Useful Quotes on Fermentation and Beyond

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Note

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Biochemical Fermentation

> "Fermentation is the process by which living organisms recycle NADH $\rightarrow$ NAD$^+$. NAD$^+$ is a required molecule necessary for the oxidation of Glyceraldehyde-3-phosphate to produce the high energy molecule 1,3-bisphosphoglycerate (Step 6 of Glycolysis). Fermentation occurs in the cytosol of cells.
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> ...
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> "In metabolism, many redox reactions are involved. Redox reactions require that electrons can be transferred or removed to either reduce or oxidize a particular substrate or molecule. Therefore, we need intermediates capable of undergoing electron transfer. These are the coenzymes NAD/NADH and FAD/FADH2. These coenzymes can exist in their oxidized (NAD+ and FAD) or reduced forms (NADH and FADH2). NADPH is a close derivatives of NADH that also acts as a redox couple.
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> "NAD+ and NADP+ are derivatives of nicotinic acid or nicotinamide. They intervene in biological redox reactions."

–Chemistry LibreTexts: CHE 301: Biochemistry at Brevard College. See https://chem.libretexts.org/Courses/Brevard_College/CHE_301_Biochemistry/08:_Metabolism_of_carbohydrates/8.04:_Fermentation and https://chem.libretexts.org/Courses/Brevard_College/CHE_301_Biochemistry/07%3A_Nutrition/7.08%3A_The_Chemistry_of_NAD_and_FAD

Excerpts of the Wikipedia article on Fermentation

"Fermentation is a metabolic process that produces chemical changes in organic substances through the action of enzymes. In biochemistry, it is narrowly defined as the extraction of energy from carbohydrates in the absence of oxygen. In food production, it may more broadly refer to any process in which the activity of microorganisms brings about a desirable change to a foodstuff or beverage.[1] The science of fermentation is known as zymology.

"In microorganisms, fermentation is the primary means of producing adenosine triphosphate (ATP) by the degradation of organic nutrients anaerobically.

"Humans have used fermentation to produce foodstuffs and beverages since the Neolithic age. For example, fermentation is used for preservation in a process that produces lactic acid found in such sour foods as pickled cucumbers, kombucha, kimchi, and yogurt, as well as for producing alcoholic beverages such as wine and beer. Fermentation also occurs within the gastrointestinal tracts of all animals, including humans.[2]

"Industrial fermentation is a broader term used for the process of applying microbes for the large-scale production of chemicals, biofuels, enzymes, proteins and pharmaceuticals.

"Below are some definitions of fermentation ranging from informal, general usages to more scientific definitions.[3]

- Preservation methods for food via microorganisms (general use).
- Any large-scale microbial process occurring with or without air (common definition used in industry, also known as industrial fermentation).
- Any process that produces alcoholic beverages or acidic dairy products (general use).
- Any energy-releasing metabolic process that takes place only under anaerobic conditions (somewhat scientific).
- Any metabolic process that releases energy from a sugar or other organic molecule, does not require oxygen or an electron transport system, and uses an organic molecule as the final electron acceptor (most scientific).

"The word "ferment" is derived from the Latin verb fervere, which means to boil."

"[1] Hui, Y. H. (2004). *Handbook of vegetable preservation and processing*. New York: M. Dekker. p. 180. ISBN 978-0-8247-4301-7. OCLC 52942889.

"[2] Bowen, Richard. "Microbial Fermentation". *Hypertexts for biological sciences*. Colorado State University. Retrieved 29 April 2018.

"[3] Tortora, Gerard J.; Funke, Berdell R.; Case, Christine L. (2010). "5". *Microbiology An Introduction* (10 ed.). San Francisco, CA: Pearson Benjamin Cummings. p. 135. ISBN 978-0-321-58202-7."

–Fermentation: From Wikipedia, the free encyclopedia. See https://en.wikipedia.org/wiki/Fermentation

Explanation of Physiological Fermentation

"One single fact surely deals the death stroke to the claim that Pasteur initiated a true understanding of fermentation; that in his earlier experiments — those of 1857, for instance, and again in 1860 — he employed proteid matters and thus showed that he had missed the whole point of Béchamp's great discovery that organised living ferments could arise in media totally devoid of anything albuminoid. The life at large in the atmosphere could only be demonstrated by its invasion of a purely chemical medium entirely free from the suspicion of any organised living elements. This fact alone demonstrates that Pasteur did not understand the real significance of Béchamp's demonstration.

"The latter now went on to describe the physiological theory of fermentation as proved by his past experiments:

"'For me, alcoholic and other fermentations by organised ferments are not fermentations in the proper sense of the term; they are acts of nutrition, that is to say, of digestion, of assimilation and of excretion.

"'Yeast transforms first of all, outside of itself, cane sugar into glucose by means of a substance that it contains fully formed in its organism and which I have named *zymase*: it then absorbs this glucose and nourishes itself on it: it assimilates, multiplies, increases and excretes. It assimilates — that is to say, a portion of the modified fermentable matter becomes momentarily or definitely a part of its being and serves towards its growth and its life. It excretes, that is to say, it expels the parts used by its tissues under the form of compounds that are the products of fermentation.

" 'M. Pasteur objected that acetic acid, the constant formation of which I had demonstrated in alcoholic fermentation, had its source not in the sugar, but in the yeast. To this question on the origin of the products of fermentation, which so greatly occupied M. Pasteur and his disciples, I made answer: They ought, according to the theory, to come from the yeast in the same way that urea comes from us, that is to say, from the materials that at first composed our organism. In the same way that the sugar which M. Claud Bernard saw being formed in the liver comes from the liver and not directly from food, so alcohol comes from yeast. This is what I call the physiological theory of fermentation. Since 1864, all my efforts have been directed to the development of this theory. I developed it at a conference held at Montpellier and at another held at Lyons. The more I insisted on it, the more it was attacked. Attacked by whom? We shall see.' "

–Ethel D. Hume, *Béchamp or Pasteur?: A Lost Chapter in the History of Biology* By Ethel D. Hume [Prefaced by *Pasteur: Plagiarist, Imposter: The Germ Theory Exploded* By R. B. Pearson], ISBN 978-1-46790-012-6, Pages 230-231

Deeper Takes on Fermentation

"Mix flour and water in a bowl and let it sit on your kitchen counter. Within days it will start to bubble. This is sourdough.

"Fermentation happens. It is the path of least resistance. Yeast and bacteria are everywhere, in every breath we take and every breath we take and every bite we eat. Try as you might to eradicate them with antibacterial soaps and antibiotic drugs, there is no escaping them.

"These microbial cultures populate our digestive tracts and play a critical role in breaking down the food we eat. They are ubiquitous agents of transformation, feasting upon decaying matter, constantly shifting dynamic life forces from one miraculous and horrible creation to the next. We humans are in a symbiotic relationship with these microscopic living beings. Without them life could not be sustained."

–*Wild Fermentation: A Do-It-Yourself Guide to Cultural Manipulation* By Sandor Ellix Katz, ISBN 978-1-934620-17-5, Introduction Page 1

"Fermented foods and drinks are quite literally alive with flavor and nutrition. Their flavors tend to be strong and pronounced. Think of stinky aged cheeses, tangy sauerkraut, rich earthy miso, smooth sublime wines. Though not everyone loves every flavor of fermentation, humans have always appreciated the unique, compelling flavors resulting from the transformative power of microscopic bacteria and fungi.

"One great practical benefit of fermentation is that it can preserve food. Fermentation organisms produce alcohol, lactic acid, and acetic acid, all "bio-preservatives" that retain nutrients while preventing spoilage and the growth of pathogenic organisms. Vegetables, fruits, milk, fish, and meat are highly perishable, and our ancestors used

whatever techniques they could discover to store foods from periods of plenty for later consumption. From the tropics to the Arctic, fermentation has been used to preserve food resources."

–*Wild Fermentation: The Flavor, Nutrition, and Craft of Live-Culture Foods* Updated and Revised Edition By Sandor Ellix Katz, ISBN 978-1-60358-628-3, Page 1

"One word that repeatedly comes to the fore in my exploration and thinking about fermentation is *culture*. Fermentation relates to culture in many different ways, corresponding with the many layers of meaning embedded in this important word, from its literal and specific meanings in the context of microbiology to its broadest connotations. We call the starters that we add to milk to make yogurt, or to initiate any fermentation, cultures. Simultaneously, culture constitutes the totality of all that humans seek to pass from generation to generation, including language, music, art, literature, scientific knowledge, and belief systems, as well as agriculture and culinary techniques (in both of which fermentation occupies a central role).

"In fact, the word *culture* comes from Latin *cultura*, a form of *colere*, "to cultivate." Our cultivation of the land and its creatures—plants, animals, fungi, and bacteria—is essential to culture. Reclaiming our food and our participation in cultivation is a means of cultural revival, taking action to break out of the confining and infantilizing dependency of the role of consumer (user), and taking back our dignity and power by becoming producers and creators."

–*The Art of Fermentation: An In-depth Exploration of Essential Concepts and Processes from Around the World* By Sandor Ellix Katz, ISBN 978-1-60358-286-5, Pages xviii-xix

"Certainly no particular ideology has a monopoly on fermentation. Intellectual, social, cultural, political, artistic, musical, religious, spiritual, sexual, and other forms of bubbly excitement are part of the range of human experience. In any realm of our lives, it is possible to get caught up in a feeling of shared effervescence. We should all be so lucky. Whatever the context, like its literal twin, metaphorical fermentation is an unstoppable force that people everywhere have harnessed, and gotten caught up in, in all sorts of different ways."

–*Fermentation as Metaphor* By Sandor Ellix Katz, ISBN 978-1-64502-021-9, Page 12

Derivation of the Microzyma Name

"Here he detailed experiments and proposed for the 'little bodies' the name *microzymas* from Greek for 'small' and 'ferment'. This descriptive nomenclature portrayed them as ferments of the minutest perceptible order. To the special 'little bodies' found in chalk he gave the name name *microzyma cretae*."

–Ethel D. Hume, *Béchamp or Pasteur?: A Lost Chapter in the History of Biology* By Ethel D. Hume [Prefaced by *Pasteur: Plagiarist, Imposter: The Germ Theory Exploded* By R. B. Pearson], ISBN 978-1-46790-012-6, Page 178

Microzymas as the Carriers of Hereditary

"This was exactly Béchamp's teaching, and, moreover, he showed that the microzymas are the transmitters of heredity. According to him, a plant or an animal is what it is by virtue of its microzymas. These are the link between the animal and vegetable kingdoms. Though appearing intrinsically the same, it is they that differentiate the essence

of one living being from that of another. It is by reason of its microzymas that an acorn develops into an oak, or a hen's egg into a chicken; microymian influence decides the child's likeness either to father or mother. And here again we find the supporting modern view that in the the *chromatin* lies the secret of heredity.

"Professor MacBride[1] thus supports Béchamp's hypothesis:

"1. Section D. Reports of British Association. 1915. *Discussion on the Relation of Chromosomes to Heredity*, by Professor E. W. MacBride.

> "'There seems to be no escape from the position that the *chromatin*, viewed as a whole, is the bearer of the hereditary tendencies, for the influence of the father in determining the character of the offspring is as potent as that of the mother. Now, the head of the spermatozoon is the only part of the father that enters into the constitution of the progeny, and this appears to consist practically exclusively of chromatin. May not the chromosomes be simply groups of these determiners (of characteristics, qualities, etc.) adhering by mutual chemical affinity under the peculiar chemical conditions prevailing in the cell in the period preceding karyokinesis? If this be the case, the apparent total disappearance of chromosomes during the resting period could be accounted for.'

"It is possible that for want of modern appliances, Béchamp may have overlooked the great importance of the cell nucleus in his cellular doctrine; but, even so, Professor Minchin confirms the correctness of his view in ascribing the supreme influence to what we may term the *microzymian*, *granular* or *chromatinic* entities. He says:

> "'Already, one generalisation of cytologists has been torpedoed by the study of the *protists* (a very primitive form of microorganism). The dictum '*omnia nucleus e nucleo*' is perfectly valid as long as it is restricted to the cells of *metazoa* and *metaphyta*, to the material, that is to say, to which the professed cytologist usually confines his observations. But in the the *protista* it is now well established that nuclei can arise *de novo*, not from pre-existing nuclei, but from the extra-nuclear chromatin for which Hertwig first coined the term *chromidia*.'

"Let us run through Béchamp's early views as we find them expressed in his *Théorie du Microzyma*:

> "'Microzymas are builders of cells, and by evolution become vibrios: they are histologically active; they are producers of zymases (ferments): they are physiologically active; and in noting that zymases are agents endowed with the chemical capacity of transformation or decomposition, it may be said that microzymas can generate **chemical energy**; it is thanks to the microzymas that we digest and that we are able to transform and assimilate the materials that serve to nourish us. They are thus thus *chemically* active; and placed in certain artificial surroundings (called putrescible), under favorable circumstances, they bring about decomposition (that is, fermentation); in other words, they nourish themselves while they multiply, regardless of whether they evolve into vibrios or not. They are therefore individually organisms comparable to those we call living and organised ferments, etc. Finally, they defy putrefaction, and if I add that they are not digested in the condition of animal matter where they are, one can say that they are *physiologically indestructible*'[1]. [my emphasis]

"1. p. 319.

"Now let us compare the modern views of Professor Minchin:

> "'I regard the chromatin elements as being the primary of the life and evolution of living organisms for the following reasons: the experimental evidence of the preponderating physiological role played by the nucleus in the life of the cell; the extraordinary individualisation of the chromatin particles seen universally in living organism and manifested to a degree which raises the chromatinic units to the rank of living individuals exhibiting specific behavior, rather than that of mere substances responsible for certain chemico-physical reactions in the life of the organism; and last, but by no means least, the permanence and, if I may use the term, the *immortality* of the chromatinic particles in the life-cycle of organisms generally.'

"Here it may be objected that though Professor Minchin confirms Professor Béchamp's views as regards the individuality and immortality of the minute cellular granules, no confirmation is given of vibrionic — or as one would say more familiarly, bacterial — evolution."

–Ethel D. Hume, *Béchamp or Pasteur?: A Lost Chapter in the History of Biology* By Ethel D. Hume [Prefaced by *Pasteur: Plagiarist, Imposter: The Germ Theory Exploded* By R. B. Pearson], ISBN 978-1-46790-012-6, Pages 250-251

The Microzyma and not Cells are the Beginning of Biological Life

"The cellularists, it is but fair to recall, regarding the cellule as the simplest anatomical element, believed it proceeded necessarily from a former cellule, *omnis cellula e cellula*, holding it to be the *vital unit*, living *per se*, and regarded an entire organism as the sum of these units. But we now know that that was a deduction from incomplete and superficial observations, for the cellule, a transitory anatomical element, has the microzyma for its anatomical element. It is this which alone possesses all the characters of an anatomical element, *living per se*, and which must be regarded as the unit of life. It is what I have already stated in the following terms:

> " '*The microzyma is at the beginning and at the end of every living organization. It is the fundamental anatomical element whereby the cellules, the tissues, the organs, the whole, of an organism are constituted living*.' "

"Let us devote a few words to develop this idea. Let us penetrate a little further into this notion of a fundamental anatomical element, which, as has been said, implies that the microzyma is the living atom of the organization as the physical atom is the element of the molecule of a simple body. This would be true if the microzyma were unchangeable in its simplicity. But in reality it is essentially mutable, as are all living bodies; and it is especially so, in order that it may fulfil its numerous functions. In fact, the microzymas, functionally different in the different anatomical systems of the same species, and different at all ages, beginning with the embryonal stage, have been primitively those of the vitellus, after having been those of the ovule. A microzyma then is not, properly speaking, an atom; but always anatomically simple, it becomes, by nutrition, that which it needs to become, so as to accommodate itself to each new condition of existence which the successive phases of the development of each anatomical system provide for it. It is thus that even in the embryo, in that which will be the ovary, a category of microzymas becomes again ovular microzymas to recommence the same cycle. I add that, taken as a whole and in its details, the THEORY HAS BEEN CONFIRMED, VERIFIED, CORROBORATED by a great number of other facts of general anatomy and of pathological anatomy and of physiology.[1] "

"1. See particularly the notes and publications following:

- *A. Bechamp:* Facts useful for the history of the origin of the bacteria. Natural development of these little plants in the frozen parts of certain plants. C. R.. Vol. LXVTII. p. 466(1869).
- *A Estor:* Note for use in the history of the microzymas contained in animal cellules. C. R.. Vol. LXVIII. p. 519. It relates to the microzymas in bacterian evolution in a cyst which had just been removed.
- *Bechamp and Estor:* On the microzymas of pulmonary tubercle in the cretacious state. C. R., Vol. LXVII, p. 960 (1868). It relates to the discovery of microzymas in a condition of evolution within the tubercle, regarded as the remains of the destroyed epithelium of the pulmonary alveoli.
- *Bechamp and Estor:* Facts useful for the history of the microzymas and bacteria. Physiological transformation of bacteria into microzymas and of microzymas into bacteria in the digestive tube of the same animal. C. R., Vol. LXXVI, p. 1143 (1873).

- *Bechamp:* Facts useful for the history of the histological construction of the glairine of Molitg. C.R., Vol. LXXVI. p. 1485 (1873).
- *Bechamp*: The diseases of the silk worm. C. R.. various notes from 1866 to 1374. They relate to the pebrine, a parasitic disease, and to the flacherie, a microzymian disease, not parasitic.
- *J. Grasset:* On the histological phenomena of inflammation. Treatise regarding a new theory, based upon the consideration of the molecular granulations (microzymas). Gazette Med. de Paris, year 1873.
- *E. Baltus:* Theory of the Microzyma, a theoretic and practical study of pyogenesis (the formation of pus). Theses of the Faculty of Montpellier, year. 1874, No. 41.
- *J. Bechamp:* The microzymas and their functions at the different ages of the same being. Theses of the Faculty of Montpellier, 1875, No. 63.
- *A Bechamp:* Microzymas and disease; in "Les Microzymas," etc., p. 744. (Chamalet, 60, Passage Choiseul.)
- *A Bechamp:* Puerperal septicaemia, pleurisy, the albuminuria and the preface to Microzymas et Microbes. (Chainalct, 60, Passage Choiseul, Paris.)
- *A. Tripier:* Electricity and Cholera. Genesis, prophylaxy and treatment. (Georges Carre, pub. 1884). In this memoir there will be found a comparison of the microbian system and the microzymian theory, highly original and at the same time the conception of what the eminent author terms the *individual coefficient*."

–Antoine Béchamp, *The Blood and its Third Anatomical Element* By Antoine Béchamp, 1912, Translated by Montague R. Leverson, [WHALE Oct 2005] {http://www.whale.to/v/bechamp_b1.html}

Microzymas are Ferments

> "My researches upon fermentations and ferments, particularly upon molecular granulations, date back some fifteen years, and those which Professor Estor and I conducted for the purpose of generalizing my earlier observations have led to this result: that the animal is reducible to the microzyma. But the microzyma, whatever its origin, is a ferment; it is organized, it is living, capable of multiplying, of becoming diseased and of communicating disease.
>
> "All microzymas are ferments of the same order — that is to say, they are organisms, able to produce alcohol, acetic acid, lactic acid and butyric acid.
>
> "In a state of health the microzymas of the organism act harmoniously, and our life is, in every meaning of the word, a regular fermentation. In a state of disease, the microzymas do not act harmoniously, and the fermentation is disturbed; the microzymas have either changed their function or are placed in an abnormal situation by some modification of the medium. This was what I tried to make clear by a positive example of a kind which would leave no room for misunderstanding either the extent or the bearings of the conclusion."

–Antoine Béchamp, *The Blood and its Third Anatomical Element* By Antoine Béchamp, 1912, Translated by Montague R. Leverson, [WHALE Oct 2005] {http://www.whale.to/v/bechamp_b1.html}

Life, Dis-ease, Death, & Fermentation

> "And, in conclusion, I beg the permission of the Academy to repeat here something which Professor Estor and I said in a recent work upon this subject:

""After death (leaving here the domain of pathology to enter into that of the physiology of the species), it is essential that matter be restored to its primitive condition, for it has only been lent for a time to the living organized being. In recent years an extravagant role has been assigned to the airborn germs; the air may bring them, it is true, but it is not necessary that it should do so."

"The microzymas, whether in the state of bacteria or not, are sufficient to assure by putrefaction the circulation of matter.

"The living being, filled with microzymas, carries in itself the elements essential for life, disease, death and destruction. And that this variety in results may not too much surprise us, the processes are the same. Our cellules, it is a matter of constant observation, are being continually destroyed by means of a fermentation very analogous to that which follows death. Penetrating into the heart of these phenomena we might really say, were it not for the offensiveness of the expression, that we are constantly rotting!"

–Antoine Béchamp, *The Blood and its Third Anatomical Element* By Antoine Béchamp, 1912, Translated by Montague R. Leverson, [WHALE Oct 2005] {http://www.whale.to/v/bechamp_b1.html}

The Optimal Temperature Range for Microzymas

"Among the causes which produce disease, a sudden chill in summer is the one most frequently indicated or invoked. The chill is at the same time an influence and a lowering of temperature. I do not insist on the fact that it is only something living which is painfully affected, so as to confine myself to the physical phenomenon. But the microzymas are very sensitive to variations of temperature; so much so that even the geological microzymas act regularly only at temperatures near 40° to 42 °C. (= 104° to 107° F.); in fact, the microzymas of the chalk of Sens do not act so as to cause fecula to ferment in a temperature below 38° C. (= 100.4 °F.). Further a very slight lowering of the temperature is sufficient for the egg which should produce a bird not to produce one, and to putrefy or to produce the monsters of Dareste when the heat is not uniformly applied. In fact, the influences of the medium (as if it should become neutral or acid), which modify the activity of the microzymas acting alone, are various. That which happens to the isolated microzymas happens also to those of the egg and for those of the organism. Suppress the air and the egg does not become a fowl, but undergoes another kind of change.

"If from any cause whatever the air does not have access or has an insufficient access to the pulmonary alveolae, and their *epithelium* becomes the pulmonary tubercle, the cellules become reduced to their microzymas, which are then found in vibrionian evolution in the tubercle in the cretatious state. If the *decoordination* resulting from an irregular functioning of a part of an anatomical system is sufficient to bring on a malaise which is not removed, there will arise a diseased condition because of a sharp change of the conditions of existence of the microzymian anatomical elements, and the change in the medium sufficient to cause the decoordination will manifest itself by the vibrionian and bacterian evolution of the microzymas of such or such part of the system. It is thus that in the disease called "Sand de rate" (Anthrax), so thoroughly studied by Davaine, the diseased microzymas end by evolving into what that learned physician called bacteridiae, the blood globules undergoing the changes which are so characteristic. The bacteridiae were not the cause of the diseased condition, but were one of its effects; *proceeding* from the *morbid microzymas* they were capable of inducing this diseased condition in the animal whose microzymas were in a condition to receive it. Hence it is seen that the alteration of natural animal matters is spontaneous, and justifies the old aphorism so concisely expressed by Pidoux: *"Diseases are born of us and in us."*

"On the other hand, the disregard of this law of nature, the firm establishment whereof is completed by the present work, necessarily led M. Pasteur to deny the truth of the aphorism, and to imagine a *pathogenic panspermy,* as he had before conceived, *a priori,* that there was a panspermy of fermentations. That M. Pasteur after having been

a sponteparist should reach such a conclusion was natural enough; he was neither physiologist nor physician, but only a chemist without any knowledge of comparative science.

"What is astonishing is, that he should have succeeded in procuring the triumph of a preconceived system among physicians and in academies, and to procure the rejection of the microzymian theory [without examination. Trans.]. For instance, an enlightened physician thus summed up the fundamental proposition of M. Pasteur: "The microbes always come from without; they constitute species which remount from generation to generation up to the origin of the world."[1]

"1. *Gazette medical*, Paris, 6th Series. Vol. V, p. 218. This is precisely what M. Chamberland said of micro-organisms in general: 'Recherches sur l'origine el le developpement des organismes microscopiques.' Theses de la Faculte des Sciences. Parais, 1879. See also "Microzymas et Microbes," p. 25, 2d Ed."

–Antoine Béchamp, *The Blood and its Third Anatomical Element* By Antoine Béchamp, 1912, Translated by Montague R. Leverson, [WHALE Oct 2005] {http://www.whale.to/v/bechamp_b1.html}

Deeper Nature of the Microzymas == Somatids

"More recently, French-born biologist Gaston Naessens has added important details to what may prove to be an entirely alternative hypothesis of disease causation. To study the microbial etiology of cancer, Naessens (like [Royal R.] Rife before him) used a specialized, high-powered microscope that allowed him to study living cells and minute microorganisms in their living state. During his examination of blood, Naessens found tiny, subcellular, living particles, which he named "somatids," that could be cultured outside the body in special nutrient mediums. These somatids were noted to be **electrical in nature and were actually tiny living condensers of energy**. According to Naessens, somatids underwent a normal, pleomorphic (form-changing) three-stage life cycle in the bloodstream. More importantly, the somatids (in their normal three-stage cycle) appeared to be essential to the health of the organism." [my emphasis]

–Richard Gerber, M.D., *Vibrational Medicine: The #1 Handbook of Subtle-Energy Therapies*, Third Edition, Page 516, Bear & Company, 2001, ISBN# 978-1-879181-58-8

Importance of the Microzymas for Biological Agriculture Rather than death agriculture (non-biological agriculture)

"A deeply interesting tribute to his teaching by Lord Geddes may be found in a reprint of speeches in the House of Lords on February 2nd, 1944, on a motion standing in the name of Lord Teviot, asking whether the Royal Commission appointed to investigate the birth rate and trends of population would cover, in its terms of reference, the condition of the soil in relation to the health of man, animal and plant:

"Lord Portsmouth moved the motion in the absence through illness of Lord Teviot. Lord Glentanar and Lord Hankey supported the motion, as did Lord Geddes. Lord Geddes referred to the controversy regarding the food required and the use of chemical fertilizers. He said it goes back for nearly a century and has been made a very difficult controversy to follow by the dominance for so many years of the German school of biology.

"'The German school — Virchow, Schwann, Liebig — laid the emphasis upon the cell out of which, in their millions, our bodies are created, and they regarded food for the cell as all that was required. Apart from that, and really obliterated and eclipsed by the German school, very likely as a result of the Franco-Prussian War and the prestige the Germans got through that war, there was a French school, of which Professor Béchamp was the leader, working at Montpellier in the 'fifties of last century. This school had a quite different idea about the structure of the body and the vitality and vigour of the body, and I think it was a great pity that, as a result of the Franco-Prussian War and various things that followed it in the 1870s, a great deal of the work of Professor Béchamp was entirely ignored and overlooked.'

"Lord Geddes then described the great contribution Professor Béchamp made, a contribution his lordship had been familiar with for over thirty years, to the whole idea of life, namely, that the cell is *not* the fundamental unit of life, but that there is a much smaller, more minute unit of life, which he called, in his later reports to the Academy of Science, the *microzymas*, but which in his earlier reports he always referred to as the 'little bodies'.

"Lord Geddes showed how these little living bodies have the power of organising life, and he suggested that as they are not present in artificial chemical manures, the German school — which we have in this country largely followed in biology for many years — overlooked something of great importance; something which may be necessary for our human bodies, if they are to maintain their full vitality by receiving in their food a continuous supply of the little living bodies.

"Lord Geddes emphasised that there is a real divergence of opinion between two schools which have existed for a long time, one of which has become dominant and out of whose practice and beliefs the whole of the chemical industry has arisen and has been able to show results of the most remarkable kind in boosting production in the plant's growth and those portions of the food that are required as fuels. But he suggested that the composters had got hold of the real source of vitality. The little bodies could be seen in drops of blood under a microscope, and during the course of that week he had examined a great many and had seen most extraordinary differences between people fed in different ways and in different states of health.

"He proposed that the research that was needed was investigation of the question: ***Is the supply of these little living bodies in the food essential to the continued vitality of human beings, or is it not?*** [my emphasis]

"He thought there was the possibility — many think the extreme probability — that the presence of these little living bodies in the food is essential to health.

"He went on to describe how these little bodies are found in the most antique remnants of life, and how they can start organisation in a sugar solution that is sterile and dead; and concluded by saying that the problem could best be answered with a combination of research by the Agricultural Research Council, and of observation carefully conducted and carefully checked by way of studies of groups of people fed on different diets.""

–Ethel D. Hume, *Béchamp or Pasteur?: A Lost Chapter in the History of Biology* By Ethel D. Hume [Prefaced by *Pasteur: Plagiarist, Imposter: The Germ Theory Exploded* By R. B. Pearson], ISBN 978-1-46790-012-6, Pages 258-260

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