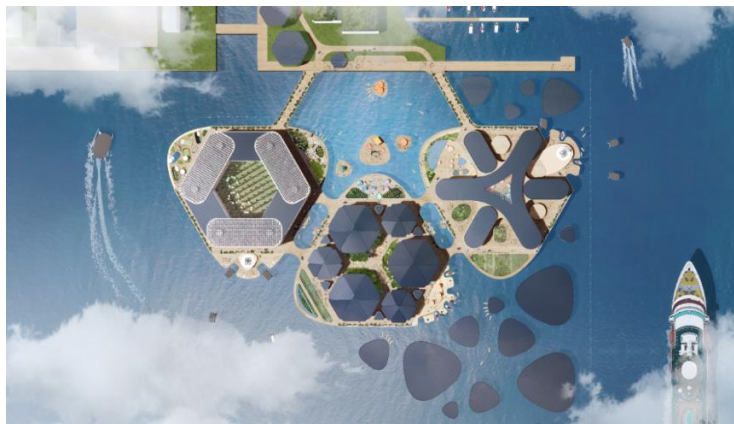
Google: <https://unhabitat.org/news/27-apr-2022/un-habitat-and-partners-unveil-oceanix-busan-the-worlds-first-prototype-floating>

New York, 26 April 2022 – UN-Habitat, the Busan Metropolitan City of the Republic of Korea, and OCEANIX today unveiled at the UN Headquarters the design of the world’s first prototype sustainable floating city. OCEANIX Busan aims to provide breakthrough technology for coastal cities facing severe land shortages that are compounded by climatic threats.

The challenge is massive: two out of every five people in the world live within 100 kilometers of the coast, and 90 percent of mega cities worldwide are vulnerable to rising sea levels. Flooding is destroying billions of dollars worth of infrastructure and forcing millions of climate refugees to leave their homes. With nowhere to expand, rapid urban population growth is pushing people closer to the water, driving housing costs to prohibitive levels, and squeezing the poorest families out.

“Today is a pivotal milestone for all coastal cities and island nations on the frontlines of climate change. We are on track to delivering OCEANIX Busan and demonstrating that floating infrastructure can create new land for coastal cities looking for sustainable ways to expand onto the ocean, while adapting to sea level rise,” said the Chief Executive Officer of OCEANIX, Mr. Philipp Hofmann.

OCEANIX, a blue tech company based in New York, led a team of the world’s best designers, engineers, and sustainability experts in designing the flood-proof prototype. The BIG-Bjarke Ingels Group and SAMOO (Samsung Group) were the lead architects of OCEANIX Busan, unveiled at the Second UN Roundtable on Sustainable Floating Cities; a follow up to the inaugural Roundtable in April 2019, where it was agreed to build a prototype with a host city. Busan signed on last year.



“As Mayor of the Metropolitan City of Busan, I take seriously our commitment to the credo ‘The First to the Future’. We joined forces with UN-Habitat and OCEANIX to be the first to prototype and scale this audacious idea because our common future is at stake in the face of sea level rise and its devastating impact on coastal cities,” said Mayor Park Heong-joon, who has set an ambitious agenda, including turning Busan into a green smart city and launching a bid for World Expo 2030.

Speaking at the Roundtable, which took place at the UN Headquarters in New York, and was attended by government ministers of housing, Mayors, Ambassadors, and high-ranking UN officials, the Executive Director of UN-Habitat, Ms. Maimunah Mohd Sharif said. “We cannot solve today’s problems with yesterday’s tools. We need to innovate solutions to global challenges. But in this drive for innovation, let’s be inclusive and equitable and ensure we leave no one and no place behind. I am happy this Roundtable takes place ahead of the High-Level Meeting on the New Urban Agenda, where cities and countries around the world come together to discuss sustainable urbanization.”

“In designing a solution for the most vulnerable coastal locations on the frontlines of climate change, OCEANIX’s new modular maritime neighborhoods will be a prototype for sustainable communities informed by Busan’s unique juxtaposition of old and new. Creating a connection between the city and the seaside, OCEANIX Busan will expand

this spirit onto the waterfront,” said Bjarke Ingels, Founder and Creative Director of BIG-Bjarke Ingels Group.

OCEANIX Busan is the world’s first prototype of a resilient and sustainable floating community. The interconnected neighborhoods total 6.3 hectares to accommodate a community of 12,000 people. Each neighborhood is designed to serve a specific purpose - living, research, and lodging. There are between 30,000 to 40,000 square meters of mixed-use programs per neighborhood. The floating platforms connect to the land with link-span bridges framing the sheltered blue lagoon of floating recreation, art, and performance outposts. The low-rise buildings on each platform, defined by their soft lines, feature terraces for indoor-outdoor living, helping to activate the network of vibrant public spaces. OCEANIX Busan will organically transform and adapt over time. Starting from a community of 3 platforms with 12,000 residents and visitors, it has the potential to expand to more than 20 platforms. The floating platforms are accompanied by dozens of productive outposts with photovoltaic panels and greenhouses that can expand and contract over time based on the needs of Busan. OCEANIX Busan has six integrated systems: zero waste and circular systems, closed loop water systems, food, net zero energy, innovative mobility, and coastal habitat regeneration. These interconnected systems will generate 100% of the required operational energy on site through floating and rooftop photovoltaic panels. Similarly, each neighborhood will treat and replenish its own water, reduce and recycle resources, and provide innovative urban agriculture.



OCEANIX is a blue tech company founded by Itai Madamombe and Marc Collins Chen in 2018 to design and build floating cities for people to live sustainably on the ocean. OCEANIX design and engineering partners on the Busan prototype include: Prime Movers Lab, BIG-Bjarke Ingels Group, SAMOO Architects and Engineers, Arup, Bouygues Construction, Helena, the MIT Center for Ocean Engineering, the Korea Maritime and Ocean University, top environmental artist Olafur Eliasson and Studio Other Spaces, Wartsila, Transsolar KlimaEngineering, Mobility in Chain, Sherwood Design Engineers, Agritecture, the Center for Zero Waste Design, Greenwave, and the Global Coral Reef Alliance. For more details, visit: www.oceanixcity.com.

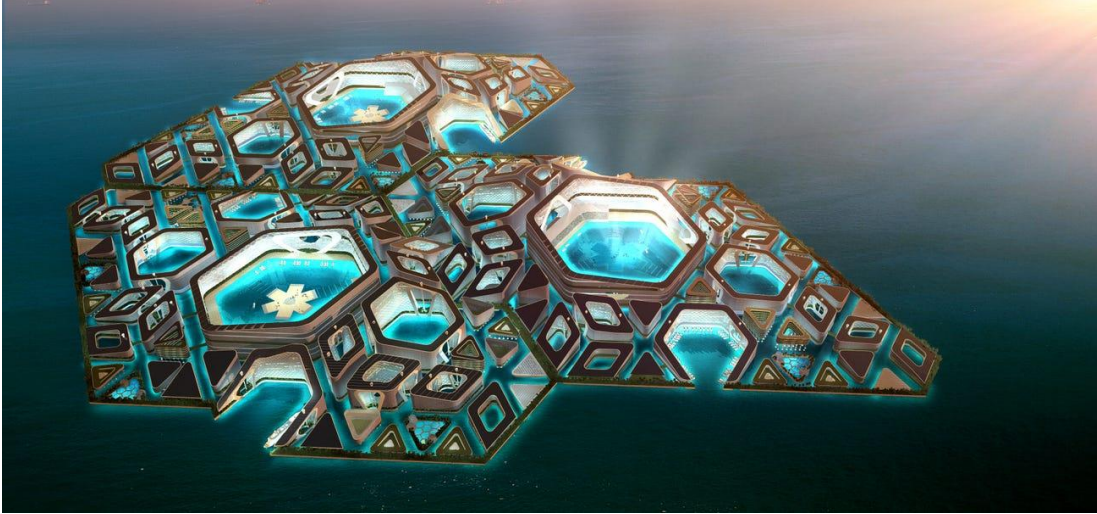
UN-Habitat, works to promote socially and environmentally sustainable cities and human settlements. UN-Habitat’s vision is to achieve “a better quality of life for all in an urbanizing world”. It works in over 90 countries to promote transformative change through knowledge, policy advice, technical assistance and demonstration projects. www.unhabitat.org.

Busan, a city of 3.4 million residents, is the second largest city in the Republic of Korea. It is home to the biggest industrial complex in the Southeast Economic Region of Korea. Busan is one of the most important maritime cities of the 21st century, making it a natural choice to deploy the sustainable floating city prototype with its marine engineering capabilities. www.busan.go.kr/eng

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UN-Habitat Director of Communications Chief of Communications
Email: ekaterina.berzgachina@un.or





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3

Floating City (1-3) China

Google:

<https://www.businessinsider.com/china-may-build-this-floating-city-2014-5>

This Futuristic Floating City Could Become A Reality In China

[Benjamin Zhang](#)

May 30, 2014, 10:24 AM

Renderings of this futuristic Floating City (via [Dezeen](#)) could very easily pass for the storyboard of a Hollywood sci-fi flick set in the distant future.

But this design for a floating city, by London-based architecture firm AT Design Office, may very well become reality.

According to the city's designers, the project's backers are in talks with a large Chinese investment group to discuss the possibility of constructing the City. "China Transport Investment Co. is reviewing the proposal and is likely to start to test this ambitious project from a smaller scale next year," [project architect Slavomir Siska said in a press release](#).

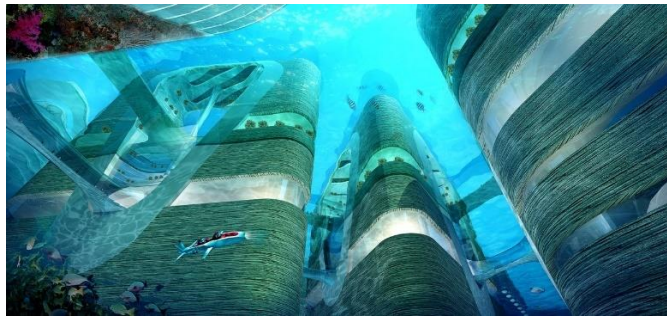
Commissioned by Chinese construction firm CCCC, the Floating City is a proposed four-square mile floating structure comprised of hexagonal modules connected by underwater tunnels that create a network of roads and walkways. The eco-friendly project is expected to be self-sufficient, with on-island food production, power generation, and waste management systems. Movement throughout the city is expected to be facilitated by electric cars or other zero-carbon forms of transport. Logistically, the movement of goods in and out of the Floating City may be a challenge, but designers are hoping a network above, as well as underwater transport canals with fleets of transport yachts and submarines, will ease the strain.



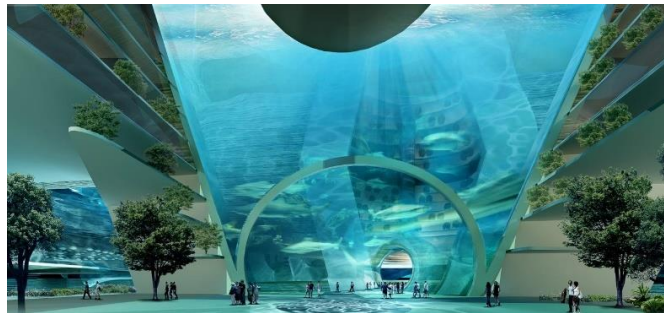
AT Design Office



AT Design Office



AT Design Office



AT Design Office

In fact, the City's center harbor, with access to its shopping and entertainment districts, could be used as a parking location of commercial submarines. The Floating City will consist of both above and underwater segments, and will feature all of the residential, commercial and entertainment accoutrements of a major city. Planners expect the City to house luxury hotels, restaurants, shopping, and other recreational options. The Floating City will even come equipped with docking facilities for cruise ships to encourage tourism. The architects at AT Design Office have also included a copious amount of green space in their design, both above and under water. The above-ground green belt is designed to provide residents with recreational space, while the underwater greenery will provide fresh air and additional relaxation space. While it is unlikely the completed Floating City will be an exact facsimile of these renderings, many of the construction techniques needed to bring the project to life already exist. The City's backers expect to

construct the city out of a series of 500 x 100-foot prefabricated blocks by implementing techniques CCCC is currently using to build a 31-mile-long bridge connecting Hong Kong, Macau and Zhuhai.

WE WANT TO LIVE

The point is that for reflective beings, death is not an option. We want to live. To die because of global warming is not an option. Admittedly, it takes five years for an idea to form a neural network in our brains.^[14] That means that it will take five years before we have the political support to apply a new idea^[15]. It also means that old ideas die hard. So does greed^[16].

So, the way out is through the separation of consciousness from the material matrix of the universe, and concern with our own personal deaths should be an incentive for us to focus on a vision of the future *that puts people first*. This preempts the death of the sun and the death of Earth, and eliminates the death of life on Earth due to global warming (the Anthropocene era). Hopefully, the possibility of death of civilization will help us to change the direction our activities. It does not eliminate our own death which is inevitable, but that stark reality should be an incentive for us to focus on this vision of the future.

CURRENT SOCIAL PROBLEMS

The prevalence of drug and alcohol problems and violence in society in the United States can be attributed in large measure to the lack of connections in society^{[17][18]}. The correction for this is the *fostering of community*.

Many of us, including those in religion think of community as spread out over a large area, a two-dimensional space. But, if we understand the Law of Complexity-Consciousness, we know that life appears in a 3-dimensional form. Take, for example, the human body. If you have ever looked at a cadaver in an anatomy class at school, you will notice that every bit of space in the organism is used. There is a high degree of organized complexity in a minimum of space. The result in a living person is *reflective* consciousness. The same is true in the organizational structure of a city. In order to foster an increase in global consciousness, we need to develop cities that have a high degree of organized complexity in a minimum of space; and unless we foster community, we are doomed to current societal problems.

LOVE^{[19][20]} AND CHRISTIANITY

Thou shalt love the Lord thy God with all thy *heart*, and with all thy *soul*, and with all thy *mind*. This is the first and great commandment. And the second is like unto it. Thou shalt *love thy neighbor as thyself*.^[21] (Mathew 22:37-39)

We often forget that we need to love God with our minds. After all, our minds came from Him too. The whole objective of our knowledge is to become one with God through Jesus. In forming community in His name, Jesus becomes present^[22]. This includes the construction of cities that foster community and psycho-social development.

Here young people with *religious* zeal can apply their enormous energy to human growth and development. We need to do more than raise our arms in fervent adoration with the expectation of leaving this physical world. We need to use our minds and our hands to participate in moving towards The Father through Christ Jesus.

CURRENT ECONOMIC PROBLEMS

The problems with inflation over more than a century can be attributed to entropic programs ^[23]: construction projects that are inefficient, costly, and do not foster psycho-social development.

Artificial intelligence is going to significantly reduce the number of available jobs. This is going to place additional stress on a population that is already suffering from loneliness, loss of community, loss of a sense of status, and the feeling that our lives do not have meaning and purpose. ^[24]

EDUCATION

The world of ideas is critical. Ideas were born with reflective consciousness. We need to add the Macroscopic Atom to our current scientific paradigm in order to compensate for our lack of a referent for motion in physics and for a solution to the problem of organization in biology and in the universe. This will change our culture ^{[25] [26]}. These ideas need to be disseminated in our educational system for the general welfare.

CONCLUSION

We have, now, a true *physics* that includes man and woman in their wholeness in a coherent picture of the world.

The institutionalized ‘billiard ball materialism of Newtonian mechanics’ (Northrop) is no longer valid. We need to change these institutionalized ideas by incorporating the new physics in our institutional and educational systems.

Evolution is, now, psycho-social. Since we are reflective elements in the system, we have the responsibility to further this process by developing cities that foster psycho-social development with community and love.

This will change our culture and eliminate a lot of the societal ills that we currently deal with.

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- ¹ Teilhard, Pierre (1961). *The Phenomenon of Man*.
- ² An increase of awareness of ourselves, each other, and the universe around us.
- ³ It is very interesting that when one Googles “images + social development”, most of the examples are in reference to children. Very few images show adults. Why is that? Isn’t social development important for adults, too? Are we so absorbed in making a living and our own families that community is not an issue? As it turns out, our primary economic goals are not people. Our primary goals are money, profit, shareholder value, and greed. The economy is operating in reverse! We are producing material goods and services instead of the spiritual.
- ⁴ What Pierre Teilhard terms in *The Phenomenon of Man* as the Omega Point (Ω).
- ⁵ Christians would do well to concentrate on this point. Since terms Christianity as the phylum of love, it becomes the responsibility of Christians to show leadership in furthering the process of evolution.
- ⁶ On a smaller scale, see the effects on the culture in Egypt: Frankfort, Henry, Frankfort, Mrs. A., Wilson, John A., Jacobsen, Thorkild, Penguin Group, 1946.
- ⁷ Moreno, J.L. (1923). *Sociometry, Experimental Method and Science of Society*. Sociometry is a technique that sociologists use to map out existing human relationships in community. The idea is to bring these human relationships as well as individuals into the new city environment.
- ⁸ Soleri, Paolo (2012). *Lean Linear City: Arterial Arcology*, Cosanti Press, 2012.
- ⁹ Soleri, Paolo (2019). *Arcology: City in the Image of Man*, Cosanti Press, 2019; first edition: MIT Press, 1969 (p).
- ¹⁰ Here is a brief sample of Paolo Soleri’s models for high density, large population urban environments:
- Hexahedron: 170,000 persons
 - Babel Canyon: 250,000 persons
 - Arcvillage: 30,000 persons
 - Arcube: 400,000 persons
 - A prototype of Babel IIB could be a smaller version: 500 persons (layers of 100, planned)
- ¹¹ Hari, Johann (2018). *Lost Connections, Uncovering the Real Causes of Depression, and the Unexpected Solutions*, 2018
- ¹² By Soleri, Paolo; Kim, Youngsoo; Anderson, Charles; Norfors, Adam; Riley, Scott, and Tamura, Tomiaki.
- ¹³ Avery, Dan (2021). “Saudi Arabia Building 100-Mile-Long “Linear” City, Architectural Digest, January 26, 2021.
- ¹⁴ McCulloch and Pitts, MIT. Neural networks in the brain are physical correlates to ideas.
- ¹⁵ Northrop, F.S.C. (1960). *Philosophical Anthropology and Practical Politics*, Macmillan, 1960.
- ¹⁶ ‘Death is the lever that moves evolution’ —Pierre Teilhard de Chardin.
- ¹⁷ Hari, Johann (2016). *Chasing the Scream, The Last Days of the War on Drugs*, 2016.
- ¹⁸ Hari, Johann (2018). *Lost Connections, Uncovering the Real Causes of Depression, and the Unexpected Solutions*, 2018.
- ¹⁹ “In regards to addicts, the opposite of addiction isn’t sobriety. It’s connection. If you are loved, you have a chance. For a hundred years we have been singing war songs about addicts. All along we should have been singing love songs to them.” Hari, Johann (2015). *Chasing the Scream*, Bloombury Publishing, New York, London, Oxford, New Delhi, Sydney, 2016 (p 293).
- ²⁰ Hari, Johann (2018). *Lost Connections: Why You're Depressed and How to Find Hope*, Bloomsbury Publishing, 2018.
- ²¹ “On these two commandments hang all the law and the prophets.” (Mathew 22:40)
- ²² “For where two or three are gathered in my name, I am **there among them**” (Matthew 18:20).
- ²³ Dickson, D.H. (1982). “Evolution and Land-Use,” (unpublished). The specific effect of an increase in numbers with no corresponding increase in organized complexity is entropy and equivalent to inflation (a world-wide phenomenon).
- ²⁴ Hari, Johann (2016). *Chasing the Scream*, Bloombury Publishing, 2016 (p 314).
- ²⁵ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p)
- ²⁶ Northrop, F.S.C. (1946). *The Meeting of East and West*, Macmillan, 1946 (p).

SOME PRACTICAL APPLICATIONS OF PIERRE TEILHARD'S THOUGHT

1. The Way Out!



Credit: www.wallpaperaccess.com

All living things have a lifespan, so does the sun. We are facing three major deaths and an impending one.



Jeanne Calment is kissed by two young girls during a special ceremony in a retirement home in Arles, Southern France, in 1995, when she was 120 years old. She died aged 122 years, 164 days, and is the longest-lived human ever reliably recorded. Photo: Reuters



Reddit

The first one is our own, personal death.

This is a subject that we do not like to talk about because it means pain from the separation of loved ones. The fear of death comes also from our very nature as reflective beings: we cannot accept the fact that our consciousness, our person, will be forever lost in death ^[1].

The second and third ones are the ageing of our sun and the death of planet Earth. There is a life-cycle for the sun. Our sun was born some 4.6 billion years ago. According to most experts we have about a billion years left on Earth before life becomes inhospitable due to the rapid expansion of the sun in its red phase that will engulf planet Earth. Everything of a physical nature will be incinerated.



The Earth from Apollo 8 as it rounded the dark side of the moon. Photograph: NASA

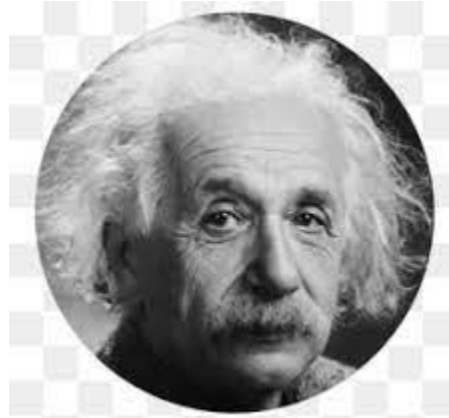
The death of planet Earth due to the death of our sun.

A fourth impending death is due to the Anthropocene phase of development on Earth. Our manufacturing processes and the gas driven automobile are expelling carbon dioxide (CO₂) and methane gas (CH₄) at an alarming rate. The greenhouse effect of these gases is warming our planet. If we reach a tipping point (and some believe we already have ^[2]) the cascading effects will threaten the very existence of civilization on Earth. Are we going to shrug off this death like we put off the death of the sun and the Earth ^[3]? *We have control over this impending death.*



Credit: Houston Chronicle, "Clear the Air," January 5, 2016
Creator: David J. Phillip | Credit: Associated Press, Copyright: AP2010

So, with three deaths in the future and an impending one what do we do? Why should I want to do anything, if all physical effort in the end will be lost, no matter how far in the future?
This is a critical question. If a human being sees no future open to him or her, they will go on strike. A proper vision of the future, then, becomes paramount.



Albert Einstein — Credit: PNG

*“When forced to summarize the general theory of relativity in one sentence:
Time and space and gravitation have no separate existence from matter.”*
—Albert Einstein

It is inescapable from our studies in science that space-time is a primary factor in the physical world. In all our observations of the universe we are looking into the past. Time and space are, therefore, inextricably linked with an increase in organized complexity. The implications? Our physical organisms are the result of an increase in (physical) organized complexity, and if we posit a quantum of consciousness associated with the atom, there is a state of consciousness associated with the organization of the human organism. We know that this consciousness in ourselves is reflective in nature since we experience it first-hand.

It becomes important that we understand this process so that we can foster its development. This will give us the vision of the future that we need because it applies to all people of Earth, no matter what geographic region or culture.

Darden H. Dickson
January 19 2023

¹ The universe is a conserver of persons (Pierre Teilhard de Chardin).

² Bendell, Jem (2020). “Deep Adaptation: A Map for Navigating Climate Tragedy,” IFLAS Occasional Paper 2 (www.iflas.info). Professor Bendel’s thinking may be under the influence of the current scientific paradigm (the present kinetic atomic theory). The Law of Complexity-Consciousness indicates a direction for evolution and is anti-entropic in nature (opposite to disintegration). This needs to be the Third Law of Thermodynamics.

³ Because of the distance in the future: Some may say, ‘I will die before that happens!’ (from a conversation with a pastor friend of mine). I replied, I replied to his remarks concernng those with this thinking, “But what about our children and their children? Also, there is the issue with our reflective consciousness: If the future is not open to preserve our persons, we will not lift a shovel. Why should we? It’s all going to be destroyed in the end. CEOs and Managers of Corporations be aware! These people are not lazy, good-for-nothings. They are just human beings (reflective in nature).

2. Multi-Colored Eggs

A variety of chickens produce eggs in a variety of colors.
The internal, physical organizational content of the eggs is identical.

The variety of human beings produce a variety (different colors) of ideas.
The ‘internal,’ physical organization of the nervous systems in the variety of human beings is the same.

In the case of chicken eggs, color is strictly the property the physics of light.
In the case of human beings, color is strictly the property of the physics of light.

With eggs, the colors are white, blue, green, brown, etc.
With human beings, the colors are white, yellow, brown, black, & so forth.

In the case of human beings, the physical organization of the nervous system and brain produces reflective consciousness ^[1]. Human beings are *persons*.

Eggs are eggs!
Persons are persons!

Yes, there is a variety of colors and physical characteristics with people just as there are with eggs.

Physical organization is common to the egg and the nervous system and brain of human beings.

But, the physical organization of human beings is more complex than that of the egg.

The *effects* of the physical organization of the egg and the physical organization of the nervous system of the human being are different.

The consciousness ^{[2][3]} of the egg is not observable (the physics and chemistry are not overshadowed by consciousness).

The consciousness of a human being is directly observable and is reflective in nature (consciousness is at a level that overshadows the physics and chemistry).

There is a direct connection, then, between organization and the level of consciousness.
This connection has been termed: the Law of Complexity-Consciousness ^[4].

This process is continuing. Human beings are, therefore, elements in the next step of organized complexity.

Since these elements are *reflective* in nature, human beings are responsible for furthering the process.
This is a weighty responsibility. If we fail to advance the process, the process will not continue.

The question then arises: “What can we do to advance the process?”

The Law of Complexity-Consciousness states that an increase in consciousness ^[5] is the specific effect of an increase in (physical) organized complexity.

That means that the reflective elements (human persons) need to be organized in society. To be more specific: we need to organize large numbers of persons in highly organized, 3-dimensional cities ^{[6][7]}.

Evolutionary development has therefore changed its face. It is now *psycho-social*. There is no ‘superior’ or ‘master’ race coming out of the human race. All the eggs are in the same basket.

Motivation. What would be the motivation to focus our efforts on such a process?

From a spiritual standpoint, “Where two or more of you are gathered together in my name, there I am also” (Mathew 18:20). Here the presence of Christ is the focus, and Christ’s purpose is to bring us to the Father.

This is the ultimate of motivations, and it means that the Christian needs to play a seminal role in furthering the process, specifically by their actions.

Community. This is a much misused and misunderstood term. What would it mean in this context?

First, when the Christian refers to community, today, they think of monasteries. My use of the term is more in line with the way the early Christians lived with something added.

Let’s take individuals and families and their required spaces surrounding them and ordering them in a 3-dimensional urban infrastructure. The person that has the most experience in doing this is the Arizona architect, Paolo Soleri, creator of the 3-dimensional, highly organized urban infrastructures (arcologies). He told me that 500 persons is the ideal minimum for community within this type of structure. This could be done in layered construction as the population increases. People would be continuing their lives in their usual manner, except now in close proximity with one another. The idea is to foster community in order to foster the presence of Christ, and to foster the presence of Christ in order to increase the experience of the love that the Father has for us.

A CONVERSATION

A Caucasian: “Why am I important?”

An African-American, an Asian, a person from India, an American Indigenous person answer together: “We are all persons!”

The Caucasian: “How are we to be successful?”

The others: “Cooperation! We have the same goals, the same purpose.

The Caucasian: “That would give us a vision of the future that would include all of us.”

The Others: “Yes, but we have a bone to pick with you.”

The Caucasian: “What’s that?”

The Others: “Your mass genocide of indigenous peoples and the poor treatment of enslaved blacks, Chinese workers, and others.”

The Caucasian: “Well, we needed the space and we needed the labor for the projects we had in mind.”

The Others: “That doesn’t justify killing, destroying people’s cultures and communities, mistreating people!”

The Caucasian: “What do you want me to do about it?”

The Others: “Well, you can start by apologizing, and then follow up by trying to make up for your actions.”

The Caucasian: “I can do that.”

The Others: “You’re a good egg!”

The Caucasian: “You are good eggs, too! Let’s begin to build the Earth together.”

Darden H. Dickson
10 October 2022

¹ We know that we know.

² Awareness of itself.

³ Here the assumption is that there is a quantum of consciousness associated with the atom (Greek: ἄτομος, indivisible, uncut, the electron).

⁴ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper & Row, 1959.

⁵ Awareness of ourselves, each other, and the environment around us.

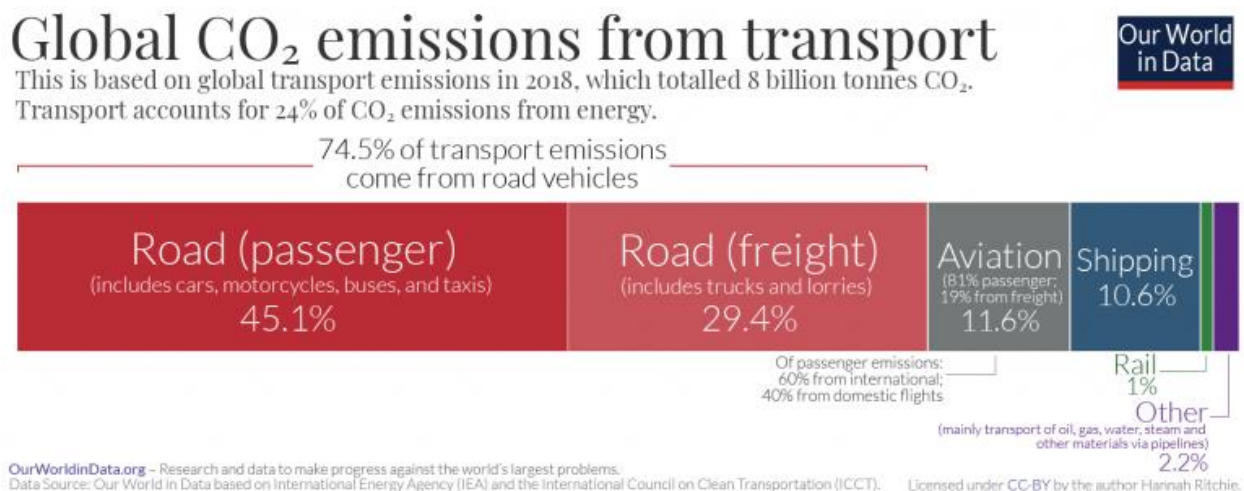
⁶ The human organism is a 3-dimensional, highly organized system.

⁷ Transportation between these cities would make mass transportation economically efficient (feasible).

3. Key Areas For CO² Reduction In Order to Curb Global Warming

Well folks, what are we going to do in 2069 when we have *depleted* our oil reserves?

FACTS:



Just 25 mega-cities produce 52% of the world’s urban greenhouse gas emissions

Posted on July 12, 2021 by [Frontiers Science Communications](#) in [Climate Action](#), [Featured News](#), [Top News](#) // 0 Comments

BY UNIVERSITY OF EAST ANGLIA COMMUNICATIONS
[STANFORD EARTH MATTERS](#)
[CLIMATE CHANGE](#),
[HUMAN DIMENSIONS AND SUSTAINABILITY](#)

March 03, 2021

At a global level, emissions reductions need to be roughly 10 times that amount, 1 to 2 billion tons each year, to hold global warming well below 2°C relative to preindustrial levels, the ambition of the Paris Agreement.



Office of ENERGY EFFICIENCY & RENEWABLE ENERGY (energy.gov)

Cities consume approximately 70% of global energy

Cities are projected to house approximately 60% of the global population by 2030

Top 10 Countries with the Largest Oil Reserves (in thousand million barrels):

Rank	Country	Reserves	% of <u>World</u> Total
1	Venezuela	303.8	17.5%
2	Saudi Arabia	297.5	17.2%
3	Canada	168.1	9.7%
4	Iran	157.8	9.1%
5	Iraq	145.0	8.4%
6	Russia	107.8	6.2%
7	Kuwait	101.5	5.9%
8	United Arab Emirates	97.8	5.6%
9	United States	68.8	4.0%
10	Libya	48.4	2.8%

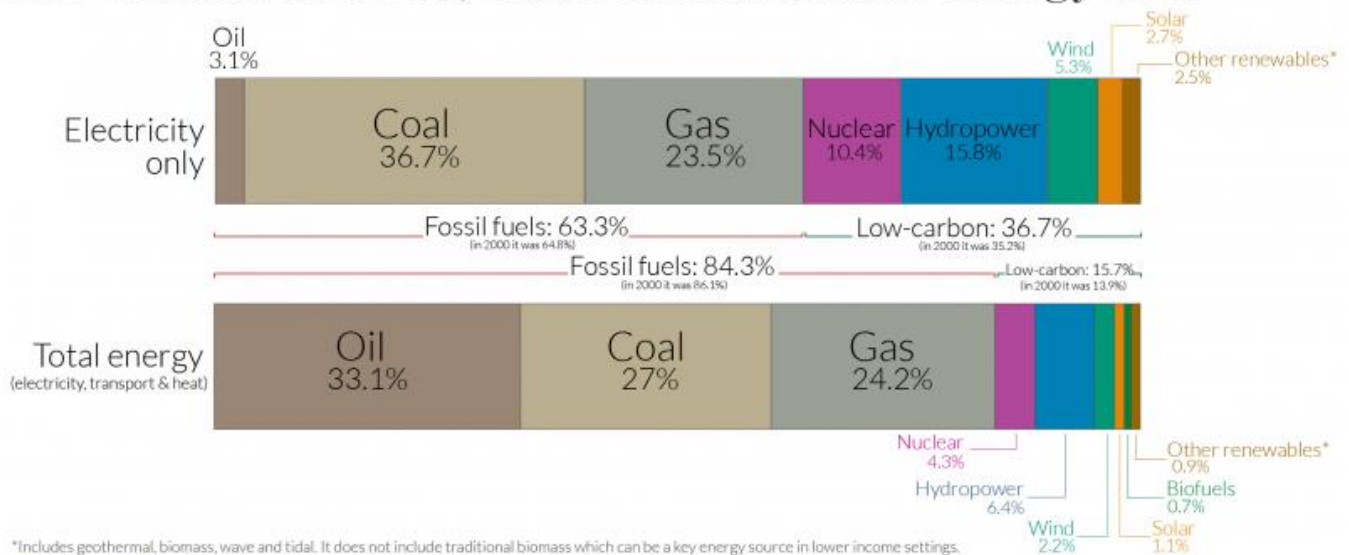
<https://worldpopulationreview.com/country-rankings/oil-reserves-by-country>

Predictive Analytics - Digital Twin for Oil and Gas - siemens.com

Summary Table

Oil Reserves	1,650,585,140,000	barrels
	35,442,913,090	barrels per year
Oil Consumption	97,103,871	barrels per day
Reserves/Consumption	47	(years left)

More than one-third of global electricity comes from low-carbon sources; but a lot less of total energy does



*Includes geothermal, biomass, wave and tidal. It does not include traditional biomass which can be a key energy source in lower income settings.
 OurWorldinData.org - Research and data to make progress against the world's largest problems.
 Source: Our World in Data based on BP Statistical Review of World Energy (2020). Based on the primary energy and electricity mix in 2019. Licensed under CC-BY by the author Hannah Ritchie.

How much of the world's oil is used for transportation? Transport Uses **25 Percent** of World Energy. Nov 19, 2015

<https://maritime-executive.com/article/transport-uses-25-percent-of-world-energy>

- What key areas should we focus on to reduce of CO² emissions in order to combat global warming?
- What key areas should we focus on to preserve our oil reserves for future generations?

THE REDUCTION OF CO² EMISSIONS

Looking at the facts, the two most promising areas to reduce CO² emissions are transportation (24%) and cities [52% (25 mega cities)].

PRESERVING OUR OIL RESERVES

The two areas that use the most oil are transportation (25%) and cities (70%).

The reduction of CO² emissions and the preservation of oil reserves requires us to focus on two areas: TRANSPORTATION and CITIES.

If fossil fuels provide 63.3% of our electrical energy, how does the charging our electric vehicles solve our CO² emission and oil preservation problem? It only postpones it.

THE CITY

Twenty-five mega cities produce 52% of our global CO² emissions and consumes 70% of global energy.

CITY: Definition of

Señor Peñalos, the former Mayor of Bogata, Columbia, defines a city as a place where people meet and talk with one another. This makes the city an instrument of psycho-social activity.

STREETS AND THE AUTOMOBILE

Streets and the automobile divide up the city and thus frustrate the psycho-social process. For that reason, the automobile and streets for automobiles must be eliminated from the urban infrastructure.

THE STRUCTURE OF THE CITY

With the elimination of the automobile and its road system, the city can be freed up for psycho-social development.

THE LAW OF COMPLEXITY CONSCIOUSNESS AND CITY DESIGN

If one looks at the design of the human organism, one sees a master piece of organized complexity. The same principles need to be applied to the city. Instead of cells as elements in the system, we have persons as reflective elements in a social system.

Darden H. Dickson
15 July 2022

4. The Openness of Children and The Future

Children amaze me.

You see them playing in all kinds of environments:

Peace, war, bad storms, sunny days, rainy days, and cold days.

They have faith in their parents, relatives, and friends that everything will be alright.

They absorb everything that's around them

Both the good and the bad.

This is what is real; these are the facts.

They are the future of our nation.

But who built this world?

We did; we adults.

“Death is the lever of evolution” says Pierre Teilhard.

‘Nothing dies harder than an old idea,’

And old ideas can no longer solve our problems.

What we are experiencing is the death of the old and the birth of the new.

Who of us adults have the eyes to see with?

Who of us has a vision of the future

In line with human growth and development?

Who of us have a vision of the future that replaces death and destruction with life?

What young person

Wants to commit him or herself

To the death of individuals and the destruction of the infrastructure and the environment?

Why not go to raves

Where one can enjoy one another's company

And get lost in drugs and alcohol.

Whose responsibility is that?

Aren't we as adults and our predecessors responsible?

Aren't we adults responsible for the current state of affairs in the world and in our nation?

What are we going to do about it?

Well, for one, we can create a new world

Centered on life and human growth and development ^[1].

How did we come into being as persons?

Does mythology in the Old Testament

Tell us the real story of how we came to be?

Or, does science, the study of God's creation, tell us?

There is ignorance in religion as well as in science,

What are we to do?

First of all, God is One.

God cannot be divided between the spiritual and the physical world.

When I was a young person in catechism classes,
I was told that this world was only temporary;
The important thing was to save one's soul
and go to heaven.

This emphasis was shifted
When I was exposed,
on my twenty-seventh birthday,
To *Le Phénomène humain*
By the French, Jesuit, priest-scientist Pierre Teilhard de Chardin.

Here evolution became an integral part of human growth and development.
It took me many years to see that the spiritual process, Divinization,
Was parallel and complementary (integral)
To the evolutionary process.

How do we define evolution?
We can define it with that of the French, Jesuit, priest-scientist Pierre Teilhard:
That evolution is an ascent of consciousness or
an increase in awareness of ourselves, each other, and our environment ^[2].

I agree with the writer, Shelli Joye,
That from an energy and physical standpoint
Consciousness is associated with
An electro-magnetic field ^[3] ^[4].

Einstein's equation, $E=mc^2$, gives us the relationship between matter and energy.
His equation, $I_4^4=3/4\rho\sqrt{\gamma}$, the forms and quantities of energy. Three-quarters of the energy of the elementary
particle is associated with an electro-magnetic field and one-quarter of the energy with a gravitational
field. The atom is indivisible, uncut: not made up of parts.

The *microscopic* atoms (the *many*) ^[5] are associated with electrons. In Northrop's model, the *Macroscopic*
atom (the *One*) is the physical boundary of the universe. This boundary is an atom in the true sense of the
Greek word ἄτομος (atom, indivisible, uncut). It cannot be divided up (that is: it is not made up of parts).
Therefore, the electro-magnetic and gravitational fields of the Macroscopic Atom are *one* and stationary
and the potentials of the electric field portion of the unitary electro-magnetic field are steady-state or dc.

Northrop's Macroscopic Atomic Theory does not support the "quark" theory (which is most likely a
mathematical fiction). "... when protons crash into one another, they release showers of electrons" ^[6].

It does support the theory of the proton, the simplest case of organized complexity, as being composed of
an organized quantity of electrons. The same would be true of the proton, but the quantity and organization
of electrons would be different.

Northrop brought our attention to the first principles of science: that they were in question.
His solution to that problem is a boundary condition for the universe, the Macroscopic Atom.
This changes our physical conception of the universe ^[7] and will change world cultures. His concept of the
Macroscopic Atom will bring East and West together ^[8].

We have the intellectual, spiritual, and scientific tools, now, to begin to build the Earth.

We owe it to our children and their children to do so.

Darden H. Dickson
11 October 2021
Revised 7 October 2022

¹ What Pierre Teilhard terms ‘The building of the Earth.’

² Evolution has changed its face. It is now psycho-social which means that we need to build community. Our old model of the city as a primary organ of economic development needs to change. (see: www.arcosanti.org). This is the meaning of the phrase ‘the building of the Earth.’ The motivation to do this work is the objective of making Christ’s presence among us and His allowing us to experience the love that the Father has for us.

³ Joye, Shelli (2018). *Ten Electromagnetic Theories of Consciousness*, The Viola Institute, 2018 (pp)

⁴ See Pierre Teilhard’s concept of energy in *The Phenomenon of Man*.

⁵ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931; Cambridge University Press, 1931 (hardback), 2013 (paperback, new).

⁶ Lerner, Eric (1985). “The Case of the Non-Existent Quark,” *Science Digest*, August, 1985.

⁷ We currently have half the physics. The other half is associated with the Macroscopic Atom and its unitary electromagnetic and gravitational field.

⁸ Northrop, F.S.C. (1946). *The Meeting of East and West*, Macmillan, 1946.

5. STRIKE IN THE NOÖSPHERE ^[1]

Summary

The evolutionary process is common to all human beings and to all life. The process that brought us into being is also the process that helps to further our growth and development as human beings in community.

To further the process of organized complexity requires that we develop a new kind of city and infrastructure development that fosters community and an increase in consciousness, or awareness of ourselves and our environment.

Once we agree on such a future and begin acting on it, the ills of authoritarianism and the democratic processes are removed: we are one in our goals, force is not required, conflicting ideational systems are eliminated, and freedom is supported.

Introduction

There are two major sets of ideas in competition with one another in the year 2021: authoritarianism and democracy.

I was on a plane trip from Washington, D.C. many years back and in conversation with a man who did business with the government. He used a phrase: “Fxxxxxg Federal Fiscal Funding” (the 4 Fs). What was his point?

Business has a difficult time planning because it doesn’t know what the government plans to do from year to year. He told me, “What is needed is a benevolent dictator.”

This points to a problem in human action: how do we efficiently organize our activities so that we can plan efficiently?

A Process Common to All Persons on Earth

What is the process that is common to all individual human beings on planet Earth? Or to phrase it a little differently: How did we come into existence as human beings?

This question is an important one for the answer comes from the study of science: the study of the physical world around us (including our own physical bodies); and because the answer provides us with a primary direction for human activity.

Evolution

What is evolution and how are we to define it?

I am going to use a French, Jesuit, priest-scientist’s definition: “evolution is an ascent of consciousness.” ^[2] As the reader can find out for himself or herself in the Webster Collegiate Online Dictionary, the current definitions do not give one a comprehensive view of the goal of evolution; and, if we grant that evolution has existed in the past, does it still exist? If it does, in what form does it currently take?

The Law of Complexity-Consciousness

The central idea in evolution as defined above is contained in the Law of Complexity-Consciousness. There is a direct link between consciousness and organized complexity:

The specific effect of an increase in organized complexity is an increase in consciousness.

or

An increase in consciousness is the specific effect of an increase in organized complexity.

[3]

To Summarize

We have defined evolution as an increase in consciousness (or awareness of ourselves and our environment) and have said that an increase in consciousness is the specific effect of an increase in organized complexity (the Law of Complexity-Consciousness).

Elements in the Process

If the elements in the process of organized complexity of the human organism are cells, what are the physical elements in the most current system of organized complexity?

The only logical conclusion that one can come to is the following: *individual human beings of all ages, sex, cultures and national backgrounds are the elements in the current process of organized complexity.* [4]

If the physical, human organism is the latest and highest form of organized complexity in nature (that we know of), what is the nature of the consciousness associated it?

By our own inspection we know that this consciousness is reflective in nature: we know that we know. This being the case, we are justified in saying, then, that human beings are reflective elements in the current stage of organized complexity. The logical implication of this for evolution is that consciousness is now psycho-social in nature. In other words, evolution has changed its face: the objective to create a physical organism having reflective consciousness has been accomplished.

To Summarize Once More

1. We have stated that all human beings in the world have come from the evolutionary process;
2. We have defined evolution as *a rise in consciousness*;
3. We have stated that the primary law in evolution is the Law of Complexity-Consciousness; that the specific effect of an increase in organized complexity is an increase in consciousness;
4. We have stated that human beings are the highest form of organized complexity (that we know of); that human beings are the leading shoot of evolution;
5. That with the advent of modern human beings, evolution has shifted to the psycho-social.

The Next Step in the Evolutionary Process

What, then, is the next step in evolution that will foster an increase in our consciousness, or awareness of ourselves and our environment? [5]

I have studied and thought about this issue for more than ten years. The conclusion I have come to is this:

The next phase in our development as human beings will be the development of community, and this development will require a more female (centered) city ^[6] (i.e. the arcologies of the Arizona architect Paolo Soleri in the United States; www.arcosanti.org). ^[7]

Current U.S. Infrastructure Proposals and the Future

Current infrastructure proposals in Congress support repairs to maintain the current, mineral-crystalline phase of urban development and urban sprawl, but do not address future needs and requirements. The minimal investment in the future would involve a national urban infrastructure project where a model city is developed to further our growth and development as human beings in community.

This project has already been started by the Cosanti Foundation (www.arcosanti.org/cosanti_foundation/), so all that is needed is government funding to rebuild the road to the construction site in order to handle the heavy construction equipment, and funds for constructing the main arcology model including any additional support structures. The cost is estimated to be less than the cost of one military aircraft. Considering that the FY 2022 President's Budget request is \$715 billion, we can certainly afford this investment in the future and in life. There are many unsolvable problems in our cities because of current city designs, one of the primary causes being the presence of the automobile and roads that break up the organized unity of the city and thus frustrate human growth and development.

In Final Summary

The evolutionary process is common to all human beings and to all life. The process that brought us into being is also the process that helps to further our growth and development as human beings in community.

To further the process of organized complexity requires that we develop a new kind of city and infrastructure development that fosters community and an increase in consciousness, or awareness of ourselves and our environment.

Once we agree on such a future and begin acting on it, the ills of authoritarianism and the democratic processes are removed: we are one in our goals, force is not required, conflicting ideational systems are eliminated, and freedom is supported.

Darden H. Dickson
28 June 2021

¹ The sphere of the mind, thought, or the world of ideas.

² Teilhard, Pierre (1955). *Le Phénomène humain*. The manuscript was written in the late 1930s in China where Pierre Teilhard and Henry Breuil discovered Peking Man.

³ For those in religion who may object, the author sees evolution as the reaction of Creation to the Creator. God set everything in motion and made everything free (which accounts for evil).

⁴ The precludes the existence in the future of a superior “race” coming out of the human race.

⁵ Since the current elements in the system are reflective in nature, human beings have the responsibility on their shoulders of *willfully* furthering the process. The process will not continue on its own.

⁶ To replace what I term the *mineral-crystalline phase* of urban development where the automobile, roads, and a lack of organized complexity are frustrating psycho-social development.

⁷ 70% of the world population will live in cities by the year 2030 (World Water Council, UN-Habitat, World Cities Report).

6. A VISION OF THE FUTURE

We in the U.S. and in the world lack a vision of the future that for all time can promote the growth and development of human beings.

After considerable study and thought since 1966, I've come to the conclusion that our actions need to be in line with the natural process that brought us into being.

Knowledge of this process is encapsulated in the Law of Complexity-Consciousness (Pierre Teilhard de Chardin, *The Phenomenon of Man*):

The specific effect of an increase in organized complexity is an increase in consciousness.

--or--

An increase in consciousness is the specific effect of an increase in organized complexity.

I define an increase in *consciousness* as an increase in *awareness of ourselves, each other, and the universe as a whole*.

Briefly speaking, there is a *quantum* (amount) of consciousness associated with the atom (the electron) and there is an increase in physical organization from the simple to the more complex causing an increase in consciousness.

As consciousness increases, there are critical phases reached, just as adding heat to water (a liquid) eventually turns it into steam (a gas). In the case of consciousness, the first critical phase is the advent of life (the biosphere), the birth of the first cells.

From uni-cellular organisms (i.e. the Stentor), evolution (a rise in consciousness) proceeds to multi-cellular organisms. The process continues, eventually to focus on the organization of the nervous system and the brain.

The next critical phase in evolution is the production of an organism with *reflective* consciousness.

Evolution becomes *psycho-social*. The *elements* in the next stage of organized complexity are *human beings* (beings who know that they know). Thus, reflective beings must assume partial responsibility for the continuation of evolution.

There will be no superior 'race' coming out of the human race (which is *one*). There will only be an increase in individual and global consciousness. Life as experienced in reflective consciousness is a major change in state. It is an entirely different form of life.

With reflective consciousness, the *noösphere* (the 'sphere of the mind' or 'the world of ideas') is born. This sphere envelops the *biosphere*.

Current political fights are concerned with ideas, ideas about ourselves and the universe as a whole. The resolution of these problems lies in correcting false notions about ourselves and the universe, and promoting change as our understanding grows.

What are the practical implications of the natural process of evolution as described here?

The conclusion I have come to after thinking and studying about the process for fifty-five years is the following:

The fostering of *community* is a direct application of the Law of Complexity-Consciousness and is the *direct means of fostering human growth and development*.

Urban planning, then, becomes the *tool* for fostering community. In short, *we need a new kind of city*.

What would this new kind of city look like?

First, anything that frustrates psycho-social development must be eliminated. This includes all automobiles, trucks, buses, etc., and their roadways. In the current phase of urban development (which I term the mineral-crystalline phase) is crisscrossed with roads that divide the city. Automobiles also take up building space (parking), and require enormous investments in manufacturing facilities, raw materials, research and development, labor, and time.

Instead of mineral-crystalline structures being built within a plexus of crisscrossing roads where growth can occur only upwards (height) and outwards (linear progression) and where the life of the city remains hindered, we need a 3-dimensional, highly organized urban environment (city) where elevators, ramps, and walking are the means of moving from place to place within a unitary structure, and where community is fostered. The definition of a city that I like is the one given by Señor Peñalosa, the former Mayor of Bogota, Columbia: *a city is a place where people meet and talk with one another*. For an example of this kind of city see: www.arcosanti.org and Paolo Soleri's models of his idea of the arcology.

I propose a national urban infrastructure project on the lines of the 'go-to-the-moon project' of the Kennedy administration where *the country, as a whole*, builds such a *model city*. This would give us a *national* project based on *life not death* (war and destruction). The military-industrial complex can be gradually phased into the construction of such cities. From an economic standpoint, such a direction for growth (the manufacture of 3-dimensional cities) can eventually replace a major part of its military production and still provide a regulating influence on the economy (can be planned for) because this process (fostering community) would be supporting an ongoing process for human development.

There are other practical applications for this direction of human activity:

1. A reduction in the use of carbon fuels, in the level of CO₂ and thus a decrease in global warming by elimination of the automobile;
2. A reduction in the use of raw materials;
3. A reduction in the cost of utility infrastructure;
4. A reduction in space-time between elements in the urban system;
5. A reduction in depression due to the elimination of commuting by automobile;
6. A reduction in heating costs: average body temperature is 98.6°F + heat from lighting, electrical equipment, passive architectural design making maximum use of the sun's heat, the use of super insulation to preserve the radiation of heat, and so forth;
7. A reduction in transportation costs by limiting major transportation to high- speed rail between high population density, 3-dimentional cities.

Such anti-entropic construction would free up capital for education, healthcare, and other important investments for human well-being.

The unending construction ^[1] of 3-dimensional, highly organized cities would provide us with a vision of the future that is anti-entropic in nature, freeing up capital for education, healthcare, and other important investments in human wellbeing as well as fostering community, a regulated economy, and human growth and development.

Darden H. Dickson
March 2021

¹ One of the primary economic indicators is the state of the construction industry. With an unending desire for human growth and development the need for functional cities to promote community and economic efficiency would be unending.

7. Pro-Life and Abortion: When is a Physical Organism a Person? (When do we have a Reflective Being?)

Abstract

Is there a direct link between the organization of a biological organism and consciousness? If there is, at what point do we have a human being with reflective consciousness (a person)?

Key Words

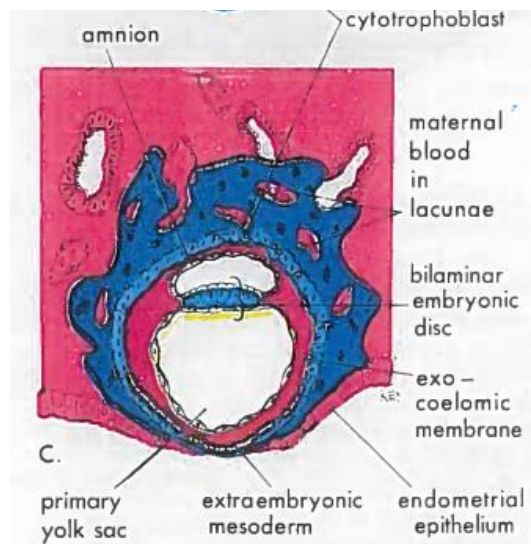
Biological, organization, person, ovary, conception, DNA, blastocyst, implantation, endometrium, uterus, embryo, fetus, organized complexity, brain, nervous system, reflective consciousness, abortion, ethical, the Burr-Lane-Nims technique, electronics, silver-silver chloride electrodes, potential differences, a unitary electro-magnetic field, early detection of ovulation, female control over one's body, early detection of cancer.

The growth and development of the human organism ^[1]

If one looks at the growth and development of the human organism from conception to adulthood, it begins with the ovum in the female ovary. Conception begins with the sharing of the male and female DNA molecules, the process of cell division and the beginning of the physical construction of the human organism.

The implantation of the blastocyst in the endometrium of the uterus is completed during the second week of development.

[Figure 4-1 C.]

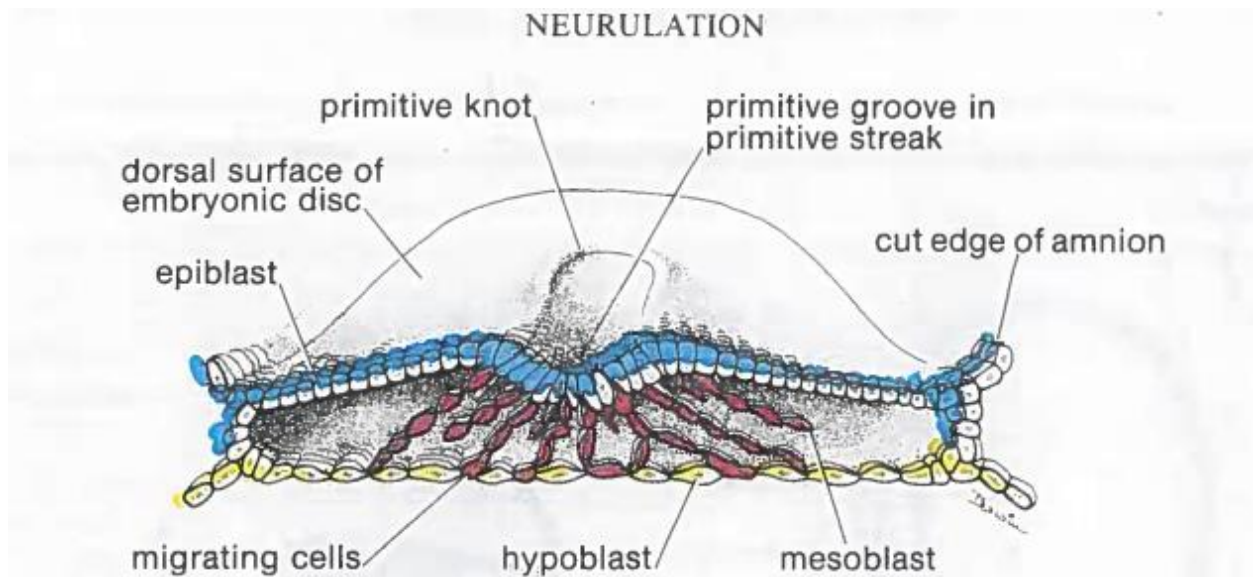


Is the blastocyst a human being?
Does it look like a human being?

Can a blastocyst walk down the street and say, “Hi”?

In the third week we have rapid development of the embryo from the embryonic disc.

[Figure 5-1]



Does an embryonic disc look like a human being?

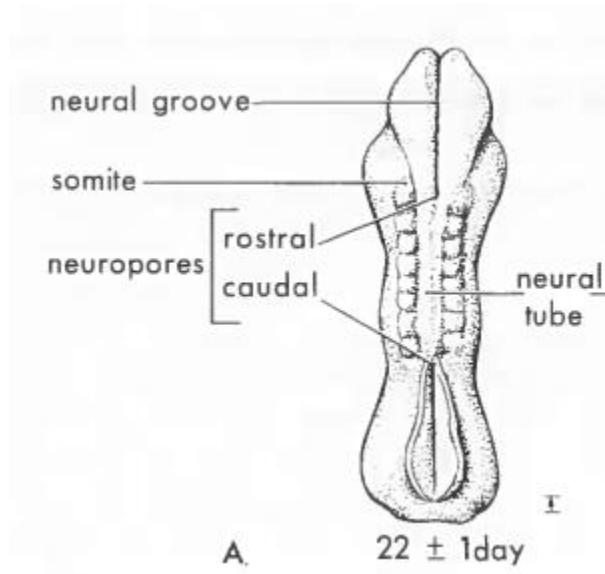
Can an embryonic disc walk down the street and say hi?

The part of the human physical organism that is specifically focused on the development of consciousness is the organized complexity of the brain and nervous system. At what point of development, then, does reflective consciousness occur and how can we measure this with the instruments of physics?

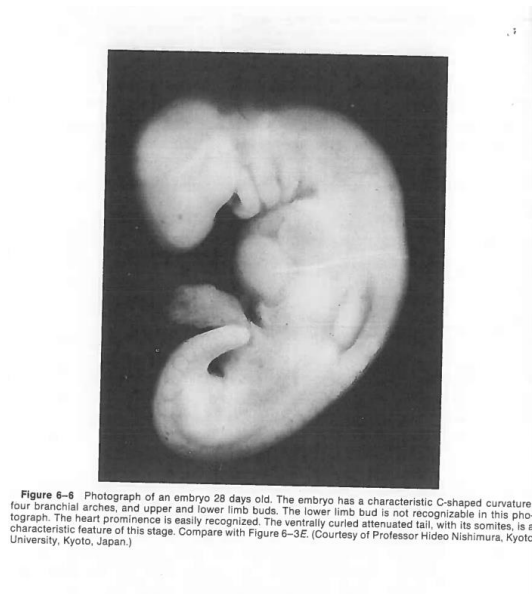
In the fourth to eighth weeks, we have the embryonic period.

In the beginning of the fourth week, the embryo is almost straight.

[Figure 6-3 A.]



In day 28, we have the embryo as shown in figure below:



[Figure 6-6]

A six-week embryo in its embryonic sac immersed in amniotic fluid looks like the following:

[Figure 6-9 B.]



A 41 to 51-day embryo looks like the following:

[Figure6-13]



A 13-week fetus looks like this:

[Figure 7-6]



A 25-week fetus looks like the following:

[Figure 7-8]



A 36-week fetus looks like the following:

[Figure 7-9]



In form, it looks like a little human being, but is it a *person*, yet?

A Physical Correlate for Reflective Consciousness

There must be an organized physical correlate for reflective consciousness in the human brain, but at what point in its development does reflection take place? This question needs to be answered because it has a direct bearing on whether abortion is ethical, or not.

The Burr-Lane-Nims Technique

Until that information is available, we have the Burr-Lane-Nims electrical technique ^[2] for the early detection of human ovulation that was developed at Yale University Medical School in the mid-1930s. With this technique, the woman knows exactly when she is ovulating and can act accordingly, reducing the necessity of abortion.

I say this advisedly because the scientific community did not pick up on this development. Why?

Two of Burr's associates, Dr. Langman and Dr. Ravitz, gave the following reasons:

1. Electronics was in its infancy at the time, and silver-silver chloride (Ag-AgCl) electrodes were difficult to manufacture (neither the portable microvoltmeter nor the electrodes were commercially available; they had to be manufactured by the Physics and Chemistry Departments at Yale) (Langman, Gynecology, New York University);
2. Vested interests (Ravitz, Psychiatry, Veterans Administration).

Confirmation of the Burr-Lane-Nims Technique

In 1988, the author, an electronic/engineering technician, familiar with the work of Pierre Teilhard de Chardin, F.S.C. Northrop, and H.S. Burr, duplicated the work of Burr on human ovulation. It was a four-month study with a registered nurse. The experimental results were positive.

The first month: no results; no electrical correlate for ovulation. He was very disappointed from a scientific standpoint.

The second month: a scientific success. For the first time, he saw an electrical correlate for ovulation: a very distinct waveform.

The third month: There was no electrical correlate for ovulation. Later, he realized that the registered nurse had only one functioning ovary. The subject and her husband made themselves ready for the fourth month.

The fourth month: an electrical correlate for ovulation occurred. The husband and wife made use of the information we had gathered. Several days later, there was another electrical correlate (fertilization). Several weeks later a chemical test was administered to confirm pregnancy (positive) and a third electrical waveform occurred (a miscarriage).

By this time, the author was emotionally involved in what was happening. Neither the nurse or he had the emotional energy to continue the study.

He would always be proud of being part of this experiment and would never forget it ^[3].

In Summary

It is critically important to understand the connection between reflective consciousness and the organization of the brain so that we may determine when the human organism is fully reflective (a person) to ethically determine whether or not an abortion can be performed. It is also important that we have a technical means in physics to verify the presence of reflective consciousness.

In the meantime, we have the Burr-Lane-Nims technique, an electrical method for the early detection of ovulation that was developed in 1935-1936. This technique was confirmed independently by the author in 1988 ^[4]. With this technique, the woman has more control over what is going on in her body and can eliminate the necessity for an abortion.

It remains to be seen whether or not the Burr-Lane-Nims technique can be used to detect the presence of reflective consciousness ^[5]. Only an experiment can determine that.

Darden H. Dickson
13 October 2020

¹ Moore, Kieth L. (1983). *Before We Are Born*, Basic Embryology and Birth Defects, 2nd Edition, W.B. Saunders Company, 1983 (pp 31, 41, 57, 60, 62, 65, 73, 75, 76).

² The measurement of potential differences of a unitary electromagnetic field. See F.S.C. Northrop's doctoral thesis, "The Problem of Organization in Biology," "The Macroscopic Atomic Theory," and *Science and First Principles*, Macmillan, 1931.

³ In addition, this same technique was used to detect the early presence of cancer before it could be detected by any other means (including a biopsy). The earlier we can detect cancer, the better the results for treatment. The lives of our loved ones are at stake. See: Northrop, F.S.C. and Burr, H.S. (1936). "Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning," *Growth*, Vol, 1, 1939 (submitted 1936) (pp 82-83; pp 78-88).

⁴ See the appendix for the experimental results of the author's work, including the data log book for the four-month experiment.

⁵ The experimental work has not been done using this technique.

8. A BRIEF INTRODUCTION TO EVOLUTION

KEY WORDS

Evolution, Darwinian, Pierre Teilhard de Chardin, 'survival of the fittest.' The American capitalist economic system, 'consumerism run amok,' social Darwinism, reflective elements, community, cities, psycho-social development, Christianity, the limited surface of the earth, an exponential increase in world population, Eastern Orthodoxy, Western Christianity, the reins of evolution, human growth and development, an increase in global consciousness, and increase in awareness of ourselves and our environment.

INTRODUCTION

It is very important to have a basic understanding of evolution.

I am not speaking about Darwinian evolution as taught in college text books of our public schools and colleges in the United States. I am speaking about the work of the French, Jesuit, priest-scientist Pierre Teilhard de Chardin ^[1].

It is easy to modify the idea of the *survival of the fittest* (species) in Darwinian evolution to support business greed in the out-of-control American capitalist economic system and 'consumerism run-amok' by defining the 'successful' business man (or woman) as one who is the *fittest*, thus, deserving to survive at the expense of others. This is so-called social Darwinism, an aberration of a true understanding of Darwin's thinking which is based on the species as a whole, not the individual.

Pierre Teilhard's work, on the other hand places all physical human beings as reflective elements in the next stage of organized complexity which will produce an increase in global consciousness of awareness of ourselves and our environment. There is no superior, physical species that will evolve out of the human species. That is an error in the logic of how evolution moves.

THE LAW OF COMPLEXITY-CONSCIOUSNESS

The fundamental idea in Teilhard's *The Phenomenon of Man* is the Law of Complexity-Consciousness which he defines as the following:

- *An increase in consciousness is the specific effect on an increase in organized complexity;*
- *The specific effect of an increase in organized complexity is an increase in consciousness.*

THE PRACTICAL IMPLICATIONS OF THIS LAW

The *fostering of community* is the practical and logical implication of this law.

Jane Jacobs in her *Economy of Cities* states that cities are primary organs of economic development. Señor Peñosa, the former Mayor of Bogata, Columbia, in a meeting in Seattle stated that cities are places where people meet and talk with one another.

Of the two definitions above, I would place Señor Peñalosa's definition of the city as primary and Jane Jacob's definition as secondary. In other words, I am placing economics subordinate to psycho-social development. This would place humanity first, as Andrew Yang did in his campaign as a Democratic candidate.

A VISION OF THE FUTURE

What do our young people have to look forward to; or to emphasize the fact: where is the hope of us with gray hair if our young people have no future?

If St. Paul's message that 'all knowledge will be wiped away' is true, then what is our purpose as human beings?

I will tell you what the ultimate goal is that everyone is striving for whether they are conscious of it, or not: perfect happiness. So, what is perfect happiness?

Perfect happiness is the experience of the love that the Father (God) has for us. That is what our souls were made for.

So, what does evolution have to do with this?

TWO PARALLEL, COMPLEMENTARY PATHS: A SPIRITUAL ONE AND A PHYSICAL ONE

In Eastern Orthodoxy *divinization* is the spiritual process of becoming more like God. The emphasis is on aesthetics and the mystical. The rational (especially philosophy, and modern science) is disdained.

In the West, the emphasis of culture is on science, the study of God's creation. In Western Christianity, theology has been based on the conception of the physical world by Plato (St. Augustine) and following that by the physical world of Aristotle (St. Thomas Aquinas).

Is it possible for there to be a conflict between the spiritual and western science?

The answer to that question is no. There only *appears* to be a conflict because of our lack of a true understanding of both the spiritual and sciences.

To be more to the point, how can God who is *one* and *who sustains everything* be divided from 'his' ^[2] creation?

That being said, the *purpose* of knowledge is to provide the means of helping us to bring ourselves into the presence of the 'Father' which is the same thing as saying 'increasing our experience of the love that The Father has for us.'

How, then, does evolution bring us closer to God? How can we accomplish that?

THE ROLE OF CHRISTIANITY

I said previously, that the practical and logical implications of the Law of Complexity-Consciousness are the fostering of community. Since human beings are reflective in nature, evolution is now *psycho-social* and requires that human beings make a *conscious effort* to further their own evolution. In other words, *evolution provides us with a means for focusing our activities and actions here on Earth*. Thus, the Christian is the spearhead on the shaft of humanity, even though it may not, yet realize it. For the first time in human history, the compression of all peoples on the surface of the Earth (society) is coming into play

by the deterministic factors of the limited surface of the Earth and by an exponential population increase in world population.

THE EASTERN AND WESTERN BRANCHES OF THE EARLY CHRISTIAN CHURCH

The return to unity of the two major branches of Christianity is, therefore, of primary importance to the future of humanity. This will provide for the union of the aesthetic and mysticism of the East and the rational knowledge (the science of God's creation) of the West. Both are needed for our further development as human beings.

THE OBJECTIVE OF WESTERN KNOWLEDGE

It has been said that the objective of Western knowledge is to find the reins of evolution. This short paper has tried to outline, in simple terms, what is needed to further that process, and thus to foster an increase in global consciousness (an increase in an awareness of ourselves and our environment).

Darden H. Dickson
29 February 2020
Revision 1: 11 April 2020

¹ Teilhard, Pierre (1955, 1959). *Le Phénomène humain* [French (1955)], *The Phenomenon of Man* [(English translation) (1959)]. Teilhard had a doctorate in geology, and degrees in botany, zoology, and anthropology.

² I use the word 'his' advisedly, for the physical form of the father is spherical in nature and can be likened to an immense womb in which everything has come into existence. From this standpoint, the father is 'female'. See Northrop's *Macroscopic Atomic Theory* in his *Science and First Principles*, Macmillan, 1931. "Somewhere in a place beyond the skies, there is a prototype or primordial image of the mother that is pre-existent and supraordinate to all the phenomena in which the 'maternal,' in the broadest sense of that term, is manifest." – C.G. Jung, *The Archetypes and the Collective Unconscious*, The Bollingen Series, Vol 9, Part 1 (p75). Jung says his archetype is synonymous with the platonic idea (p75).

9. The Responsibility of the State

Introduction

I heard a report this morning concerning the water issue in Flint, Michigan. Those problems are continuing.

What's going on in Flint Michigan?

The reporter on the radio mentioned that the state has discontinued giving bottled water to the citizens of Flint, Michigan. Those citizens have been lining up at local churches who have been raising funds for bottled water. Complaints have been that people are still worried about the water and don't trust the state. Apparently, the state has not monitored the installation of water purifiers that are supposed to handle the lead content. A good number of the citizens are elderly and disabled. One citizen was blind, and when someone visited her and she was told that the little red light on her water purifier was blinking, she broke down and cried.

Genocide?

The larger percentage of the population in Flint are black or poor. Those who could afford to move away have done so.

Nationally, there are around 300 cities whose lead levels are higher than those in Flint— some as much as twice the level. The citizens of these cities are also principally, black or poor.

Why are these persons being treated this way?

Is this *genocide*?

The System

What is the aim of the current economic system? Is it not the extraction of wealth from the poor and the middle class?

All the evidence indicates that this is exactly what is happening.

This is IDOLATARY; making money and profit one's *God*.

'I am the Lord your God, you shall not have strange gods before me!' is one of the Ten Commandments.

Another name for this is crass materialism, or greed.

An Analysis

An analysis of the actions of the politicians in the state of Michigan indicates that the *bottom line* takes precedence over the welfare of the state's citizens.

This, in turn, reflects the influence of the current economic system, the 'water' in which we swim.

There is another factor which is not spoken much about. The neo-Malthusians believe that there are not enough material resources to go around for the current world population of over 7 billion human beings. This is supported by the information in the book, *Limits to Growth*, by Donella H. Meadows, 1972. Their solution is to eliminate, by various means, over 5 billion persons.

So, who gets eliminated in the United States, if not those who are of color: those who are not white Anglo-Saxon, Protestant; those who are not the original stock that founded the United States. Here we have *white supremacy*! There is no other word to call this but *racism* and the resultant actions as *genocide*!

What is at the core of racism or white supremacy?

I have discussed this issue in other papers. Basically, we are dealing with a *static view of the world*, rather than a *process* which has brought human beings into existence.

When I use the word *process*, I am not speaking of a 'Darwinian evolution' which can be easily twisted to mean 'social Darwinism,' 'the survival of the fittest,' which is ideational support for the drive for money and profit in the American capitalist system. I am speaking of the general outlines of evolution as presented by the French, Jesuit, priest-scientist Pierre Teilhard de Chardin.

What are Teilhard's basic ideas of the process which brought us into being?

The principal idea in Teilhard's *The Phenomenon of Man (Le Phénomène humain)* is what he calls The Great Law of Complexity-Consciousness.

To begin with, he postulates that if there is consciousness in human beings, there is consciousness in the elementary particles. In other words, the *atom* (electron) in the Greek sense of that word (indivisible, uncut) has a quantum of consciousness associated with it.

He states that there is a process in growth from the simple to the more complex with a corresponding increase in consciousness.

This would mean that the *proton* is the next stage in an increase of organized complexity, followed by the *neutron*. The next major stage in organized complexity is the chemical element, hydrogen primarily with one *electron* and one *proton*. The next element is helium primarily with two *electrons*, two *protons*, and two *neutrons*.

What follows are an increase in complexity of all the elements in the Periodic Table.

The next major stage in organized complexity is the molecule. Water is a good example. It contains two elements of hydrogen and one element of oxygen. In other words, here we have a joining of two or more chemical elements: in this case hydrogen and oxygen.

The next stage in the process are polymers (large chains of molecules) and eventually to the birth of the first living *cells*. Here we have a critical point in which the level of consciousness overrides the effects of physics and chemistry. We have the birth of life and the biosphere.

As this process continues, we eventually have the development of nervous systems and brains.

Our sciences tell us that eventually, the organized development of the nervous system and brain reaches a point where there is a change in state: we have *reflective consciousness* and *persons* (those who know that they know).

We can observe in this process the previous major stages in organized complexity become elements in the next stage. That is, in human beings the cell becomes the basic element in the physical system.

We need to extend this process into the future.

What will be the elements in the next stage of organized complexity?

Extending this process, *human beings (persons)* will become the next elements in the process of an increase in organized complexity (*psycho-social development*).

Here we have a major change above the level of the cell. Consciousness in the human element is *reflective*. In other words, the elements in this stage of organized complexity are *reflective* in nature. Evolution (the *process*) has become *psycho-social* (persons with persons). An increase in consciousness, thus, becomes *global*, lining the limited geometrical structure of Earth. Above the biosphere we have the *noösphere* (the sphere of human thought) and *psycho-social development*.

What are the implications of these facts?

First of all, there will be no superior, *physical race* evolving from the process. What does this mean?

It means that there is only one race, the human race with human variations. *All human beings* are *elements in the next stage of organized complexity*. The consciousness associated with the next stage in organized complexity, then, will be *individual* and *global (one)*.

If we apply these ideas (scientific facts) to current societies in the United State and in the world, it means that *every person is important in the process* and *every person is meant to develop* in that process.

In other words, there is no room for *racism, genocide, or white supremacy* in the United States, on this planet Earth, or in the universe as a whole. We are done with these things *forever* by our understanding! They are *verboten*!

What is the state's responsibility, then?

In order to understand the state's responsibility, we need to talk about community.

It is the community that establishes government, and community (*the psycho-social*) is primary. Lack of community (*the psycho-social*) means that government is separated from community (community is minimal or non-existent). Those in government by education, experience or by choice exist, then, by and for themselves, but not for community.

The states real *responsibility*, then, is to *community* and the physical aspects of fostering an increase in organized complexity. The materialism of the state, then, becomes *subordinate to* an increase in consciousness: an increase in understanding of the individual and the individual's environment; an increase in human growth and development.

What is the community's responsibility?

The community's responsibility is to pursue the process of human growth and development (evolution).

The fact that human beings have free will and their understanding of themselves is not complete, means that persons will make mistakes. These mistakes will make it difficult for community to function, so there is a spiritual dimension to human growth and development.

There needs to be constant work and effort in fostering community. This is where the energy associated with evolution (in ourselves) needs to focus.

Policing

The function of police in the current society in the United States and elsewhere is to support the economic system and those in power (the empire).

What would be the function of police in the new system?

The community would take responsibility for community order.

As is stands, now, the police force is trying to maintain order externally with a fragmented society. If one follows the logic of this, the ideal would be for each citizen to have its own policeman or policewoman to keep him or her in line. In other words, under the current system *without the police*, there would be *no morality*. There is a hidden but fundamental error here. All of us are 'sinners', even the police. *Who is going to police the police?*

This is the cultural effect of the 'billiard ball materialism of Newtonian mechanics,' a phrase I picked up from F.S.C. Northrop, Professor Emeritus, Yale University, in the Spring of 1972.

Most of us has seen a billiard table at one time or another. The balls are arranged on the table in a triangular formation, then a cue stick and ball are used to strike the formation to break it apart and to target the side pockets. The one with the largest number of balls in the side pockets wins.

The game of billiards requires that a player apply force in order to make the balls move in a direction he or she wants it to move. Applied to society this defines power politics and the philosophy of those in positions of power to get others to do what they want them to do. The fact that cue balls are replaced by human beings (with free will) means that, carrots and sticks are used, but if carrots don't work, then the stick is used. But this is an old and dying system.

The new 'game,' the process of an evolving system (evolution) as defined above means that policing is transferred to *community*. There is an exterior responsibility for protection that would still reside in the state, but that would be limited to physical protection. Spiritual and human growth and development would be protected by those in community which would include those with governmental responsibilities.

This would be a democratic republic in the pure sense of that word, not an empire, because materialism as an end in itself would have ended.

Christianity and Evolution

Most of those in Christianity are not aware of their responsibilities to foster human growth and development.

If God brought us into being through a process of development, then Christians need to foster that development.

This means that there is a Christian objective that motivates the process.

The Second Coming of Christ coincides with what Teilhard terms the Omega Point, the point at which the whole evolutionary process culminates. The only supremely attractive force would be *the person of Christ*. What this means for the Christian is that he or she cooperates in the Second Coming.

The Future

For the second time in the history of Earth a major event is preparing to take place: a shift from the material to the spiritual. The first major event was the birth of the first *persons*.

What is before us?

Once we shift from the material to the spiritual, the old capitalist system as we know it will fade from memory.

The growth and development of *persons* will become primary.

The State, then, will be responsible for fostering the development of community by the use of architectural techniques to build a new kind of city, a 3-dimensional, highly organized urban infrastructure.

Since we will learn as we go along which designs perform the best for fostering community, the construction business will be a primary aspect of our economy and the principal occupation of the State under the control and supervision of the citizens of that state.

Darden H. Dickson
11 October 2018

10.0 A Solution to Human Sexuality Problems In the Roman Catholic Church

News Reports

The news reports from major media have been focusing on the sexual abuse of children by Roman Catholic priests in the state of Philadelphia.

With few exceptions the emphasis has been on reporting the current facts, as known.

Little emphasis has been given to examining the reasons behind the behavior.

One priest being interviewed stated that *celibacy* was not the *cause* of the problem. He went on to say that the *real cause* was *insufficient screening* of candidates for the priesthood.

A Comprehensive Analysis

What is lacking, in my view, is a comprehensive analysis of the problem.

This morning I heard a lecture on the radio by Chris Hedges entitled “Extraction Industries & Sexploitation” on Alternative Radio. He lays the source of the problem directly to the capitalist system, exploitation, empire-colonialism, and especially to the problem of male superiority and the denigration of adult and female children. He says it is a *power-over-others* issue.

A Power-Over Others Mentality

In regards to the Roman Catholic Church issue in Philadelphia, it is my view that celibacy *is* an issue. But there is *another issue* that stems from empire: the hierarchical structure of the Roman Catholic church itself. Here we have a definite *power-over-others* mentality.

A Conflict Between What One is Taught and What One Learns from Life

In the Roman Catholic Church, the religious life (which includes celibacy) has been taught as the highest life a person can choose. This can cause problems. What happens to a *young* person who chooses the vow of celibacy without the catechism instructor knowing about it? What happens to that person in puberty with the normal experiences of Human sexuality? If a person in the Roman Catholic Church chooses the most perfect life (which includes celibacy) and if the primary reason for doing so is a love for God, what happens to that person’s psyche and normal sexual development? The church teaches that to love God one must do what the Church asks one to do. If one cannot, then the logic of these ideas and circumstances mean that one does not love God. “Love the Lord your God with all your heart and with all your soul and with all your strength and with all your mind”; and, ‘Love your neighbor as yourself.” (Luke: 10-27). That person is now locked into what can be a serious, life-long psycho-social-religious struggle. For one leading the life of a religious, labeling sexual intercourse as a mortal sin, touching a woman’s breast as a venial sin, and masturbation as a mortal sin compounds the problem. In regards to a mortal sin, one is in danger of losing one’s soul unless one makes it to confession in time before he or she dies.

Effect on the Attitudes Towards the Opposite Sex in General and in Marriage

What does this do the attitude of a male or female towards the opposite sex? It sets up the female or male as an enemy of the spiritual life for the religious. After about five years of that kind of training (before puberty), the human brain has formed neural networks that correlate with these ideas (McCulloch & Pitts, MIT). If a person marries, sexual intercourse is *experienced as a sin*. Unless this problem is corrected, these embedded ideas can break up a marriage. Though the Church has the primary responsibility in teaching these ideas in an appropriate manner to young persons, the *ultimate responsibility to solve this problem* lies with the person who accepted the ideas in the first place.

How can Such a Problem be Solved on a Personal Level?

How does one solve such a problem? The only solution I am aware of is a statement by the author of *The Aquarian Conspiracy*, Marilyn Ferguson. She said that ‘only a positive experience can break through the negative attitudes in our culture and in religion’. I would add that a *pure human love* must be an aspect of that experience.

How can this Problem be Corrected at the Church Level?

The issue of *celibacy* and *the hierarchical structure of the Church* need re-examination.

First, if not already done, *a thorough examination of the history of celibacy* needs to be compiled. Next, *an examination of the problems that married priests pose to the Church* need to be examined and resolved in a manner that is satisfactory to *all* members of the Church. This should be easy because there are married priests in the Roman Catholic Church that come from Protestantism and from some Eastern Churches.

Second, an examination of the hierarchical structure of the Church will require an examination of how we came to be in God's creation. In other words: what is the process that God set in motion to bring us into being? Evolution is the response of the created to the Creator.

The Work of St. Thomas Aquinas, Einstein, and Others in Relation to Theology in the West

The last major influence in theology in the Roman Catholic Church was the work of St. Thomas Aquinas.

St. Thomas Aquinas' work was based on the work of Aristotle. Aristotle's work is *teleological* (*goal-oriented*). It should be noted that Aristotle's *physics* has been proven to be *in error*, and the physics of its replacement, the billiard ball materialism of Newtonian mechanics (a source of much spiritual grief) is a case in the newer physics of Albert Einstein. Additionally, the work of Einstein has been supplemented by an amendment in the form of a physical addition to the kinetic atomic theory (the current scientific paradigm). This physical conception of the universe gives us an *organic view* of the universe.

The Roman Catholic Church, a valid western religion, finds itself in a position in which she does not relate to the ideas in the current culture of the West and thus cannot provide a vision of the future which is congruent with God's creation. This is true also for the Eastern Orthodox Churches, but for other reasons, since the Eastern Orthodox Churches have an emphasis on the *mystical*, the *aesthetic*, and *intuitive*, not the *theoretic*, which is the basis for theology in the West. The balance of both lies within the union of the Eastern and Western Churches (i.e. the union of Eastern and Western thought; see: *The Meeting of East and West*, F.S.C. Northrop, Macmillan, 1946).

A New Theology in the Roman Catholic Church will be required

There has been no major, new theology in the Roman Catholic Church since St. Thomas Aquinas (1225 –1274).

A new theology in the West will require the amended physics, by F.S.C. Northrop, of Albert Einstein's Special and General Theories of Relativity, and the work of the French, Jesuit, priest-scientist Pierre Teilhard de Chardin.

The Biblical Commission in Rome was responsible, according to a conversation with Fr. King at Georgetown University, for the ban against the publication of Teilhard's work while he was living. If Teilhard had not willed his work to his Secretary, we might not have it now. As it stands, we do, and the knowledge of it is world-wide. That *does not mean* that the basic scientific, social, and economic implications of his work in *The Phenomenon of Man* have been accepted.

Pierre Teilhard's work in *The Phenomenon of Man* spells out the mechanisms in which God brings His creation into being. That needs to be part of the theology because it points to a goal and a vision for the future that parallels the Church's spiritual goals (the divinization process).

F.S.C. Northrop, Professor Emeritus, Philosophy and Law, Yale University, in his *Science and First Principles* amended the physics of Albert Einstein to correct Einstein's false theory of motion. The Experimental work that verified Northrop's proposal for an amendment to the kinetic atomic theory was accomplished by Harold S. Burr, Professor Emeritus, Section of Neuro-Anatomy, Yale School of Medicine and his colleagues. Their findings: *an electrical method for the early detection of ovulation and cancer.*

These findings, though not intended, also verify Teilhard's proposal for *radial* energy which he associated with organization in nature. Professor Northrop's amendment provides the *new physics* and H.S. Burr and his colleagues provide experimental verification for Northrop's work. Northrop's doctoral thesis taken under Lawrence J. Henderson, Professor of Biologic Chemistry at Harvard, was "The Problem of Organization in Biology." As it turns out, this physics accounts for organization in the universe (as a whole). The ideas of Teilhard and Northrop on energy, therefore, are *congruent*.

A Vision of the Future, Some Implications of a Philosophy and Theology based on the New Physics

First, I would like to address the religious community.

When I was a young man in electronic and other manufacturing businesses, the thought often occurred to me as to how Christianity and the goals of a corporation could be joined together.

More often than naught, I saw the Roman Catholic and Eastern Orthodox *Churches* with eyes focused on the past (the Church fathers, scripture, etc.) rather than with eyes on the future.

What would be a vision of the future (the teleological) that would include all human beings?

In order to answer that question, one needs to understand the social implications of the work of Pierre Teilhard de Chardin.

The Social Implications of Teilhard's Thinking in *The Phenomenon of Man*

The main idea in *Le Phénomène humain* (the French title) is *The Law of Complexity-Consciousness*.

Assuming a quantum of consciousness associated with each individual atom of matter, *The Law of Complexity-Consciousness* states: *The specific effect of an increase in [physical] organized complexity is an increase in consciousness. Or, correlatively, an increase in consciousness is the specific effect of an increase in organized [physical] complexity.*

With an increase in organized complexity there is an increase in consciousness, but there are, he says, critical points along the way. One of them, for example, is the birth of the first unicellular organisms. Here consciousness for the first time rises above the local physics of matter. This is the birth of the first life forms, the beginning of the biosphere (*the beginning of life*). Another example of a critical stage in the develop of consciousness is the birth of the first *human beings*. In this case, the nervous system and brain have developed to such a high degree of organized complexity that there is a *change in the state of consciousness*: consciousness has become *reflective*. In other words, we have beings that *know that they know*. We have *persons*.

Another deduction from this process is that all major stages of organized complexity are incorporated into the next stage; a primary example of this is the *cell*. The cell is the *basic element* in the human organism.

Extending these ideas, human beings are *reflective elements* in a willful *increase* in organized complexity. This means that evolutionary development has changed its face. No longer will it need to bring physical organisms with *reflective consciousness*, or *persons* into being. That *has already been accomplished*. Now evolution is *psycho-social*, *persons-with-persons* in *community*. The next major increase in consciousness, then, will be global as well as individual.

Community, then, is a direct application of *The Law of Complexity-Consciousness*.

How do We Define Community?

At present, we use the word *community* in our conversations quite frequently, but what do we mean by *community*?

In our present culture in the United States the emphasis is on the individual which reflects the institutionalization of the physics of the billiard ball materialism of Newtonian mechanics. This *cult of the individual* along with *competition* is antithetical to *community* and *cooperation*.

The *capitalist economic system* also encourages isolation of the individual. Under the influence of 'social Darwinism,' the successful businessman becomes the superior race ('the survival of the fittest') which is an aberration (a misunderstanding) of how evolution works. In other words, it is a *big lie*.

As a general policy in the United States, we do not actively seek *community*; *isolation of individuals* is the prevalent policy.

A good definition of *community* is: *willful organized complexity*, a willful association of persons with adequate surrounding space who live together frugally in a highly organized, 3-dimensional environment that includes living, working, and playing spaces, without the automobile and without roads to divide community and the socialization process (see: www.arcosanti.org).

Urban Design, a Tool to help foster Community

Urban design, then, becomes the tool to foster community, and community becomes the means to help foster human growth and development. This would parallel and help foster the divinization process in Christianity:

Where two or more of you are gathered in my name,
there I am, also. (Mathew 18:20)

High density, urban population areas, then, could be connected by high-speed transportation systems, making cities and transportation systems economically efficient.

The development of these new cities would be anti-entropic, thus contributing to the availability of funds for important purposes, such as health care, education, the arts, and for research in the basic sciences.

The Energy of Evolution and Human Sexuality

The energy associated with evolution needs to be expended somewhere. If *not focused on community and human growth and development*, where does the *energy* associated with this development process go?

One of the strongest forces in human beings is the *sexual*, the primary force of reproduction. At the present time, and in general, many of us are wasting the energy for our growth and development as human beings on human sexuality and, in addition, on *violence* and *anger*. In short, we are unhappy, and our genuine human needs are not being met. We are looking for our happiness in the wrong place, and not understanding the source of our unhappiness, and with our seeming inability to change things, we resort to violence and anger. We do not have our eyes to see with.

Crossing the Rubicon

Now, I would like to quote the final paragraphs in *Crossing the Rubicon*:

It may not sound like much, but it will hopefully prove to be more than we think. Great things are accomplished from humble beginnings, and unlike oil, courage is a limitless and renewable resource.

You will make your decisions in the deepest places where you live. If there is anything that I want you to understand, it is that as a species and as a planet we have reached a point of self-imposed crisis that can neither be postponed nor evaded. That crisis [Peak Oil] and the values with which it is addressed are matters of life or death. But they are also even more than that: the crisis and our response will constitute, for good or for evil, an open and monumental testament that fully and finally reveals our most fundamental nature. It will be a validation of what humanity's deepest priorities *really* are (emphasis mine). If the best we can do for our tens of thousands of years of cultural evolution is to destroy our planet and then ourselves, then perhaps *we do not deserve to survive* (emphasis mine).

Human beings have explored outward to the limits of this planet in search of resources and understanding and experience. We have peered deep into boundless space [it only appears to be boundless] by sending probes billions of miles away, even beyond the outer planets of the solar system. We also explore backwards in time, extrapolating the sublime mysteries of the Big Bang cosmology and theoretical physics. We spend hundreds of millions of dollars and lifetimes of intellectual passion on archaeological digs to find the earliest ancestors of our bodies and of our human mind.

But that mind is readily seduced toward astonishing feats of domination and cruelty. The combination of bureaucracy, technology, and rationalized quantitative measurement that built the great industrial civilization of the past 200 years, also created the Nazi death camps. There, efficiency and centralized control were as developed and refined as their uses were depraved and vile. The same cold, administrative approach to life that built the vast economies of the modern world is also preparing a terrible solution to the collapse of those economies. In the Empire's vision, love and art and religion and community are invisible; *they count for nothing* [emphasis

mine]. It is as if the human race existed only in a statistical dimension; a calculus equation in need of a solution.

Distilled, all our pursuits essentially ask just two simple questions: Who are we really? And why are we here? We have been looking in the wrong places for our answers.

Let them that have ears listen. Let them that have eyes see.

[Rupert, Michael (2004). *The Decline of the American Empire at the End of the Age of Oil*, p 594]

A Vision of the Future for Christianity and a Leadership Role for the Church

The problems of the Roman Catholic Church in Philadelphia reflect *a general problem in society as a whole*.

The solution to this problem will involve a change in world cultures. This will happen gradually with *an updated vision of the physical universe of which we are an integral part*. It means that our sciences will need to be updated with an amendment to the first principles of all our sciences, and all our educational systems, including private secular and religious, will need to teach the new physics.

Community will be fostered by the development of new kinds of cities (3-dimensional, highly organized) with high-speed transportation systems linking them.

Nations will have a new vision of the future, a vision in which the human person and his or her personal growth and development is primary.

The current capitalist system will need to be re-engineered so that personal growth and development will be primary and the material made secondary and subservient to the primary goal. We could name it the *human growth and development (hgd) economic system*.

What I Believe and do not Believe:

I personally do *not* believe that secular society, by itself, has the spiritual resources to enable it to accomplish this vision of the future.

I believe that Christianity *does* have the spiritual resources to accomplish this vision.

I believe that the *sexual problems* endemic in the general society will gradually subside with this new view of the future, as will abortions and the suffering from cancer (both from technology stemming from the new physics). We have confirmation of the new physical conception of the world and its attendant physics and a vision of the future for ourselves and for our children and grandchildren.

I believe that once we human beings willfully begin this crucial journey it will not end until *all has been accomplished*.

What the Church is enduring now is *painful*, but there is also a vision of the future in which she is capable of being an example for others to follow, by extending the process which God has put in motion. This, indeed, is being of service to humankind. We finally have the ability to combine Christianity with the Earth and human endeavors and development.

We need to begin, *immediately*, a serious *building of the Earth and our future as human beings*.

An Admonishment and Exhortation

In regards to the Roman Catholic Church: 'He who is without sin cast the first stone!'

A question to those who are 'throwing stones': What is your object? Is it to make this a better world, or is it to divide and conquer? Is it to try and bankrupt the Church through payment of legal fees (to support the legal profession) and the sale of church property (a way for secular forces to steal Church property)? Is this an attempt by *empire* to eliminate a threat to their power? Or is this an attempt to make this a better world?

Robert Mueller (like the news media shining light on the problems in the Roman Catholic Church) is shining a light on President Trump and his associates. If he were to shine that same light in another area of business or politics, he would find similar corruption. *The entire system, itself, is corrupt*. So, what is the purpose of Robert Mueller's special investigation? It must be *political!* There are forces at play who want Trump removed from office (from power).

The same case could be made for the sexual problems in the Roman Catholic Church. *The whole of society has a similar problem*.

Let's make our objective *God's will for us*, not *greed, power and control*, and, with a new understanding of our place in the universe, let's work together to make this *a better world in which to live*: for ourselves, our children, and our grandchildren.

And when I am lifted up from the earth, I will draw everyone to myself. (John 12: 32).

Christ is the very meaning of the whole evolutionary process and the source of power and energy that draws all things to itself. (Ref: Pierre Teilhard de Chardin, Marcus Braybrooke, "Intertwining Science and Religion for the Sake of the Planet," The Interfaith Observer, September, 2017

Darden H. Dickson
20 August 2018



11.0 There is Only One Race: the Human Race, with Human Variations

There is only one race: the human race, but where do *human variations* come from?

The further back we go in time, the simpler are the means of travel and communications. It seems incredible to us who have automobiles, air planes, radio, faxes, television, computers, and cell phones that there was a time when *these things did not exist!*

When I was a little boy, I remember the automobile, the airplane, and the radio, but there was no television. We had an icebox that held a large block of ice that would be delivered each week to our house. My mother had a washing machine with a ringer on the side that was used to ring water out of the clothes. Then, she would hang them to dry on a clothes line, or, if it was cold, or rainy, she would hang them on a wooden clothes' rack that could be mounted over the wood stove or on the floor. We got our water from a hand pump next to the kitchen sink that delivered water from a hand-dug well beneath the floor. We grew a lot of our own food. The neighbor had a Model T Ford. There were no jet planes; they were all propeller-driven. This was during WWII, the end of the war, and a few years afterwards.

If we go back even further, there were no automobiles, only horses, horse-drawn carriages, and wagons. My grandmother came to the Eastern Washington area around Walla Walla on a wagon train. There were no air planes, no steamboats, only sailing vessels. When I was a young boy, a fellow we knew as “old Joe” had come around the tip of South America on a sailing schooner. The Panama Canal hadn’t been built, yet. He had killed someone in Florida, I think, and had escaped to the Pacific Northwest. He was a model citizen and attended his political party meetings on a regular basis. He lived in a small house in the woods. Until the late 1800s and early 1900s, there were no automobiles, no air planes, no telephones, no telegraphs, and no radios! Until the late 1800s in England, there were no electrical systems to generate electricity.

The further back we go, our means of transportation and communication become more and more limited in allowing us to move any considerable distance over a short period of time. In other words, the ability of the general public to move about was pretty much restricted (for most persons) to the geographical location in which they lived. This meant that the geology and climate of the region had a considerable influence on the color of human skin. Those who lived in tropical climates had darker skin and those who moved to cooler climates developed lighter skins.

Anthropology and genetics teach us that *the birth of humankind took place in Africa*. In other words, the black African is not only our brother and sister, but also our relative and ancestor. The brown-skinned Asian and Mexican American are also our brother and sister, but their relatives and ancestors were the black Africans, too. The more recent African American is more closely related to the black African because of the slave trade from Africa.

What is the difference between the pre-human being of over a million years ago, then, and the first truly modern human beings of about ten thousand years ago?

To answer that question, we need to understand consciousness.

Darden H. Dickson
5 May 2018

12.0 There is no Superior Race Coming out of the Human Race: Our Future is in Psycho-Social Development And an Increase in Consciousness

There is no superior race coming out of the human race. There is only the human race with human variation, and psycho-social development. Our focus as human beings needs to be on psycho-social development and an increase in consciousness.

What is consciousness? Consciousness is an awareness of ourselves, each other, and the world around us. In human beings, that consciousness is reflective: we know that we know. A dog or cat have consciousness, but it is not *reflective*. Consciousness is an integral part of matter and its organization. This goes all the way back to the first one-celled organisms. At that point, we have the birth of the first living organisms. The mega-molecular world before the birth of the first living, one-celled organism does not have the same expression of consciousness. Consciousness is there, but submerged beneath the physical aspects of matter. The one-celled animal denotes a change in the organized state of matter with a correlative change in the state of consciousness (the birth of life) and denotes a consciousness that rises above the physical aspects of matter.

The nervous system in mammals points the way to the human organism in which the nervous system and brain have reached such a high degree of organized complexity that a critical change in the state of consciousness occurred: *consciousness has become reflective!* We can literally look back and see where we and our consciousness come from.

If our development as human beings is tied to the development of consciousness, then further human growth and development is tied up with consciousness, too. Reflective consciousness is part of every human being, no matter what the color of our skin, nor matter what our cultural heritage. Since consciousness is so pervasive and integral to our coming into being, it must advance in some form. The statement can legitimately be made, then, that *life is the rise of consciousness*. If this rise of consciousness is continuing, as evidence indicates it is, what form in the future will it take?

Since human beings represent a change in the state of consciousness that is reflective in nature, further development must take the form of *psycho-social development*.

In other words, there is no superior race coming out of the human race!

I repeat: *there is only one race, the human race, with human variation*. Anyone who says differently has either *a lack of scientific knowledge* or is *lying!*

This should, once and for all, end the white, Teutonic, Aryan idea of superiority. It has *no foundation* in our *sciences* (economic or otherwise), and has no place in *religion* or in our *physical conception of the world!*

Our future is in psycho-social development and an increase in consciousness, an increased awareness of ourselves and our environment.

Darden H. Dickson, May 2018

13.0 With Technology

Born from a New Physical Conception of the Universe, As Organic and One, There will be Less Need for the Human Female to Have an Abortion

Not-with-standing the “multi-universe” of quantum mechanics, the *real* physical universe is *organic* and *one*. This new, physical conception of the universe gives us a technology *for the early detection of ovulation and cancer*. The need, therefore, for a woman to have an abortion will become a *non-issue*, except for serious medical issues.

The above, physical conception of the universe, that it is *one* and *organic*, has the support of the greatest scientist of our age, Albert Einstein. It is also supported by the biologic chemistry of Lawrence J. Henderson of Harvard and by the work of the Russian scientist Vernadsky in a communication to a French scientific organization and published in French. In my view the “multiverse” of quantum mechanics is a product of mathematics that has no connection with the physical world we find ourselves in. It is just a *reflection* of the current scientific paradigm, the kinetic atomic theory.

Professor F.S.C. Northrop (*Science and First Principles, 1931*) took his doctorate “The Problem of Organization in Biology,” under Lawrence J. Henderson at Harvard in the late 1930s. The pre-publication manuscript of Henderson’s *Blood: A Study of General Physiology* had a strong influence on his doctoral thesis, though he focused on the solution to the philosophical problem of *the one and the many*. Philosophy follows from the first principles of science (Northrop in his 1931 Preface to *Science and First Principles*).

Harold Saxton Burr, Section of Neuro-Anatomy, Yale School of Medicine, and his colleagues did the experimental work that verified Northrop’s hypothesis in his doctoral thesis and independently verified Pierre Teilhard’s hypothesis of ‘radial’ energy (though they were not aware of it). Teilhard’s concept of energy and that of Professor Northrop’s in his doctoral thesis, “The Problem of Organization in Biology,” and in *Science and First Principles*, are *congruent*. (Dickson, D.H., journal for the Center for Frontier Sciences, Temple University, Vol 5, Number 1, Fall/Winter, 1995)

What are the experimental findings?

“By the mere application of the electrodes of the apparatus to the rabbit, Burr, Hill and Allen found in 1935 that the instant of ovulation, confirmed by the immediate opening of the animal, exhibits itself in a sharp and marked deviation of the potential reading from the normal.

“In 1936, Burr, G.M. Smith and Strong found that strain differences between cancer-bearing and cancer-immune mice were accompanied by different systemic electrical field characteristics for the two strains.

“Moreover, these changes of potential difference increase in intensity with the presence of cancer, and enable one to detect the inception of cancer before its presence can be detected by any other means.” (“Experimental Findings Concerning the Electro-Dynamic Theory of Life, and an Analysis of their Physical Meaning,” *Growth*, Vol I, 1939, pp 78-88)

We have already, therefore, a method for the early detection of human ovulation and cancer that was discovered in 1935-1936!

I hope some woman stands up and raises hell about this. Consider the *82 years of the human suffering* from the result of cancer from 1936 to 2018! *Heads are going to roll on this one!*

You corporations who are in the business of dealing with the presence of cancer had better get on the bandwagon or you are going to lose out! In other words, you need to support this technology and see to it that the general public has a simple, electrical and affordable means for the early detection of cancer. I warn you corporations and politicians: If you try to bury this knowledge for financial reasons, there will be a national and international ferment!

The same goes for human ovulation. We need a simple and affordable device for the early detection of ovulation (the breaking of the follicle). A woman will be able to monitor her own body, then, and decide if she wants to be pregnant, or not. With this technology, *born from a new physical conception of the world*, there will no legitimate need for the female to have an abortion, other than for serious medical reasons. In other words, abortion will be a non-issue!

Both the sperm and the egg are alive! At what point does reflective consciousness occur in human morphology and growth? At reflection we have a person, a being that knows that it knows. We do not have a human person (a reflective being) at conception; we just have *the beginning of the construction* of a human organism. Reflective consciousness requires a high degree of organization in the nervous system and the brain.

Concerning the matter of abortion, the key question, then, is: "What structure in the brain correlates with reflective consciousness, and when is it formed?"

Darden H. Dickson
5 May 2018



14.0 We Have an Electrical Method for the Early Detection of Cancer and Human Ovulation that was First Developed in 1935-1936!

What is the theoretical basis for the experimental findings that gave us an electrical method for the early detection of ovulation and cancer in 1935-1936?

The theoretical basis for the early experimental findings for an electrical method for the early detection of ovulation and cancer came from the philosophical work of F.S.C. Northrop and the experimental work of H.S. Burr, Section of Neuro-Anatomy, Yale University Medical School and his colleagues.

Dr. Burr and his colleagues were measuring *potentials of a unitary electro-magnetic field*. The positive results of these experimental findings and subsequent findings over a period of fifty years confirm Northrop's doctoral thesis which will require an amendment in the form of an addition to the current kinetic atomic theory.

There is a physical boundary to the universe which is atomic in character (indivisible, uncut) which surrounds all microscopic, kinetic atomic matter (is hollow in the interior).

Emanating from the interior of the physical boundary (the *Macroscopic Atom*) and filling its interior is a unitary electro-magnetic and gravitational field. This *macroscopic* field (the *one*) interacts with the *microscopic* electro-magnetic and gravitational fields of kinetic atomic matter (the *many*), and forms a *compound* electro-magnetic field.

In reference to the human organism, this *compound field* is present throughout the organism. Since an electro-magnetic field has two components to it: an electric field and a magnetic field, there are two types of potentials associated with the *compound* electro-magnetic fields: variable potentials, and steady-state, or d.c., potentials. The variable potentials will modulate the d.c. potentials. This means that any organizational change in the organism will be reflected in the d.c. potentials of the unitary electro-magnetic field of the *compound* field. These potentials can be observed on the *surface* of the organism by using a high impedance digital voltmeter (≥ 10 meg ohms), an ionic medium (saline solution, conductive gel, etc.), and silver-silver chloride (Ag-AgCl) electrodes.

It must always be remembered that, although the two types of electro-magnetic fields interact, the *sources* of these two types of fields are different (*separate*).

This experimentally verifies the idea that the universe is *one* and *many* (*organic* and *one*).

We have an experimentally verified, electrical method for the early detection of ovulation and cancer, then, that was first developed in 1935-1936.

The suffering of humankind and our loved ones requires that we do something about this!

Darden H. Dickson
5 May 2018

15.0 Human Beings are in a Spiritual and Physical Struggle for Our Future Development on Earth

**(As an Integral Part of the Universe,
We are using the Limited Resources of Earth
As if it had an Unlimited Supply)**

The physical conception of the universe as *organic* and *one* has implications for the environment. No longer can we ignore our place in the universe. We have a *physics*, which *includes* the *human person*, and if we poison our environment, we poison ourselves. We are an integral part of our environment: *the environment is one pole of our very existence!* This includes Earth and its environment, the sun, our solar system, the Milky Way Galaxy, and all the rest of the universe! The Earth will provide for our existence, then, if we are *frugal* in the use of its resources; but its resources are *limited!* We are in a spiritual and physical struggle for our future development on Earth.

The current form of capitalism will destroy us, because it sees profit as its motive (greed) and the production of material goods and services as its end. It sees the world's resources as limited, but wants to limit the use of those resources to those countries that already have a high standard of living (greed). In their minds, there is not enough to go around! They are simply gobbling up Earth's resources as if they were the property of corporations and governments (empire). This is making money one's God (idolatry)! In effect, by their actions they are destroying the Earth!

This has to be *reversed!* *Material and financial pursuits need to be subordinated to the growth and development of human beings*, not the other way around! In other words, *the system needs to be re-engineered!*

The question arises: in what direction do we need to go in for human growth and development? The following phrase (often repeated by leaders or by public officials), "... we need to move forward," drives me up the wall! This presupposes a *goal* or *direction*, but that *goal* or *direction* is *never given!* Now that *I have given it*, it is *not my* responsibility to *refute it!* *If they cannot refute it*, then we need to be going about the *important business of building the earth!*

The phrase, "The separation of church and state," needs to be re-examined! The responsibility of the state needs to be the *physical* part of things. They need to *stay out of the personal lives of its citizenry!*

The churches and individual human beings in community are responsible for the spiritual or moral part of citizen's lives. The police are not the *protectors* of morality! Some in law enforcement and the prison system think that unless there is a policeman at every person's side, human beings will be immoral. Therefore, the police and prisons must protect us. Hog wash! All of us are sinners, including the police! The police are presently there, in my view, to protect empire, to establish an environment that business (those with money) can flourish in, and to perpetuate class structure. It is an *impossible task* to ask them to monitor and control society as a whole!

The state's responsibility is our physical welfare. That includes economics, infrastructure building, the building of cities to *foster* community, etc. A lot of our problems have to do with *lack of community*. It is my view that religious leaders and individuals with appropriate knowledge need to take responsibility as far as *community development* is concerned, while the state needs to be *responsive* and *responsible* to members of the community, and *needs to support physical infrastructure so that community can be fostered by individuals and their supporting organizations*.

"A house divided against itself cannot stand!" (Abraham Lincoln). Everything from soup to nuts, including the sexual, a very strong force in human beings is being used by politicians to destroy one another and to divide the nation. What makes it an even more effective tool to destroy one's enemy or divide the public is the fact that Christianity and our culture in the United States have a negative attitude towards human sexuality.

It is interesting that *sexual problems* are laid in the *male's* lap. *Why?*

I know of a woman of a vice president of a corporation who wanted to go to bed with an employee who worked on the manufacturing floor. He refused. She sent him threatening, unsigned notes to make his job uncomfortable. One of his friends, who was female, was threatened with the loss of her job. Finally, the man's job was taken over by a member of the parent corporation.

I know of a woman engineer who played footsy with a technician and later became the head of a group and used her position to take over the decision-making of a person who was already doing well, taking responsibility for the shipment of the final product. Here is an example of the desire for power and control.

I know of another example in the movie industry of a female head of a department requiring that the men go to bed with her if they wanted to work with her.

I also know of a well-known western author who received letters from readers who wanted him to include sexual events in his stories. Those letters were sent by women, not men!

What I am trying to say is this: if a woman is given responsibility in a corporation that has top down management, are not the same temptations there for her as well as for males, especially since the advent of the birth control pill?

The attempt is being made to divide men and women! This is part of an old military strategy: divide and conquer! We need *cooperation* between males and females, not *isolation and division*!

The sexual, then, becomes a symptom of something much deeper. *The hierarchical organizational structure* itself is in question. *Community* and democracy become the cure, but they both need a physical conception of the universe in which the human being is a part, and an understanding of the process by which we came into being, as well as the age old prescriptions of religion. Otherwise, the many forms of democracy or authoritarianism will not succeed, and sexual problems and other problems of a social nature will continue to increase. *Any* hierarchical organizational structures will have these problems — including those in religion!

We are human beings in a struggle to understand what we were made for. This is essentially a *spiritual issue*. But how we came to be is a *physical* issue. Knowledge of *both* are necessary for our future development on Earth.

Darden H. Dickson
5 May 2018

16.0 The Future is Open to All of Us: We Have the Tools We Need to Participate in Our Own Development as Human Beings

The future is open to us all. We have the keys, both technical and social, to help us participate in our own development as human beings. The implications of The Law of Complexity-Consciousness are an important as far as psycho-social development is concerned. This means that we need a new type of city, a city in which the architecture fosters community and human growth and development (See the work of the Arizona architect, Paolo Soleri; www.arcosanti.org).

Since our consciousness is reflective, *we are responsible for furthering our own growth and development as human beings*. In other words, if we *choose* to further our development as human beings, we will *progress* in our psycho-social development. If we *choose* not to, or if we are ignorant of the process which brought us into being, we will *regress* in *psycho-social development*; thus the importance of the *educational process* and *community*.

We are in a situation where we are being compelled to be physically closer to one another. The limited spherical surface of the earth, and the exponential increase in world population is pressing us together?

Since we as human beings join together from the 'within', I happen to believe that this evolutionary pressure will ultimately help us to succeed in our development as human beings.

In the meantime, we need to update our physical conception of the world we live in and incorporate this physical conception of the world into our classrooms, right down to the lower educational levels. This will help change the errors in our culture and in world cultures, prevent basic science and research from marking time, and will provide us with technologies and a community environment that will support the individual, marriage, the family, our own nation, and the other nations and members of the world. It will provide us with a vision of the future, a vision where every person counts and every person, male or female, young or old, and no matter what color or culture has a role to play in this world of ours. The future is open to us all!

***There is no superior race coming out of the human race!
There is only the human race and human variation!***

We all came out of Africa!

Which way will we choose to go?

There is only one logical conclusion: The building of the earth and our growth and development as human beings.

Darden H. Dickson
5 May 2018

17.0 EINSTEIN'S GENERAL THEORY OF RELATIVITY: SOME PROBLEMS AND THEIR SOLUTION

Abstract

A consideration of some of the problems with Einstein's General Theory of Relativity and their solution.

A survey of literature and recent experimental work concerning F.S.C. Northrop's Macroscopic Atomic Theory and its relation to the above problems in the General Theory of Relativity.

Key Words and Phrases

The General Theory of Relativity, P.A.M. Dirac, Alfred North Whitehead, F.S.C. Northrop, boundary condition, the Einstein-DeSitter model, measurement over great distances, the kinetic atomic theory, a referent for atomicity and motion, The Macroscopic Atom, The Macroscopic Atomic Theory, compression of kinetic atomic matter and their individual fields, the problem of organization in biology, atom, silver-silver chloride electrodes, input impedance in making electro-magnetic field measurements, cosmic implications, steady-state dc potentials, a unitary electro-magnetic and gravitational field (either), a compound electro-magnetic and gravitational field, the Burr-Lane-Nims technique.

PROBLEMS

(1) P.A.M. Dirac:

Part I – Einstein's Theory is Inadequate

I might mention in one respect in which the present Einstein theory [the General Theory] is clearly inadequate. It is a theory which gives us equations describing the gravitational field, but does not give sufficiently precise equations for one to be able to get answers to specific problems. In order to be able to get definite answers we have to have these equations supplemented by boundary conditions. We have to know something about the conditions at very great distances. People up to the present have been working on the assumption that the study of the gravitational field of certain masses one can assume that at great distances space is just a flat space of the Minkowski-type. But that is plainly not a correct assumption. In order to understand the conditions at great distances one has to have a model of the universe. One has to have some appreciation of what the universe is like when the local irregularities produced by stars and galaxies being scattered about; when these local irregularities are smoothed out. Now Einstein himself proposed a certain model; Einstein's cylindrical model, it is called. But it was soon realized that this model would not do because it was observed that matter at great distances from us, the galaxies, are all

receding from us. They are not in constant positions. They are all moving away; all moving apart from one another. This would contradict Einstein's model, so Einstein gave up that model.

Mike Waters: After years of work in 1932, Einstein collaborating with DeSitter proposed another model.

P.A.M. Dirac (continues): It was proposed jointly by Einstein and DeSitter. They joined forces and produced another model, the Einstein-DeSitter model, in 1932. This model gave distant matter to be receding from us in the way that it ought to, and it also gave the non-zero average density of matter, an average density roughly of the correct value. This Einstein-DeSitter model is the simplest model which is acceptable, which does not have some obvious flaw.

Part II – Should there be some absolute zero velocity ...?

P.A.M. Dirac:

If you think of velocities, then it is quite obvious that the velocity of a body can have a meaning only with respect to the velocity of something else. It's only the difference of two velocities which is a well-defined concept; and the question is, should there be some *absolute zero velocity* to which all other bodies can be referred to give us an *absolute velocity for a body*? That is a question which really cannot be decided by philosophy. It can only be decided really by experiment, by observation. One must see if one can find this absolute velocity.

P.A.M. Dirac (continues):

Experiments had been done by Michelson and Morley to see whether there was such an absolute zero velocity and the base of their theories, in fact all of physical theory, at that time, was based on the idea that there was an absolute ether and that had to be used for a referent system when we talk about light moving with a definite velocity through the ether. Now, the question arose, can one determine the velocity of the ether; can one find out the velocity with which the earth is moving through the ether? And that is just what Michelson and Morley tried to do with some careful experiments at different times of the year when the velocity of the earth would have to be different, but their experimental results were all the same. ^[1]

(2) Alfred North Whitehead:

[The tensor equation for gravitation] necessitates that the metrical structure of space is conditioned by the motion and distribution of matter. Hence, we can understand why Einstein maintains that space-time must be defined in terms of matter. However, Alfred North Whitehead has pointed out that it is very difficult to understand *how measurement is possible if this is the case*. ^[2]

(3) F.S.C. Northrop:

... [T]he General Theory of Relativity as it came from Einstein cannot be the end of the story.

... [Our] knowledge of the consequences of ... [the] physical theory, consequences established by Greek science, indicates that if nature is physical and contains motion, then it must be kinetic atomic in character, and there must be a referent for atomicity and motion which is other than the moving microscopic particles. As matters now stand, with the traditional referent, absolute space, non-existent, and space-time eliminated, and no geometrical structure permissible, *no such referent [for motion] exists.* ^[3]

THE SOLUTION TO PROBLEMS (1 – Parts I and II), (2), and (3)

Introduction

Professor F.S.C. Northrop, Department of Philosophy, Yale University, received his doctorate in the Philosophy of Natural Sciences under Lawrence J. Henderson, Professor of Biologic Chemistry at Harvard in 1924 with guidance in philosophical clarity under Professor William Ernest Hocking ^[4]. Northrop's doctoral thesis, "The Problem of Organization in Biology," provided the physics for the problem of organization in biology ^{[5], [6]} the implications from which were cosmic in extent.

THE PHYSICS OF THE MACROSCOPIC ATOMIC THEORY

First, we have an immense, hollow, physical *atom* ^[7] (in the Greek sense of that word: *indivisible, uncut, with no parts*) as the *physical boundary condition* of the universe. ^{[8], [9], [10], [11]} (1-Part I) (2) (3)

This gives us a justification for the *curved space* referred to in Einstein's tensor equations for gravity in his General Theory of Relativity, and makes it psychologically simple *by making spherical space the interior of a physical, 3-dimensional, spherical object.*

The Macroscopic Atom gives us a *referent for motion*, since absolute space, absolute time, and absolute space-time have been removed by Einstein in his Theory of Relativity. This also gives us *philosophical and scientific justification for the kinetic atomic theory.* (3)

A closed physical, spherical boundary for the universe would indicate that the universe is not expanding outwardly with no end to the process; that *kinetic atomic matter is being compressed by the physical form and the unitary electro-magnetic and gravitational field of the Macroscopic Atom.* Otherwise, the universe would fly apart, and no account could be made for *the anti-entropic increase in organized complexity of the biosphere.* This compression also gives us the ability to make measurements over great distances. (1-Part I) (2)

Second, within the hollow portion of the Macroscopic Atom (the physical boundary) is contained the *many* microscopic atoms (the electrons) with their individual electro-magnetic and gravitational fields. The Macroscopic Atom (the *one*) has a unitary electro-magnetic and gravitational field emanating from its inner surface and filling its hollow, curved interior. (1, Part II) (3)

The fields of the Macroscopic Atom and the Macroscopic Atom itself are at rest (stationary), and the Macroscopic Atom, itself, is at rest and has no moving parts. The unitary electro-magnetic field of the Macroscopic Atom can, therefore, be referred to as the '*either*,' but the lines of force of this field are curved and the mathematics for the unitary electro-magnetic and gravitational field, according to Northrop, have not been developed. ^[12] (1-Part II) (3)

Third, within the hollow portion of the Macroscopic Atom we have a *compound gravitational and electro-magnetic field* ^[13] made up of the *many* electro-magnetic and gravitational fields of the microscopic atoms (electrons) and the *one* (unitary) electro-magnetic and gravitational field of the Macroscopic Atom (the '*either*'). (1-Part II) (3)

Since gravity bends light, one cannot see the Macroscopic Atom. This model also requires us to reexamine the effects of the *compound electro-magnetic and gravitational field* on the passage of light (the doppler effect and the bending of light in a gravitational field), and correlatively, *our notion of the permanent expansion of the universe*.

Fourth, *the lines of force of the unitary electro-magnetic field are curved* (circular). The lines of force issuing forth from the microscopic atoms are *linear*. *So also*, is the motion of electrons within the Macroscopic Atom. *The spiral form of the double-helix of the DNA molecule* is a combination of the *linear forces and direction* of the microscopic atoms and the steady-state *circular force* of the *unitary electro-magnetic force in time and space* (space-time).

Fifth, *the potential differences of the electric portion of the unitary electro-magnetic field are dc* (steady-state) in nature. Since the *Macroscopic Atom* accounts for *organization in biology* ^{[14], [15]}, then *the changing fields of the kinetic atomic* will 'modulate' the *steady-state (dc) potentials of the unitary electro-magnetic field*, giving us a means for monitoring organizational changes in biological systems.

Sixth, *the measurement of the steady-state potentials of the electric portion of the unitary electro-magnetic field require the use of silver-silver chloride (Ag-AgCl) electrodes and an ionic medium between the measuring instrument and the organism*. *The instrumentation* itself must have a microvolt or millivolt range with *an input impedance ≥ 10 megohms*. ^[16] Otherwise, the instrumentation will cause current flow through the resistance of the tissues, setting up potentials across that resistance which will mask the dc potentials of the unitary electro-magnetic field.

Seventh, *the orientation (structure) of bioparacrystalline materials* ^[17] in the *structure of the cell of the organism* ^{[18], [19]} is affected by *electric and magnetic forces*. ^{[20], [21]} This would include *heat*, and *light*, both of which are *electro-magnetic* in nature. This would make *field physics* primary and *chemistry* secondary.

Experimental Verification of the Macroscopic Atomic Theory

At this point, it was necessary for Northrop to present his theory to the scientific community for experimental verification.

Professor Northrop joined forces with H.S. Burr, Section of Neuro-Anatomy, Yale University Medical School, and published two papers, one in 1935 ^[22] and the second one completed in 1935-1936 and published in 1939 ^[23].

The results of that experimental work were astounding: *an electrical technique* ^[24] *for the early detection of cancer and the early detection of female ovulation* ^[25].

Some Scientific Implications of the Findings of the Macroscopic Atomic Theory

1. An amendment in the form of a physical addition to the current kinetic atomic theory;
2. The current scientific paradigm (the current form of the kinetic atomic theory) has only *half* the physics. The other *half* is *the physics of the Macroscopic Atom*, having to do with *unity and organization* in biology and in the universe as a whole ^[26].

A Social Implication of the Findings of the Macroscopic Atomic Theory

1. Experimental evidence supports *an organic conception of the universe*. No longer can we see ourselves as separate from the universe. In fact, *we are part of the whole and the whole of the universe supports our existence as human beings*. ^{[27], [28], [29]}

Experimental Findings of The Macroscopic Atomic Theory and The Electro-Dynamic Theory of Life

Burr and his colleagues in their experimental work referred to the potentials in their experimental work as *potential gradients*. It must be emphasized, here, that these potential gradients are *dc* in nature and are associated with the *unitary electro-magnetic field*, the source of which is *external to the organism being studied*. ^[30]

1. An electrical correlate for the early detection (screening) for cancer ^{[31], [32], [33]};
2. An electrical correlate for the early detection of human ovulation and the elimination (except for serious medical reasons) of abortion. All females at the age of puberty would be monitoring their ovulatory cycle. ^{[34], [35], [36], [37], [38], [39]};
3. An electrical correlate for hypnosis ^[40];
4. An electrical correlate for sleep studies (including sleep apnea) ^[41];
5. An electrical correlate for psychiatric studies ^[42];
6. An electrical correlate for the study of diseases ^[43];
7. An electrical correlate for the study of trees ^{[44], [45]};
8. A possible electrical correlate for earthquake prediction ^[46];
9. An electrical correlate for death (the absence of the dc potentials of the unitary electro-magnetic field) ^[47].

In Summary

The Macroscopic Atom (the *one*) of Northrop's Macroscopic Atomic Theory provides a *physical boundary* for the universe. The mathematics of the unitary electromagnetic and gravitational field will need to be worked out by mathematical physicists before we can supplement Einstein's equations for gravitation, so that we can find solutions to specific problems. This takes care of P.A.M. Dirac's observations concerning a boundary condition for the universe. (1-Part I)

The Macroscopic Atom, with its physical existence and inner, unitary electro-magnetic and gravitational field, provides an *absolute zero velocity*. (1-Part II)

The *compression of the kinetic atomic* (the *many*) by the Macroscopic Atom (the *one*) gives us *metrical uniformity* so that we can make *measurements over long distances*. This removes Alfred North Whitehead's objection to Einstein's General Theory. (2)

Professor Northrop's *Macroscopic Atom* provides *the missing referent for motion* and provides *philosophical and scientific support for the current kinetic atomic theory and the problem of organization in biology and the universe as a whole*. (3)

From a pragmatic standpoint, experimental verification of Northrop and Burr and his colleague's work gives us an *electro-metric technique for the early detection of cancer and human ovulation*.

For the field of science as a whole, *an amendment in the form of a physical addition to the current kinetic atomic theory will be required*.

Darden H. Dickson
31 July 2019



P.A.M. Dirac
Mathematics, Quantum Physics (1902-1984)

Paul A.M. Dirac was born in 1902 at Bristol, England, his father being Swiss and his mother English.

He studied electrical engineering [at Bristol University], obtaining the B.Sc. (Engineering) degree in 1921. He then studied mathematics for two years at Bristol University, later going on to St. John's College, Cambridge, as a research student in mathematics. He received his Ph.D. degree in 1926. The following year he became a Fellow of St. John's College and, in 1932, Lucasian Professor of Mathematics at Cambridge.

He received the Nobel Prize in physics with Erwin Schrödinger in 1933.

Dirac's work has been concerned with the mathematical and theoretical aspects of quantum mechanics.

The importance of Dirac's work lies essentially in his famous wave equation, which introduced special relativity into Schrödinger's equation. Taking into account the fact that, mathematically speaking, relativity theory and quantum theory are not only distinct from each other, but also oppose each other, Dirac's work could be considered a fruitful reconciliation between the two theories ^[48].

Paul A.M. Dirac died on October 20, 1984.

Dirac's publications:

- *Quantum Theory of the Electron* (1928)
- *The Principles of Quantum Mechanics* (1930; 3rd ed. 1947) ^[49].



Photo by Richard Carver Wood

Alfred North Whitehead Mathematics, Philosophy, Metaphysics (1861-1947)

Alfred North Whitehead, English mathematician and philosopher was born in Ramsgate Kent in 1861.

In his early career Whitehead wrote on mathematics, physics and logic. During that period, he is best known for *Principia Mathematica* (1910-1913) which he co-authored with Bertrand Russell, a brilliant student of his at Trinity College. The "official" text was written in a notation, most of which was either taken from Peano or invented by Whitehead. The devising of a theory of logical types Whitehead left to Russell, who, having no teaching duties, wrote out most of the book. Whitehead's "On Mathematical Concepts of the Material World" (1905) employed the symbolism of the *Principia*.

Also well-known are his *An Introduction to Mathematics* (1911), one of the best books of its kind.

One of the greatest books in Western metaphysics is Whitehead's *Process and Reality* (1929). His philosophical system exerted its greatest influence on "process theology" through the influence of the philosopher Charles Harshorne and the theologians David Ray Griffin and John B. Cobb.

"Culture is activity of thought, and receptiveness to beauty and humane feeling. Scraps of information have nothing to do with it." ^[50]

In *Religion in the Making*, "Whitehead interpreted religion as reaching its deepest level in humanity's solitude, that is, as an attitude of the individual toward the universe rather than as a social phenomenon." ^[51] – Victor Lowe, the Editors of Encyclopedia Britannica

On a personal note, his father, Alfred Whitehead, was an Anglican clergyman. His mother, "Maria Sarah Buckmaster, was the daughter of a prosperous military tailor."

Alfred North Whitehead was the youngest in their family. He was home-schooled until he was 14 by his father. He then attended Sherborne School, Dorset, "one of best schools in England". "In 1880 Whitehead entered Trinity College, Cambridge, on a scholarship where he attended only mathematical lectures. " ... [H]is interests in literature, religion, philosophy, and politics, at the time, were nourished solely by conversation."

In February 1891, he married Evelyn Willoughby Wade. "She had been born in France, a child of impoverished Irish landed gentry, and educated in a convent. She encouraged Whitehead in making some of his major decisions, one of which was to accept a position at Harvard in 1924 to teach philosophy at age 63. She had "a great sense of drama and a real and unusual aesthetic sensibility, and she enriched Whitehead's life immensely."

Whitehead's background in religion had been the Church of England, "But Whitehead under the influence of John Cardinal Newman, began to consider the tenets of the Roman Catholic Church. For eight years he read a great deal of theology. Then he sold his theological library and gave up religion. Whitehead was never again a member of any church."

As a metaphysician, Whitehead was "comparable in stature to Gottfried Wilhelm Leibnitz and G.W.F. Hegel".

Whitehead died in Cambridge, Massachusetts, USA, in 1947. ^[52]

Source and excerpts: Victor Lowe, the Editors of Encyclopedia Britannica (including quotations).

Whitehead's principal works:

- *Principia Mathematica*, Volumes I-III, Whitehead and Russell, Cambridge at the University Press (1910)
- *An Introduction to Mathematics*, Williams and Norgate, London (1911)
- *Science and the Modern World*, Macmillan (1925)
- *Religion in the Making: Lowell Lectures, 1926*, Macmillan Publishing (1926)
- *Process and Reality*, Macmillan (1929)
- *Adventures of Ideas*, Simon & Schuster (1933)
- *Modes of Thought*, Macmillan (1938)



F.S.C. Northrop:

Filmer S.C. Northrop was born in Janesville, Wisconsin in 1883 and received his Bachelor of Arts degree from Beloit College in 1915 with a major in history. His mother died in child birth ^[53].

During his studies at Yale, Northrop further developed his interests in the "first principles" of any system of knowledge or any discipline. Just as at Beloit College, he realized that there "is no fully understood history without philosophy." At Yale, where in 1919 he received an M.A. in Economics, he began to see that social theories rest on certain fundamental pre-suppositions about "facts." This intellectual trait was further demonstrated in his graduate work at Harvard where he received a second MA, this time in Philosophy in 1922 and a PhD in the Philosophy of Natural Sciences in 1924. His doctoral dissertation was entitled "The Problem of Organization in Biology" and involved both careful research in biochemistry under Professor Lawrence J. Henderson and also philosophical clarity under Professor William Ernest Hocking.

He studied the philosophy of mathematical physics under Alfred North Whitehead at the University of London Imperial College of Science and Technology. Professor Northrop's teaching career was primarily at Yale. He was an Instructor of Philosophy at Yale in 1923. His promotion to full Professor took place in 1932. He was chairman of the Department of Philosophy from 1938 to 1940. Then, in 1947, the Yale Law School bestowed upon Northrop a rare honor, granting him the sterling Professorship of Philosophy and Law, a special chair for distinguished academicians in related fields who offer a broader understanding of the problems of law. He held this honor from 1947 until June 1962 when he reached his 68th year and the retirement age. ^[54]

Professor F.S.C. Northrop died in his sleep at the age of 98 in a nursing home in Exeter, N.H. on July 22, 1992. ^[55]

Northrop's principal works:

- *Science and First Principles*, New York: The Macmillan Company, 1931. Reprinted in 1979, Ox Bow Press.
- *The Meeting of East and West: An Inquiry Concerning World Understanding*, New York: The Macmillan Company, 1946. Reprinted in 1979, Ox Bow Press.
- *The Logic of the Sciences and the Humanities*, New York: Meridian Books, Inc., 1947. Reprinted in 1983, Ox Bow Press.
- (ed.) *Ideological Differences and World Order: Studies in the Philosophy and Science of the World's Cultures*, New Haven: Yale University Press, 1949.
- *The Taming of the Nations: A Study of the Cultural Basis of International Policy*, New York: The Macmillan Company, 1952. Reprinted in 1987, Ox Bow Press.
- With Gross, Mason W. (eds.) *Alfred North Whitehead: An Anthology*, New York: The Macmillan Company, 1953.
- *European Union and United States Foreign Policy: A Study in Sociological Jurisprudence*, New York: The Macmillan Company, 1954.
- *The Complexity of Legal and Ethical Experience: Studies in the Method of Normative Subjects*, Boston: Little, Brown and Company, 1959. Reprinted in 1959, Greenwood Press.
- *Philosophical Anthropology and Practical Politics*, New York: The Macmillan Company, 1960.

- *Man, Nature and God: A Quest for Life's Meaning*, The Credo Series, Planned and edited by Ruth Nanda Anshen, paperback 1963. New York: A Trident Press Book, Simon and Schuster, December, 1962.
- With Livingston, Helen H. (ed.), *Cross-Cultural Understanding: Epistemology in Anthropology*. New York: Harper & Row, 1964.
- *The Prolegomena to a 1985 Philosophiae Naturalis Principia Mathematica*, Ox Bow Press, Woodbridge, Conn. 1985.

A note from the author:

A dear friend of mine with an eidetic memory, Norman P. Riise, formerly a book seller at the University of Washington Book Store, Seattle, Washington, lived with Professor Northrop while assisting him in putting together *The Prolegomena*. Norm was interested in the philosophical side of Northrop's work, while I was more interested in the scientific side. Norm and I met at the University of Washington Book Store where I ordered a copy of Northrop's *Science and First Principles*. Norm could not believe that someone was ordering that book! We were good friends from that time onward, with the exception toward the end when we were separated and I was living with my brother and mother in Gig Harbor, Washington. I was under a great deal of stress from circumstances in my life, and was rather sharp in my last conversation with him over the phone. I can't help but think that this had something to do with his heart failure. I love him dearly, miss him, and think of him often. Sorry about that, Norm!

Norm Riise was born on July 20, 1942, and passed away in his sleep from heart failure in Seattle, Washington, on April 2, 2001. He was a Vietnam Veteran and suffered greatly from this experience.



The Author: Darden H. Dickson
Electronic / Engineering Technician (1939- present)

Darden Dickson was born in Omaha, Nebraska, USA, on January 26, 1939, the eldest of five brothers.

His father, Edgar H. Dickson, received a BA from the University of Washington with a Major in English Composition and Literature and a Minor in Oriental History. His mother, Lillian, was a registered surgical nurse. His father Edgar was from a family of bakers and had spent a year at the Chicago Institute of Baking. Upon finishing, his father and his wife Lillian travelled to Omaha, Nebraska, to follow up on a job-offer. That job-offer fell through, and his father worked as a painter to support his family. When Darden was eleven weeks old, his father and mother returned with him to Tacoma, Washington.

The spiritual and the scientific were part of Darden's intellectual life as a young person. His mother saw to it that he attended catechism classes in the Roman Catholic Church from ages 7 to 18, and joined the cub scouts when he was

about 10 years old. In the cub scout book was a project that interested him: the construction of a crystal set, and a one-tube radio.

His father had a ham radio friend at work in Puyallup, Washington where they lived at the time. His friend got the parts together for him, and his dad made a long-wire antenna on the peak of the roof of their house by running the wire many times along the length of the roof. His dad attached a ground wire to a water pipe and ran the antenna and ground leads through the window in the upstairs bedroom where he slept.

Darden put all the parts together following the wiring diagram and symbols. It worked! He ran the thick, copper strap over the sanded radius of the coil to select the stations. The signals were weak, but he could hear them.

His next project was to make a one-tube radio. He guessed that would be even better than the crystal set. He ordered the catalogue from the Allied Radio Corporation in Chicago, then ordered the parts. A local radio repair shop owner sold him a pair of head phones for a few dollars.

The parts for the one-tube radio came. He proceeded to put them together on a platform. There were two batteries to connect it to, a 1.5v "A" battery to heat the filament in the 1S5 tube, and a 45v "B" battery to connect to the plate of the tube.

With the one-tube radio, he could receive a lot more stations and they were louder. One of the programs came on at 10:00 pm called the "10:00 O'clock Mysteries," which sometimes had programs about 'werewolves'. His mother would have freaked out, if she knew. She worried, though, that he might choke while falling asleep with the head phones on.

At night he could see the red "glow" of the filament in the vacuum tube and the other physical parts. He could visualize electro-magnetic fields in his mind (even though they could not be seen).

His dad's friend, an Amateur Radio Operator, sent him a copy of the Amateur Radio Handbook which introduced Darden to the laws and mathematics of electro-magnetic fields. He absorbed this material like a sponge. He sensed something fundamental in nature about them. This would set the stage for another period in his life at age twenty-seven.

January 26, 1966 was his birthday. His father had sent him a paperback copy of *The Phenomenon of Man* by Pierre Teilhard de Chardin, the French, Jesuit, priest-scientist. He had to read that book completely through about nine times before he was able to grasp what Pierre Teilhard was trying to say. Over a period of a year, this book shifted his spiritual and scientific foundations.

Of particular interest to him was Teilhard's hypothesis of radial energy, the energy, he said, that draws matter to ever higher degrees of organized complexity. Darden was convinced that there must be some instrumentation in physics that would enable one to measure a correlate of organization in biology. This thought was in the back of his mind, and he was looking for a physical correlate for organization.

Then, in 1972, he came across the work of F.S.C. Northrop and H.S. Burr.

His father had sent him a copy of the magazine, *Psychology Today*. The article of interest was on Kirlian photography, the work of a husband-and-wife team from the Soviet Union.

What was of particular interest to him was a photo Kirlians had taken of a living leaf by placing the leaf on top of a photographic plate and sandwiching the assembly between two metal plates connected to a Tesla coil. The resulting photo showed an electric field pattern of the leaf as a whole, *even the portion of the leaf that was missing* ^[56].

The next issue of *Psychology Today* had a Letter to the Editor published in it from a reader who was upset with the Russians 'taking credit for everything'. He mentioned the work in England by Kilner, *The Human Aura*. He purchased the book. In the Introduction was a statement concerning 'cell radiation' [a misinterpretation of Burr's experimental work] and the authors F.S.C. Northrop and H.S. Burr.

Darden was between jobs, and so he had some time on his hands. He went to the Library at Pacific Lutheran University in Parkland, Washington, just south of Tacoma. He found two books by F.S.C. Northrop: *The Meeting of East and West*, 1931 and *The Logic of the Sciences and the Humanities*, 1946. He wondered, was this the same Northrop? He found nothing written by H.S. Burr.

He went back to the PLU Library and took another look at both books, looking carefully in the bibliographies. There it was in *The Logic of the Sciences and the Humanities* a reference to the “The Electrodynamical Theory of Life,” by F.S.C. Northrop and H.S. Burr! How was it possible that one man could have written on the subjects of both science and world cultures? This was a peak intellectual experience for him, and the first time he had been formally introduced to philosophy.

He knew that he would not remember the path he had taken to get to Northrop and Burr’s work, so he constructed a flow chart. ^[57]

He was working for a company called Automix Keyboards, Inc., Redmond, Washington, that made keyboards for the graphics industry. His supervisor was looking for someone to take a programming course for a piece of automated test equipment in the Boston area, so he volunteered. He modified his return trip to Seattle and took the train to Old Lyme, Connecticut. He was met at the train station by Professor Northrop and his second wife ^[58] in their Chrysler automobile. His wife asked him if he minded if she stopped by at a local store to pick up some bananas.

He spent the evening and the next day at Professor Northrop and his wife’s home in Old Lyme. Professor Northrop told him that he preferred talking in the morning because if he started in the evening, his mind would start racing and he would not be able to sleep.

It was a wonderful dinner, and he noticed large salt crystals in a little crystal bowl with a little silver spoon in it.

In the morning, he talked for a while with Professor Northrop’s second wife. She told him that Professor Northrop’s mother had died during childbirth. She also mentioned that she was amazed at the speed and amount of books Professor Northrop could read. ^[59]

In the morning they had breakfast, and then he and Professor Northrop talked for hours. Darden mostly listened.

What was Professor Northrop talking about? Well, he was reviewing a very advanced form of mathematics from the scholar, Fonseca, in Portugal: a tripartite logic, a logic of intentions. When Professor Northrop finished, he told Darden that the ideas he had discussed with him would filter down into his subconscious.

Professor Northrop wanted to show him something.

He took him to a chapel in Old Lyme (the Congregational Church, Old Lyme, Connecticut). He said the original design was by the architect, Sir Christopher Wren, from England that had studied the work of the ancient Greeks. He said there were only two chapels like this in the United States. The other one, he said, was a chapel in Virginia (the Wren Chapel at William and Mary in Williamsburg, Virginia).

It was like walking up the steps with the likes of a Plato or Aristotle.

They went inside. Professor Northrop asked him, “How many people do you think this chapel seats?” He replied, “Maybe a hundred or a hundred and fifty.” He said, “Four hundred and fifty.” He continued, “The minister preaches the Holy Spirit, but the architecture preaches God the Father.”

Professor Northrop took him to the airport for his flight back to Seattle, Washington.

What Darden had discovered in Northrop and Burr’s work was an electrical correlate for the detection of organizational changes in the human organism that he had been looking for since 1966.

This led him to define ovulation as an organizational change (the breaking of the follicle and the release of the egg) and cancer as an organizational anomaly (where cells depart from the unitary organizational field of the organism and start multiplying on their own without being integrated into that organizational pattern of the whole).

The next phase in his life was following up on what he had discovered in the scientific field.

The company he was working for in 1987 was Quantum Medical Systems. This was the largest venture capital operation in the history of the State of Washington and Oregon in the United States. The company was doing research and development on a high-end ultrasound system using doppler techniques for tracking blood platelets.

A wife of a cousin of his on his father's side suggested he associate himself with a PhD in order to help give credence to his private work. He chose two: a biomedical engineer and a contract employee who had received his doctorate in artificial intelligence at the University of Washington.

The biomedical engineer suggested he focus on duplicating Burr's work on ovulation, since that would be simpler to verify.

In June of every year all the employees received bonuses. For him, it amounted to around \$1000. He used that money to buy scientific supplies to duplicate Burr's work in his original papers.

A registered nurse had always wanted to be part of an experiment, so she joined him in a four-month study on human ovulation. The details of that study are in Appendices A, B, and C of the paper "Current Experimental Support for the DC Potentials of a Unitary Electro-Magnetic Field in Biology, D.H. Dickson, 13 July 2019."

A period of twelve years followed in which he focused on miniaturizing the original equipment and developing commercial prototypes. The name of the product was OvSense™, an ovulation sensing device.

Dr. Waleed Hajaar set up a corporation, Electro-Dynamic Systems, Woodinville, Washington with Dickson and Dr. Hajaar as principals. Dr. Hajaar focused on the business end of things, and Dickson, an electronic/engineering technician, focused on the technical end of things and product development. That was twelve years' worth of effort.

Both Dr. Hajaar and Dickson had full time jobs, families, cars, etc., in addition to private, scientific project. It was too much for them to do. The corporation was eventually dissolved.

Dickson gave up pursuing the technical aspects of Northrop, Burr, and Pierre Teilhard's work. He was informed that Dr. Hajaar had died of prostate cancer.

In about 2008 he began working on translating the western ideas on evolution of Pierre Teilhard de Chardin to ideas that would be acceptable to the Greek Orthodox Church, one of the Eastern Orthodox Christian churches of the early Christian Church that had separated from the Roman Catholic Church (the Western Church) in 1054 (The Great Schism). He focused on community, a direct application of the law of complexity-consciousness.

Darden spent about three years preparing the intellectual groundwork (ideas) by publishing a monthly newsletter to a select list of parishioners in the community. He shared everything he was writing with the Metropolitan of San Francisco and with the head of the Greek Orthodox Church, the Ecumenical Patriarch Bartholomew of Istanbul, Turkey, who gave him encouragement and support for his writings. The project was eventually approved by Metropolitan Gerasimos of San Francisco, but there was little or no support from the parish priest, and no substantial support from the hierarchy. There were strong ethnic, cultural, ideational and structural reasons for this.

Eventually, he separated from the Greek Orthodox Church, and became discouraged with organized religion in general. It was his opinion that Christians should be leading the evolutionary process that God used to bring human beings into existence; that evolution was parallel to the divinization process.

He still had his prayer life, but the focus was on Creation, the Universe as a whole, and his place in it, and working with like-minded souls.

He had written and done much over the years with a focus on the work of Pierre Teilhard de Chardin, F.S.C. Northrop, H.S. Burr and his colleagues, and the work of the Arizona architect, Paolo Soleri on a new type of city, the *arcology*. Paolo Soleri was familiar with Pierre Teilhard's work and had planned to build a chapel in his honor at Arcosanti, Soleri's urban laboratory near Cordes Junction, about halfway between Phoenix and Flagstaff. Dickson spent a seminar week at Cordes Junction in June of 1986. He said that it was a miracle *that the site even existed*. There was no State or Federal funding, only income from architecture students who paid a fee, workshops, lectures, visitors, the sale of ceramic and bronze bells, designed by Soleri. Paolo died at age 93 on 9 April 2013 and was buried at Arcosanti in its private cemetery, beside his wife, Colly. Darden saw the architecture of Paolo Soleri as a tool to foster community and future human growth and development.

Darden was educated in the Washington State Public School System, attended the University of Washington, College of Engineering, The School of St. Philip Neri, for Delayed Vocations to the Roman Catholic Priesthood in Boston, under the Jesuits, where he studied accelerated Latin, Greek, English Composition & Grammar, and Religion, and spent a year with the Jesuits at St. Francis Xavier Novitiate, Sheridan, Oregon. In 1960 he entered the US Navy and received his formal electronics training in electronic communications at Treasure Island, San Francisco, California. Later, he attended Tacoma Community College, where he received his Associates in Arts & Sciences, and Centralia Community College, where he spent a year studying Computer-Aided Drafting in order to help him develop graphic representations of complex electronic systems, a technique developed by Dickson when working for Automix Keyboards, Inc., Redmond, WA.

He worked for Communications Satellite Corporation, where he received training in logic fundamentals; Biotronex Laboratory, Inc., where he learned how to manufacture electromagnetic blood-flow transducers and designed a testing framework and produced a new line of transducers; and the IBM Corporation where he received formal training in mechanics for office machines. His last two positions were at medical start-up companies: Northstar Neuroscience and the NeuroVista Corporation, both in Seattle, Washington. At Northstar Neuro he worked on developing a device to stimulate activity in the paralyzed, upper torso of stroke victims; at NeuroVista Corporation he worked on developing a device for the early detection of epileptic seizures.

The year was 2008. Because of the difficult financial situation in the United States, his services as an electronic / engineering contract employee were terminated.

Dickson is 80, now, and working on this paper to try and get before the scientific community what he has discovered and learned through education, experience, contemplative isolation and self-study.

Dickson's principal works are:

- "Radial Energy and the First Principles of Science", an introduction to Northrop's Macroscopic Atom from a Teilhardian perspective to show that Pierre Teilhard's hypothesis of radial energy (in *The Phenomenon of Man*) is congruent with the unitary electro-magnetic field of Northrop's Macroscopic Atom in his Macroscopic Atomic Theory; first published in *The Desire to be Human*, International Teilhard Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attaché at the British Embassy, The Hague, and by Robert Müller, PhD, Assistant Secretary General of the United Nations, New York, Mirananda Publishers b.v., Wassenar, Netherlands, 1983 (pp 92-94); revised edition published in *Frontier Perspectives*, the journal for The Center for Frontier Sciences, at Temple University, Volume 5, Number 1, Fall/Winter, 1995, Correspondence (pp 4-5); the basic works of Northrop, Burr, Pierre Teilhard, and Paolo Soleri are imbedded in the notes on the Periodic Table designed by Dickson.
- *In the Womb of the Hollow, Spherical Moon*, a science fiction novel which has been in process since 1999 under his pen name, Nicholas J. Dardan. This work was conceived to bring the ideas of Northrop, Burr and his colleagues, Pierre Teilhard, and Paolo Soleri before the public in story form. Dickson is aware of the work of McCulloch and Pitts at MIT on neural networks; that it takes at least five years for new ideas to form physical correlates in the brain, and thus provide a foundation for political action ^[60].
- *Memorizing the Periodic Table of Chemical Elements*, Advanced Noöspheric ^[61] Systems, 2008 (self-published); a response to a request from a professor of chemistry at Tacoma Community College to

memorize ten elements of the periodic table. Dickson wondered whether one could memorize the entire table. The answer is, “Yes, including nuclear mass numbers.”

- *Collected Works on Field Theory*, a two-volume set containing important papers by Northrop, Burr, Langman, Ravitz, Einstein and others, Advanced Noöpheric Systems, 2011 (self-published);
- *Cancer: An Organization Anomaly*, Advanced Noöspheric Systems, 2016 (self-published); cancer is essentially a problem in physics, a problem in organizational control.
- *Graphic Representations of Complex Electronic Systems*, Advanced Noöspheric Systems, 2019 (self-published); a method for the documentation of complex electronic systems, first developed in about 1973 by the author to help the mind grasp, as a whole, a complex electronic system. This technique is also useful for training purposes and for troubleshooting down to the component level. It is also helpful in generating feedback for design purposes.

¹ Dirac, P.A.M. (1979). “The Nature of Albert Einstein”, Produced and Directed by Tom Laport, Options, National Public Radio Station WSIU, Carbondale, Illinois, Dirac (Side 2), Albert Einstein Centennial Celebration, Early March, Campus of Southern Illinois University, OP-790925.01/01-C 1979 NPR.

² Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, p 94.

³ *Ibid.*, p 50.

⁴ Escobar, Francisco (1971). *The Logical and Epistemological Foundations of Sociology in the Philosophy of F.S.C Northrop*, University of Costa Rica, 1971 (from: A Biographical Sketch).

⁵ Northrop, F.S.C. (1928). “The Theory of Relativity and the First Principles of Science”, *The Journal of Philosophy*, Vol XXV, No. 16, August 2, 1928, pp 421-435; Northrop, F.S.C., 1928; “The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity”, *The Journal of Philosophy*, Vol XXV, No. 17, August 16, 1928, pp 449-467. Note: See Whitehead, Alfred North, 1929. *Process and Reality*, footnote p 508; Northrop, F.S.C., 1931. *Science and First Principles*, Macmillan Company, New York, 1931.

⁶ Dickson, D.H. (2019). “A Physics for the DNA Molecule (unpublished).

⁷ The Macroscopic Atom.

⁸ Einstein, A (1917). Cosmological Considerations on the General Theory of Relativity, *The Principle of Relativity*, Einstein, Lorentz, Weyl, Minkowski, Dover Publications, Inc., 1952 (pp 187-188).

⁹ Dirac, P.A.M. (1979). Albert Einstein Centennial Celebration, Southern Illinois University, Carbondale, Illinois, Audio Cassette: OP-790925.01/01-C, National Public Radio (NPR), Options, 1979.

¹⁰ Northrop, F.S.C. (1928). The Theory of Relativity and the First Principles of Science, *The Journal of Philosophy*, Vol XXV, No 16, August 2, 1928 (p 426).

¹¹ Einstein, A. (1919). Do Gravitational Fields Play an Essential Part in the Structure of Elementary Particles of Matter? *The Principle of Relativity*, Einstein, Lorentz, Weyl, Minkowski, Dover Publications, Inc., 1952 (p 198).

¹² Note: From a conversation between Professor Northrop and myself at his home in Old Lyme, Connecticut, in the spring of 1972.

¹³ Which can be referred to as the either.

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¹⁵ Burr, H.S. (1940). Biologic Organization and the Cancer Problem, *Yale Journal of Biology & Medicine*, Vol 12, 1940 (pp 277-282).

¹⁶ Burr, H.S., Lane, C.T., Nims, L.F. (1936-1937). “A Vacuum Tube Microvoltmeter for the Measurement of Bioelectric Phenomena,” *Yale Journal of Biology & Medicine*, Vol 9, 1936-1937 (pp 65-76).

¹⁷ Rinne, Friedrich (1933). “Investigations and Considerations Concerning Paracrystallinity,” *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 148 September 1933 (pp 1016-1032).

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- ²³ Northrop, F.S.C. and Burr, H.S. (1939). Experimental Findings Concerning the Electro-Dynamic Theory of Life and An Analysis of Their Physical Meaning, Growth, Vol 1, 1939 (pp 78-88).
- ²⁴ The Burr-Lane-Nims technique.
- ²⁵ Burr, H.S. and Northrop, F.S.C. Experimental Findings Concerning the Electro-Dynamic Theory of Life and An Analysis of Their Physical Meaning, Growth, Vol 1, 1939 (pp 82-83).
- ²⁶ An experiment in the field of astrophysics needs to be performed to verify the physical existence of the Macroscopic Atom. A suggestion: the determination of the same object by two telescopes pointed in two different directions, taking advantage of the spherical, unitary gravitational and electro-magnetic field of the Macroscopic Atom.
- ²⁷ Henderson, L.J. (1913). *The Fitness of the Environment*, an Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass (p 312).
- ²⁸ Henderson, L.J. (1928). *Blood: A Study in General Physiology*, New Haven, Yale University Press, London; H. Milford, Oxford University Press, 1928.
- ²⁹ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931.
- ³⁰ Northrop's Macroscopic Atom, the physical boundary of the universe.
- ³¹ Burr, H.S. (1940). "Biological Organization and the Cancer Problem," Yale Journal of Biology & Medicine, Vol 12, 1940 (pp 277-282).
- ³² Langman, L., Burr, H.S. (1949). "A Technique to aid in the Detection of Malignancy of the Female Genital Tract," Journal of Obstetrics & Gynecology, Vol 57, No 2, 1949 (pp 274-281).
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- ⁴³ Ravitz, Leonard J. (1962). "History, Measurement, and Applicability of Periodic Changes in the Electromagnetic Field in Health and Disease," Annals New York Academy of Sciences, No 98, 1962 (pp1144-1202).
- ⁴⁴ Burr, H.S. (1972). *Blueprint for Immortality, The Electric Patterns of Life*, Neville Spearman, LTD, London, 1972. A Compendium of the work of H.S. Burr et al using the Burr-Lane-Nims technique (pp 96-109, 166-184).
- ⁴⁵ Dickson, D.H. (1987-1988). Appendix F, "Current Experimental Support for the DC Potentials of a Unitary Electro-Magnetic Field in Biology," Advanced Noöspheric Systems (self-published), 2019.

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- ⁴⁶ Burr, H.S. (1972). "Blueprint for Immortality," (pp 101-102).
- ⁴⁷ Dickson, D.H. (1994). Appendix G, "Current Experimental Support for the DC Potentials of a Unitary Electro-Magnetic Field in Biology," Advanced Noöspheric Systems (self-published), 2019.
- ⁴⁸ This point needs to be studied in light of Northrop's physical addition to the kinetic atomic theory.
- ⁴⁹ Nobel Lectures, *Physics 1922-1941*, Elsevier Publishing Company, Amsterdam, 1965.
- ⁵⁰ Alfred North Whitehead. Victor Lowe, Editors of Encyclopedia Britannica.
- ⁵¹ Victor Lowe, Editors of Encyclopedia Britannica.
- ⁵² Source of biographical material: Victor Lowe, Editors Encyclopedia Britannica.
- ⁵³ From a conversation that the author had with his second wife at their home in Old Lyme, Connecticut.
- ⁵⁴ Escobar, Francisco (1971). *The Logical and Epistemological Foundations of Sociology in the Philosophy of F.S.C. Northrop*, Universidad de Costa Rica; BA, MA The University of Kansas, 1971; 1975 Submitted to the Department of Sociology and the Faculty of the Graduate School of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.
- ⁵⁵ Depalma, Anthony (July 23, 1992). Prof. F. S. C. Northrop, 98, Dies;, The New York Times (archives) 1992.
- ⁵⁶ For him, this pointed to the existence of an electro-magnetic field associated with organization in biology and the primacy of that field over chemistry.
- ⁵⁷ The author also made a pdf file (a digital copy), later, and stored it on his computer hard drive.
- ⁵⁸ According to my friend, Norman Riise, Northrop's first wife died of hardening of the arteries of the brain. This was a very difficult period, emotionally, for Professor Northrop, he said.
- ⁵⁹ The author also found out that Professor Northrop's books were orally dictated, then transcribed in book form (none were typed or handwritten by him).
- ⁶⁰ See: Northrop, F.S.C. (1960). *Philosophical Anthropology and Practical Politics*, The Macmillan Company.
- ⁶¹ Of or relating to the 'sphere' of ideas or thought. Advanced Noöspheric Systems: advanced systems of ideas or thought.

18,0 RADIAL ENERGY AND THE MACROSCOPIC ATOMIC THEORY

“Man can be understood only by ascending from physics, chemistry, geology and biology. In other words, he is first of all a cosmic problem.” – Teilhard, Pierre (1952). “Reflections on Energy,” *Revue des questions scientifiques*, October 1952.

Pierre Teilhard de Chardin, the French, Jesuit, priest-scientist, in his *The Phenomenon of Man* states:

To avoid a fundamental dualism, at once impossible and antiscientific, and at the same time to safeguard the natural complexity of the stuff of the universe, I accordingly propose the following as a basis for all that is to emerge later.

We shall assume that, essentially, all energy is physical [also psychical] ^[1] in nature; but add that in each particular element this fundamental energy ^[2] is divided into two distinct components: a *tangential energy* which links the element with all others of the same order as itself in the universe; and a *radial energy* which draws it to ever greater complexity and centricity — in other words forwards. ^[3]

Pierre Teilhard has been criticized for his hypothesis of radial energy because no one knew how to experimentally verify it. There was a good scientific reason for this: an amendment in the form of a physical addition to the kinetic atomic theory is necessary to account for the organization of matter. In other words, a paradigm change affecting the first principles of all the sciences is required.

Pierre Teilhard did *not* propose a *means* of experimental verification for radial energy; he just stated that radial energy is required to address the organization of matter, and that everything that follows in *The Phenomenon of Man* is based on that proposal [hypothesis].

Professor F.S.C. Northrop, Department of Philosophy, Yale University, received his doctorate under Lawrence J. Henderson, Professor of Biologic Chemistry at Harvard. Northrop’s doctoral thesis, “The Problem of Organization in Biology.” *did* provide a physics for the problem of organization in biology ^[4] ^[5], which turned out to be the physics for the organization of matter in the universe as a whole.

At this point, it was necessary for Northrop to see to it that his theory was presented to the scientific community, since philosophy can only *present* a problem to Science, *not experimentally verify it*.

Professor Northrop joined forces with H.S. Burr, Section of Neuro-Anatomy, Yale University Medical School, and published two papers, one in 1935, entitled “The Electro-Dynamic Theory of Life,” ^[6] and the second one completed in 1935-1936 and published in 1939 entitled, “Experimental Findings Concerning the Electro-Dynamic Theory of Life and An Analysis of Their Physical Meaning” ^[7]

The results of that experimental work were astounding: *an electrical technique for the early detection of cancer and the early detection of ovulation in the female* ^[8].

Here we have experimental verification, not only of Northrop's solution to the problem of organization in biology, but also of Teilhard's hypothesis of radial energy, both of which it are congruent. ^[9]

What are the scientific, cultural, technological and social implications of these findings?

The Scientific and Cultural Implications of the New, Scientific Paradigm

3. An amendment in the form of a physical addition to the current kinetic atomic theory;
4. A solution to the cultural differences between the East and the West with a common physical conception of the universe which supports the main cultural elements of both cultures ^[10].

Some Technical Applications of the New, Scientific Paradigm

10. An electrical correlate for the early detection (screening) for cancer ^{[11][12][13]};
11. An electrical correlate for the early detection of human ovulation, a 100% effective method of birth control, and the elimination, except for serious medical reasons of abortion (all females at the age of puberty monitoring their ovulatory cycle) ^{[14][15][16][17][18]};
12. An electrical correlate for hypnosis ^[19];
13. An electrical correlate for sleep studies ^[20].
14. An electrical correlate for psychiatric studies ^[21];
15. Potential differences in the study of diseases ^[22]
16. An electrical study of trees ^{[23][24][25]};
17. An electrical technique for earthquake prediction? ^[26]

The Social Implications of the Verification of Radial Energy by the Macroscopic Atomic Theory

1. Verification of Pierre Teilhard's work in *The Phenomenon of Man*.

A Summary of and Logical Deductions from the Ideas in *The Phenomenon of Man*

The French, Jesuit, priest-scientist, Pierre Teilhard de Chardin defined *evolution* as an *ascent of consciousness*, and an *increase in consciousness* as *the specific effect of an increase in organized complexity* ^[27]. A thumbnail sketch of organized complexity in nature follows.

The basic building blocks of chemical elements are electrons, protons, and neutrons. In the next major stage of organized complexity, the world of the molecule, the basic components are chemical elements. Next come molecules with molecules, and so on. This process (an increase in organized complexity) continues and leads to the first cells, and eventually to the first human organisms ^[28].

The following observations can be derived from nature and the law of complexity-consciousness ^[29]:

1. Each major stage of organized complexity contains physical 'elements' of the preceding stage, which in turn include representative physical 'elements' from all previous major stages ^[30].
2. Complex matter is concentrated matter, that is, space and time are minimized between 'elements' in the system ^[31].
3. The most efficient organic systems take the least amount of energy and materials out of the environment ^[32].

Assuming that Pierre Teilhard's definition of evolution is correct, what form will the physical take in the next major stage of organized complexity?

1. We know from observation (1.) that the physical ‘elements’ in the next stage are human organisms, and we know from direct observation that the consciousness associated with these organisms is reflective in nature (human beings know that they know).
2. Observation (2.) tells us that space and time are minimized between physical ‘elements’ in the system.
3. Observation (3.) tells us that frugality ^[33] is a prime concern in constructing the physical system.

The next major stage of organized complexity, then, will require the conscious development ^[34] of 3-dimensional cities ^[35] within which would be contained representative physical ‘elements’ from all previous stages ^[36].

These ideas emphasize the necessity of dense, 3-dimensional, highly organized urban centers in the furtherance of human evolution. The desired effect would be among others: a reduction in urban sprawl, and preservation of our natural environment; long term reduction in urban infrastructure costs; cost effective mass transportation systems between dense urban centers; and an increase in global consciousness.

Thus, for the first time in human history we have humankind included in the physics of the universe. At the same time, we have a perception of the universe and ourselves that gives all human beings a vision of the future in which human growth and development (the spiritual) becomes primary and the physical becomes secondary and subordinate to human growth and development.

We have the reins of evolution in our hands, now. It is up to us to help in furthering our own evolution.

Darden H. Dickson
14 May 2019

¹ Added by the author to Teilhard’s statement keeping in mind his presentation of the Law of Complexity-Consciousness in *The Phenomenon of Man*. Note: In some of the English editions, the word psychical was used: ‘all energy is psychical in nature.’

² Congruent with the compound electro-magnetic field in Northrop’s Macroscopic Atomic theory.

³ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper & Row, Torchbook, 1961, (pp 64-65); originally published in French as *Le Phénomène humain*, Editions du Seuil, Paris, 1955 (available in France, Argentina, Belgium, Brazil, Canada, Germany, Mexico, and Switzerland from Larousse & Company, Inc); first published in English by William Collins Sons & Co., Ltd., London, 1959. Note: the manuscript was written in China in the 1930s where Pierre Teilhard was leading the group that discovered Peking Man.

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- ²⁸ During the process of evolution unities of a higher order are being formed.
- ²⁹ Teilhard, Pierre (1961). *The Phenomenon of Man*.
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- ³¹ The effect of the spherical form of the Earth is the minimization of space-time; its spherical surface permits the shortest distance between the 'elements' on the surface.
- ³² Organisms that require less from the environment are in a better position to survive in the case of shortages.
- ³³ A term frequently used by the Arizona architect Paolo Soleri.
- ³⁴ This fact is crucial. Evolution will come to a halt without the willful participation of human 'elements.'
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19.0 A PHYSICS FOR THE DNA MOLECULE

What is the physics underlying the structure of the DNA molecule, and will it require an amendment in the form of a physical addition to the kinetic atomic theory?

Very few scholars are aware of the work of F.S.C. Northrop (Department of Philosophy) Yale University. In the late 1920s and in the Deems Lectures in 1929 which were then published in book form in *Science and First Principles*, Macmillan, 1931, Professor Northrop brought something important to the attention of the scientific community: the first principles underlying *all the sciences* are in question.

“The first or philosophical concepts and principles involved in a given verified theory are those which it takes as primary. The primary concepts and principles of any theory are those which are taken as undefined, and are used to define other derived concepts and principles.

“It happens that [an analysis] of current scientific theories gives us a common set primary of concepts.

“However, it soon becomes evident that they are incomplete, for circular definitions appear and one fundamental problem to all branches of science exhibits itself [the problem of organization ^[1]].

“Thus, our analysis led us to the discovery of a new theory of the first principles of science [the Macroscopic Atomic Theory ^[2]].” ^[3]

This theory accounts for organization in biology and in the universe as a whole, and requires an amendment in the form of a physical addition to the kinetic atomic theory: a physical boundary for the universe: The Macroscopic Atom.

What is the *physics* of this theory?

First, we have an immense, hollow, physical *atom* (in the Greek sense of that word: *indivisible, uncut, with no parts*) as the physical boundary of the universe (See Appendix 1. and 2. and 3.).

Note 1: This gives us a justification for the curved space referred to in Einstein’s equations for gravity in his General Theory of Relativity, and makes it psychologically simple by making space the interior of a 3-dimensional, physical, spherical object.

Note 2: The Macroscopic Atom gives us a referent for motion, since absolute space, absolute time, and absolute space-time have been removed by Einstein in his Theory of Relativity. This gives justification for the kinetic atomic theory which has been experimentally verified: how do we differentiate between atoms or account for motion.

Note 3: A closed physical, spherical boundary for the universe would indicate that the universe is not expanding outwardly with no end to the process, that kinetic atomic matter is being compressed by the physical form and the unitary electro-magnetic and gravitational field of the Macroscopic Atom. Otherwise, the universe would fly apart, and no account could be made for the increase in organized complexity of the biosphere.

Second, within the hollow portion of the Macroscopic Atom (the physical boundary) is contained the *many* microscopic atoms (the electrons) with their individual electro-magnetic and gravitational fields. The

Macroscopic Atom (the *one*) has a unitary electro-magnetic and gravitational field emanating from its inner surface and filling its hollow, curved interior. (see Appendix 3.)

Note 1: The fields of the Macroscopic Atom and the Macroscopic Atom itself are at rest (stationary), and the Macroscopic Atom, itself, has no moving parts. The unitary electro-magnetic field of the Macroscopic Atom can, therefore, be referred to as the ‘either’, but the lines of force of this field are curved and the mathematics for this unitary electro-magnetic and gravitational field, according to Northrop, have not been developed by mathematicians.

Third, within the hollow portion of the Macroscopic Atom we have a *compound gravitational and electro-magnetic field* made up of the *many* electro-magnetic and gravitational fields of the microscopic atoms (electrons) and the *one* (unitary) electro-magnetic and gravitational field of the Macroscopic Atom.

Note 1: Since gravity bends light, one cannot see the Macroscopic Atom. This model also requires us to reexamine the effects of the *compound* electro-magnetic and gravitational field on the passage of light, and correlatively, our notion of the permanent expansion of the universe.

Fourth, the lines of force of the unitary electro-magnetic field are *curved* (circular). The lines of force issuing forth from the microscopic atoms are *linear*, and the motion of electrons within the Macroscopic Atom is *linear*, also. The spiral form of the double-helix is a combination of linear forces in time and a steady-state, unitary, circular force.

Fifth, the potential differences of the electric portion of the unitary electro-magnetic field are dc (steady-state) in nature. Since the Macroscopic Atom accounts for organization in biology ^[4], then the changing fields of the kinetic atomic will ‘modulate’ the steady-state (dc) potentials of the unitary electro-magnetic field, giving us a means for monitoring organizational changes in biological organisms.

Sixth, the measurement of the steady-state potentials of the electric portion of the unitary electro-magnetic field requires the use of silver-silver chloride (Ag-AgCl) electrodes and an ionic medium between the measuring instrument and the organism. The instrumentation itself must have a microvolt or millivolt range with an input impedance ≥ 10 megohms. ^[5] Otherwise, the instrumentation will cause current flow through the resistance of the tissues, setting up a potential across that resistance which will be read by the instrument, thus masking the potentials of the unitary electro-magnetic field.

Seventh, the orientation (structure) of bioparacrystalline ^[6] materials in the structure of the cell of the organism ^{[7][8]} (See: Appendix 4.) is affected by electric and magnetic forces. ^{[9][10]} This would include heat, and light, both of which are electro-magnetic in nature. This suggests that field physics is primary and chemistry secondary.

Conclusion: Thus, the double helix organizational structure of the DNA molecule is accounted for by the physics of the Macroscopic Atomic Theory, and the addition of the Macroscopic Atom to the Kinetic Atomic Theory will require an amendment in the form of a physical addition to the first principles of science.

Darden H. Dickson
01 May 2019

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19.0 CANCER: AN ORGANIZATION ANOMALY

PREFACE 2016

This small book ^[1] is but an arrow pointing the way to the discovery of the reason why cancer cells are no longer under the organizing influence of the living organism.

The author believes, along with F.S.C. Northrop and H.S. Burr, that the organizing force from the standpoint of physics is *one* (unitary) *macroscopic*, electro-magnetic and gravitational field which interacts with the *many*, individual electro-magnetic and gravitational fields of the *microscopic* atoms ^[2].

Burr and his colleagues' experimental work focused on the d.c. potentials of the *unitary* electro-magnetic field ^[3]. These potentials were directly observable using an electronic device in the microvolt range with an input impedance ≥ 10 megohms, and silver-silver chloride (Ag-AgCl) electrodes with a conducting medium (normal saline solution, conductive paste, etc.) ^[4].

The findings of Burr and his colleagues in the early experimental work in 1936 (published in Growth in 1939) were:

1. A technique for the early detection of cancer, before its detection in a biopsy; and
2. A technique for the early detection of ovulation.

The author successfully duplicated Burr and his colleagues' work on human ovulation in 1988. Those findings are contained in the Appendix.

The research involved in pursuing a solution to the problem of organization in biology (and in the universe as a whole) is going to require a Manhattan-type of project, similar to the one where we experimental verified Einstein's equation, $E=mc^2$.

This project will also require a large number of scientists in a variety of fields: astrophysicists (the detection of the Macroscopic Atom), nuclear and wave physicists (the structure of the proton), electronic engineers (equipment design), crystallography (the study of the physiological and wave properties of bio-paracrystalline materials in the cell structure complex), chemical engineers, oncologists, dermatologists, and other physicians, technicians, etc.

The last company that the author worked for as an electronic / engineering technician was Neuro Vista Corporation in Seattle, Washington.

It is the author's conclusion that the clinical trial phase performed in Australia failed because they were using statistical methods to try and predict when *an individual* epilepsy patient would have a seizure. I was not a statistician, but common sense told me that statistics deals with large numbers. Statistics can not predict when a single individual would have a seizure.

Is this same method being used on a national level to find a statistical predictor for cancer? If it is,

that process is doomed to failure. The solution to the problem of organization in biology is in field physics, not in statistics.

The DNA molecule has a physical structure of its own: it is the combination of linear and circular forces (the double helix). The linear forces can be attributed to the kinetic atomic theory, but to what do we attribute the circular forces? In other words, what are the source of the circular physical forces involved in the structure of the DNA molecule?

There is only one answer to this question: *the circular lines of force* in the *one*, macroscopic electro-magnetic field. The *source* of this field is exterior to the kinetic atomic particles and is a *macroscopic atom* ^[5] which is the boundary condition of the universe, made up of no parts and which compresses the kinetic atomic. The result is a compound electro-magnetic and field.

The universe, therefore, is *one* and *organic*.

I am 77, now.

I have pointed the way.

It is time, now, for others to contribute to the subject of field theory in biology and the control of the organization of cells.

We have the solution to the early detection of cancer in our hands.

A Manhattan-type of Project will allow us to understand cancer itself.

Darden H. Dickson
Renton, Washington USA
17 May 2016

Siddhartha Mukherjee in *The Emperor of all Maladies* states that:

Cancer is a flaw in our growth, but this flaw is deeply imbedded in our selves. We can rid ourselves of cancer, then, only as much as we can rid ourselves of the processes in our physiology that depend on growth—aging, regeneration, healing, reproduction. ^[6]

It is unclear, he says, whether an intervention that discriminates between malignant and normal growth is even possible. ^[7]

This War on Cancer may best be ‘won’ by redefining victory. ^[8]

Have our researchers given up? Do they not understand that they are facing the problem first solved in natural philosophy by F.S.C. Northrop in his doctoral thesis at Harvard under L.J. Henderson: “The Problem of Organization in Biology”?

Harold Saxton Burr, Section of Neuro-Anatomy, Yale Medical School, states in one of his early papers:

Growth and development still have as a central problem the determination of the factor, or factors, which controls the pattern or configuration of the living whole.” He says, “. . . Sinnott has shown that organ form in the cucurbits is unrelated to cell number, size, or type and is, therefore, in all probability, independent of cell proliferation and cell differentiation. ^[9]

The initiation of cell proliferation is a constant concomitant of all living things, present in health as well as in disease, in normal processes as well as in the process of repair. . . . Important as it is to determine the physical and chemical conditions necessary to start growth, it is equally vital to know what *controls growth* (emphasis mine) subsequently, for it is very obvious that profound derangement of this control is a necessary concomitant of the unrestrained growth of cancerous tissue. . . . ^[10]

Burr ends with:

It is impossible to avoid the conclusion that living mechanisms possess electro-dynamic fields, and that they are stable, being modified only by profound changes in biologic activity. ^[11]

For most, this small book will be an intellectual adventure into new territory.

Darden H. Dickson
Renton, Washington
16 May 2011

Section I

A New Scientific Paradigm or Conceptual Scheme for the Problem of Organization in Biology

The failure to find the cause for cancer is not due to a lack of money or to a lack of dedicated researchers. The failure to find the cause of cancer is due to inadequate first principles. It is a problem in deep science.

The central focus of this first section on cancer is the problem of organization in biology. Cancer is defined as an organization anomaly. Two proposals for a solution to the problem of organization are presented here: Pierre Teilhard de Chardin's hypothesis of radial energy, and F.S.C. Northrop's Macroscopic Atom and its associated compound unitary electro-magnetic and gravitational field. Both proposals are congruent and require an amendment in the form of a *physical addition* to the kinetic atomic theory.

The Problem of Organization

Professor F.S.C. Northrop in *Science and First Principles* states that "The relations which join the parts of a living thing together to form the whole seem to involve something more than the parts themselves. Since the presence of form which is *not* [italics mine] defined in terms of matter, is incompatible with the physical theory that is demanded by mechanical principles, the presence of mechanical causation and organization in living things, constitutes a problem".^[12] "... [O]f all the problems of physiology, the problem of form and structure is the most difficult of approach" (Otto Warburg^[13]). This problem was the subject of Northrop's doctoral thesis under Lawrence J. Henderson, Professor of Biochemistry, at Harvard.^{[14][15]} We are dealing here with first principles, the first principles behind *all* of our sciences.^[16]

Two Solutions

Pierre Teilhard de Chardin, the French geologist and paleontologist, proposed that there are two kinds of energy: tangential, the energy that current physics is familiar with; and another energy which he termed "radial", which draws matter to ever higher degrees of organized complexity.^[17] The source of "radial energy", Teilhard said, has to be separate from and surround all the elementary particles.

The following is Teilhard's definition of radial and tangential energy as found in *The Phenomenon of Man* [with a scientific definition of energy (based on Einstein's equations $E=mc^2$ and $I \frac{4}{4} = \frac{3}{4}\rho\sqrt{\gamma}$ ^[18]) in brackets]:

We shall assume that all energy [matter^[19] or electromagnetic and gravitational fields] is psychical^[20] in nature; but add that in each particular element this fundamental energy is divided into two distinct components; a tangential energy [a gravitational and electromagnetic field] which links the element with all others of the same order (that is to say, of the same complexity and centricity) as itself in the universe; and a radial

energy [a gravitational and electromagnetic field] which draws it towards ever greater complexity and centricity—in other words forwards. ^[21]

In Teilhard's definition tangential energy represents 'energy' as generally understood by science; but, what of radial energy? In his definition he attributes the source of radial energy to each particular element (complex particle), and in his description of the effect of radial energy he says that it draws that particle towards ever greater complexity and centricity. This increase in complexity and centricity, he says, augments radial energy which in turn forms a new arrangement in the tangential field. But, a change in a physical arrangement requires the presence of a physical force [Northrop]. This physical force would have to be associated with radial energy. In addition, since according to Teilhard's description the effect of radial energy is different from that of tangential energy the electromagnetic and gravitational field associated with each would have to be different. Can the nature of this difference be determined?

If we look at a tree, we see that it is one, yet, we know from our sciences that this tree is composed of many parts (billions of them) arranged in particular patterns.

Oneness and manyness are two basic characteristics of complex matter and of nature as a whole. Since these characteristics are attributed to complex matter, they can also be attributed to the gravitational and electromagnetic fields composing tangential and radial energy. The logical choices are oneness: radial energy; manyness: tangential energy. Teilhard states that these two energies interact yet are distinct or separate. How can we express in scientific terms these seemingly contradictory characteristics and still account for the fundamental unity of the universe?

An electromagnetic and a gravitational field constitutes the energy making up the elementary particle (ἄτομος, atom, uncut, one substance with no parts) [to be associated with the electron ^[22]]. Manyness requires that an electromagnetic and a gravitational field be attributed to each of the elementary particles. Oneness requires that an electromagnetic and gravitational field be attributed to a unitary physical object (ἄτομος, atom, uncut, one substance with no parts). The characteristics of separateness and interaction require that this physical object surround all the elementary particles and their individual fields. The simplest form that this object could take would be an immense, hollow, physical sphere of one substance with no parts and a unitary electromagnetic and gravitational field [emanating from it and] filling its interior. This field would be most intense at the inner surface of the sphere and would decrease toward the center—just as the field extending out from the elementary particle is most intense near the particle and decreases with distance. ^[23]

Einstein's equation $I_4^4 = 3/4\rho\sqrt{\gamma}$ means "that of the energy constituting matter three-quarters is to be ascribed to the electromagnetic field, and one-quarter to the gravitational field". If Pierre Teilhard and F.S.C. Northrop are correct, it means that there would be two separate sources for fields, the *many* elementary particles (i.e. the kinetic atomic) and the *one* cosmic and unitary source, Northrop's Macroscopic Atom. ^{[24] [25] [26]}

The Early Experimental Work of H.S. Burr and His Colleagues

This discussion is important because it gives a background for understanding the relevance and importance of the experimental work done by Burr and his colleagues concerning the early detection of cancer. They chose the *electric* component of the steady state, *unitary electro-magnetic field* for their measurements. ^[27] This unitary electro-magnetic field is an amendment in

the form of an *addition* to the current kinetic atomic theory and the physical source of this field is *external* to the elementary particles (See Figures 1. and 2. ^[28]), though in this model it is also associated in some way with the electromagnetic structure ^[29] of the proton and neutron. Pierre Teilhard's concept of the two energies and Northrop's Macroscopic Atomic Theory are congruent, and both require an amendment in the form of an addition to the kinetic atomic theory.

The Microscopic

In this model the atom (ἄτομος, uncut, indivisible) is associated with one of the three primary building blocks of chemical elements, the electron. Each individual electron has its own gravitational and electromagnetic field that radiates outwardly.

The Macroscopic

The *Macroscopic Atom* is an atom in the Greek sense of that word (ἄτομος, uncut, indivisible). It is one substance with no parts, just as the electron is, and it has a congesting influence on kinetic atomic matter within it. The Macroscopic Atom is feminine in the sense that it is analogous to an immense womb within which is contained the whole of creation. ^[30]

The Many and the One

The many individual electromagnetic and gravitational fields interact with the unitary electromagnetic and gravitational field emanating from the Macroscopic Atom, forming a complex compound field within the interior of this hollow, spherical object. This compound field provides the background for chemistry. In this model *the field*, not chemistry, is causal ^[31]. It must be emphasized again that the sources of these fields are *separate*, but their fields *interact*. This means that what goes on in one part of a living system can be detected in another part via the *electric* and *magnetic* component of the unitary *electro-magnetic* field. ^[32] The Macroscopic Atom ^[33] and its unitary field provide for the unity of nature as a whole, the microscopic and their fields are the kinetic atomic part of nature. Northrop's model thus solves *the problem of the one and the many* that eluded the early Greek thinkers, and provides a referent for motion, putting the kinetic atomic theory back on a sound philosophical and physical basis.

The philosophical and physical issues concerning the current kinetic atomic theory center on early Greek objections: If you have one atom and you do not know where it is, then it is everywhere, and atomicity is impossible. Einstein removed absolute space and time as referents for motion; brought space and time together in a continuum, and then removed the space-time continuum as an absolute referent for motion. Northrop states that Einstein's theory of motion is false, and provides the Macroscopic Atom as the missing physical referent.

Northrop's Macroscopic Atomic Theory also satisfies Alfred North Whitehead's objection to Einstein's Theory of Relativity concerning macroscopic metrical uniformity. ^[34] Northrop's model gives us a conception of the universe that is psychologically simple ^[35] and at the same time consistent with Einstein's theory of relativity. ^[36] "In simplicity and in beauty there is truth" (Tom Laport ^[37]).

From China

There are ideas in Taoism that have similarities to the model presented here.

The Tao which can be spoken of is not the eternal Tao. ^[38]

... [I]n the case of the Tao the form of its order is not only free from any external necessity; also, it does not impose its rule on the universe, as if the Tao and the universe were separate entities. In short, the order of the Tao is not law. ^[39]

But though the Tao is *wu-tse* (non law), it has order or pattern which can be recognized clearly but not defined by the book because it has too many dimensions. This kind of order is the principle of *li*, a word which has the original sense of such patterns as the markings in jade or the grain of wood. ^[40]

Li may therefore be understood as organic order, as distinct from mechanical or legal order. ^[41]

Tao is the flowing course of nature and the universe; *Li* is its principle or order which, following Needham, we can best translate as “organic pattern;” and water is its eloquent metaphor. ^[42]

The universe came into being with us together; with us all things are one. ^[43]

What is there in Western scientific knowledge that evades definition like the Tao and the *li*? A magnetic and electric field ^[44], and a gravitational field cannot be defined in Western physics. By this I mean that though we know a lot about them, we simply do not know what these fields are; and Pierre Teilhard says that all energy is *psychical*, which means that it can be *experienced*.

The Law of Complexity-Consciousness

A physically-bounded finite spherical universe puts the emphasis on an increase in organized complexity and a corresponding increase in consciousness, just as does the finite spherical shape of the Earth.

According to Pierre Teilhard ^[45] there is consciousness associated with energy and Einstein's equation for the equivalency of matter and energy denotes that consciousness is associated with all matter. This would mean that there would be an elemental quantum of consciousness associated with each individual electron and its field (the many), as well as the Macroscopic Atom and its unitary field (the one). In the model proposed here one cannot separate consciousness from physics. Thus we have a physics which *includes* the human person, consciousness, and ideas. This has important implications for philosophy and law. ^{[46] [47]}

The Evolution of the Universe

“The properties of matter and the course of cosmic evolution are now seen to be intimately related to the structure of the living being and to its activities; they become, therefore, far more important in biology than has been previously suspected. For the whole evolutionary process, both cosmic

and organic, is one, and the biologist may now rightly regard the universe in its very essence as biocentric.”^[48]

The Application of these Ideas to the Cancer Problem

The unitary electromagnetic and gravitational field in conjunction with the congesting influence of the Macroscopic Atom provides the conditions for organization in biology. If cancer is defined as an organization anomaly, the solution to the abnormal behavior of cancerous cells and tissues must be related to the unitary physical force involved in organization. This means that *we will never find the solution within the conceptual framework of the current kinetic atomic theory* because it provides for only *half* the physics. In short, we are looking in the wrong place. We will need to *add* a physical amendment to the kinetic atomic theory and focus on *radial energy* as postulated by Pierre Teilhard and the *unitary electromagnetic field* of Northrop’s Macroscopic Atomic Theory, and by implication on the hydrogen ion (the proton), and the neutron. The components that make up the parton model (Feynman)^[49] of the proton^[50], the simplest case of organized complexity, are electrons and their fields in motion, light in the ultraviolet spectrum (Werner Heisenberg^[51]), and the constant, unitary compound electromagnetic and gravitational field of the Macroscopic Atom.^[52]

Conclusion

The preceding model implies that the cause of the abnormal behavior of cancerous cells and tissues is a problem in basic physics. In accordance with this reasoning, it is critical to understand the *electromagnetic structure* of the *proton*, the *neutron*, *hydrogen*, and *water in the context of a living organism*.^{[53][54]}

Section II

Bioparacrystals (Biological ‘Liquid Crystals’) and the Physical Forces Causing their Orientation

Cancer in this paper is defined as an *organization anomaly*. An examination is made of paracrystalline substances (‘liquid crystals’), their rôle in organization; and the forces responsible for their orientation. It is then shown that primary biological structures, including the cell, are composed of paracrystalline materials. The author maintains that cancerous cells and tissues are isolated from a unitary electro-magnetic field that causes the orientation of bioparacrystalline substances on a local level.

This section begins with a short, but important discussion of energy release in cells and the abnormal conduct of carcinoma tissue. This will be followed by an examination of thinking on cancer. The main argument of the paper is then presented.

Energy Release vs Abnormal Conduct of Carcinoma Tissue

The following is an attempt by Otto Warburg of the Kaiser Wilhelm Institute for Biology, Berlin-Dahlem, to explain the abnormal conduct of carcinoma tissue.

Application to a transplantable animal carcinoma—the Flexner rat carcinoma—gave two

results. The first may be summed up by saying that the oxygen-respiration of the tumour-cell, both as regards its intensity, and also in respect of its capacity for being affected by external influences, is “normal”, i.e. does not differ substantially from the oxygen-respiration of normal epithelial cells.

The second result is that the tumour cell splits up glucose to lactic acid to an extent far exceeding the cleavage effected by normal epithelial cells. This cleavage reaction behaves towards narcotics in the same way as energy-supplying reaction, and it further satisfies our demand as to the magnitude of its metabolism. For in 6 to 10 hours the tumour splits a quantity of sugar equal to its own weight, and the energy thereby set free amounts to 35 to 42% of the energy liberated by oxygen-respiration. ^[55]

Upon the assumption [...that the respiration of the intact organ is in the main preserved in the sections], the principal result of my investigation is *that the volumes of respiration of carcinoma tissue and of a normal epithelial tissue are not very different*, [Possibly the somewhat lower respiration of the carcinoma tissue is due not to a lower respiration of an intact carcinoma-cell, but to the fact that the carcinoma tissue contains some cells which are no longer intact, even though not yet “necrotic”]., and that, therefore, the result of the measurement of the oxygen-respiration does not furnish any explanation of the abnormal conduct of carcinoma tissue; in particular, of its rapid growth. ^[56]

According to Warburg, a tumour develops due to oxygen deprivation. He also says in his *The Metabolism of Tumours* that, if you take a group of normal cells, some will produce energy by respiration only and some by both respiration and the cleavage of glucose into lactic acid. During oxygen deprivation those cells that produce energy only by respiration die leaving those cells that are able to produce energy by the splitting of glucose into lactic acid. One finds in tumours, therefore, a high rate of energy production by the cleavage of glucose, a perfect example of Darwin’s Theory of Natural Selection.

Cancer: An Examination of Thinking

We need to be careful and precise in our reasoning. Those of us in the United States tend to be builders like the Romans, rather than philosophers like the early Greeks. We need to be both. The following is from the World Book Encyclopedia:

Cancer results from damage to genes that control growth and division ^[57].

When we carefully analyze this statement, we find that we have, in actuality, two statements that are presented as being true:

1. Genes control growth and cell division.
2. The abnormal behavior of cancerous cells and tissues is the result of damage to genes.

Both statements are misleading, and the form of their presentation is not good science. We do not know what causes the abnormal behavior of cancerous cells and tissues; and statement two is

dependent on the truth of statement one.

The author found the following in the same section on cancer in the World Book Encyclopedia:

Researches have not yet been able to identify any [chemical] processes that occur only in cancer cells. ^[58]

If chemistry is the means by which the genes control growth and cell division, and no chemical processes have been found that occur only in cancer cells, there appears to be no experimental support, at present, for the statement that genes control growth and cell division.

The original statements could have been presented in the following manner:

The two primary working hypotheses in the United States concerning cancer:

1. Genes control growth and cell division.
2. The abnormal behavior of cancerous cells and tissues is the result of damage to genes.

Now we are on good logical and scientific ground. We are making these two statements working hypotheses or assumptions, and stating clearly that that is what they are. Experimental evidence will either support them or not.

These two hypotheses happen to be logical implications of the current kinetic atomic theory, the billiard ball materialism of Newtonian mechanics, which emphasizes physical causes. It is assumed by many scientists still, that this theory accounts for organization and form. Northrop has shown that this is clearly a false assumption. ^[59]^[60] This issue will be re-visited in a subsequent paper in this series.

Now let us look at the methods currently used to treat cancer ^[61]^{284c}:

1. surgery
2. radiation
3. drugs

and see what we can learn.

These methods imply the following:

1. Every cancerous cell needs to be removed or destroyed.
2. If one cancerous cell is left, it will multiply.
3. We do not know how to make a cancerous cell non-cancerous.
4. We do not know what the actual cause of the abnormal behavior of cancerous cells and tissues is.
5. We do not have a cure for the abnormal behavior of cancerous cells and tissues.

Since there is no evidence that energy production by oxygen respiration or glucose-cleavage is responsible for the abnormal behavior of carcinoma tissue (1930), and since there appears to be no current evidence of any chemical processes that occur only in cancer cells (1998); where are we to look for a solution to this problem?

Well, we can begin by defining carefully what the problem is (Northrop^[62]). In other words, we can begin by answering the question, “What is cancer?”

Cancer and Organization

On a deeper level, cancer is defined as an organization anomaly. “The problem of cancer seems to be tightly connected to the organization of the cell” (C. Oberling^[63]). This paper assumes that a deeper understanding of organization in general is a requirement for finding the cause of cancer, and that the *problem of organization* (Northrop^[64], Burr^[65], Teilhard^[66]) in biology can only be solved by an amendment in the form of a physical *addition* to the *kinetic atomic theory* (Northrop,^{[67][68]} Dickson^[69]), as described earlier in the first of the series on cancer.^[70]

What is Normal and What is Not?

A definition of cancer by the National Institutes of Health in the early 1990’s describes some empirical observations concerning cancer:

“It occurs when a particular cell or group of cells begin to multiply and grow uncontrollably.....”.

In analyzing this definition, we need to be careful of the subject-predicate structure of the English language (Whitehead). For example, the use of the word *control* in regards to cell multiplication. Cell division is associated with the *organization of the living system*. It is not a simple “on-off” function.

A cell, group of cells, and multiplication and growth are normal. Our attention, then, centers on an analysis of *uncontrolled* multiplication and growth. We need to determine, therefore, the fundamental physical force underlying the normal morphology and growth of an organism.^[71] If we can do this successfully, our analysis should point in a direction that will help us to discover the actual cause of cancer. In discovering the cause, the cure should not be far behind.

The Terrain

To answer the question, “What is the controlling force in the morphology and growth of an organism?”, we need to evaluate materials in any living cell structure. Why? Because, if there is a controlling force, all non-cancerous cells are influenced by it. Also, the nature of the controlling force will be global, encompassing the organism as a whole. “Claude Bernard was right. The microbes don’t mean anything, its the terrain that’s everything”, “Le microbae c’est rien, le terrain c’est tout” (Louis Pasteur^{[72][73]}). Professor L.C. Vincent of France defined the terrain

using the following bio-electronic factors: pH, rH₂, and r. The pH value is the statistical value of the proton, H⁺, and is a representative factor for the mass or kinetic energy. It also represents the magnetic potential. The rH₂ value is the statistical value of the electron through the double bond 2 H⁺ + 2e⁻ through the polarization potential of H₂ [the electric potential]. The r value or specific electrical resistance as a measurement for viscosity is also the main factor for heating and it represents the resistance against any kind of warming (Lucien Roujon ^[74]^[288c]). These three factors correspond with the three factors that “Professor Janos Kemeny, Co-Vice Chancellor and Professor for Biomathematics at the Polytechnic School in Budapest, proposed as truly and completely representing the biological terrain. According to Lucien Roujon, Kemeny proved his assertion in 1953 ^[75]^[76].

... Cancer develops in a terrain with increased pH and rH₂ values and a low r (resistance) according to Prof. Vincent, and this is very interesting from the viewpoint of medical cybernetics... These values pH and rH₂ are the reacting coefficients of the kinetic energies, which are potentially reversible; r is the reaction coefficient of the irreversible heat energy.

It seems to be peculiar at first that the organism seems to have lost its only irreversible reaction in the case of an illness like cancer which is capable of changing the structure

of the organism... A thorough examination of this phenomena will be worthwhile. It could bring us new insights into various causes of cancer and perhaps lead to the detection of a “common denominator”. ...The answer to this question will come from physics (Prof. Janos Kemeny, April 1964, Budapest). ^[77]

Bioparacrystallinity (‘Liquid Crystals’)

“It is probable that the structure of cells as revealed by the microscope represents but little of the dynamic system as it operates in the living; but the coalescences of the parts of these dynamic systems, as revealed by staining, indicate that the inner structure of the cells must be symmetrical” (Crile ^[78]).

Almost without exception all substances which have been investigated by the Debye-Scherrer method (X-rays) have shown a crystalline structure or at least a pattern arrangement similar to the pattern arrangement of crystals. This has been seen even in the micellae of colloids. In accordance with these findings, we may conceive that the ultimate structure of protoplasm is probably crystalline in character, that is the dynamic units form systems of force as in crystals. The forces that produce protoplasm first produce films of water and hydrocarbons which provide the essential interfaces, where are produced the electric potentials which hold apart the ions which otherwise would coalesce into the form of crystals. Protoplasm then might be conceived to be a potential crystal, and the cell itself may be regarded as a large model of the infinitely small protoplasmic elastic crystal. The growth of a non-living crystal is along definite lines of force analogous to the lines of force along which protoplasmic growth is propagated. The components of the non-living crystal, however, are water tight, inelastic, there are no semi-permeable interfaces where electric charges can be built up. In the non-living crystal, therefore, the lines of force are static, and the crystal grows by accretion but cannot reproduce itself; in the living crystal

the lines of force are dynamic, and the crystal grows by reproduction. (Crile ^[79])

“The number of different chemical compounds—molecules and crystals—in inert natural bodies of the biosphere (and Earth’s crust) is *limited*. There exists a few thousands of such molecules and crystals. This determines the essentially small number of forms of inert natural bodies of the biosphere.

“The number of chemical compounds—molecules and crystals—in living natural bodies is *unlimited*. It is connected with individuality, and is different for each individual unit of living matter. We already know *millions* of species of organisms and *millions of millions* of different molecules and crystal lattices corresponding to them. Although far from all of them have been described, this character of theirs is beyond any scientific doubt.” (Vernadsky ^[80]).

Referring to the late Geheimrat Rinne’s Report (page 1016 ^[81])

Mr. Bernal (Cambridge) said: I should like to say a few words of appreciation of this last paper of a great crystallographer. It is not given to many men at an age when most are content to rest on their laurels to open up a fresh field of scientific research, and to assess its importance with an intuition ahead of that of far younger men.

Rinne was not the first to see that liquid crystals had a bearing on biological problems, but I think he had glimpsed at the fundamental rôle they played, and understood the essential nature of the properties that enabled them to do so.

The biologically important liquid crystals are plainly two or more component systems. At least one must be a substance tending to paracrystallinity and another will be water. This variable permeability of liquid crystals enables them to be as effective for chemical reactions as true liquids or gels as against the relative impenetrability of solid crystals. On the other hand, liquid crystals possess internal structure lacking in liquids, and directional properties not found in gels. These two properties have far-reaching consequences. In the first place, a liquid crystal in a cell through its own structure becomes a proto organ for mechanical or electrical activity, and when associated with specialized cells in higher animals gives rise to true organs, such as muscle and nerve. Secondly, and probably more fundamentally, the oriented molecules in liquid crystals furnish an ideal medium for catalytic action, particularly of the complex type needed to account for growth and reproduction. Lastly, a liquid crystal has the possibility of its own structure, singular lines, rods, and cones, etc. Such structures belong to the liquid crystal as a unit and not to its molecules which may be replaced by others without destroying them, and they persist in spite of the complete fluidity of the substance. These are just the properties to be required for a degree of organization between that of the continuous substance, liquid or crystalline solid and even the simplest living cell ^[82].

The ‘cell surface complex’ (Ambrose and Easty) is a useful term which is intended to include the outer coat, lipid layer and underlying protein components.the cell surface complex behaves as a functional component of the cell and ... its behavior depends on an interaction between assemblies of molecules showing liquid crystalline properties ^[83].

[It is interesting to note the visual similarities between liquid crystalline materials and fractals shown in the important video tape, Fractals: The Colors of Infinity, narrated by Arthur C. Clarke ^[84]]

Bioparacrystalline substances (biological ‘liquid crystals’), then, make up the structure of cells. It is interesting to note here that “[Water] as a liquid is nearly inactive in chemical processes (Henderson ^[85]) and is pseudo-crystalline in structure (Fowler, Bernal ^[86]).

An acceptable nomenclature for the fine structural types can only be developed on a structural basis (Frederich Rinne):

- I. Basic Material
 1. Electrons
 2. Protons
 3. [Neutrons] ^[87]
- II. Basic Types: Leptons (fine, delicate)
 1. Atoms
 2. Molecules
- III. Complex Types
 1. Ataxy (irregular structure, fine)
 2. Atactites
 3. Eutaxy (regular structure, fine)
 - a. Paracrystals
 - b. Crystals

The division of matter into gases, liquids, and solids does not accord with this classification. ^[88]

The only basic feature of colloids is that the size of the parts should lie between molecular and microscopic dimensions. ^[89]

Examples of Bioparacrystalline Structures

Some examples of paracrystals in biological systems are colloids, lipoid drops, sperm, muscle fibers, and nerve formations.

Colloids—A further unusually important biological tendency of paracrystalline materials is the fine-structural mixture of many chemical substances in the colloid-submicroscopic micellar patterns. It is precisely on this account that a most important feature of many organic substances is obtained, *viz.*, their chemical complexity and high chemical lability. A large number of “biomolecules” or genes find their location within paracrystalline materials, and not least important, water also, somewhat as in the case of zeolites or albumen crystals. ^[90]

Lipoid Drops—In the case of lipoid drops we are concerned with the cholesterol ester of fatty acids or with mixtures of these and triglycerides.Significantly their thermal behavior is analogous to that of many artificially prepared paracrystalline materials, i.e.

crystalline \leftrightarrow paracrystalline \leftrightarrow isotropic melt.

....In the case of vertebrate animals the body heat causes lipoid drops to appear in the liquid crystalline state.Possibly the so-called “blood dust” which is found for some hours in human blood after an abundant meal of butter, also belongs to this group. On account of the extraordinarily small dimensions of the particles (which show a Brownian movement) their paracrystalline nature has not as yet been investigated. It should be noticed that the above-mentioned certainly paracrystalline lipoid drops are sometimes extraordinarily small. They appear, then, like an anisotropic cloud. ^[91]

Sperm—In sperm material we have a combination of nucleoproteins with other albumin substances. We select for brief discussion the sperms of *Sepia officinalis*, as being the most carefully studied examples, the exact knowledge of which is due to W.J. Schmidt. They belong to the nematosperms, which consist of an extended chromatin [a deeply staining substance present in the nucleus of a cell that contains the genetic material. It is deoxyribonucleic acid attached to a protein structure base] head and a soft appendage made up of other albumin types.An especially strong paracrystallinity is to be ascribed to the paracrystalline sperm heads of *Sepia officinalis*. In the case of the above-mentioned sperms this marked paracrystalline strength acts also as a hindrance to a transition into a crystalline modification. ^[92]

Muscle Fibers—Muscle fibers, on account of their optical and X-ray behavior, are also to be reckoned as paracrystalline materials.The albumin components of the cross-striated skeleton muscles consist, according to H.H. Weber, of about 70 per cent. globulin like myosin and 30 per cent. myogen of albumin nature. A long shape must be ascribed to the globulin molecules as is seen by observations of stream double refraction; those of albumin have no marked longitudinality. By squirting into distilled water from a capillary, threads may be obtained from myosin solutions as H.H. Weber showed. They exhibit the possibility of a more than 100 per cent. stretching.With X-rays an excellent fibre diagram was obtained, which corresponded with that of the Sartorius muscle of *Rana esculenta*. Thus, in myosin preparations we have an excellent model of muscle structure. ^[93]

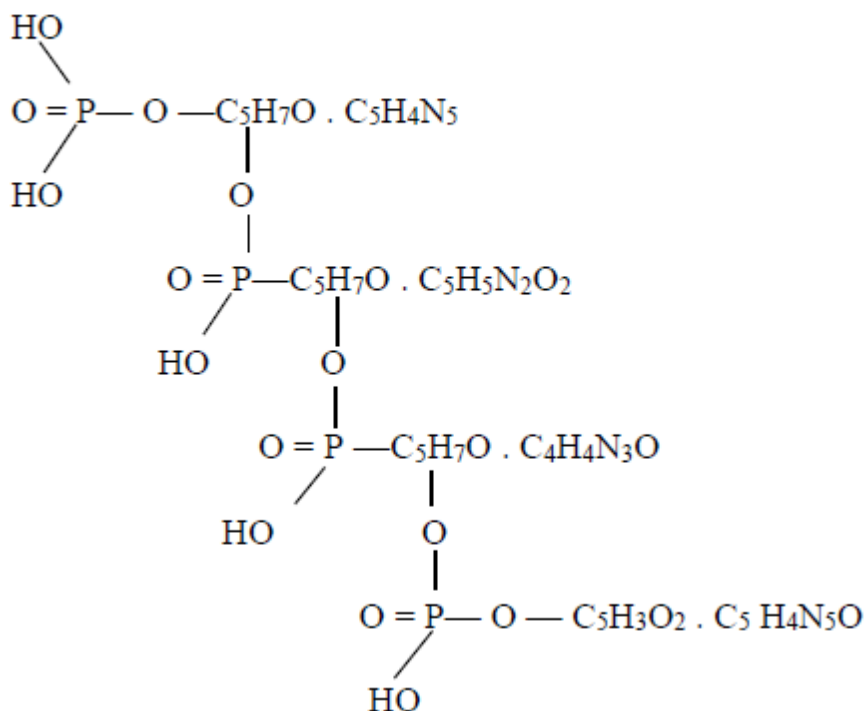
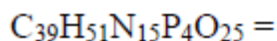
Nerve Formations—The optical properties of [nerve] formations, also biopara-crystalline, will be only briefly mentioned, the reader being referred to the more extended exposition of W.J. Schmidt (*Bausteine des Tierkörpers in polarisierendem Lichte*), in which further details of the literature are given. In the case of most complex nerve systems there are three components: (1) a boundary in the form of a tube-shaped external cover; (2) an axial cylinder; (3) the binding tissue surrounding the actual nerve as an intermediate substance. As Ehrenberg recognized in 1849, the boundary is optically anisotropic with a in the longitudinal direction. The optical axes of the substances lie radially. Thus this

direction corresponds to g. It is certainly worthy of notice that such a structure corresponds completely with that of lecithin-myelin sloughs. ^[94]

In General—The possibility that paracrystalline states were widespread in biological material was reviewed by Needham, who drew an analogy between the development of a mesophase and the growth of limb buds and other organs in amphibia. Substances with paracrystalline or birefringent properties had also been noted in muscle, collagen, reticulin, adrenal cells, ovary, and other tissues, as well as in plant viruses. A leading crystallographer [Bernal] had already predicted that liquid crystals possessed properties essential for the organization of protoplasm. ^[95]

Examples of Structural Formulae for Paracrystals

The following is the structural formula for an enantiomorphic liquid crystal and the zig-zag formula by Levene and London for thymonucleic acid ^[96]:



Free Radicals

Henderson for the purpose of economy of thought and logical clarity in *The Fitness of the Environment* focused on **C** (carbon), **H** (hydrogen) and **O** (oxygen). In the Introduction to Henderson's treatise George Wald (1958) states that he would have chosen four elements, C, H, O, and **N** (nitrogen). He says that "Ninety-nine percent of the living parts of all living organisms are made of these four elements alone" ^[97].

The following is a list of the main chemical elements (by weight) that make up the human body ^[98]:

O (oxygen)	65.0%	Ca (calcium)	1.5%	Na (sodium)	0.2%
C (carbon)	18.5%	P (phosphorous)	1.0%	Cl (chlorine)	0.2%
H (hydrogen)	9.5%	K (potassium)	0.4%	Mg (magnesium)	0.1%
N (nitrogen)	3.3%	S (sulfur)	0.3%		

When the *requirements* of the organism are added, we have the following additional elements (Vernadsky ^[99]):

Fe (iron)—protoplasm

Mn (manganese)

Si (silicon), etc.—skeletal structures.

Vernadsky also states that "The number of chemical elements necessary for each species of matter, for its prolonged normal life, is rapidly increasing as it is studied, and has now reached a total of 60 most studied ones. Without them, normal, prolonged existence is impossible.

Dispersed elements (chiefly the so-called trace elements) *often play a primary rôle* [italics mine]. It is conceivable, that the number of elements in each living organism exceeds 80" ^[100].

"Atoms and molecules with unpaired electrons are called *free radicals*" ^[101]. H and N are free radicals (having an odd number of valence electrons); so are Na (sodium), K (potassium), P (phosphorous), and Cl (chlorine). Any *molecule* that has a free radical attached (leaving an unpaired electron) is also, by definition, a free radical. Barry Halliwell and John M.C. Gutteridge in *Free Radicals in Biology and Medicine* define a free radical in the following manner: "*a free radical is any species capable of independent existence that contains one or more unpaired electrons* (an unpaired electron is one that occupies an atomic or molecular orbit by itself). The presence of one or more unpaired electrons causes the species to be attracted slightly to a magnetic field (i.e. to be *paramagnetic*)" ^[102]. They say that "[that] [i]n order to understand [what 'free radicals' are], it is essential to appreciate clearly what is meant by such chemical terms as 'covalent bond', 'Pauli principle', 'atomic orbital', 'antibonding molecular orbital', 'spin quantum number', 'Hund's rule', and 'transition metal' ^[103] all of which are explained in the Appendix of their book. Under this definition things are more complex. "[T]he oxygen molecule, as it occurs naturally, certainly qualifies as a radical: it has two unpaired electrons ..." ^[104].

"Free radicals are associated with toxicology, chronic inflammation and the autoimmune diseases,

aging, and the *initiation of cancer* [italics mine]. As a useful species they are found in the reduction of ribonucleosides; oxidation, carboxylation, and hydroxylation reactions; phagocytosis, peroxidase and NADH oxidase enzymes; fruit ripening and the ‘wound response’ of plant tissue; prostaglandins and cyclic nucleotides; and lipoxygenase products” [105]³⁰⁸. It is evident, then, that free radicals are included in the family of bioparacrystalline substances.

Physical Forces that Cause the Orientation of Bioparacrystals

What are the forces that affect the structure of bioparacrystalline substances? There are three: electric forces, magnetic forces, and heat (which is electro-magnetic in nature) [106]. To these a fourth must be added, *light* which (like heat) is also electro-magnetic in nature. Einstein defines matter as gravitationally trapped light [107].

Optical Characteristics of Living Systems—Left-handedness

The following is “Pasteur’s discovery of optical activity as a distinguishing characteristic of life” [108] [109].

In 1848, Louis Pasteur succeeded in separating, by hand, the left- and right-handed forms of tartaric acid crystals Dissolving them in water, and examining the two solutions in a polariscope ... , he found that one solution turned the plane of light to the left, and the other one to the right.. He then showed that only the left-hand form is produced in biological processes, such as fermentation, while equal quantities of left- and right-handed forms (racemic solution) arise in a laboratory synthesis of the compound.

The molecular dissymetry, discovered by Pasteur, showed that the presence of living matter is reflected in the chemical formula, including in solutions, and that *right- and left-handed atomic structures* are found to be non-equivalent in chemical reactions. *They are chemically distinct in living matter, but chemically identical in inert chemical media.* (Vladimir Ivonovich Vernadsky [110])

Electromagnetic Radiation from Living Cells and Tissues

... [I]n the 1920’s, the famous Russian biophysicist Alexander Gurwitsch had already established beyond any reasonable doubt, that living cells and tissues generate an extremely weak, yet *biologically* active, form of electromagnetic radiation, in particular in the ultraviolet range; and that the presence of this radiation is somehow intimately connected with the nature of the living processes themselves (Jonathan Tennenbaum [111] and Fritz Popp [112] [113]).

Gurwitsch was led to his experimental demonstration of what he called “mitogenetic radiation” in a lawful and rigorous way, as a by-product of his attempts to hypothesize a *universal biological principle*, ... which (among other things) would encompass the paradoxical, but otherwise undeniable correlations between events of cell division (mitosis) and other events occurring in widely separated locations within a living organism (Tennenbaum [114]).

The Fundamental Physical Force Underlying the Normal Morphology and Growth of an

Organism

Einstein's equation $E = mc^2 = \frac{3}{4} \rho v \gamma$ means "that of the energy constituting matter three-quarters is to be ascribed to the electromagnetic field, and one-quarter to the gravitational field" [115] [116]. Since the billiard ball materialism of Newtonian mechanics does not account for organization and form, then neither can the electro-magnetic and gravitational field composing microscopic matter (electrons) [117].

The *controlling force*, then, would have to be a *global (unitary) electro-magnetic field* [118] [119] [120]. This would apply to all living organisms. The presence of a unitary electro-magnetic field the source of which would be cosmic in extent and external to the elementary particles would provide the physical field necessary for bioparacrystalline substances to maintain their structure while other molecular substances are replaced [121]. This indicates that water is a unique substance (Henderson [122]). The hydrogen ion (proton) may act as a lens or means of concentrating this unitary field. Northrop's Macroscopic Atomic Theory [123] implies that the structure of the proton includes electrons and their individual fields. The bombarding of protons with protons and the resulting shower of electrons [124] seems to confirm this. So does the transmutation of a neutron into a proton by β - radiation (the loss of an electron from a neutron) and a loss of energy from the nucleus (in the form of an antineutrino).

Cancerous Cells and Electro-Magnetic Fields

Cancerous cells, according to our reasoning above, are *cells that are not under the influence of the unitary (global) electro-magnetic field of the organism*. As a result of this state, cell structure will also be affected.

These rather general considerations of the structure of the cell surface complex have a relevance to the cancer problem. It is now well established that one of the major changes in malignancy is an alteration of the cell surface coat, leading to changes in the sialo-muco protein and increased negative surface charge in highly malignant cells, also a loss in surface cell-cell adhesion. By ion etching studies we have now established that the layer like sheets of sub surface fibres seen in normal fibroblasts appear less organized in polyoma transformed cells. In normal human brain cells (astrocytes) the elongated pseudopodia contain well organized fibres lying along their length, whereas these are less well formed in malignant cells, while in highly anaplastic cells they are reduced to a reticulum. The highly malignant cells also show a reduced tendency to form the elongated pseudopodia seen in normal astrocytes [125].

From the standpoint of physics how could a group of cells be isolated from an electro-magnetic field? Two possibilities come to mind.

Isolation by Substances of High Magnetic Permeability

One possibility: a hi- μ (high magnetic permeability) material may surround the cancerous cells and act as a shield by absorbing the unitary electro-magnetic field, thus isolating them from the rest of the organism.

According to Bruce Brandt, Director of DC Field Facilities, at the National High Magnetic Field Laboratories, Florida State University, “There have been no studies of the magnetic permeability of biologic materials in the DC Field Facilities. There has been one study of the effects of high magnetic fields on frog’s eggs, but it has little to do with their magnetic permeability” [126].

Isolation by the Reversal of the Electric and Magnetic Components of the Unitary Electro-Magnetic Field

A second possibility is that the electric and magnetic components of the unitary electro-magnetic field may be reversed. As an example, the electric field associated with the cancerous cells may be reversed (Leonard J. Ravitz [127][128]). Consider, for example, the steady-state potential difference between the nucleus of the cell and the cytoplasm. In a normal cell the cytoplasm is positively charged while the nucleus has a negative charge. In a cancerous cell the reverse is true (Lucien Roujon [129]). This indicates that the cytoplasm in a normal cell is more acidic, has a higher hydrogen ion, H^+ (proton) concentration; and that the nucleus is more alkaline, has a higher hydroxyl ion, OH^- , concentration. Roujon (Germany) says that “The physical-chemical disturbance of the constituent elements of the protoplasm leads to an energetically unstable cell and to a change of the nucleo[cyto]plasmic proportion (RNP). He goes on to say that this “...explains swelling of the nucleus [130] and the anarchic proliferation”, and continues, “During separation the abnormal cell transmits this anomaly to the daughter cells”. “In 1925, C. Laville, France, related the increasing RNP in cell pathology to the discovery of his time, namely the discovery that the nucleus of the cancer cell is positively ionized and the cytoplasm is negatively ionized”. “The American, Bohatirchuk came to the same conclusions through his experiments with radiation proof thorotrast (thorium dioxide). It was only after his publication in 1954 that the above-mentioned facts were gradually considered acceptable for cancer control” [131].

George W. Crile (United States) in *A Bipolar Theory of Living Processes* (1926) concluded that there was no polarity difference between normal and cancerous cells. He said that “...the cytoplasm of the living cells of the multicellular animals, like that of the primal cell which supposedly originated in the alkaline waters of the sea, is alkaline in reaction [-]; [and that] the nucleus is comparatively acid [+]” [132]. “According to this conception the cells of the organism would be electric cells in which the comparatively acid nucleus would be the positive pole and the comparatively alkaline cytoplasm the negative pole. At this point we began to consider the organism as a bipolar mechanism and to direct our researches in the field of biophysics” (1926) [133].

George Crile’s statement concerning the polarity of the electric charges associated with the nucleus and the cytoplasm differ from the information given by Roujon. Obviously, one or the other is correct. Measurements and methods are the key. It should be pointed out that electronic instrumentation was not available at that time for Crile to make accurate potential difference measurements. Portable electronic equipment for the measurement of bio-electric phenomena took three years to develop at Yale [see Burr, Lane, and Nims (1936-1937) [134]] aided with a Grant from the Rockefeller Fund. These measurements also awaited the development of the Silver-Silver Chloride (Ag-AgCl) electrodes (that prevented liquid junction potentials) which,

according to Louis Langman, M.D., "... were conceived by a brilliant physical chemist at the Rockefeller Institute [now part of Rockefeller University]" [135]. Burr and his colleagues used saline solution to bridge the Ag-AgCl electrodes to living matter. It would appear from his writings that Crile used acid-alkaline stainability to determine the polarity of the difference in potential between the nucleus and the cytoplasm.

Conclusion

The twin empirical discoveries, that paracrystalline substances make up cell structure, and that electric forces, magnetic forces, and heat and light (all under the heading of electro-magnetic fields) determine their orientation, imply that electric and magnetic forces are involved in the abnormal behavior of cancerous cells and tissues; that the cause of cancer is a problem in basic physics.

In accordance with this reasoning, the presence of cancer should be detectable by the measurement of electric or magnetic fields (measurement of the constant electric or magnetic component of the unitary electro-magnetic field). This is supported by the experimental work of H.S. Burr and Louis Langman and other colleagues (1936, 1949) [136] [137] [138].

We have a separate argument, then, that supports the experimental work of Burr and his colleagues, as well as additional support for Pierre Teilhard's hypothesis of radial energy and Northrop's macroscopic atomic theory, the existence of a unitary electro-magnetic field, the source of which is external to the elementary particles; a portion of which, but still connected directly to it, is the global electro-magnetic field of the organism [139].

Section III

Experimental Findings: Potential Differences in the Electric Component of a Unitary Electro-Magnetic Field, the Source of Which is External to the Elementary Particles

The central focus of this section on cancer will be the experimental findings of the Macroscopic Atomic Theory.

The rapid exchange of ideas is vital to our survival as a nation and as a species. Also, *basic problems in science* need to be widely known so that our best minds can be working on them. This is meaningful work and needs to be done no matter where those minds are; no matter whether they are male or female, and no matter what age. This cannot be relegated solely to the staff of corporate and university research organizations. Every citizen who desires to needs to be involved. This is crucial. The more minds we have working on a problem the greater chance we have of a solution. An important contribution to this effort would be regional basic research centers open to all in which any citizen of any age, sex, religion, nationality or human variation with the proper training could participate. Right next door, or preferably in the same building, could be centers for the arts. *Observation* and *design* play an important a rôle in the sciences as well as in the arts. By studying art, the scientist learns to observe nature more carefully and to cultivate an aesthetic sense. The artist on the other hand can learn to observe design in the sciences and to understand something of the natural world beneath direct observation, the beauty of mathematical forms. The Mandelbrot

set ($Z = z^2+c$) is an example of this, where colors can be used to represent mathematical boundaries [140].

The most beautiful thing we can experience is the mysterious. It is the source of all true art and science — Albert Einstein

We cannot afford to let valid theoretical and experimental research fall through our fingers. Much important research goes unnoticed or unpublished for years. This tends to foster duplication of effort and lack of progress in other fields of study. In the example that follows the experimental work was done in the 1930s. The theoretical and philosophical work that supported it was done in the 1920s. *Both* were published in *professional scientific journals* at the time. But first...

A Creation Story

They saw it from the moon, that great, blue, living sphere floating in the black of space with the other planets encircling the sun. And the sun was among billions of other suns in the mighty galaxy called The Milky Way. The Milky Way was, in turn, a member of billions of other galaxies spread across the vastness of space. To look deep into space was to look into the past. Now was pure being.

By the time men, women, and children appeared on the spherical surface of the Earth she was prepared to receive them. Everything was there to provide for their needs. When they arrived, reflective consciousness and the resulting birth of ideas placed on their shoulders the necessity for making decisions (freedom) and for determining what was the best course of action (responsibility). As time went on, a tree of knowledge began to form. That knowledge was of the whole of creation of which human beings were a part, including their own bodies. Mistakes were to be made and hopefully learned from. They came to understand that the rest of the universe was free, too, and that there was pain and suffering as a result, as well as joy for both.

As there was fruit on fruit trees, so there was fruit on the tree of knowledge; and some of that fruit was to be for future generations (sometimes fifty or a hundred years in advance)—a sometimes frustrating and usually humbling situation.

Now it was the season to harvest some of that fruit, food for young and old minds of the present and the future, and to prophesy that it was time to organize that knowledge so that it was accessible to all. The technical and intellectual tools to do that were there, and human beings (male and female) needed to do it so that they could be efficient in their quest to understand the universe of which they were an integral part. At stake was the further development of humankind and the future of Earth.

The Harvest

It is time now for us to ingest some of that fruit, and to use it to assemble a new intellectual framework or conceptual scheme to enable us to discover the cause of the abnormal behavior of cancerous cells and tissues.

Today I think the sin we are in danger of committing, and some people have already committed it rather heavily, is the sin of failing to use the knowledge that exists. (Margaret Mead, 1972^[141])

The following is an example of existing knowledge, applicable to the problem at hand. This knowledge has *not* been picked up for use by the general scientific community.

By the mere application of the electrodes of the apparatus to the rabbit, Burr, Hill, and Allen found in 1935 that the instant of ovulation, confirmed by immediate opening of the animal, exhibits itself in a sharp and marked deviation of the potential reading from the normal (Burr, Smith, Allen, '35).

In 1936, Burr, G.M. Smith and Strong found that strain differences between cancer-bearing and cancer-immune mice were accompanied by different systematic electrical field characteristics for the two strains (Burr, Smith, Strong, '36). Moreover, studies made during the major part of the life history of these mice showed definite correlations with growth, maturation, and senility. They found also, by taking frequent regular readings over 12 months, on mice known to produce cancer in that time, that potential changes occur not merely at the locus of the cancer but also in the systematic potential gradient of the organism as a whole. Moreover, these changes of potential difference increase in intensity with the appearance of the cancer, and enable one to detect the inception of cancer before its presence can be determined by any other means.

More interesting and important still, this association of potential changes with specific regions and processes of the organism is not a purely local phenomenon. No one would have supposed that the mere immersion of the end of a finger in each hand in a salt solution in which micro-pipettes [had been immersed] from the apparatus would reflect profound local alterations in the physiology of the organism such as those involved in the menstrual cycle. Nor would one expect that two electrodes placed on the two sides of the chest would exhibit cancer development at a distance at the far end of the body from the electrodes. Yet both these effects have been found in every case examined. The local potential differences and changes of potential differences are part of a systematic potential pattern of the organism as a whole. (Burr & Northrop, 1936^[142])

It is only reasonable to wonder *why* this thinking and research was not picked up by the general scientific community? The National Cancer Institute does not have Northrop and Burr's papers listed on their computer data base. The reason? Only papers from the mid 1960s to the present are there. The response from a representative of the National Cancer Institute as to why this research wasn't picked up by the general scientific community?: "We can only assume that Drs. Langman and Burr's research did not prove useful in planning new investigations."^[143]

Two other responses as to *why* this thinking and research was not picked up by the scientific community came from Louis Langman, M.D. (gynecology) and Leonard Ravitz, M.D. (psychiatry), both colleagues of Dr. Burr. Dr. Langman's opinion was that electronics was in its infancy at the time, and that the silver-silver chloride electrodes were difficult to manufacture. Dr. Ravitz's opinion pointed to ideational and economic reasons [vested interests].

The Author's Response

The author studied the early papers by Burr and Northrop and duplicated the electrode construction techniques. Once the author learned the techniques, the electrodes were easy to manufacture.

The author also duplicated one of the experiments that Burr performed to detect human ovulation in order to confirm the experimental results for himself. He performed these studies with several different subjects over a period of years from 1988 with positive experimental results (Fig. 1). During the first study that took place during a four-month period in 1988, the author observed an electrical correlate for ovulation and conception as well as for a miscarriage. The subject, a registered nurse, recorded the data manually and the author graphed the results. Also discovered during those studies was the fact that there was a 180° reversal of polarity of the ovulatory wave forms for the left and right ovaries. In other words, experimental researches showed one wave form for one ovary and a similar ‘mirror image’ of the wave form when ovulation occurred at the other. The electrical correlate for a miscarriage and the 180° reversal of polarity for the ovulatory cycles of the left and right ovaries recorded by the author were not reported in the earlier published papers. The electrical correlate for human ovulation is one of three examples given in Figures 1,2 and 3 for slowly varying electric field potentials of an electromagnetic field. There is no question as to the experimental validity of Burr’s technique to detect human ovulation by electrical means. The same technique using a high input impedance microvoltmeter and silver-silver chloride (Ag-AgCl) electrodes was used for the *early detection of cancer*.

The story of what happened here should be grist for the mill of an enterprising investigative reporter. Personally, I hope this reporter is a woman. I don’t have any biases in that regard. I just think some men in science and business need to be made to run for cover. This is a non-invasive, electrical screening for the *early detection of cancer*, the *early detection of ovulation*, and the *detection of conception (as it occurs)*!

Dr. Louis Langman, a gynecologist and colleague of Dr. Burr, who practiced at a hospital associated with New York University, explained to me over the telephone many years ago that when it came time to renew the grant money for his work on an early screening for cancer of the female genital tract^{[144][145]} the NIH sent over a physician from Mt. Sinai Hospital in New York. That physician asked Dr. Langman what was the source of the voltages that he was reading with his instrumentation? Dr. Langman replied that he didn’t know. The physician recommended to the NIH that Dr. Langman’s grant not be renewed. Dr. Langman said that he had a family to support and could not continue his research.

The voltages from an ECG (*electrocardiogram*) travel faster than the speed of the nervous system^{[332]5}. Can any of the readers explain to me what the sources of these voltages are? What health professionals did with ECGs was to accept the validity of the experimental evidence and use this information for the health care of their patients. Is that any different than using the experimental findings of Dr. Langman and Dr. Burr?

It may seem far-fetched to some readers that the same technique used to detect ovulation could be used for the early detection of cancer. The key to understanding this is an understanding of the problem of organization in biology, and the solution to this problem will require a change in our physical conception of the universe. We will need to *add* something to what we already know. To some this may seem like science fiction. In fact, it is the result of the efforts of some of our best

minds. These ideas have important social, religious, and economic implications, if one has the eyes to see them.

The universe in the model presented here ^[146] ^[147] is finite and one. The source of its union is the Macroscopic Atom and its unitary electromagnetic and gravitational field. The universe is also composed of many parts (the kinetic atomic) all of which are interacting with one another. Complex matter is held together by this primary causal unitary field the source of which (the Macroscopic Atom) is external to and compresses all matter within it with a corresponding reduction in space-time between elements in the system.

Teilhard's Proposal of Two Energies

Pierre Teilhard divided energy into two basic types, tangential energy, the energy that current physics deals with, and a radial energy, an energy that draws matter to ever higher degrees of organized complexity (this radial energy is congruent with the primary causal unitary electromagnetic and gravitational field of the Macroscopic Atom ^[148]).

Electrical Measurements of the Unitary Electro-Magnetic Field

The *potential differences* associated with the unitary field of the Macroscopic Atom without any interaction from the kinetic atomic are constant (dc) (Northrop & Burr ^[149], Ravitz ^[150]). The Macroscopic Atom is like the electron in composition. It is not made up of parts. It is truly an atom in the Greek sense of that word. It can only be reduced to energy. Since matter is embedded in a compound electromagnetic and gravitational field made up of the individual electromagnetic and gravitational fields of the elementary particles (electrons) and the primary causal unitary electromagnetic and gravitational field of the Macroscopic Atom, the unitary steady-state electromagnetic field of the Macroscopic Atom, which includes the global field of the organism, will be “modulated” by changes in local systems, thus making it possible to measure those changes at a distance from the source. The steady-state potential differences of the unitary electromagnetic field vary slowly over time due to internal and external environmental changes.

Electro-Magnetic Fields and Chemistry

The chemistry that takes place within this field can be likened to an immense number of compass needles in the Earth's magnetic field. The chemical elements and molecules in a bioparacrystalline arrangement align themselves within the field. If the electric and magnetic components of an electromagnetic field reversed themselves the chemical elements and molecules would reorient themselves in a manner that would change their orientation in respect to the overall field pattern of the organism, isolating the involved tissues from the unitary field and forming cancerous tissue.

“The microscopic physico-chemical constituents do help to determine the character of the field[but] [t]o make sense out of the notion that the field determines the behavior of a local process or constituent within it, it is necessary to modify modern science at its very foundations by revising our theory of first principles [The Macroscopic Atomic Theory] to provide meaning for the unity of nature as a causal factor” (Burr and Northrop ^[151]).

It must be re-emphasized that in using this model the *field*, not the chemistry, *is causal*, and that the electric or magnetic component of an electro-magnetic field are measurable using modern electronic instrumentation.

Obviously, if the field determines the pattern of organization, it should be possible to change development of an organism by modifying the field. However, a little calculation has shown that the field intensities in cellular units of the living system are so great that the construction of an external DC field, sufficiently large to modify them, is either physically impossible or prohibitively expensive ^[152]. [This does not preclude the use of high intensity DC magnetic fields to change the development of an organism—the author]

“According to the newest research in the U.S.A., [there is a potential difference of about 480,000 volts between the sperm and the ovum]. ...That would kill a man! And, that contact, the sudden contact of the sperm with the ovum is a very high discharge of potential. And this discharge makes the membranes of the ovum coagulate, and therefore other sperms cannot enter” (Franz Morell) ^[153].

It is clear, then, that the proof of the importance of the DC field must be derived from indirect evidence. If, for example, the unfertilized or undivided egg of such a form as a frog possesses an electrical pattern which can be traced through in a significant relationship to the morphological pattern, the implications would be very great that the field defined by the electrical pattern determines the form of the ensuing embryo.

.....[S]ix thousand determinations on fifty frog’s eggs [were made] prior to the development of the primary axis of the embryo as seen in the appearance of the medullary plate. Potential differences between the vertex of the animal pole and four equidistant points on the equator of the egg were measured by the Burr-Lane-Nims (1936) technique. Three variations in the technique were employed and all were subjected to statistical analysis.

From the very beginning it was apparent that at least one of the four points on the equator showed a significantly greater voltage drop from the vertex than any of the other three. This point was then marked either by staining with Nile Blue sulphate or by the establishment of orientation points in the immediate environment of the egg. Of the fifty embryos, ten were marked successfully and developed to the neural plate stage.In every case where correlations were possible, the primary axis of the organism came to lie in the plane of the greatest voltage drop from the vertex. In other words, it was possible to predict from the voltage pattern where the head of the organism would develop. It is hard to escape the conclusion, therefore, that the electrical pattern is primary, and in some measure at least, determines the morphological pattern.

It seems clear from the above that, at least in the frog’s egg (and in the egg of *Amblystoma*, for some preliminary studies in the latter confirm these findings), there exists an electrical field which appears prior to the appearance of the formed structures and also predicts the longitudinal axis of the future embryo. ^[154]

“In measuring the L (Life) fields of plants, [*the basic blueprints of life*],it has been found that the change of a single gene in a parent stock produces profound changes in the voltage pattern.

This phenomenon could be of great importance in the study of genetics in plants and in animals”
[155b]

The association with Professor Sinnott was extraordinarily fruitful. Many suggestions were made as to the kind of electrometric studies which could be made on growing systems. Two of these were furthered. The first of these, following Professor Sinnott, was carried out with the help of Oliver Nelson, at that time a student in the graduate school of Yale University, Department of Botany, and closely associated with the Connecticut Agricultural Experiment Station. The suggestion was made that electro-metric studies be made of a single seed. The choice was necessitated largely by practical considerations and fell on corn kernels—sweet corn kernels.

With the cooperation of the Connecticut Agricultural Experiment Station, it became

possible to study the electrical patterns in several pure and hybrid strains of sweet corn. These seeds had been under study for some time. The strains differ considerably in genetic constitution and in the degree of hybrid vigour shown in crosses between them. Four inbred strains were studied and three hybrids. One of these was a mid-season yellow sweet corn, an inbred of unknown origin. Another was a semi-dwarf mutant of P-39; it is normal in appearance but much reduced in size. It has been shown by singleton that they differ only by one gene.

In this material, therefore, we had four stable pure strains of significantly different properties with which to correlate electric patterns. The three hybrids show a graduation of hybrid vigour. If the electrical patterns have any significance, the electrical correlates of these differences should be manifest. A statistical analysis shows that the mean potential measured between the attached end of the corn kernel and its opposite pole gave highly significant results.

Aside from the generally different mean, however, the most striking finding was a very great difference between the means of the single gene mutant and the parent stock. It is remarkable that the change of a single gene in the parent stock should produce such profound and significant change in the over-all pattern of the voltage difference. The conclusion seems to be inescapable that there is a very close relationship between the genetic constitution and the electrical pattern. If further studies should confirm this conclusion, it seems very probable that one of the ways the chromosomes impart design to protoplasm is through the medium of an electro-dynamic field.
(Burr) [156]340c [157]

Chemistry and Form

Molecular shapes are important in biochemistry. We are faced again with the problem of organization: the presence of mechanical causation, the billiard ball materialism of Newtonian mechanics, and organization in living systems. This will require modification of the valence theory, for if the current kinetic atomic theory is a thorough going physical conception of nature, then how does one explain the fact that with carbon, for example, the outer energy level contains four electrons and is capable of holding four more? This makes a total of ten electrons and six protons giving the chemical element carbon a net negative charge of 4^- . Where are the other protons, the *physical elements with positive unit charges*, that should be necessary to hold these electrons in orbit? It would seem here that Newtonian mechanics and a physical theory of nature breaks down. *There are no positively charged physical objects to hold the four extra electrons in orbit.* We may have a rule for what happens, but we have no understanding in *kinetic atomic terms* as to the reason

why. This is additional reinforcement for the statement that *the current kinetic atomic theory does not account for form.* [334]

“At this point, it can no longer astonish us to discover that we have reached the limits of visualization, and that the concept of electrons circling a nucleus cannot be taken literally, like the concept of a water molecule consisting of two hydrogen atoms and one oxygen atom, arranged in a triangular pattern.” [158] This statement would seem to invalidate the Valence Shell Electron Pair Repulsion theory (VSEPR) [159], or at least make it experimentally unverifiable.

The limitations imposed here on visual representation can be formulated with greater accuracy with the aid of a relationship, called the *uncertainty principle*, which is based on the quantum theory. It can be expressed in the simplest form as follows: One can never know simultaneously with perfect accuracy both of those two important factors which determine the movement of one of these smallest of particles—its position and its velocity. It is impossible to determine accurately *both* the position and the direction and speed of a particle *at the same instant*. If we determine experimentally its exact position at any given moment, its movement is disturbed to such a degree by that very experiment that we shall then be unable to find it at all. And conversely, if we are able to measure exactly the velocity of a particle, the picture of its position becomes totally blurred (Heisenberg) [160].

The Resolution of the Atom Probe Field Ion Microscope

The atom probe field ion microscope “has the highest analytical spatial resolution of any microscope and provides a fundamental determination of the chemistry of a nanometre-scale region by simply counting the number of atoms of each type in a given volume.” “The instrument is made up of two parts, a field ion microscope (FIM) and a mass spectrometer.” “The original development of both the field ion microscope and the atom probe was due almost entirely to Professor Erwin Müller and his co-workers in Berlin and then at the Physics Department of Pennsylvania State University, USA” [161]. The resolution of this instrument is a single atom. It does not image the internal structure of a single atom, though, which according to Heisenberg, is not possible.

Eastern Medicine: Acupuncture

Western medicine is focused on a traditional kinetic atomic approach to disease, and is preoccupied with chemical elements, molecules, DNA, etc. The current kinetic atomic theory does not provide a theoretical basis for the efficacy of acupuncture. Field theory does. Einstein’s Special and General Theories of Relativity incorporated and modified the billiard ball materialism of Newtonian mechanics; “Atomic physics has had to be supplemented with field physics” (Northrop [162]). The entire human organism can be mapped using a millivoltmeter having an input impedance of ten megohms or greater along with silver-silver chloride (Ag-AgCl) electrodes that are in contact with the skin through a saline solution. The results of the mapping of field potential differences between a common point and all areas of the human organism should show a pattern that matches the acupuncture points of Chinese medicine.

Energy and the Psychical (Consciousness)

Pierre Teilhard de Chardin begins his statement concerning two energies in nature by saying that “all energy is essentially psychical in nature” [163] [164]. Assuming Pierre Teilhard’s definition, it becomes apparent that reflective consciousness would directly impact the global electro-magnetic

field of the human organism, thus providing a scientific way to measure the effects (stress) of the external (social) and internal (psychological) environment with regards to cancer.

With the cooperation of the late Dr. Eugen Kahn in the Department of Psychiatry, a number of patients—who had been studied carefully by the psychiatric staff, were selected and measurements made on them daily for a considerable period of time.

At the conclusion of the electro-metrics the patients were divided into three groups: those with markedly changed electro-metrics, those with relatively little change, and an intermediate group. Subsequently, the intermediate group was subdivided into a high-low group and a low-high group.

At the conclusion of the experiment, the groups selected by the psychiatrists were compared with the groups selected by the electro-metric investigator, who—it should be emphasized—knew nothing about the psychiatric diagnosis. *Results of the study showed clearly enough that the group consisting of those markedly deviated from normal behaviour by psychiatric examination also showed a similar deviation in electro-metric examination.*

.....This, of course, is very interesting and it suggested that the electro-metric technique might be useful in the neurological and psychiatric fields.

This whole area has been extensively investigated by Dr. Leonard J. Ravitz, Jr. At one time staff of the Department of Psychiatry at Yale, and followed by him through appointments in a number of other institutions. His results are striking and extraordinary. Perhaps the most remarkable result obtained in our laboratory by Dr. Ravitz was when he found a significant electro-metric correlate of hypnotism that was astonishing to watch: *a continuously-recording voltmeter showed evidence of marked changes in voltage gradient during the hypnotic process.* [See Fig. 2, Sleep Study]

It becomes evident from Dr. Ravitz's examination that by using electro-metric techniques on patients in psychiatric hospitals, patients—as a result of therapy, or changing circumstances—could safely be discharged from the hospital when the voltage gradient indicated a reasonable return to normal. Likewise, electro-metrics could show clearly enough when certain patients—no matter what the therapy was—could *not* be returned safely to normal life outside of the institution. The value of this to the institutionalized psychotic should be apparent at once. (Burr ^[165], Ravitz ^[166])

“Both emotional activity and stimuli of any sort involve mobilization of electric energy, as indicated on the galvanometer. Hence, both emotions and stimuli evoke the same energy. Emotions can be equated with energy” (Ravitz ^[167]).

Using Einstein's equation $E=mc^2$ (stating the equivalency of energy and mass) and Teilhard's definitions we can deduce that *all matter* is essentially psychical in nature. He then goes on later to define life as the rise of consciousness, and he defines evolution as an increase in consciousness. He then correlates organized complexity with consciousness. He says that the specific effect of an increase in organized complexity is an increase in consciousness or to say it the other way around, an increase in consciousness is the specific effect of an increase in organized complexity. This is embodied in what he terms The Law of Complexity-Consciousness ^[168].

A study of the increase of organized complexity in nature shows that the evolution of matter moves from the simple to the more complex, and that *each principle stage of organized complexity is incorporated into the next higher stage*: The chemical elements of the periodic table are incorporated into the world of molecules (e.g. the chemical elements hydrogen and oxygen make up a molecule of water); molecules are linked together to form mega-molecules which in turn are incorporated into the basic building materials of the cell, amino acids and proteins. The cell contains all the previous principal stages in organized complexity: protons, neutrons, chemical elements, simple molecules, mega-molecules, aminoacids and proteins, etc. The basic building block in the human organism is the cell. The specific effect of the organization of cells in the human body is reflective consciousness. What then is the next step in the process of organized complexity and what will be its effects?

First it is necessary to determine what the physical elements are that will make up the building blocks for the next step in organized complexity. Using the steps above, the next building blocks will be elements of reflective consciousness, human persons (all human variations—male and female of all ages and cultures). Evolution having perfected the physical structure for reflective consciousness has changed its face; it is principally psycho-social. I say *principally*; the arrangement of physical elements (human persons) remains critical. The physical elements of reflective consciousness have been perfected. There will be no ‘master race’ that will come out of humankind—only leaders who will set the example and help guide others along the way. The psycho-social then is an extension of the biological and more generally an extension of the whole evolutionary process. The next step, then, will require bringing people together. This is being accomplished by the limited area of the spherical surface of the Earth and an increase in numbers. It becomes readily apparent that architecture and urban design will be necessary structural tools for fostering the further development of consciousness and humankind. The arcologies of the Arizona architect Paolo Soleri ^[169] reflect the importance of this statement. A properly designed city, then, would have ‘elements’ of the preceding stage, which in turn include representative ‘elements’ from all previous major stages [i.e. towns, communities, neighborhoods, families, individual human beings (male and female), etc.] ^[170]. The city needs to be a 3-dimensional, highly-organized structure with a minimization of space-time between elements in the system. The specific effect of this organization would be an increase in consciousness, in this case a *global and individual* increase in consciousness.

In Pierre Teilhard’s scheme of thought one cannot separate consciousness from physics. For him, the whole universe is conscious. This coincides with the view of indigenous peoples that everything in the universe is alive and has a spirit.

What trees and branches are there that break up the sky, that make me think that the moon, the planets, and the stars are just bright spherical fragments whirling through space? What hollow, spherical womb is this? filled with planets and stars and galaxies with nothing in between; or is it just that it cannot be seen except by my mind, or felt except by my heart.

In Conclusion

It will be up to others now to contribute their part in helping to discover experimentally the cause of the abnormal multiplication and growth of cancer cells which has been a very difficult scientific

problem.

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Glossary of Scientific Terms

accretion ^{A4} the process of growth or enlargement; esp. increase by external addition or accumulation.

acetylcholine ^{A5} a neurotransmitter $C_7H_{17}NO_3$ released at autonomic synapses and neuromuscular junctions, active in the transmission of nerve impulse, and formed enzymatically in the tissues from choline.

acidity ^{A6} 1: the quality, state or degree of being sour or chemically acid [having a pH less than 7; hydrogen-containing molecules or ions].

adenine ^{A11} A purine base $C_5H_5N_5$ that codes hereditary information in the genetic code in DNA and RNA.

adenosine ^{A11} A nucleoside $C_{10}H_{13}N_5O_4$ that is a constituent of RNA yielding adenine and ribose on hydrolysis.

alimentary canal ^{A19} the tubular passage that extends from the mouth to anus, functions in digestion and absorption of food and elimination of residual waste, and includes the mouth, pharynx, esophagus, stomach, small intestine, and large intestine.

alkalinity ^{A19} :[the quality, state or degree of] having the properties of an alkali or alkali metal: basic; esp. of a solution: having a pH of more than 7.

amide ^{A24} a compound resulting from replacement of an atom of hydrogen in ammonia by an element or radical or one or more atoms of hydrogen in ammonia by acid radicals having a chemical valence of one.

amino group ^C A nitrogen-hydrogen molecule, ($-NH_2$); will bind to a carbon in biological compounds.

anaplastic ^{A29} characterized by, composed of, or being cells which have reverted to a relatively undifferentiated state.

anarchic proliferation ^{A560} a: rapid and repeated production of new parts or of offspring (as in a mass of cells by a rapid succession of cell divisions).

anarchy ^{F65} 3. Disorder in any sphere of activity; proliferation.

anomaly ^{A33} a deviation from the normal esp. of a bodily part.

antioxidant ^{A39} a substance (as beta-carotene or alpha-tocopherol) that inhibits oxidation or reactions promoted by oxygen or peroxides.

apo enzyme ^{A42} A protein that forms an active enzyme system by combination with a coenzyme and determines the specificity of this system for a substrate.

assimilate ^{A50} 1: to take in and appropriate as nourishment: absorb into the system 2: to become

absorbed or incorporated into the system.

assimilation ^{A50} 2: the incorporation of or conversion of nutrients into protoplasm that in animals follows digestion and absorption.

astrocytes ^{A51} a star-shaped cell; esp: any comparatively large much-branched neurological cell.

atom ^{A52} the smallest particle of an element that can exist either alone or in combination. *Greek.* uncut, indivisible.

atomic theory ^{I130} the theory that all matter is composed of atoms [$\alpha\tau\omicron\mu$ uncut, indivisible], especially the modern theory that [a chemical element] is made up of a nucleus around which electrons revolve. [We need to be careful with our definitions, e.g words like ‘an atom of hydrogen’ are used, when the more precise term ‘the chemical element, hydrogen’ should be used or some other terms that would differentiate it from the early Greek meaning of the word atom. There are sound philosophical reasons for this, not to mention logical clarity].

autoimmune diseases ^{A56} [Diseases] caused by antibodies or T cells that attack molecules, cells or tissues of the organism producing them.

β - Beta radiation: emitted from the nucleus of a chemical element. The loss of an electron and an antineutrino from a neutron changes the neutron into a proton.

base ^C A carbon-nitrogen ring compound (either purine or pyrimidine). ^A 2. Any of the five purine or pyrimidine bases of DNA and RNA that includes cytosine, guanine, adenine, thymine, and uracil.

beta rays (β -) ^D Electrons emitted with much higher energy than can be produced in any sort of chemical reaction.

bio- ^{F184} [Greek: bios, life] a combining form meaning life, of living things, biological.

biosphere ^{E145} [lit. the sphere of life or of living things] all of life on Earth, usually discussed as an interdependent system.

C-60 ^{E84} a molecule consisting of 60 carbon atoms. It resembles a soccer ball and has unusual chemical, magnetic, and electric properties. Nicknamed a “buckyball” after the American architect, Buckminster Fuller.

carbonyl group ^C A carbon-oxygen molecule, ($-C=O$); will bind to another carbon in biological compounds.

carboxyl group ^{C47} A carbon-oxygen-hydrogen molecule, ($-COOH$); will bind to another carbon in biological compounds.

carboxylation ^C adding a carboxyl molecule ($-COOH$) to another molecule.

carcinoma ^{A96} : a malignant tumor of epithelial origin.

catalysis ^{A100} A change and especially an increase in the rate of chemical reaction brought about by a substance (catalyst) that is itself unchanged at the end of the reaction.

catalyze ^{A100} To bring about the catalysis of (a chemical reaction).

cell division ^{A102} the process by which cells multiply involving both nuclear and cytoplasmic division.

ceramide ^{A105} any of a group of amides formed by linking a fatty acid to sphingosine and found widely but in small amounts in plant and animal tissue.

cerebrosides ^{A106} any of various lipids composed of ceramide and a monosaccharide and found esp. in myelin sheath of nerves.

chemical element ^{A199} any of more than 100 fundamental substances that consist of elements of only one kind and that singly or in combination constitute all matter 2: one of the basic constituent units (as a cell or fiber) of a tissue.

choline ^{A114} a base $C_5H_{15}NO_2$ that occurs as a component of phospholipids esp. in animals, is a

precursor of acetylcholine, and is essential to liver function.

cholinergic ^{A114} 1 of *autonomic nerve fibers*: liberating, activated by, or involving acetylcholine.

cleavage ^{A122} 2: the splitting of a molecule into simpler molecules.

coenzyme ^{A127} A thermostable non-protein compound that forms the active portion of an enzyme system after combination with an apoenzyme.

compound ^{A133} something formed by a union of [different] elements or parts; spec: a distinct substance formed by chemical union of two or more ingredients in a definite proportion.

corrode ^{A142} to eat or be eaten away gradually (as by chemical action).

covalent bond ^{A145} a chemical bond that is not ionic and is formed by one or more shared pairs of electrons.

cyclic fatty acids ^C

cyclic nucleotides ^C Any of several compounds that consist of ribose or deoxyribose sugar joined to a purine or pyrimidine base and to a phosphate group that are basic structural units of RNA and DNA.

cytoplasm ^{A158} the organized complex of inorganic and organic substances external to the nuclear membrane of a cell and including the cytosol and membrane-bound organelles (as mitochondria).

cytosol ^{A158} the fluid portion of the cytoplasm exclusive of organelles and membranes.

dehydrogenase ^{A165} An enzyme that accelerates the removal of hydrogen from metabolites and its transfer to other substances.

deliquescent ^{I551} 1. Becoming liquid by absorbing moisture from the air: *deliquescent crystals* 2. *Botany*: branching in such a way that the main stem or axis is lost in the branches: *trees like the elm, cottonwood, oak, hickory, and many others are deliquescent*.

deoxyribose ^C b-D-2-deoxyribose, a five-prime carbon sugar (pentose) use in deoxyribonucleic acid (DNA).

dextrorotary ^{A173} turning clockwise or toward the right; esp: rotating the plane of polarization of light toward the right.

distended ^{A183} to enlarge or stretch out (as from internal pressure).

DNA (deoxyribonucleic acid) ^{A184} Any of various nucleic acids that are the molecular basis of heredity, are localized especially in cell nuclei and are constructed of a double helix held together by hydrogen bonds between purine and pyrimidine bases which project inward from two chains containing alternate links of deoxyribose and phosphate.

electric current ^{E292} an electric current consists of charged particles—most often electrons—moving through a conductor. The electrons in some atoms, such as copper and aluminum, are free to move and to jump from one atom to another. Such materials are called *conductors*; other materials, such as wood, do not contain as many moving electrons and are called *insulators*. When a material is neither completely a conductor nor an insulator, it is called a *semiconductor*.

electro-magnetism ^{E294-295} moving and spinning electric charges create magnetic fields; conversely, a moving magnetic field sets charges in motion, generating an electric current; this principle makes electric motors, generators, and transformers possible. [The *weak nuclear force* has been associated with electromagnetism; this has been verified experimentally. The *unitary electro-magnetic field* of the Macroscopic Atom may be the *weak nuclear force*, but this will require *an amendment in the form of an addition* to the current kinetic atomic theory.

electron ^{A198} an elementary particle [an atom in the Greek sense of that word: atoms, uncut,

indivisible] consisting of a charge of electricity equal to about 1.602×10^{-19} coulomb and having a mass when at rest of about 9.109534×10^{-28} gram or about 1/1836 that of a proton.

electrostatics ^{E291} all matter is composed of [chemical elements] which in turn are composed of [electrons, protons and neutrons]. There is a difference in potential between protons and electrons. We have assigned the proton as having a *positive* charge and the electron as having a *negative* charge. [In the neutron any difference in potential has been cancelled. It has not charge. We must be careful in our thinking concerning this issue. An isolated 'charge' has no meaning. A potential difference is always between two reference points]

emollient ^{A202} n: an emollient agent. adj: making soft or supple; also: soothing esp. to the skin or mucous membrane.

emulsify ^{A202} to disperse (as an oil) in an emulsion.

emulsion ^{A202} a system (as fat in milk) consisting of a liquid dispersed with or without an emulsifier in an immiscible liquid usu. In droplets of larger than colloidal size.

enantiomer ^{A203} either of a pair of chemical compounds whose molecular structures have a mirror image relationship to each other.

enzyme ^{A208} any of numerous complex proteins that are produced by living cells and catalyze specific biochemical reactions at body temperatures.

epithelial ^{A211} : of or pertaining to the epithelium.

epithelial ^{A211} : of or relating to epithelium.

epithelium ^{A211} : a membranous cellular tissue that covers a free surface or lines a tube or cavity of an animal body and serves esp. to enclose and protect the other parts of the body, to produce secretions and excretions, and to function in assimilation.

epithelium ^{A211} a membranous cellular tissue that covers a free surface or lines a tube or cavity of an animal body and serves esp. to enclose and protect the other parts of the body, to produce secretions and excretions, and to function in assimilation.

ester ^{A217} any of a class of often fragrant compounds that can be represented by the formula RCOOR^1 and that are usually formed by the reaction between an alcohol usu. with elimination of water.

esterify ^{A217} to convert to an ester.

excretion ^{A221} 2a: something eliminated by the process of excretion that is composed chiefly of urine or sweat in mammals including humans and of comparable materials in other animals, characteristically includes products of protein degradation (as urea and uric acid) usu. differs from ordinary body secretions by lacking any further utility to the organism that produces it, and is distinguished from waste materials (as feces) that have merely passed into or through the alimentary canal without being incorporated into the body proper.

fat ^{A231} 1: animal tissue consisting chiefly of cells distended with greasy or oily matter 2.b: any of numerous compounds of carbon, hydrogen, and oxygen that are glycerides of fatty acids, are the chief constituents of plant and animal fat, are a major class of energy-rich food, and are soluble in organic solvents but not in water.

fatty acids ^{A231} any of numerous saturated acids $\text{C}_n\text{H}_{2n+1}\text{COOH}$ containing a single carboxyl group and including many that occur naturally usu. in the form of esters in fats, waxes, and essential oils.

fibroblasts ^{A235} a connective-tissue cell of mesenchymal origin that secretes proteins and esp. molecular collagen from which the extracellular fibrillar matrix of connective tissue forms.

gene ^{A255} a specific sequence of nucleotides in DNA or RNA that is located in the germ plasm usu. on a chromosome and that is the functional unit of inheritance controlling the

transmission and expression of one or more traits by specifying the structure of a particular polypeptide and exp. a protein or controlling the function of other genetic material.

glucose ^{A263} a sugar $C_6H_{12}O_6$ known in dextrorotary, levorotary, and racemic forms; esp: the sweet soluble dextrorotary form that occurs widely in nature and is the usual form in which carbohydrate is assimilated by animals.

glycerol ^{A264} a sweet syrupy hygroscopic alcohol $C_3H_8O_3$ containing three hydroxyl groups per molecule usu. Obtained by the saponification of fats and used as a moistening agent, emollient, and lubricant, and as an emulsifying agent—called also *glycerin*.

gravity ^{E281} is the weakest force in nature but has an infinite range [the strength of this gravity varies as the inverse square of the distance from the source; this is true of gravity in the current kinetic atomic theory associated with microscopic matter]. It cannot be canceled by a “negative” force, the way electromagnetism can or be negated after a short distance like nuclear forces [the properties of the *unitary gravitational field* of the Macroscopic Atom may be different, and may be the *strong nuclear force*, but this will require an *amendment in the form of an addition* to the current kinetic atomic theory]

guanosine ^{A271} A nucleoside $C_{10}H_{13}N_5O_5$ composed of guanine and ribose.

homologous ^{A294} a: having the same relative position, value, or structure b: having the same allelic genes with genetic loci usu. arranged in the same order.

hormone ^{A295} 1a: a product of living cells that circulates in body fluids and produces a specific effect on the activity of cells remote from its point of origin; esp: one exerting a stimulatory effect on a cellular activity.

hydrocarbon ^{A300} an organic compound (as benzene) containing only carbon and hydrogen and often occurring esp. in petroleum, natural gas, and coal.

hydrolysis ^{C103} the enzyme-catalyzed addition of water.

hydroxyl group ^{C47} an oxygen-hydrogen molecule, (–OH); will bind to a carbon in biological compounds.

hydroxylation ^C adding a hydroxyl molecule (–OH) to another molecule.

hygroscopic ^{A302} readily taking up and retaining moisture.

hypothesis ^{H5} a tentative conclusion derived from a set of observations.

inert ^{A325} 1: lacking the power to move 2: deficient in active properties: esp: lacking a usual or anticipated chemical or biological action.

intact ^{A332} physically and functionally complete.

ion ^{E231} an *ion* is a [chemical element, or molecule] with a net electric charge.
^{I112}

ion [a chemical element] or a group of [chemical elements] having a negative or positive charge as a result of having lost or gained one or more electrons.

ionic bond ^{I113} *Chemistry*. A bond between two ions with opposite charges.

isotropic ^{I121} 1 *Physics*. having the same properties such as elasticity or conduction, in all directions. 2 *Zoology*. Without predetermined axes.

kinetic ^{A355} of or relating to the motion of material bodies and the forces and energy associated therewith.

labile ^{A358} readily or frequently changing: as a: readily or continually undergoing chemical, physical, or biological change or breakdown.

lactic acid ^{A360} : an organic acid $C_3H_6O_3$ that is known in three optically isometric forms: a or D-lactic acid: the dextrorotary form normally in blood and muscle tissue as a product of the metabolism of glucose and glycogen; b or L-lactic acid: the levorotary form obtained by

biological fermentation of sucrose or DL-lactic acid: the racemic form present in food products and made usually by bacterial fermentation.

lattice^{I1185} 3a: the geometrical pattern of molecules, atoms, or ions in a crystal: *in a crystal all the atoms are distributed in an orderly arrangement throughout the space occupied by the crystal. This is called a lattice.*

law (or principle)^{H6} a theory that withstands the test of time and further experimentation.

lecithin^{A367} any of several waxy hygroscopic phospholipids that are widely distributed in animals and plants, form colloidal solutions in water, and have emulsifying, wetting, and antioxidant properties.

levorotary^{A373} turning toward the left or counterclockwise; esp: rotating the plane of polarization of light to the left.

lipid^{A376} any of various substances that are soluble in non-polar organic solvents, that with proteins and carbohydrates constitute the principle structural components of living cells, and that include fats, waxes, phospholipids, cerebrosides, and related and derived compounds.

lipoid^{A377} resembling fat.

lipoxigenase products^{A377} A crystallized enzyme that catalyzes the oxidation primarily of unsaturated fatty acids or unsaturated fats by oxygen.

liquid junction potentials^{A377} Potential differences (voltages) set up at the junction of dissimilar liquids.

magnetic field^{E293} a field of attractive or repulsive forces generated by moving or spinning electric charges. *A magnetic field can be described as a set of imaginary lines that indicate the direction a compass needle would point to at a particular spot. These are called lines of force.* Magnets have a south and north pole. The north pole attracts the south pole, while like poles repel. The strength of the attraction or repulsion depends on the strength of the magnetic field, and is inversely proportional the distance between the magnetic poles.

magnetic permeability^{F1336} in *physics* (a) the measure of the ease with which magnetic lines of force are carried by a particular material.

magnetism^{E293-294} a *magnetic field* is a field of attractive or repulsive forces generated by moving or spinning electric charges; a magnetic field can be described as a set of imaginary lines that indicate the direction a compass needle would point to at a particular spot; these are called *lines of force*. [magnetic fields have a north and south pole; like poles repel, unlike poles attract]

meiosis^{A404} the cellular process that results in the number of chromosomes in gamete-producing cells being reduced by one half and that involves a reduction division in which one of each pair of homologous chromosomes passes to each daughter cell and a mitotic division.

mesenchyme^{A410} Loosely organized undifferentiated mesodermic cells that give rise to such structures as connective tissues, blood, lymphatics, bone, and cartilage.

mesodermal^{A411} The middle of the three primary germ layers of an embryo that is the source esp of bone, muscle, connective tissue, and dermis.

metabolism^{A413} The sum of the processes in the buildup and destruction of protoplasm; specifically: the chemical changes in living cells by which energy is provided for vital processes and activities and new material is assimilated.

metabolite^{A413} A product of metabolism: a. a metabolic waste usually more or less toxic to the organism producing it.

Micellae (micelle)^{F1136} 2: the structural unit of gel-forming colloids, made up of complex molecules: it can change chemically and may have crystalline properties.

micelle ^{I1309} a colloidal particle, especially one in a soap solution.

microbe ^{A418} microorganism, germ—used esp. of pathogenic bacteria.

mitochondria ^{A427} any of various round or long cellular organelles of most eukaryotes that are found outside the nucleus, produce energy for the cell through cellular respiration, and are rich in fats, proteins, and enzymes.

mitogenetic radiation ^{A427} [radiation in the ultraviolet spectrum] producing or stimulating mitosis.

mitosis ^{A427} 1: a process that takes place in the nucleus of a dividing cell, involves typically a series of steps consisting of prophase, metaphase, anaphase, and teleophase, and results in the formation of two new nuclei each having the same number of chromosomes as the parent nucleus.

molecule ^{I1339} a molecule of [a chemical element] consists of one or more [chemical elements] that are alike; a molecule of a compound consists of two or more different [chemical elements].

myelin ^{A441} a soft white somewhat fatty material that forms a thick myelin sheath about the protoplasmic core of a myelinated nerve fiber.

NAD ^{A445} A coenzyme (C₂₂H₂₇N₇O₁₄P₂) of numerous dehydrogenases that occur in most cells and plays an important rôle in all phases of intermediary metabolism as an oxidizing agent or when in the reduced form as a reducing agent for various metabolites.

NADH ^{A445} The reduced form of NAD. A reducing agent for metabolites.

narcotic ^{A446} a drug (as opium) that in moderate doses dulls the senses, relieves pain, and induces profound sleep but in excessive doses causes stupor, coma, or convulsions.

necrosis ^{A449} death of living tissue; spec: death of a portion of tissue differentially affected by local injury (as loss of blood supply, corrosion, burning, or the local lesion of a disease).

necrotic ^{A449} affected with, characterized by, or producing necrosis.

nucleic acids ^{A467} Any of various acids (as DNA or RNA) composed of nucleotide chains.

nucleoside ^{A467} A compound (as guanosine or adenosine) that consists of a purine or pyrimidine base combined with deoxyribose or ribose and is found especially in DNA or RNA.

nucleotide ^{C66} A subunit of nucleic acid. A nucleotide consists of a nitrogen-containing base, a five-prime carbon sugar (pentose), and one or more phosphate groups (-PO₃²⁻). Nucleotides are abbreviated by three capital letters. An example: ATP (adenosine triphosphate).

nucleus of a cell ^{A467,468} 1: a cellular organelle of eukaryotes that is essential to cell functions (as reproduction and protein synthesis), is composed of nuclear sap and a nuclear protein-rich network from which chromosomes and nucleoli arise, and is enclosed in a definite membrane.

oxidation ^C A chemical reaction in which one or more electrons are transferred from one [chemical element] or molecule to another; [*a loss of electrons*]^B.

papovavirus ^{A496} any of a group of viruses that have a capsid composed of 72 capsomers and that are associated with or responsible for various neoplasms (as some warts).

peroxidase ^{A515} An enzyme that catalyzes the oxidation of various substances by peroxides.

peroxides ^{A515} An oxide containing a high proportion of oxygen; esp: a compound (as hydrogen peroxide) in which oxygen is visualized as joined to oxygen.

pH ^{A517} a measure of acidity and alkalinity of a solution that is a number on a scale whose values run from 0 to 14 with 7 representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity.

phagocytes ^{A518} A cell (as a white blood cell) that engulfs and consumes foreign material (as microorganisms) and debris.

phagocytosis ^{A518} The engulfing and usually destruction of particulate matter by phagocytes.

phosphate ^{C47} a phosphorous-oxygen molecule, ($-\text{PO}_3^{2-}$). Phosphoanhydride ($-\text{O}-\text{PO}_3-\text{PO}_3$) has a high-energy bond and is found in ATP (adenosine triphosphate).

phosphate group ^C ($-\text{PO}_3^{2-}$) occur repeatedly in organic molecules.

phosphatide (phospholipid) ^{A524} any of numerous lipids (as lecithins and sphingomyelin) in which phosphoric acid as well as fatty acid is esterified to glycerol and which are found in all living cells and in the bilayers of plasma membranes.

phosphoric acid ^{A524} 1: a syrupy or deliquescent acid H_3PO_4 having three replaceable hydrogen atoms—called also *orthophosphoric acid* 2: a compound consisting of phosphate groups linked directly to each other by oxygen.

plasma membranes ^{A534} a semi-permeable limiting layer of cell protoplasm consisting of three molecular layers of which the inner and outer are composed of protein while the middle layer is composed of a double layer of fat molecules—called also *cell membrane*.

polarize ^{I1612} to give polarity to: cause polarization in: some natural crystals, such as tourmaline, can polarize light. Tourmaline transmits the components that lie in one vibration direction, and holds back others by absorbing them internally.

polyoma (polyoma virus) ^{A543} a papovavirus of rodents that is associated with various kinds of tumors.

potential ^{I1630} *Physics*. Existing in a potential form, not as motion. 4 having to do with voltage.

prostaglandins ^{A562} Any of various oxygenated unsaturated cyclic fatty acids of animals that have a variety of hormone-like actions (as in controlling blood pressure or smooth muscle contraction).

protein ^{A563} 1: any of numerous naturally occurring extremely complex substances that consist of amino-acid residues joined by peptide bonds, contain the elements carbon, hydrogen, nitrogen, oxygen, usu. sulfur and occas. Other elements (as phosphorous or iron), and include many essential biological compounds (as enzymes, hormones, or immunoglobulins).

proton ^{A564} a [complex] particle [the simplest case of organized complexity—of the three basic building blocks of chemical elements] that is identical with the nucleus of the [chemical element hydrogen, ^1H], that along with neutrons is a constituent of all other atomic nuclei, that carries a positive charge numerically equal to the charge of an electron, and that has a mass of 1.673×10^{-24} gram.

protoplasm ^{A564} 1: the organized colloidal complex of organic and inorganic substances (as proteins and water) that constitutes esp. the living nucleus, cytoplasm, and mitochondria of the cell 2: cytoplasm.

pseudopodium ^{A566} 1a: a temporary protrusion or retractive process of the cytoplasm of a cell (as in a unicellular organism or a white blood cell of a higher organism) that functions esp. as an organ of locomotion or in taking up food.

purine ^C A nine-element carbon-nitrogen ring compound [adenine (A), Guanine (G)]. ^A 1. A crystalline base $\text{C}_5\text{H}_4\text{N}_4$ that is the parent of compounds of the uric acid group. 2. a: A derivative or purine; esp: a base (as adenine or guanine) that is a constituent of DNA or RNA.

pyrimidine ^C A six-carbon-nitrogen ring compound [cytosine (C), thymine (T), and uracil (U)].

racemic ^{A580} of, relating to, or constituting a compound or mixture that is composed of equal amounts of dextrorotary and levorotary forms of the same compound and is not optically

active.

ramus communicans ^{A584} any of the bundles of nerve fibers connecting a sympathetic ganglion with a spinal nerve and being divided into two kinds: a: one consisting of myelinated preganglionic fibers—called also *white ramus*, *white ramus communicans* b: one consisting of unmyelinated postganglionic fibers—called also *gray ramus*.

reduction ^C A chemical reaction in which one or more electrons are transferred from one [chemical element] of molecule to another; [*a gain of electrons*]^B.

respiration ^{A596} 1a: the placing of air or dissolved gases in intimate contact with the circulating medium (as blood) of a multicellular organism (as by breathing) 2: The physical and chemical processes by which an organism supplies its cells and tissues with oxygen needed for metabolism and releases them of the carbon dioxide formed in energy producing reactions 3: any of various energy-yielding oxidative reactions in living matter that typically involve transfer of oxygen and production of carbon dioxide and water as end products.

reticulum ^{A599} 1: the second compartment of the stomach of a ruminant in which folds of mucous membrane form hexagonal cells. 2b: the network often visible in fixed protoplasm both of the cell body and the nucleus of many cells.

ribonucleoside ^{A603} A nucleoside that contains ribose.

ribose ^C b-D-ribose, a five-prime carbon sugar (pentose) used in ribonucleic acid (RNA).

RNA (ribonucleic acid) ^{A605} Any of various nucleic acids that contain ribose and uracil as structural components and are associated with the control of cellular chemical activities.

saline consisting of or containing a salt [such as sodium chloride (NaCl)] <a [saline] solution>.

saponification ^{A614} 1. The hydrolysis of a fat by an alkali with the formation of a soap and glycerol 2: the hydrolysis esp. by an alkali of an ester into the corresponding alcohol and acid.

secretion ^{A623} 1: the process of segregating, elaborating, and releasing some material either functionally specialized (as saliva) or isolated for excretion (as urine).

sepia ^{I1899} 1. A dark-brown paint or ink prepared from the inky secretion of a cuttlefish. 4. Any one of a group of cuttlefish having an internal shell.

sialo-muco protein ^{A435,634} a saliva-mucous protein.

smooth muscles ^{A640} muscle tissue that lacks cross striations, that is found in vertebrate visceral structures (as the stomach and bladder) as this sheets performing functions not subject of conscious control by the mind and in all or most of the musculature of invertebrates other than arthropods.

specificity ^{A646} b. The condition of participating in or catalyzing only one or a few chemical reactions (enzyme specificity).

sphere ^{F1746} 1. Any round body of figure have the surface equally distant from the center at all points; a globe, a ball.

sphingomyelins ^{A648} any group of crystalline phosphatides that are obtained esp. from nerve tissue and that on hydrolysis yield a fatty acid, sphingosine, choline, and phosphoric acid.

sphingosine ^{A648} an unsaturated amino compound $C_{18}H_{37}NO_2$ containing two hydroxyl groups and obtained by hydrolysis of various sphingomyelins, cerbrosides, and gangliosides.

substrate ^{A670} 1. The base on which an organism lives. 2. The substance acted upon by enzymes.

symmetrical ^{A681} correspondence in size, shape, and relative position of parts on opposite sides of a dividing line or median plane or about a center or axis.

theory^{H6} an hypothesis supported by data obtained by experimentation.

thymus^{A701} a glandular structure of largely lymphoid tissue that functions in cell-mediated immunity by being the site where T cells develop, that is present in young of most vertebrates typically in the upper anterior chest or at the base of the neck, and that tends to disappear or become rudimentary in the adult—called also *thymus gland*.

toxicology^{A708} The science that deals with poisons and their effect.

tumor^{A722} an abnormal benign or malignant mass of tissue that is not inflammatory, arises without obvious cause from cells of preexistent tissue, and possesses no physiological function.

unsaturated^{A729} a: capable of absorbing or dissolving more of something b: able to form products by chemical addition; esp: containing double or triple bonds between carbon atoms.

valence electrons^{I2309} an electron in the outer shell of an atom. In a chemical change, the atom gains, loses, or shares such an electron in combining with another [chemical element or elements] to form a molecule.

visceral^{A747} located in the large cavity of the trunk; of or relating to, or located on or among the viscera.

viscus^{A747} : an internal organ of the body; esp: one (as the heart, liver, or intestine).

voltage^{E291-292} [There is electrical potential energy between a proton (+) and an electron (–). This potential difference is also called *voltage*.] When separated electric charges are allowed to move, they create an *electric current*. [That current is usually electrons, but when electrons move from chemical element to chemical element in a semiconductor, for example, a positive charge on the nucleus can ‘appear’ to move. Actually the protons stay in place in the nucleus, but the absence of an electron gives a net positive charge to a chemical element or molecule in a crystal lattice structure.]

wetting agent^{A755} any of numerous water-soluble or liquid organic substances that promote spreading of a liquid on a surface or penetration into a material esp. by their oriented adsorption on the surfaces in such a way that the wetting liquid is no longer repelled.

white blood cells^{A756} any of the blood cells that are colorless, lack hemoglobin, contain a nucleus and include the lymphocytes, monocytes, neutrophils, eosinophils, and basophils.

^A Webster’s New Explorer Medical Dictionary, Merriam-Webster, 1999.

^B Chemistry, The Easy Way, 3rd Edition, Joseph A. Mascetta, Baron’s Educational Series, Inc. 1996.

^C Essential Cell Biology, An Introduction to the Molecular Biology of the Cell, by Alberts, Bray, Johnson, Lewis, Raff, Roberts, and Walter, Garland Publishing, 1998.

^D Physics the Easy Way, by Robert L. Lehrman, Baron’s Educational Series, 1998.

^E Science and Desk Reference, New York Public Library, Macmillan, 1995.

^F Webster’s New Universal Unabridged Dictionary, 2nd Edition, Simon & Schuster, 1979.

^G The World Book Encyclopedia, 1998 Edition, Vol 12.

^H Biology The Easy Way, Gabrielle I. Edwards, Baron’s Educational Series, Inc., 1990.

^I The World Book Dictionary, World Book, Inc., 1996.

^J McGraw-Hill Dictionary of Chemistry, 1997.

^K The Pocket Oxford Latin Dictionary, Edited by James Morwood, Oxford University Press, 1994.

^L Frogs, text by David Badger, photographs by John Netherton, Voyageur Press, Inc., 1995.

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- ¹ *Cancer: An Organization Anomaly* was previously published under my pen-name, Nicholas J. Dardan, *without bibliography and notes* on the website, The Benson.Biz, in October 2013, and can be found in three separate sections (Parts 1, 2 and 3) with a Google search, or directly at TheBenson.biz.
- ² Northrop's formal name for this theory (formal and scientific) is the Macroscopic Atomic Theory.
- ³ This can be likened to a carrier wave in communications electronics which is modulated by an audio and/or video signal (with the exception that the 'carrier' in this case is a pure d.c.: verified by the author and two PhDs with a spectrum analyzer). In the experimental work in biology, any major organizational change shows up as a variation in the d.c. potential of the unitary electro-magnetic field.
- ⁴ Since there were no commercially available instrumentation and electrodes available in the 1930s, the equipment in the early, original studies were manufactured by the Physics and Chemistry Departments of Yale University; thus derives the name, the Burr-Lane-Nims technique.
- ⁵ The *atom*, ἀτομος in the Greek sense of that word means *uncut*, or *indivisible*.
- ⁶ Mukherjee, S. (2010). *The Emperor of all Maladies*, A Biography of Cancer, Scribner, New York, London, Toronto, Sydney, 2010 (p 462).
- ⁷ Ibid. (p 462).
- ⁸ Ibid. (p 465).
- ⁹ Burr, H.S. (1940). "Biologic Organization and the Cancer Problem," Yale Journal of Biology & Medicine, Vol 12, 1940 (p 277).
- ¹⁰ Ibid. (p 278).
- ¹¹ Ibid. (p 282).
- ¹² Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p 168). e: pp 55-124; reprinted: Oxbow Press, P.O. Box 4045, Woodridge, Connecticut 06525 USA, 1979 (ISMB's: hardcover 0-918024-08-0, paperback 0-919024-09-9).
- ¹³ Warburg, Otto (1930). *The Metabolism of Tumours*, Investigations from the Kaiser Wilhelm Institute for Biology, Berlin-Dahlem, Edited by Otto Warburg, Constable & Co. Ltd., London, 1930 (p 129).
- ¹⁴ Northrop, F.S.C. (1924). "The Problem of Organization in Biology," doctoral thesis taken under Lawrence J. Henderson, Professor of Biologic Chemistry, Harvard University.
- ¹⁵ Henderson, L.J. (1928). *Blood: A Study in General Physiology*, New Haven, Yale University Press, London; H. Milford, Oxford University Press, 1928.
- ¹⁶ F.S.C. Northrop (1931). *Science and First Principles*, Macmillan 1931 (p Preface pp ix-xii).
- ¹⁷ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper & Row, New York (pp 64-65). French edition: *Le Phénomène humain*, Pierre Teilhard de Chardin, Editions du Seuil, Paris; available in the United States from Larousse & Co., Inc., 572 Fifth Avenue, New York, N.Y. 10036; available in France, Argentina, Belgium, Brazil, Canada, Germany, Mexico, and Switzerland from Larousse & Co.
- ¹⁸ Einstein, A. (1919). Do Gravitational Fields Play an Essential Part of the Structure of the Elementary Particles of Matter?, *The Principle of Relativity*, A Collection of Original Memoirs on the Special and General Theory of Relativity, H.A. Lorentz, A. Einstein, H. Minkowski, H. Weyl, with notes by A. Sommerfeld, Dover Publications, Inc., New York, General Publishing Company, Ltd., Toronto, Ontario, Canada, Constable and Company, London, 1952 (p 198).
- ¹⁹ Eichenbach, Diane (1998). *Soul Signs*, Fireside, New York, 1998 (p 203). Einstein's definition of matter contributed to what the author was trying to present.
- ²⁰ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, Cambridge University Press, 1931 (see 'The Nature of Status of the Psychological').
- ²¹ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper & Row, New York, 1959.
- ²² Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931.
- ²³ Dickson, D.H. (1983, 1995). "Radial Energy and the First Principles of Science", first published in *The Desire to be Human*, International Teilhard Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attaché (now Scientific Attaché), British Embassy, The Hague, and by Robert Müller, PhD, Assistant Secretary General, United Nations, New York; Mirananda Publishers b.v. Wassenaar, Netherlands, 1983 (pp 92-94); expanded version published in *Frontier Perspectives*, the journal for the Center for Frontier Sciences at Temple, University, Vol.5, No.1, Fall/Winter 1995, Correspondence (pp 4,5).

- ²⁴ The Macroscopic Atom is made up of one substance with no parts. The pattern of the lines of force within its interior has not been determined; neither is it known how the field strength varies with distance. The inverse square law, $1/d^2$, where d is the distance, applies to gravitational and electromagnetic fields associated with microscopic matter. The constant characteristic of the unitary *gravitational* field of the Macroscopic Atom may explain the characteristics of the strong nuclear force that holds the protons and neutrons together in the nucleus of chemical elements. The constant character of the unitary *electromagnetic* field of the Macroscopic Atom may explain the weak interaction in the nucleus of chemical elements which is responsible for certain radioactive decay processes, such as beta decay (β^-) of the neutron which produces a proton.
- ²⁵ Sheldon Glasgow, Aldus Salam and Steven Weinberg developed a set of equations linking electromagnetism and the weak interactive force for which they received the Nobel prize for physics in 1979. The theory has been confirmed by experiment [*Q is for Quantum*, John Gribbin, 1998 (p 143, 432-433)].
- ²⁶ Einstein, A. (1917). "Cosmological Considerations on the General Theory of Relativity," *The Principle of Relativity*, Einstein, Lorentz, Weyl, Minkowski; Dover Publications, Inc., 1952 (pp 187-188).
- ²⁷ Burr, H.S., Lane, C.T., Nims, L.F. (1936-1937). "A Vacuum Tube Microvoltmeter for the Measurement of Bioelectric Phenomena," *Yale Journal of Biology and Medicine*, Vol 9, 1936-1937 (pp 65-76).
- ²⁸ Baker, Marcia M. (1999-2000). Book Review, "Natural Water Resources are Man-Made", *21st Century Science & Technology*, Winter 1999-2000 (p 88). The author first picked up the phrase, "electromagnetic structure" from Marcia Baker's comments on the de-salinization of sea water.
- ²⁹ Figures 1. and 2. are direct corollaries, not analogies. They are logical implications of two different conceptions of the nature of the physical universe of which we are a part, the result of ideas in the consciousness expressed in human actions with physical correlates in the human nervous system and brain. See *The Logic of the Sciences and the Humanities, Philosophical Anthropology and Practical Politics, The Complexity of Legal and Ethical Experience*, by F.S.C. Northrop.
- ³⁰ Soleri, Paolo (1972). *Arcology: City in the Image of Man*, MIT Press, 1972; re-published recently: Cosanti Foundation, 6433 Doubletree Road, Scottsdale, Arizona 85253; Telephone: 602-998-6145.
- ³¹ The author has assumed the same energy ratio as with the electromagnetic and gravitational fields associated with microscopic elementary particles (Einstein). That is the safest assumption at this point, though the results of theoretical and experimental work in the future may prove differently.
- ³² "Somewhere in a place beyond the skies, there is a prototype or primordial image of the mother that is pre-existent and supraordinate to all the phenomena in which the 'maternal,' in the broadest sense of that term, is manifest." – Jung, C.G. (1959). *The Archetypes and the Collective Unconscious*, The Bollingen Series, Vol 9, Part 1 (p75). Jung says his archetype is synonymous with the platonic idea (p75).
- ³³ The author sees a hierarchical relationship between consciousness, electromagnetic fields, **bioparacrystallinity, chemistry, and organized matter. That makes him neo-Lamarckian in outlook.** For the subject of paracrystallinity see: Rinne, Frederick (1933). "Investigations and Considerations Concerning Paracrystallinity," *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 140, Sept. 1933 (pp1016-1032); Bernal (1933). Mr Bernal's Statement, *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 140, Sept. 1933; Ambrose, E.J., Osborne, J.S., Stuart, P.R. (1970). "Structure and Properties of the Cell Surface Complex," *Liquid Crystals and Ordered Fluids*, Edited by Julian F. Johnson and Roger Porter, Plenum Publishing Corporation, 1970.
- ³⁴ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p 115-124); reprinted: Oxbow Press, P.O. Box 4045, Woodridge, Connecticut 06525 USA, 1979 (ISMB's: hardcover 0-918024-08-0, paperback 0-919024-09-9).
- ³⁵ Ibid. (pp 449-467).
- ³⁶ Ibid. (pp 55-124).
- ³⁷ Dirac, P.A.M. (1979). "The Nature of Albert Einstein", Produced and Directed by Tom Laport, Options, National Public Radio Station WSIU, Carbondale, Illinois, Dirac (Side 2), Albert Einstein Centennial Celebration, Early March, Campus of Southern Illinois University, OP-790925/01/01-C1 1979 NPR.
- ³⁸ Watts, Alan (1965). *The Watercourse Way*, Pantheon Books, New York, 1975 [103c] (p38).
- ³⁹ Ibid. (p 45).
- ⁴⁰ Ibid. (p 46).
- ⁴¹ Ibid. (p 46).
- ⁴² Ibid. (p 55).
- ⁴³ Ibid. (p 55).
- ⁴⁴ Ibid. ().

⁴⁵ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper & Row, 1959.

⁴⁶ Needham, Joseph (1962). *Science and Civilization in China*, Vol 4, Physics and Physical Technology, Part I: Physics, Cambridge University Press, 1962 (p 229).

⁴⁷ Northrop, F.S.C. (1960). *Philosophical Anthropology and Practical Politics, The Complexity of Legal and Ethical Experience*.

⁴⁸ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (p 312).

⁴⁹ Gribbin, John (1998). *Q is for Quantum*, An Encyclopedia of Particle Physics, The Free Press, Simon and Schuster, 1998 (pp271-272).

⁵⁰ If the proton is acting like a lens for a portion of the primary causal field of the Macroscopic Atom, it would mean that all protons in an organism and all protons in nature would be linked via a cosmic unitary field. Visualizing Michael Faraday's 'lines of force' the proton would bunch the lines of force together like a small glass bead holding several threads in a fabric—similar to a contractile ring of actin and myosin filaments around the remains of polar microtubules (see *Essential Cell Biology*, An Introduction the Molecular Biology of the Cell, by Alberts, Bray, Johnson, Lewis, Raff, Roberts, and Walter, Garland Publishing Co., 1998, Fig. 17-16b). It must be emphasized that the character of the lines of force in this field have not been determined; but it can be safely assumed that they are spherical or curved in nature.

The human organism is the most complex case of organized complexity that we know of. The organization of society on a global scale is the next higher case of organized complexity on Earth. The physical elements in this stage are human beings, male and female of all ages. This model does not imply the destruction of national or cultural entities, but the incorporation of these into the next stage while retaining their identities, as the cell in many varieties is incorporated into the human organism.

If we wish to understand the organization of the human organism and at a higher level how to plan for the furtherance of human development by means of the instrument of 3-dimensional, highly-organized, urban infrastructures¹³, it will be necessary to understand the Law of Complexity-Consciousness⁴ and the physical process and forces involved in an increase of organized complexity. The 'song' will be played by the reflective elements (human beings) in the system (Soleri). Reflective consciousness and free will require that we guide our own evolution. I agree with the actor and activist Dennis Weaver in saying that those who wait for God to solve our problems are going to be disappointed; that God gave us minds to think with and that God sees creation through our eyes (a paraphrase of his comments during a review of his book, *All the World's a Stage*, aired on the television channel, C-Span2, March 2002).

⁵¹ Heisenberg, Werner (1953). *Nuclear Physics*, Philosophical Library, New York, First Greenwood reprinting, 1969 (pp 30-31).

⁵² The Macroscopic Atom came from the field of Natural Philosophy. To verify its existence is a scientific matter (Northrop). The mathematics (field equations) for this unitary field may have to be developed before we are able to verify the Macroscopic Atom's physical existence from an astronomical standpoint. The curvature of light in a curved unitary electromagnetic and gravitational field would be a basis for that experiment.

A unified field theory, according to this model, would combine field equations of a Riemannian geometric for the Macroscopic Atom and its unitary electromagnetic and gravitational field (the one) and field equations of a Euclidian geometric for the microscopic and their individual electromagnetic and gravitational fields (the many). Nature is a combination of both linear (Euclidean) and curved (Riemannian) forces. The double helix structure of DNA is an example of this; the spiral is found throughout nature. Do Riemannian (curved) forces (of the Macroscopic Atom) take precedence over the Euclidean at the birth of the cell?

"The investigative work of naturalists, in reality, always employs the mathematical constructions of geometers. Without them, it cannot develop correctly. On the other hand, mathematical thinking grows and

autonomous. This is completely coherent with the character of aloofness of living organisms in the biosphere, their autarchy [italics mine].

“Which of the array of Riemannian geometries is appropriate here? What are its geometrical characteristics? It seems to me, that this task cannot be ignored by our geometers. It deserves their attention in and of itself as a geometric problem.

“All the more so, because it is connected with a still more general physical problem: with the question of the geometrical states of *physical space*, which have been very little touched upon by philosophical and physical thought.” Vernadsky, Vladimir Ivanovich (1938). “Problems of Biogeochemistry II on the Fundamental Material-Energetic Distinction Between Living and Non-living Natural Bodies of the Biosphere”, translated for the Russian by Jonathon Tennenbaum and Rachel Douglas; 21st Century Science and Technology, Winter 2000-2001 (p39).

⁵³ “Chemists would actually tell us that although water is an ultrafamiliar substance its *known* properties are enveloped in more mysteries than those of any other compound.” – Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process*, Harvard University Press, 1971 (p134).

⁵⁴ Hydrogen ions can be a single proton (from protium), a proton and a neutron (from deuterium), or a proton and two neutrons (from tritium) (trace amounts). There are also two types of H₂ molecules: *ortho*-hydrogen and *para*-hydrogen, where [...] protons spin in the same plane, or the [...] protons spin in opposite planes, respectively. The magnetic properties and the electromagnetic band spectra of *ortho*- and *para*-hydrogen are different (*Exploring Chemical Elements and Their Compounds*, by David L. Heiserman, Tab Books, McGraw Hill, 1992). The loss of an electron (b-) and additional energy (an antineutrino) from a neutron changes the neutron into a proton. For example, ${}^8_2\text{He} = {}^7_3\text{Li} + (\text{b-}) + (\text{energy})$. Beta rays (b-) are electrons emitted with much higher energy than can be produced in any sort of chemical reaction. The noble gases (helium, neon, argon, krypton, xenon, and radon), though essentially inert chemically, have played an important rôle in the evolution of chemical elements. “Evidently, a shift (within certain ranges) in the isotopic composition (atomic weights) inside living organisms is a *characteristic property of living matter*. This has been proven for hydrogen, carbon and potassium, and is probable for oxygen and nitrogen. This phenomenon calls for precise investigation.” Vernadsky, V.I. (1938). 21st Century Science and Technology, Winter 2000-2001 (p 35).

Water has a pseudo-crystalline structure (Fowler, R.H. and Bernal, J.D.), and plays a key rôle in bioparacrystal-line substances that make up the structure of cells (Ambrose, E.J., Osborne, J.S., Stuart, P.R.; Stewart, G.T.). The orientation of these substances is determined by electro-magnetic fields in their various forms (e.g. light, heat, etc.) and the electric and magnetic components of these fields (Transactions of the Faraday Society, Vol XXIX, Part 9, No. 140, Sept. 1933).

⁵⁵ Warburg, Otto (1930). Experiments on Surviving Carcinoma Tissue—Methods, Otto Warburg; *The Metabolism of Tumours*, Investigations from the Kaiser Wilhelm Institute for Biology, Berlin-Dahlem, Edited by Otto Warburg, Constable & Co. Ltd., London, 1930 (p 76).

⁵⁶ Ibid. (p 99).

⁵⁷ Harris, Jules E. (1998). “Cancer”, *The World Book Encyclopedia*, Vol 3, World Book Inc., 1998 (p 167).

⁵⁸ Ibid. (p172).

⁵⁹ Dickson, D.H. (2002). “A New Scientific Paradigm or Conceptual Scheme for the Problem of Organization in Biology”, re-edited 23 Nov 2006. (unpublished).

⁶⁰ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (p 168).

⁶¹ Harris, Jules E. (1998). “Cancer”, *The World Book Encyclopedia*, Vol 3, World Book Inc., 1998 (p 171).

⁶² Northrop, F.S.C. (1947). *The Logic of the Sciences and the Humanities*, Macmillan, 1947.

⁶³ Roujon, Lucien (1973?). “Vincent Bio-Electronics, Theory and Application,” Lucien Roujon, Sibev, Doktorgasse, 5963 Wenden, 4 Ottfingen, Germany (p 33).

⁶⁴ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931 (a: p168; b: pp 203-204; c: preface pp ix-xii)

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- ⁶⁹ Dickson, D.H. (1983, 1995). “Radial Energy and the First Principles of Science,” first published in *The Desire to be Human*, International Teilhard Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attache, British Embassy, The Hague, and by Robert Müller, PhD., Assistant Secretary General, United Nations, New York, Mirananda Publishers b.v. Wassenaar, Netherlands, 1983 (pp 92-94); revised edition published in *Frontier Perspectives*, the journal for The Center for Frontier Sciences at Temple University, Vol. 5, No. 1, Fall/Winter 1995, Correspondence (pp 4,5).
- ⁷⁰ Dickson, D.H. (2002). “A New Scientific Paradigm or Conceptual Scheme for the Problem of Organization in Biology”, re-edited 23 Nov 2006. (unpublished).
- ⁷¹ Burr, H.S. (1932). “An Electro-Dynamic Theory of Development Suggested by Studies of Proliferation Rates in the Brain of *Amblystoma*”, *Journal of Comparative Neurology*, Vol 56, No. 2, 1932, pp347-371.
- ⁷² Morell, Franz (1982). An official transcript of the three hour lecture by Dr. Franz Morell of West Germany regarding “The Bio-Electronic Method of Professor Vincent [of France]” (p 2).
- ⁷³ Roujon, Lucien (1973?). “Vincent Bio-Electronics, Theory and Application,” Lucien Roujon, Sibev, Doktorgasse, 5963 Wenden, 4 Ottfingen, Germany (p 1).
- ⁷⁴ Ibid. (p 3).
- ⁷⁵ Ibid. (p 2).
- ⁷⁶ Kemeny, Janos (1953). “Beitrag zur physikalischen und mathematischen Erklaaerung des Reaktionvermoegens der lebenden Organismen”, *Bulletin der Akademie der Wiossenschaft*, Berlin, Februar 1953. Review Generale des Sciences, Paris, T.Lx. Nr. 7 and 8, 1953.
- ⁷⁷ Roujon, Lucien (1973?). “Vincent Bio-Electronics, Theory and Application,” Lucien Roujon, Sibev, Doktorgasse, 5963 Wenden, 4 Ottfingen, Germany (p 29).
- ⁷⁸ Crile, George (1926). *A Bipolar Theory of Living Processes*, The Macmillan Company, New York, 1926 (p 52).
- ⁷⁹ Ibid. (p 52).
- ⁸⁰ Vernadsky, Vladimir Ivanovich (1938). “Problems of Biochemistry II on the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere”, translated from the Russian by Jonathan Tennenbaum and Rachel Douglas, *21st Century Science and Technology*, Winter 2000-2001 (p 34).
- ⁸¹ Rinne, Frederich (1933). “Investigations and Considerations Concerning Paracrystallinity,” *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 148, Sept. 1933, pp1016-1032; a: p1030; b: p1023; c: pp1023-1025; d: p1025; e: pp1025-1027; f: pp1027-1028; g: pp1028-1029; h: p1026).
- ⁸² Bernal (1933). Mr Bernal’s Statement, *Transactions of the Faraday Society*, Vol XXIX, Part 9, No. 140, Sept. 1933.
- ⁸³ Ambrose, E.J., Osborne, J.S., Stuart, P.R. (1970). “Structure and Properties of the Cell Surface Complex,” *Liquid Crystals and Ordered Fluids*, Edited by Julian F. Johnson and Roger Porter, Plenum Publishing Corporation, 1970, (pp 83-96) (p 83).
- ⁸⁴ Clark, Arthur C. (1997). “Fractals: The Colors of Infinity,” narrated by Arthur C. Clarke, Newbridge Communications, Inc., 1997; video cassette (52 min) VHS. A discussion and computer-generated description of the Mandelbrot set, what it means, its internal consistency, and the revolutions in thought resulting from its discovery.
- ⁸⁵ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (p 79).
- ⁸⁶ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (a: p 79; b: p xx; c: pp72-126).
- ⁸⁷ The existence of the neutron was theorized by Ernest Rutherford in 1920 and discovered by Sir James Chadwick in 1932 (<https://byjus.com>).
- ⁸⁸ Rinne, Frederich (1933). “Investigations and Considerations Concerning Paracrystallinity.” *Transactions of the*

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- ⁹⁶ Rinne, Frederich (1933). "Investigations and Considerations Concerning Paracrystallinity," Transactions of the Faraday Society, Vol XXIX, Part 9, No. 148, Sept. 1933 (pp1016-1032) (p1026).
- ⁹⁷ Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (a: p 79; b: p xx; c: pp72-126) Hill, John W. and Kolb, Doris K. (1998). *Chemistry for Changing Times*, 8th Edition, Prentice Hall, 1998 (p 123).
- ⁹⁸ Hill, John W. and Kolb, Doris K. (1998) *Chemistry for Changing Times*, 8th Edition, Prentice Hall, 1998 (p 123).
- ⁹⁹ Vernadsky, Vladimir Ivanovich (1938). "Problems of Biochemistry II on the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere", translated from the Russian by Jonathan Tennenbaum and Rachel Douglas, 21st Century Science and Technology, Winter 2000-2001 (p 35).
- ¹⁰⁰ Ibid. (p 35).
- ¹⁰¹ Halliwell, Barry and Gutteridge, John M.C. (1985). *Free Radicals in Biology and Medicine*, Clarendon Press, Oxford, 1985 (p 11).
- ¹⁰² Halliwell, Barry and Gutteridge, John M.C. (1985). *Free Radicals in Biology and Medicine*, Clarendon Press, Oxford, 1985 (p 11).
- ¹⁰³ Ibid. (p 10).
- ¹⁰⁴ Ibid. (p 12).
- ¹⁰⁵ Halliwell, Barry and Gutteridge, John M.C. (1985). *Free Radicals in Biology and Medicine*, Clarendon Press, Oxford, 1985 (p 11).
- ¹⁰⁶ "Contents," Transactions of the Faraday Society, Vol XXIX, Part 9, No 148, September 1933.
- ¹⁰⁷ Eichenbach, Diane (1998). *Soul Signs*, Fireside, New York, 1998 (p 203). Einstein's definition of matter contributed to what the author was trying to present.
- ¹⁰⁸ We know experimentally and mathematically about light that is emitted when electrons change their energy level. The question naturally arises as to the frequency of light emitted from the nucleus of a chemical element. Is it 'white' light as emitted from the sun (light of many wavelengths), or is the light emitted at a single, specific wavelength?
- ¹⁰⁹ Tennenbaum, Jonathon (2000). "Russian Scientists Replicate 'Impossible' Mitogenic Radiation", 21st Century Science and Technology, Winter 2000-2001 (pp 60-63). Jonathan Tennenbaum ("heads the Fusion Energy Foundation in Europe, and is based in Germany").
- ¹¹⁰ Vernadsky, Vladimir Ivanovich (1938). "Problems of Biochemistry II on the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere", translated from the Russian by Jonathan Tennenbaum and Rachel Douglas, 21st Century Science and Technology, Winter 2000-2001 (p 27).
- ¹¹¹ Tennenbaum, Jonathon (2000). "Russian Scientists Replicate 'Impossible' Mitogenic Radiation", 21st Century Science and Technology, Winter 2000-2001 (pp 60-63). Jonathan Tennenbaum ("heads the Fusion Energy Foundation in Europe, and is based in Germany").
- ¹¹² Popp, Fritz (1985). "Principles of Quantum Biology as Demonstrated by Ultraweak Photon Emission from Living Cells", International Journal of Fusion Energy, Vol 3, No 4 (Oct.). "Low-level luminescence of cucumber seedlings," see 27. (diagram, p 60).
- ¹¹³ Tennenbaum, Jonathon (2000). "Why Dead Minds Can't Know the Noosphere", 21st Century Science and Technology, Winter 2000-2001, Editorial, photo insert (p 4).
- ¹¹⁴ Tennenbaum, Jonathon (2000). "Russian Scientists Replicate 'Impossible' Mitogenic Radiation", 21st Century Science and Technology, Winter 2000-2001 (pp 60-63). Jonathan Tennenbaum ("heads the Fusion Energy Foundation in Europe, and is based in Germany").
- ¹¹⁵ Einstein, A. (1919). Do Gravitational Fields Play an Essential Part of the Structure of the Elementary Particles of Matter? *The Principle of Relativity*, Einstein, Lorentz, Weyl, Minkowski, Dover Publications, Inc., 1952 (p198).
- ¹¹⁶ This could provide an explanation for the characteristics of the strong force that holds protons and neutrons

Attache, British Embassy, The Hague, and by Robert Müller, PhD., Assistant Secretary General, United Nations, New York, Mirananda Publishers b.v. Wassenaar, Netherlands, 1983 (pp 92-94); revised edition published in Frontier Perspectives, the journal for The Center for Frontier Sciences at Temple University, Vol. 5, No. 1, Fall/Winter 1995, Correspondence (pp 4,5).

¹²¹ Bernal (1933). Mr Bernal's Statement, Transactions of the Faraday Society, Vol XXIX, Part 9, No. 140, Sept. 1933.

¹²² Henderson, L.J. (1913). *The Fitness of the Environment*, An Inquiry into the Biological Significance of Matter, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Mass. (pp 72-126).

¹²³ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931.

¹²⁴ Lerner, E. (1985). "The Case of the Non-Existent Quark—Experiments with Colliding Protons yield Inexplicable Results, Science Digest," August, 1985.

¹²⁵ Ambrose, E.J., Osborne, J.S., Stuart, P.R. (1970). "Structure and Properties of the Cell Surface Complex," *Liquid Crystals and Ordered Fluids*, Edited by Julian F. Johnson and Roger Porter, Plenum Publishing Corporation, 1970 (p 96).

¹²⁶ Brandt, Bruce (2001). Director of DC Field Facilities, National High Magnetic Field Laboratories, Florida State University; communication: e-mail, Monday, April 02, 2001 6:17pm.

After my communications with Bruce Brandt, Florida State University, the author saw a video on television that showed a strawberry and a spider (in separate scenes) suspended between the poles of a magnet with high magnetic fields. Apparently, the field was strong enough to counteract gravitational forces. This study may have been at the National High Magnetic Field Laboratories at Florida State University, but the author has not confirmed this.

Magnetic susceptibility "defined by $X_m = (\mu - \mu_0) / \mu_0$, where μ is the [magnetic] permeability of the medium and μ_0 the permeability of a vacuum" is a functional relationship of matter presented in the CRC Handbook of Chemistry and Physics, 81st Edition 2000-2001 (p 2-53); Landolt-Börnstein (1980). Numerical Data and Functional Relationships in Science and Technology, New Series II/16, Diamagnetic Susceptibility, Springer-Verlag, Heidelberg, 1986. There was no indication that this information reflected studies on substances in living matter.

Diamagnetism, "a type of magnetism characterized by a negative magnetic susceptibility, so that the material, when placed in an external magnetic field, becomes weakly magnetized in the direction opposite to the field" needs to be examined in connection with cancerous cells and tissues. "This magnetization is independent of temperature "whereas *paramagnetism*, characterized by a positive magnetic susceptibility [where] the material becomes weakly magnetized in the direction of an external field, ... is inversely proportional to temperature." (CRC Handbook of Chemistry and Physics, p 2-43).

Note Professor Kemeny's remarks under "**The Terrain**" concerning the reaction coefficient of the irreversible heat energy (r).

¹²⁷ Ravitz, L.J. (1962). "History, Measurement, and Applicability of Periodic Changes in the Electromagnetic Field in Health and Disease," Annals New York Academy of Sciences, No. 98, 1962 (a: p 1147).

¹²⁸ Ravitz, L.J. (1953). "Electro-Dynamic Field Theory in Psychiatry," Southern Medical Journal, Vol. 46, No. 7 (pp 650-660).

¹²⁹ Roujon, Lucien (1973?). "Vincent Bio-Electronics, Theory and Application," Lucien Roujon, Sibeve, Doktorgasse, 5963 Wenden, 4 Ottfingen, Germany (p 30).

¹³⁰ "[T]he increased water content of the cancer cell known to investigators for more than half a century continues to require explanation. "The physical nature of liquid water has been studied in recent years but no final atomic or molecular geometry has been developed which fully explains all the properties of this substance. (*Mammalian Cell Water* by Edwin G. Olmstead. Lea & Febiger. Philadelphia. 1966 (pp 6.9).

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- ¹³⁷ Burr, H.S. (1940). "Biological Organization and the Cancer Problem," *Yale Journal of Biology and Medicine*, Vol 12, 1940 (pp 277-282).
- ¹³⁸ Langman, Louis, and Burr, H.S. (1949). "A Technique to Aid in the Detection of Malignancy of the Female Genital Tract," *Journal of Obstetrics and Gynecology*, Vol 57, No 2, 1949 (pp274-281); (Aided by a grant from the National Cancer Institute of the United States Public Health Service).
- ¹³⁹ The implications of this for western culture are enormous. It implies that all life is interconnected. It also implies that the universe is one, and that geology and life are part of a single process, the evolution of the universe as a whole.
- ¹⁴⁰ Clark, Arthur C. (1997). "Fractals: The Colors of Infinity", Narrated by Arthur C. Clark, e Communications, Inc., 1997; video cassette (52 min) VHS. A discussion and computer generated description of the Mandelbrot set, what it means, its internal consistency, and the revolutions in thought resulting from its discovery.
- ¹⁴¹ Mead, Margaret (1972). *Twentieth Century Faith*, 1972 (p 50).
- ¹⁴² Northrop, F.S.C. and Burr, H.S. (1936). "Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning," *Growth*, Vol, 1, 1939 (submitted 1936) (a: pp 82-83; b: pp 78-88).
- ¹⁴³ Langman, Louis and Burr, H.S. (1949). A Technique to Aid in the Detection of Malignancy of the Female Genital Tract *, *Journal of Obstetrics & Gynecology*, Vol 57, No 2, 1949 (pp274-281); *Aided by a grant from the National Cancer Institute of the United States Public Health Service.
- ¹⁴⁴ Burr, H.S. (1972). *Blueprint for Immortality*, The Electric Patterns of Life; H.S. Burr, Neville Spearman, London, 1972 (Forward), Langman (Appendix).
- ¹⁴⁵ Northrop, F.S.C. (1928). The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity, *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928, (pp449-467).
- ¹⁴⁶ Northrop, F.S.C. (1928). The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity, *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928, (pp449-467).
- ¹⁴⁷ Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, Cambridge University Press, 1931 (a: p 168). Northrop, F.S.C. (1931). *Science and First Principles*, Macmillan, 1931; reprinted: Oxbow Press, P.O. Box 4045, Woodridge, Connecticut 06525 USA, 1979 (ISMB's: hardcover 0-918024-08-0, paperback 0-919024-09-9). For a summary of the ideas in the Macroscopic Atomic Theory see: Dickson, D.H. (2002) "A New Scientific Paradigm or Conceptual Scheme for the Problem of Organization in Biology", and note 8. For a discussion of the psychical see "The Nature and Status of the Psychical" in *Science and First Principles*.
- ¹⁴⁸ Dickson, D.H. (1983, 1995). Radial Energy and the First Principles of Science, first published in *The Desire to be Human*, International Teilhard Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attaché, British Embassy, The Hague, and by Robert Müller, PhD., Assistant Secretary General, United Nations, New York, Mirananda Publishers b.v. Wassenaar, Netherlands, 1983 (pp 92-94); revised (expanded) edition was published in *Frontier Perspectives*, the journal for The Center for Frontier Sciences at Temple University, Vol. 5, No. 1, Fall/Winter 1995, Correspondence (pp 4,5).
- ¹⁴⁹ Northrop, F.S.C. and Burr, H.S. (1936). *Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning*, *Growth*, Vol, 1, 1939 (submitted 1936) (pp 78-88).
- ¹⁵⁰ Ravitz, L.J. (1962). History, Measurement, and Applicability of Periodic Changes in the Electromagnetic Field in Health and Disease, *Annals New York Academy of Sciences*, No. 98, 1962 (pp 1144-1201; (p 1147).
- ¹⁵¹ Burr, H.S., Northrop, F.S.C. (1935). "The Electro-Dynamic Theory of Life," *Quarterly Review of Biology*, Vol. 10, 1935 (pp 322-333; a: p 324; b: p 325).
- ¹⁵² Burr, H.S. (1941). "Field Properties of the Developing Frog's Egg," *Proceedings National Academy of Sciences*, US Vol 27, 1941 (pp 276-281).
- ¹⁵³ Morell, Franz (1982). An official transcript of the three-hour lecture by Dr. Franz Morell of West Germany regarding "The Bio-Electronic Method of Professor Vincent [of France]" (a: p2: b: p 8).

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- ¹⁵⁹ Hill, John W. and Kolb, Doris K. (1998). Chemistry for Changing Times, 8th Edition, Prentice Hall, 1998 (a: pp 124-129; b: p 123).
- ¹⁶⁰ Heisenberg, Werner (1953). Nuclear Physics, Philosophical Library, New York, First Greenwood Reprinting, 1969 (p 30,31).
- ¹⁶¹ Miller, M.K., Cerezo, A., Hetherington, M.G., and Smith, G.D.W. (1996). Atom Probe Field Ion Microscopy, Clarendon Press, Oxford, 1996 (p 1). This is a monograph on the physics and chemistry of materials. It is an advanced text, but presents some nice images. Another text is Atom-Probe Field Microscopy, by T.T. Tsong, 1990. An earlier work is Field Ion Microscopy: Principles and Applications by E.W. Müller and T.T. Tsong, 1969.
- ¹⁶² Northrop, F.S.C. (1931). Science and First Principles, Macmillan, Cambridge University Press, 1931 (p 168).
- ¹⁶³ Teilhard, Pierre (1959). The Phenomenon of Man, Harper & Row, New York (pp 64,65).
- ¹⁶⁴ Northrop, F.S.C. (1931). Science and First Principles, Macmillan, Cambridge University Press, 1931.
- ¹⁶⁵ Burr, H.S. (1972). Blueprint for Immortality, The Electric Patterns of Life, H.S. Burr, Neville Spearman, London, 1972 (pp 86-87); e: p 89); “The Implications of the Electrometric Test in Cancer of the Female Genital Tract” Louis Langman (pp137-154).
- ¹⁶⁶ Ravitz, L.J. (1953). Electro-Dynamic Field Theory in Psychiatry, Southern Medical Journal, Vol. 46, No. 7 (pp 650-660)
- ¹⁶⁷ Burr, H.S. (1972). Blueprint for Immortality, The Electric Patterns of Life, H.S. Burr, Neville Spearman, London, 1972 (p 89).
- ¹⁶⁸ Teilhard, Pierre (1959). The Phenomenon of Man, Harper & Row, New York (a: pp 64,65?).
- ¹⁶⁹ Soleri, Paolo (1972). Arcology: City in the Image of Man, MIT Press, 1972; re-published recently: Cosanti Foundation, 6433 Doubletree Road, Scottsdale, Arizona 85253.
- ¹⁷⁰ Dickson, D.H. (1982). “Evolution and Land-Use” (unpublished).

21.0 BOTH PLATO AND ARISTOTLE WOULD BE PLEASED!

Noösphere is a word that was coined by the French, priest-scientist, Pierre Teilhard de Chardin.^{1 2 3}

Teilhard's hypothesis of radial energy,⁴ referring to the energy associated with drawing matter to higher degrees of organized complexity, requires an amendment in the form of an addition to the kinetic atomic theory. His hypothesis has been duplicated in the theoretical work of F.S.C. Northrop.⁵ Northrop's doctoral thesis under Lawrence J. Henderson,⁶ Professor of Biochemistry at Harvard, was "The Problem of Organization in Biology." The experimental work to verify Northrop hypothesis was done by Harold Saxton Burr, Section of Neuro-Anatomy, Yale Medical School and his colleagues.⁷ Among the findings: an electrical technique for the early detection of cancer (an organization anomaly), and the early detection of ovulation (an organizational change).⁸ The linking of the work of Pierre Teilhard and F.S.C. Northrop was the subject of a paper that was published in 1983.⁹ There are fifty years of positive experimental verification of Northrop's Macroscopic Atomic Theory¹⁰, making Pierre Teilhard's theory of radial energy and Northrop's Macroscopic Atomic Theory a fundamental law of nature.

The solution to the problem of organization in biology is key to linking the abiotic-biotic-noöspheric (Vernadsky)¹¹ to physics. It happens that the physical amendment to the kinetic atomic theory is cosmic in extent and gives us an organic physical conception of the universe in which human beings are an integral part.¹² The solution to the problem of organization in biology turns out to be the solution to the general problem of organization in the universe as a whole. Something this important cannot be ignored. *These ideas will fundamentally change our physical conception of the world, and, as a result, change our culture.*¹³

"The three conceptions of nature which Greek science formulated [the real is the physical, the real is the mathematical, and the real is the functional] are uniquely defined in terms of four basic principles: (1) the principle that the real is physical, (2) the principle that the real is rational, (3) the principle that the real is being, and (4) the principle that the real is becoming. The principle of being means that the real does not change its properties; the principle of becoming, that it does. To assert that the real is being and is physical is to maintain the physical theory of nature; that the real is being and rational, the mathematical theory; and that the real is becoming, the functional theory." Pierre Teilhard states that all energy is psychic in nature, and Einstein's equation $E=mc^2$ shows the equivalency of mass and energy. The implication is that matter has a psychic aspect to it. According to Northrop, "Man is conscious because he *is* the entities of the macroscopic atomic theory in one of their many particularizations, which the pluralistic principle of this theory necessitates, and these atoms are inherently conscious. And observed nature is more than physical and formal nature, and is in part constituted by the perceiving subject, because the ultimate entities which constitute both it and its part, the observer, combine psychical with physical and formal properties in its synthesis. Hence, because colors and sounds and pains and pleasures are in part psychical, it by no means follows that they are illusions or mere appearances, for even the psychical, which is a necessary factor in their existence, is as ultimate and irreducible and essential a property of atomic nature, as the physical and formal.

"..... [W]hen one senses what it is to be oneself, the atoms of our theory [the Macroscopic Atomic Theory] are joined to the knowing subject by the relation of ²identity; one knows the atoms which constitute oneself and nature by being immediately aware of what it is to be them. Now, I am conscious. Hence, they must be also. Thus we discover that the subjective and psychical factor, which the presence of colors and sounds

reveals, is an inherent property of the atoms of our theory.”

The work of Pierre Teilhard addresses the development of consciousness directly. The Arizona architect, Paolo Soleri,¹⁴ has been effectively applying what Teilhard calls *The Law of Complexity and Consciousness* which links further human evolution with *an increase in organized complexity and a corresponding increase in consciousness*. The *physical elements* in the current stage of evolution are *reflective beings*, and the *instrument of organization, a 3-dimensional, highly organized, urban infrastructure*. This will dovetail nicely with the Eurasian Land Bridge, or New Silk Road, proposal for infrastructure and utility corridors.

The first principles of science have their logical consequences, whether we foresee them or not. According to Northrop, the death of science in the middle ages was due to the prevalence of the mathematical theory of Plato under St. Augustine. “..... [T]his theory with its doctrine of of ideal forms, does not become reasonable unless one accepts the conclusion that the real world is not what nature appears to be. But to accept this doctrine is to deprecate the importance of the observable world of sensation. A loss of interest in nature for its own sake follows. Without this interest, empirical science dies, and without empirical science, there is no mathematics or mathematical theory.” An emphasis on the functional theory of Aristotle to the exclusion of the mathematical theory of Plato gives us the dangers of positivism. If Northrop's reasoning is correct, by emphasizing the Platonic or mathematical theory of nature to the exclusion of the Aristotelian or functional theory of nature, one is undercutting the discovery of fundamental scientific truths.

I suspect that Teilhard is not mentioned as the source of the word noosphere, or his work discussed for that matter by Executive Intelligence Review or in 21st Century Science & Technology, because he represents the Aristotelean or functional theory of nature: that the real is becoming, and its corollary, as Northrop points out, the epistemological principle that the real world is contained in the world of sensation. This is in contradistinction to the Platonic or mathematical theory of nature, that the real world is suggested by, but not contained in, the world of sensation. But, both the rational and the world of sensation are real when the psychical is added to Northrop's Macroscopic Atomic Theory, a thorough-going physical theory of nature that requires an amendment in the form of a physical addition to the kinetic atomic theory. This theory has solved the problem of organization in biology, and its experimental verification has brought us a technique for the early detection of human ovulation and cancer. The three fundamental theories of nature and their corollaries, as well as the nature of the psychical and consciousness, therefore, deserve careful study and discussion. It will not be surprising that the mathematical and functional theories of nature will eventually be replaced by an amended physical theory of nature, the Macroscopic Atomic Theory. This would help to bring about a new era in the history of humankind.

Both Plato and Aristotle would be pleased.

Darden H. Dickson
Renton, Washington
7 July 2006

- ¹ “..... [I]n 1925 [Pierre Teilhard] coined the term noosphere to denote the sphere of mind, as opposed to, or rather superposed on, the biosphere or sphere of life, and acting as a transforming agency promoting hominisation (or as I would put it, progressive psychosocial evolution)” – Julian Huxley, Introduction, *The Phenomenon of Man*, Paris, March 1947.
- ² “Teilhard first described the noosphere in a long essay titled 'Hominisation', written in 1925. It bears the subtitle 'Introduction to a Scientific Study of the Phenomenon of Man' and is a remarkable pointer to his major book on the subject, not begun until the late 1930s. The human being is the key to the understanding of evolution; it is also pointing beyond itself, to 'a higher pole or center that directs, sustains and assembles the whole sheaf of our efforts'.....After Teilhard had coined the word 'noosphere', the philosopher, Edouard LeRoy, and the Russian Geologist, Vladimir I. Vernadsky, soon adopted the term and helped to make it better known” – Ursula King, Chair of Theology and Religious Studies at the University of Briston, England, *Spirit of Fire, The Life and Vision of Teilhard de Chardin*, Orbis Books, Maryland, New York, 1996.
- ³ “We are living in a brand new, bright geological epoch. Man, through his labor – and his conscious relationship to life – is transforming the envelope of the Earth – the geological region of life, the *biosphere*. Man is shifting it into a new geological state: Through his labor and his consciousness, the biosphere is in a process of transition to the *noosphere*” 2, “Problems of Biogeochemistry II, On the Fundamental Material-Energetic Distinction Between Living and Nonliving Natural Bodies of the Biosphere,” by Vladimir I. Vernadsky, 21st Century Science and Technology, Winter 2000-2001, p22. 2 Le Roy, E. *L'exigence idéaliste et le fait d'évolution*, Paris, 1927, p. 196.
- ⁴ *The Phenomenon of Man by Teilhard de Chardin*, HarperCollins, Perennial, 2002 (pp64-66) (\$14.95 paperback); original French edition: *Le Phénomène humain (The Human Phenomenon)*, Editions du Seuil, Paris, 1955 – available in the United States from Larousse & Co., New York, N.Y.
- ⁵ *Science and First Principles*, F.S.C. Northrop, Macmillan, New York, 1931; Cambridge University Press, 1931; reprinted in 1972 by Ox Bow Press, P.O. Box 4045, Woodridge, CT 06525, 1972 Tel: 203.387.5900 Fax: 203.387.0035 (\$22 paperback, \$32 hardback); (a: p123; b: pp24-25; c: p253-254; d: pp27-29).
- ⁶ *The Fitness of the Environment, An Inquiry into the Biological Significance of Matter*, by L.J. Henderson, Macmillan, 1913; reprinted 1958 (Beacon Paperback); reprinted 1970, Peter Smith, Gloucester, Massachusetts. *Blood: A Study in General Physiology*, by L.J. Henderson, New Haven, Yale University Press; London, H. Milford, Oxford University Press, 1928.
- ⁷ “A Technique to Aid in the Detection of Malignancy of the Female Genital Tract”, Louis Langman and H.S.Burr, *Journal of Obstetrics and Gynecology*, Vol.57, No.2, 1949 (pp274-281); “History, Measurement, and Applicability of Periodic Changes in the Electromagnetic Field in Health and Disease”, by Leonard J. Ravitz, M.D., *Annals New York Academy of Sciences*, No.98, 1962 (pp1144-1201); “Electro-Dynamic Field Theory in Psychiatry”, Leonard J. Ravitz, M.D., *Southern Medical Journal*, Vol.46, No.7, 1953 (pp650-660). Much experimental work was done using the Burr-Lane-Nims technique including work done in biology, forestry, zoology, botany, meteorology, physics, and chemistry. I do not have all the reference material in front of me while writing this response, so I apologize if I have left out any fields of study, or any work done by others. This is all very important work, and needs to be studied carefully.
- ⁸ “Experimental Findings Concerning the Electro-Dynamic Theory of Life and an Analysis of their Physical Meaning”, F.S.C. Northrop and H.S. Burr, *Growth*, Vol 1, 1939 (submitted in 1936) (pp 78-88).
- ⁹ “Radial Energy and the First Principles of Science”, D.H. Dickson, *The Desire to be Human*, International Teilhard Compendium, Centenary Volume, edited by Leo Zonneveld and Robert Muller, Miranda Publishers b.v. Wassenaar, Netherlands, 1983 (pp92-94); edited and reprinted in *Frontier Perspectives*, the journal for the Center of Frontier Sciences, Temple University, Vol 5, No.1, Fall/Winter 1995, Correspondence (pp4,5).
- ¹⁰ *Blueprint for Immortality, The Electrical Patterns of Life*, by H.S. Burr, Neville Spearman, London, 1972. Langman's papers on the early detection of cancer of the female genital tract using the Burr-Lane-Nims technique are in the appendix.
- ¹¹ The Abiotic – Biotic - Noöspheric correspond to the three main divisions in *The Phenomenon of Man*: Book One: Before Life Came – Book Two: Life – Book Three: Thought.
- ¹² See: *The Fitness of the Environment, An Inquiry into the Biological Significance of Matter*, L.J. Henderson, Macmillan, 1913 p312.
- ¹³ From a Christian perspective: all the logical possibilities are in God, and God is one in three persons (through love, *αγαπη*).
- ¹⁴ *Arcology: City in the Image of Man*, Paolo Soleri, MIT Press, Cambridge, Massachusetts and London, England, 1969; reprinted by Bridgewood Press, 1999 (0-927015-15-3).

22.0 EVOLUTION AND LAND-USE

If one compares the results of land-use practices in the Puget Sound Region with those in Los Angeles, the findings are identical. There is pollution, urban sprawl (the spread of the 2-dimensional city), destruction of the natural environment (including prime agricultural land), and the constantly increasing costs of dis-organized complexity. ^[1]

There are some in Los Angeles who are convinced that the human organism will adjust to its new (man-made) environment like a pollution resistant strain of asparagus. Will we shut our eyes like they do, or will we re-examine our relationship with nature? After all, we cannot live without oxygen, plant and animal life, the warmth of the sun, and fresh water. These are facts! It may well be, therefore, that an examination of processes in nature will give us a clue as to a path we can follow. It turns out that this is indeed the case.

The French, Jesuit, priest-scientist, Pierre Teilhard de Chardin defined *evolution* as an *ascent of consciousness*, and an *increase in consciousness* as *the specific effect of an increase in organized complexity* ^{[2][3]}. A thumbnail sketch of organized complexity in nature follows.

The basic building blocks of chemical elements are electrons, protons, and neutrons. In the next major stage of organized complexity, the world of the molecule, the basic components are chemical elements. Next come molecules with molecules, and so on. This process (an increase in organized complexity) continues and leads to the first cells, and eventually to the first human organisms. ^[4]

The following observations can be derived from nature and the law of complexity-consciousness ^[5]:

4. Each major stage of organized complexity contains physical ‘elements’ of the preceding stage, which in turn include representative physical ‘elements’ from all previous major stages ^[6].
5. Complex matter is concentrated matter, that is, space and time are minimized between ‘elements’ in the system ^[7].
6. The most efficient organic systems take the least amount of energy and materials out of the environment ^[8].

Assuming that Pierre Teilhard’s definition of evolution is correct, what form will the physical take in the next major stage of organized complexity?

4. We know from observation (1.) that the physical ‘elements’ in the next stage are human organisms, and we know from direct observation that the consciousness associated with these organisms is reflective in nature (human beings know that they know).
5. Observation (2.) tells us that space and time are minimized between physical ‘elements’ in the system.
6. Observation (3.) tells us that frugality ^[9] is a prime concern in constructing the physical system.

The next major stage of organized complexity, then, will require the conscious development ^[10] of 3-dimensional cities ^[11] within which would be contained representative physical ‘elements’ from all previous stages ^[12].

This paper emphasizes the necessity of dense, 3-dimensional, highly organized urban centers in the furtherance of human evolution. The desired effect would be among others: a reduction in urban sprawl, and preservation of our natural environment; long term reduction in urban infrastructure costs; cost effective mass transportation systems between dense urban centers; and an increase in global consciousness.

Darden H. Dickson, Original paper: March 12, 1982, Rev 1: July 20, 2000, Rev 2: September 18, 2006

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- ¹ The specific effect of an increase in numbers with no corresponding increase in organized complexity is entropy and equivalent to inflation (a world-wide phenomenon).
- ² Teilhard de Chardin, Pierre, 1961. *The Phenomenon of Man*, Harper & Row, New York (pp 64-65); French edition: *The Phénomène humain*, Editions du Seuil, Paris, 1955; available in the United States from Larousse & Company, Inc., 572 Fifth Avenue, New York, N.Y. 10036; available in France, Argentina, Belgium, Brazil, Canada, Germany, Mexico, and Switzerland from Larousse & Company, Inc.
- ³ Pierre Teilhard's concept of *radial* energy was verified experimentally by H.S. Burr and his colleagues at Yale University in the late 1930's. See Additional Bibliography.
- ⁴ During the process of evolution unities of a higher order are being formed.
- ⁵ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper Torchbooks TB-383.
- ⁶ Human beings contain cells which in turn contain molecules, chemical elements, electrons, protons, and neutrons.
- ⁷ The effect of the spherical form of the Earth is the minimization of space-time; its spherical surface permits the shortest distance between the largest possible number of 'elements' on the surface.
- ⁸ Organisms that require less from the environment are in a better position to survive in the case of shortages.
- ⁹ A term used often by Arizona architect Paolo Soleri.
- ¹⁰ This fact is crucial. Evolution will come to a halt without the willful participation of human *elements*.
- ¹¹ Soleri, Paolo, 1969. *Arcology, The City in the Image of Man*, MIT Press, 1972; Cosanti Foundation, 6433 Doubletree Road, Scottsdale, Arizona 85253, Telephone 602.948.6145; reprinted by Bridgewood Press, 1999 (0-927015-15-3) (www.arcosanti.org).
- ¹² Towns, communities, neighborhoods, families, individual human beings, and so forth.

23.0 EPSILON ERIDANI AND TAU CETI

The shrill whistle lowered its notes in farewell as the train disappeared into the night.

The starry veil above caught me in its web, and I turned my thoughts to Epsilon Eridani and Tau Ceti. The light from Tau Ceti, one of the nearest stars most like our own sun in brightness, passed through the lens of my eye and struck the retina. Particle and wave were eleven years old and had traveled approximately 64,746,000,000,000 (64 trillion, 746 billion) miles. If I were to extend my vision so as to see the surface of Tau Ceti, I could only see it as it looked eleven years ago.

If we could see the center of the Milky Way Galaxy, the galaxy in which our solar system is located, what we would see would be what the center looked like approximately 30,000 years ago. To look from edge to edge of our galaxy we would be observing what occurred 100,000 years ago.

The distance from our galaxy to the beautiful Andromeda galaxy in the local group of about twenty-seven known galaxies is 12,949,200,000,000,000 (12 quintillion, 949 quadrillion, 200 trillion) miles. What we observe now took place 2,200,000 years ago. Light from the farthest known optical galaxies takes 5,000,000,000 years^[1].

The universe is expanding it is said by some. The red-shift tells us so, they say. The stars and galaxies are trains speeding away from us with whistles of light, giving us a lowered color for a lowered note.

But what about Pound and Rebka and the Mosbauer effect, what about the gravitational red-shift^[2]? What if the whole universe is immersed in a gravitational field, the source of which is external to the stars and galaxies, and what if this gravitational field be stronger the further we are from the center of the universe, Then, the farther look toward the source, the greater the gravitational red-shift, and the greater the curvature of light. It would soon become apparent that we cannot see out of our universe, no matter how powerful our telescopes might be.

A disembodied gravitational field, though, would be nonsense. A physical force requires a physical object, and this physical object would have to be external to and enclose the created universe. What looms in our consciousness is the existence of the Macroscopic Atom^{[3][4]} a hollow, physical, spherical object containing within its 'womb' the whole of the created universe.

What importance our thoughts!

In looking at the nearest star, Proxima Centauri we are looking 4.25 years into the past. In looking at Mars we are looking into the past by 19 minutes. The light from the moon takes approximately 1.25 seconds to reach us. In looking at my friend I am looking at what my friend looked like a small fraction of a second before.

What is now?

What I am trying to say, I cannot say. We have come to that part of us which is common to all others and to the source which brought us into being.

Darden H. Dickson
August 1976
Gig Harbor, Washington

¹ Moore, Patrick, 1970. *The Atlas of the Universe*, Rand McNally and Company in association with Mitchell Beazley Ltd. London. The distance of the farthest known optical galaxy keeps increasing with further scientific investigation. The James Webb infrared telescope, which is going to full operation in the summer of 2022 is going to give us further distances for known optical galaxies.

² Whitrow, G.J., 1972. *The Nature of Time*, Holt, Rinehart and Winston, 1972, p131.

³ Northrop, F.S.C. (1931). *The First Principles of Science*, Macmillan, 1931 (p 140).

⁴ Northrop, F.S.C. (1928). "The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity," *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928 (pp 449-467).

24.0 IN THE WOMB OF THE HOLLOW, SPHERIAL MOON ^[1]

The moon glistened from behind the alder trees
As they moved in the wind. And when the moonlight
Passed through the window into my eyes
It was as though my soul was filled with your love.

The alder trees and their branches
Seemed to break the moon into parts.
If I had not seen the moon in its fullness
I might have believed that it came in pieces
Like the physicist in looking at the atom
Sees only parts.
The physicist who has a knowledge of the parts
Must see the broken curves of the object he is looking at
And infer that there is something more,
Something that the trees and branches of his knowledge
May be keeping from him.

It is good to be by myself at this moment.
You are more than just in my thoughts;
You are part of my very being.
I am closer to nature now.
I feel one with the flowers,
One with everything green.
It is as though I were a part of everything.

What trees and branches are there that break up the sky;
That make me think that the moon, the planets and the stars
Are just bright spherical fragments
Whirling through space?
What hollow, spherical moon is this? ^{[2][3][4][5]}
Filled with planets and stars and galaxies
With nothing in between,
Or is it just that it cannot be seen
Except by my mind
Or felt
Except by my heart.

You knew me inside before you met me.
I didn't tell you.
How did you know?
Unless we are in the womb of the hollow, spherical moon.

D.H. Dickson
May 1975
Gig Harbor, Washington

¹ First Published in Teilhard Perspectives, Vol 56, No 1, American Teilhard Association, Summer 2022 (p 5).

² Northrop, F.S.C. (1931). *The First Principles of Science*, Macmillan, 1931 (p 140).

³ Northrop, F.S.C. (1928). "The Macroscopic Atomic Theory: A Physical Interpretation of the Theory of Relativity," *The Journal of Philosophy*, Vol XXV, No 17, August 16, 1928 (pp 449-467).

⁴ Teilhard, Pierre (1959). *The Phenomenon of Man*, Harper Torchbooks TB-383, pp 41, 42, 46.

⁵ Teilhard, Pierre (1969). *Christianity and Evolution*, Harcourt Brace Jovanovich, pp 26, 27.

APPENDIX A: Correspondence from Dr. Louis Langman.

Nov. 5th 1986.

Gordon H. Dickson
3302 Tarabochia St.
Big Harbor, Wa. 98335

Dear Mr. Dickson,

Dr. Gordon very kindly forwarded your letter with contents. Thank you for your inquiry & interest. In answer to your questions:

① Yes, I am still alive & very much interested in the happenings in medicine. My address is: 1951 Sagewood Lane Reston, Va. 22091

② The technique & instrumentation was very difficult & relatively crude compared to present day electronics. A great deal depended on special Ag Ag Cl electrodes which were conceived by a brilliant physical chemist at Rockefeller Institute & which were difficult to duplicate. I have but recently been



2.

contacted by a doctor in Australia who is attempting to duplicate our findings.

Thank you again for your interest.

Sincerely yours,

Louis Langman, M.D.

L. Langman, M.D.
1951 Sagewood Lane
Reston, Va. 22091
apt. 509



APPENDIX B: Correspondence from Dr. Leonard Ravitz

59 West 10 st 2c
NEW YORK NY 10011

Darden H. Dickson
3302 Tarabochia St
GIG HARBOR WA 98335

23 Jan 1987

Dear Mr Dickson: Appreciate your letter of 14 Jan with enclosures,
just forwarded. I'm presently in the New York City
area 4 days/wk, though the Willoughby Spit address is probably the
best to use. Thank you for Dr. Langman's current address.

Though early difficulties with instrument and electrode complexities may have furnished one reason for inhibiting the logical development of the Burr-Northrop constructs with medical/scientific persons, these were not that difficult once basic simple understandings had come about. Certainly high-input instruments and relational, reversible, nonpolarizing AgAgCl electrodes with appropriate saline electrode paste are now commercially available. Burr liked the 412A Hewlett-Packard instrument, for example. The problem, I believe, in the USA involves radically new ideas which are threatening to those whose livelihoods depend on "traditional" thinking at dipoles with the electrodynamic-field concepts. This may also be associated with the type of education received in the USA as opposed to that received in some other countries. To this date the majority of reprint requests to me come from overseas. Old ideas die hard. It appears to be easier to proclaim that women ovulate during the middle of their menstrual cycle, as shown by body temperature; even though only 1/3 ovulate when they are supposed to, and the voltage spikes correlating with ruptured follicles have nothing to do with temperature. Moreover the Catholic Church promotes mid-cycle rhythmic notions. And in psychiatry, it seems easier to promote Cartesian battles between mental substances and forces rather than to look at the field picture as it changes in time -- the time factor being a crucial variable; and objective, quantitative, reproducible energy quanta encompassing total statefunction based on field physics have been substituted for archaic mind-body dualisms.

Best regards to Norm Riise and, of course, to you.

Sincerely


Leonard J. Ravitz, MD

APPENDIX C: Correspondence from Carol Case, National Institutes of Health, National Cancer Institute.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Cancer Institute
Bethesda, Maryland 20892

October 24, 1986

Mr. Darden Dickson
3302 Tarabochia Street
Gig Harbor, WA 98335

Dear Mr. Dickson:

Dr. Vincent T. DeVita, Jr., Director of the National Cancer Institute (NCI), has asked us to respond to your inquiry about the research of Dr. Louis Langman and Dr. H.S. Burr.

You ask why members of the scientific community have not used their research as a basis for more current studies of the diagnosis of cancer. We regret that we cannot answer this question. NCI researchers and others in the field do rely on the biomedical literature as well as scientific meetings to obtain information used in their own studies. We can only assume that Drs. Langman and Burr's research did not prove useful in planning new investigations. We have learned through a search of the medical literature that scientists are using electrometric methods in other areas of scientific research. We also checked the medical databases for citations from 1965 to the present to see if other reports by Dr. Langman and/or Dr. Burr had been published. We were unable to locate any other citations by these scientists.

Please let us know if we can be of further assistance.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Carol Case".

Carol Case, R.N., M.Ed.
Chief, Public Inquiries Section
Office of Cancer Communications
National Cancer Institute

APPENDIX D: INTRODUCTION TO OVULATION GRAPHS

General Summary

From a theoretical point of view, the author was convinced of the validity of the work of Pierre Teilhard de Chardin concerning radial energy and the work of Professor F.S.C. Northrop concerning organization in biology, but he wanted to confirm from his own experience and satisfaction the work of Harold Saxton Burr (Section of Neuro-anatomy, Yale Medical School) and his colleagues on the early detection of ovulation and cancer by electrical means.

The author performed a study with the help of a registered nurse who wanted to participate in an experiment and who wanted a second child, but was having difficulty conceiving. The study lasted approximately four months.

The nurse took readings in the morning and at night before going to bed, and then telephoned the results to the author who graphed the results, by hand.

A month went by, but no electrical correlate for the ovulatory cycle appeared in the first month.

That was a technical disappointment!

On the second month an electrical correlate for the ovulatory cycle did appear.

On the third month, again, no electrical correlate.

On the fourth month we were prepared. When the electrical correlate indicated the breaking of the follicle, the nurse and her husband took advantage of the event. A few days later, there was a waveform indicating that she had conceived. This was confirmed, later, by a standard chemical test.

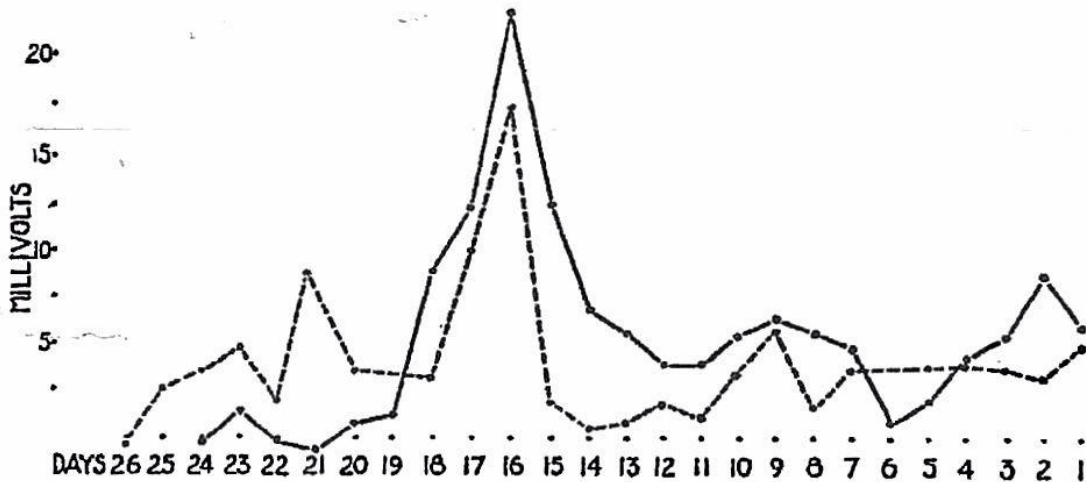
About two weeks later, she miscarried. There was a large electrical correlate over several days for this event.

Subsequent studies on another female indicated that the nurse had only one functioning ovary. Those studies also showed that the electrical correlates for the ovulatory cycle in both ovaries are 180° out of phase. In other words, if both ovaries are working, the electrical correlate for one ovary would be flipped over on the other side of the zero line on the graph. You can see this in Appendix B. This graph is from Burr's early studies. You can see how closely this resembles the graph of the ovulatory cycle by the author.

My profession was electronic/engineering technician. I was able to duplicate Dr. Burr's work using a modified, commercially manufactured Corning Ag-AgCl reference electrodes and a modern digital multi-volt meter with a high impedance input (10 meg ohms to prevent errors in reading potentials from a unitary electro-magnetic field).

The subject for the sleep study in 1994 (Appendix D) was the author (at age 55). The electrodes were attached to the center of the forehead and the inner right palm of the right hand.

APPENDIX E:



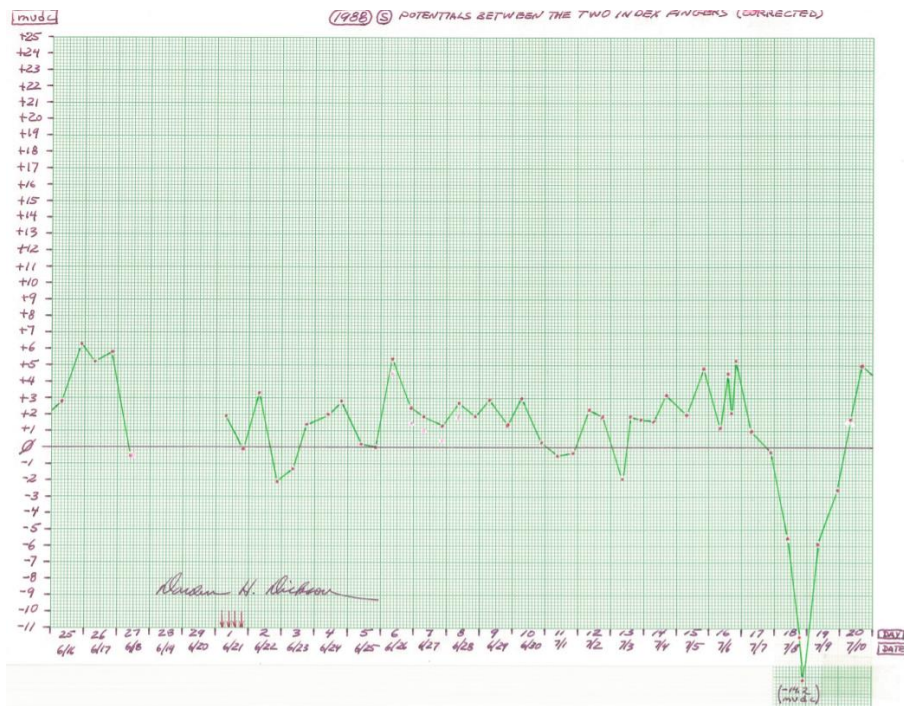
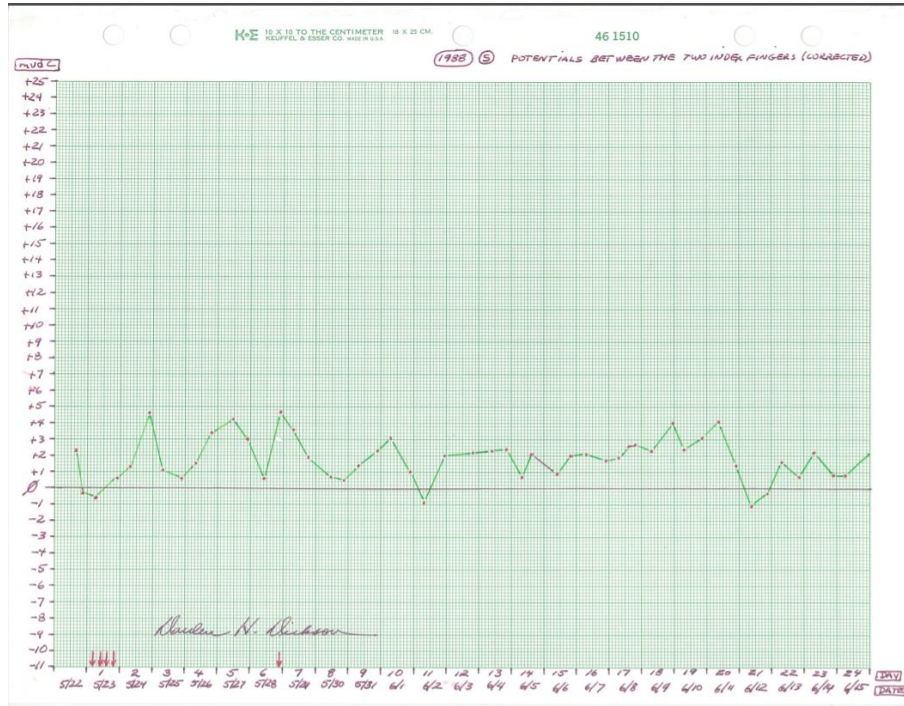
The algebraic summation of the daily readings for all nine cycles is shown in the solid line in Figure [4]. The fifth cycle in arch is shown in the dotted line in the same figure. The graph shows clearly that during the period from the ninth to the twelfth day after the onset of the menses or the fifteenth to the seventeenth day before the beginning of the succeeding period, there is a marked increase in the voltage difference between the two fingers. Moreover, it shows an interesting correlation with the probable figures for ovulation in the human female, with the amount of estrin recovered from the urine, and with the copulatory activity and the swelling of the sexual skin in the infrahuman primates. It will be noted that there is a slight rise toward the end of the cycle. It is possible that this second rise parallels a similar rise of estrin in urine. Statistical analysis of the data warrants the conclusion that the mid-cycle peak is a valid finding. [*]

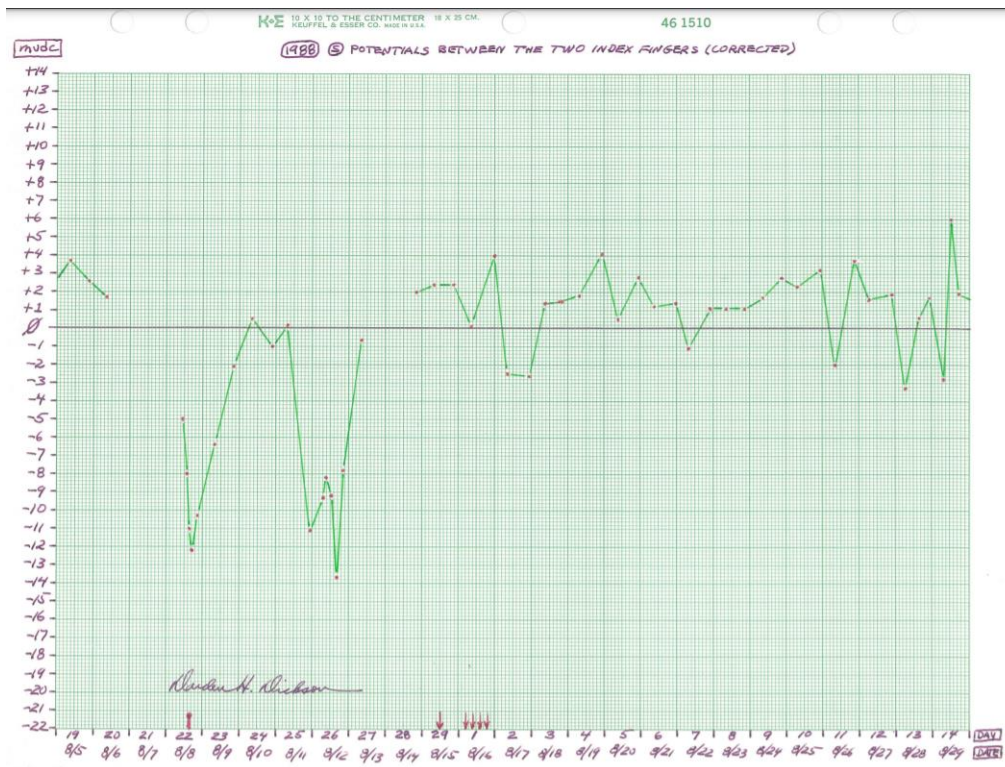
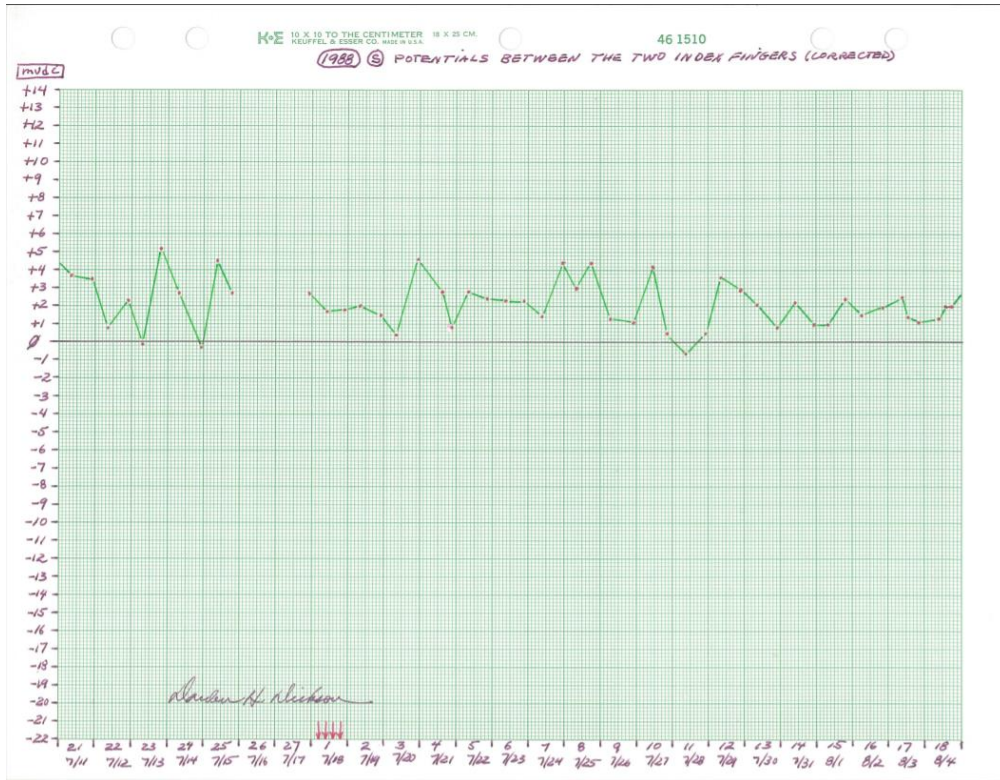
* Burr, H.S. and Musselman, L.K. (1936). "Bioelectric Phenomena Associated with Menstruation," Yale Journal of Biology and Medicine, Vol 9, 1936 (p 156).

APPENDIX F: The author's test set-up for the measurement of dc potentials of the unitary electromagnetic field of the Macroscopic Atom in millivolts for the ovulatory cycle between the two index fingers of the subject using a saline solution as a conductive medium.

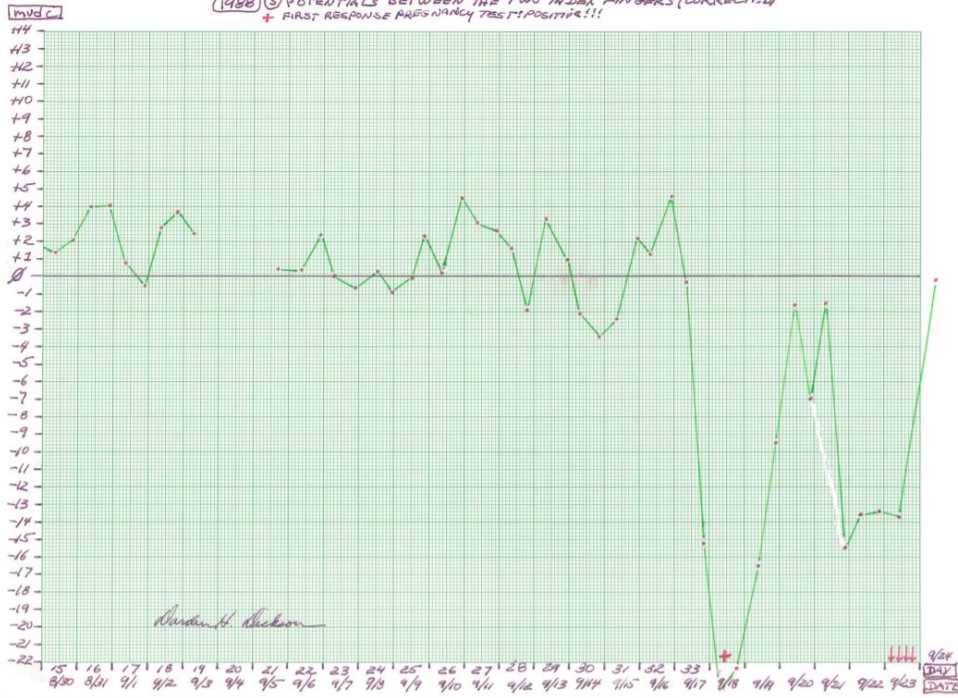


APPENDIX G: OVULATORY GRAPHS 1988

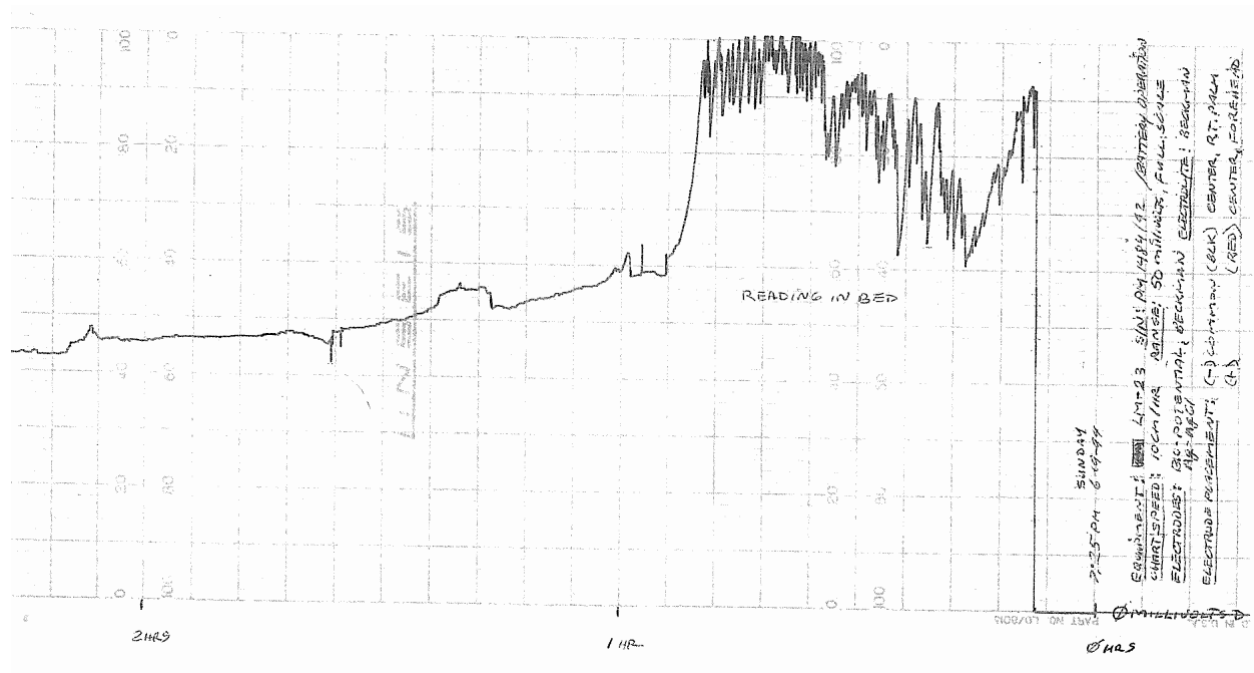




(1988) ③ POTENTIALS BETWEEN THE TWO INDEX FINGERS (CORRECTED)
+ FIRST RESPONSE PREDOMINANTLY TEST POSITIVE!!!



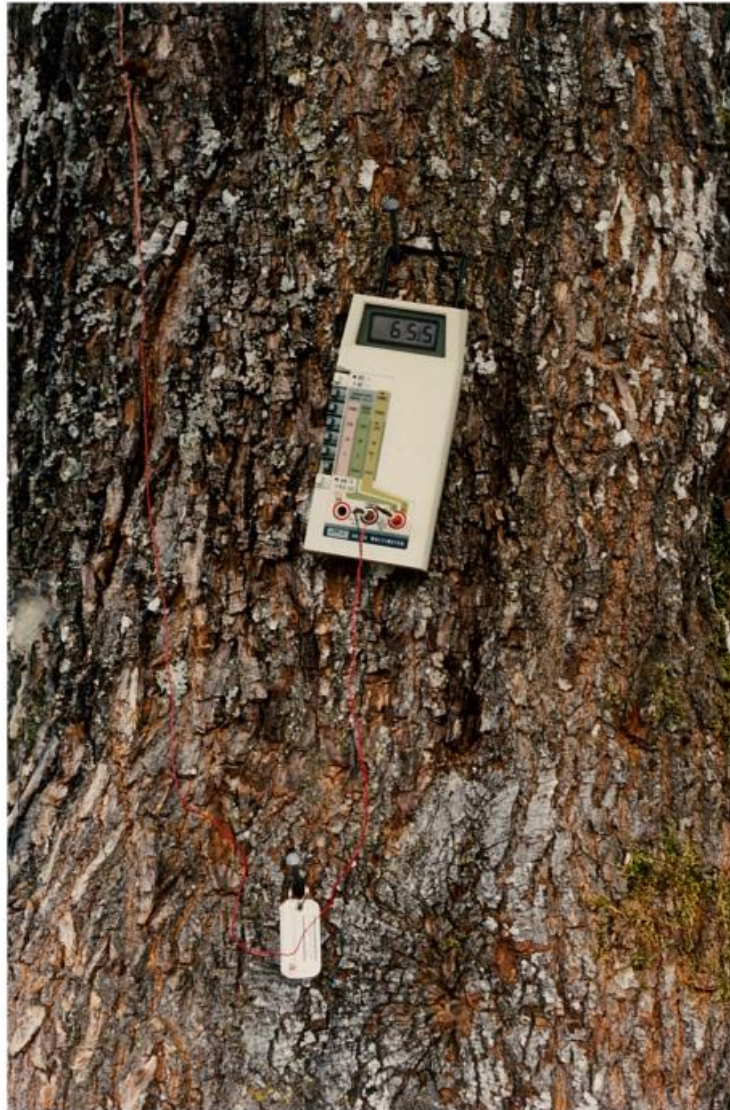
APPENDIX H: Sleep Study (1994): Subject, the author, using a strip chart recorder with an input impedance equal to or greater than 60 megohms for the measurement of potentials of the unitary electro-magnetic field in a human being.



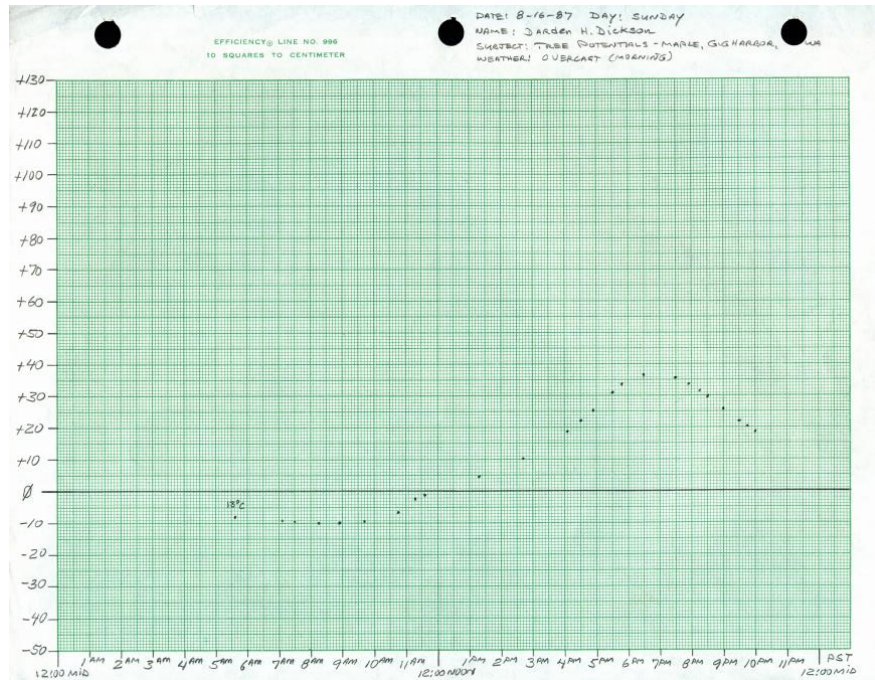
APPENDIX I: A LARGE LEAF MAPLE TREE — Gig Harbor, Washington



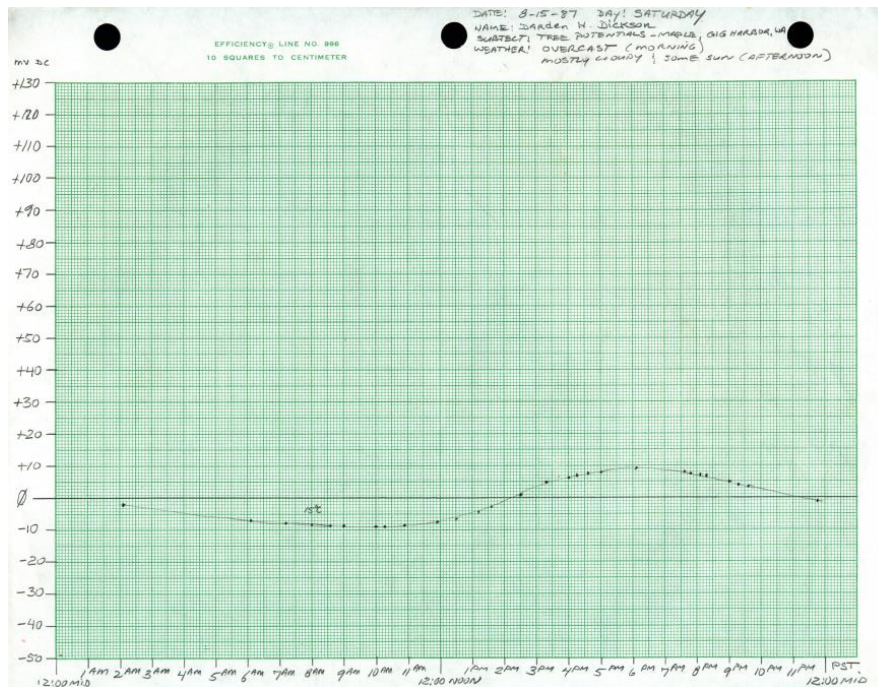
APPENDIX J: Multimeter used in making the dc potential measurements of the Macroscopic Atom's unitary electro-magnetic field in a large maple tree in Gig Harbor, Washington.



APPENDIX K: The measurement of dc potentials of a unitary electromagnetic field of the Macroscopic Atom on the trunk of a large-leaf maple tree in Gig Harbor, Washington.



August 16, 1987 [Overcast in the morning. Sunny in the afternoon.]



[August 15, 1987 — Mostly Cloudy. Some sun in the afternoon]

Darden H. Dickson, AAS, EET, has had a varied career as an electronic/engineering technician. At Biotronex Laboratory in Silver Spring, Maryland, he worked on the manufacture and design of blood-flow transducers. In Washington State, he worked on high-end ultrasound systems for the detection of blood-flow, and test systems for devices used in stroke therapy and the detection of epilepsy seizures.



The author has a strong interest in the work of Pierre Teilhard de Chardin, Paolo Soleri, and F.S.C. Northrop. His writings include: “**The Theory and Operation of Electro-Magnetic Blood-Flow Transducers,**” *Memorizing the Periodic Table of Chemical Elements, A Simple Method,* “**Radial Energy and the First Principles of Science,**” first published in *The Desire to be Human*, International Compendium, Centenary Volume, Edited by Leo Zonneveld, Commercial Attaché British Embassy in the Hague and by Robert Muller, Assistant Secretary General of the United Nations. He has self-published two books: *Collected Works on Field Theory* (a two-volume set) and *Cancer: An Organization Anomaly*. In the latter book, he states that the cancer problem is a problem in physics and that half the physics is missing, the physics associated with organization in biology and with the organization of the universe in general. In the end he says, the cancer problem is a cosmic problem, involving a boundary condition for the universe, a requirement that is necessary to correct Einstein’s theory of motion and to further verify his General Theory of Relativity.