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Dialectic Materialism in the Research of Life

Presentation on the Bion-Experiments

*(Held on May 1, 1937, in conjunction with the opening
of the participating laboratory in Oslo)*

by Wilhelm Reich

Dear Friends and Colleagues!

It is no coincidence that we arranged for the opening of the institute's participating laboratory for May 1st. Labor Day and laborers are celebrated internationally on May 1st. That doesn't mean that the expression "May 1st" is not misused by reactionary parties. Joined in the production process are all areas whether manufacturing, scientific research, or agriculture, and it is not right to exclude scientific work from the general category of labor as it is so often done from the side of academia. Another important reason to select this date is the fact that our work in experimental science is based on the principles of *dialectic-materialistic* research methods. May 1st as Labor Day and dialectic materialism as the method of acquiring scientific knowledge go directly together. One of its principles is the so-called "Unity of Theory and Practice." I am tasked with the job of explaining the difficult, theoretical questions of scientific research methods to you, most of whom are not specially trained biologists, in such a manner that the advantages of the dialectic materialistic method compared to other research methods become crystal clear. Should I fail at this, then I will only prove that I poorly apply dialectic materialism.

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What is dialectic materialism? Concepts are subjected to a lot of nonsense. I remember that during the time when Hitler took power over Germany, one

attempted to employ dialectic materialism by discussing the “dialectic unity of coincidence and necessity.” However, it was not meant this way. Dialectic materialism is a very simple, I would almost like to say, *the* simple, humane way of viewing things and events. This does not indicate superficiality. It merely means that man is part of nature, the object of processes and also the subject of social activity. He forms a unit with everything that he observes, works with, or creates. It was Hegel’s brilliant idea to rip the philosophical reasoning of his time out of its static rigidity by delineating the law of change, the flow in all that exists. However, with Hegel, the world, the thing, the process was nothing more than the reflection of human “ideals”. Marx succeeded in, as he put it, getting the dialectic method “up and running.” According to him, human concepts are reversed, reflections of scientifically understandable processes and events. And a concept is then correct when it *immediately* reflects the objective process. Using the difficulties associated with our work in biology, I will now attempt to describe the unusual and natural innovative application of dialectic materialism, especially in biology.

In biological science, one encounters very unusual and apparently unsolvable contradictions. For example, one advocates the decree: “Living things come only from Living Things.” Organic nature and inorganic nature are understood to be two strictly separate, independent areas. However, in contrast to this, biological research everywhere is occupied with the question of “Life in Non-Living Matter,” with the old problem of the creation of Life from the non-living. During this, non-living matter often becomes mystically alive. Artificially producing living protein by combining and complicating protein molecules has also been attempted. I remember the first successful experiment by *Fischer* to synthetically produce urea. Between individual organic materials and a live, functioning clump of plasma; however, lie more than quantitative differences. A difference in the *functionality* is present. The contradiction is that, on the one side, one strictly separates the living and non-living, but on the other side attempts to construct it mechanically from the non-living using “synthesis.”

Another contradiction is between mechanics and vitalism. Mechanics claim, and rightly so, that all living things are similarly governed by physical, chemical, and electrical processes as are non-living thing, that it is “the same thing.”

On the other hand, the vitalist, who is also a metaphysic, claims, and rightly so, that Life in all of its forms is so completely different from the Non-Living that a similarity is totally out of the question. One might be able to reconstruct a sea urchin from a cluster of sea urchin pieces; however, it is completely impossible to create a complete machine from one of its screws, (*Driesch*), and that is without doubt correct. So is the juxtaposition of the two viewpoints of mechanism and vitalism. Very often the mechanistic viewpoint mixes with that of religion. The drive to understand the so-called “irrational” is always present and expresses itself in the metaphysical theory of Life. I will now attempt to delineate in which way dialectic materialism is able to solve the contradiction between mechanism and vitalism.

About a year ago, I succeeded in creating a solution out of non-living materials that, when intensely sterilized, i.e. autoclaved at 120⁰, contained life forms. I called these forms *bions*. Some months ago, the first cultivation of these structures succeeded. Reproduction, metabolism, and biological staining have already been established. I will now explain how I, whose original area of expertise is psychology, automatically came to work in the field of biological research.

In the course of the development of the natural sciences, Life was split up into different fields, which are specifically separated from one another, and are so dealt with. Observing Life as *one unit* in spite of all of its complicated fragmentation suffered because of this. Fragmenting Life into branches is equivalent to splitting up sciences into mechanical specialized disciplines, one separated from the other. The unity of the living apparatus revealed itself to me during my work in the following manner:

Freud had postulated a duality in psychological functions that should place the “sex drive” opposite the “death wish”. He thought of both of these basic urges as two pillars sunken deeply into a foundation, with no connection to one another “below” and first forming complicated connections with one another “above” in a highly developed psychological apparatus. While I could verify the “sex drive” as *Freud* described it with a few important corrections, the death wish could not be verified. A “will to die”, a “yearning for death,” from a biological standpoint, contradicted *every* clinical experience. It gradually dawned on me that what *Freud* attempted to grasp with the term “death wish” was the same phenomena that I had

captured clinically in the Theory of Orgasm during the past one and a half decades:
The desire of orgasm for the release of tension, for "dissolution",

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"deliverance", "melting with the world." While *Freud* contributed tension to the urge to live and release to the urge to die, that is he separated the two functions by their mechanics, it appeared to me that the processes of tension and release formed a *union while simultaneously being a dichotomy*. The impulse function consists primarily in the interplay between tension and release. The higher the first, the more intense the desire for the second, just as the tension of a coil spring becomes higher the tighter that it is wound. Here we find a typical dialectical state of affairs. The dialectic-materialistic criticism of the Freudian Drive Theory led unexpectedly but directly into the field of biology. Very early on, I saw that it is not possible to have a neurosis without a disturbance in the sexual release function, the *orgasm* function, beginning in puberty. Because the release of sexual energy is quantitatively less than the existing tension, an over-supply of sexual (I later said vegetative) energy builds up which presents with the neurotic symptom mechanisms as described by *Freud*. The breakdown of the orgasmic release function was, thus, recognized as the dynamical core mechanism of the neurotic process. Consequently healing a mental illness depended on eliminating the energy source of the neurosis, that is: eliminating orgasmic dysfunction and enabling full genital satisfaction.

The question concerning the source of neurotic energy was, thus, no longer a psychological question, for the orgasm is a basic biological function which requires that the higher psychological function be extinguished during the lust experience. The human or animal orgasm in question is basically nothing more than a jerking heap of plasma during the climax of sexual release. It made sense to research the mechanics of orgasm. About four years ago, a formula was found by which the orgasm mechanism functions. First a *mechanical filling* of the genitals takes place during sexual genital stimulation. Electro-physiological experiments have shown that sexual arousal depends on electrical charge on the surface of the erogenous zones. An electrical surface charge kicks in with the mechanical fluid tension in the tissue. Thus the conditions for *electrical discharge* are fulfilled. The muscle spasms that occur during an orgasm are nothing more than a discharge of the high electric

potential built up due to sexual friction. The fourth stage is *mechanical release*: The sex organs lose their excess of blood. The formula: *mechanical tension – electrical charge—electrical discharge—mechanical release* that was discovered clinically and experimentally turned out to be a typical dialectic-materialistic formula without striving to be one.

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For every correct interpretation of objective facts must necessarily be dialectic-materialistic. Soon two things became very clear to me:

First, that this formula could not be applied to inorganic procedures. There are no processes in non-living nature by which a mechanical charge suddenly changes into an electrical charge. In that case there is either only the mechanical tension-release-mechanism or solely the electrical charge-release-process.

Second: All of the organs controlled by the parasympathetic nervous system, such as the heart, colon, bladder, etc. function according to the tension-release-principle.

If one combines these two truths into *one*, then this results in the following solution to the battle between mechanism and vitalism: Life contains the same mechanisms as does the Non-living: mechanism, electricity, chemistry. *Life is, thus, the same as Non-Living [matter]. But, at the same time*, in living organisms, the function of inorganic matter is combined in a specific manner characteristic only of Life forms. *Life is, also, simultaneously something completely different from Non-Living matter.*

The orgasm formula is, thus, identical to the formula for Life.

It fell within the logical sequence of my work to begin swelling different materials, for example soil and charcoal, after completing the electro-physiological experiments that verified the tension-charge-sequence. I sped up the swelling process by letting the substances in the swelling solution boil for a long time.

Through this, the following previously unexpected particulars resulted:

1) All of the materials I could obtain (charcoal, soil, moss, lecithin, cholesterol, milk, muscle tissue, etc.) dissolved into vesicles and completely lost their original structure when swollen, whether slowly or quickly by boiling. The vesicles

are best detected using a microscope in dark field. One can first clearly observe their appearance at a magnification of 300X in dark field.

2) The material, which previously displayed neutral charge during the electrical flow experiments, showed an electrical charge in the vesicles following its degeneration into loose vesicular parts. Here positive in soil and charcoal; there negative in lecithin, moss, muscle tissue, etc.

The discovery of the vesicular decomposition of swollen matter and the appearance of previously absent electrical charge shows the correctness of the vegetative formula. The vesicles are liquid-filled, mechanically stretched structures. The electrical charge, which was not added through external means, can only be explained due to dissolution in the cohesion ...

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...of individual parts of the material which then released the bundled electrical energy, setting it free. Parallel experiments using different types of bacteria like staphylococci, streptococci, cancer cells, etc. gave the same positive result: vesicular nature and electrical charge.

It was only to be expected that I would then perform experiments by collecting all the different types of substances contained in living matter, mixing them together, and cooking them. The experiment was successful after several failures. Already when mixing the highly sterilized or autoclaved individual substances, structures appeared all at once: cocci, rods, amoeboid structures, all displaying the characteristics of Life: movement, contraction, expansion, and color reaction. These structures even survive heating in a sterilizer at 180°, at least immediately after the mixture is created. They are likewise just as present and as mobile as before. The question whether this is merely an example of living matter or an authentic form of Life can only be decided through culture trials. In December, 1936, following extensive, exhausting experiments, the first bion-mix culture on bouillon (Preparation 6b) succeeded. Since then whole series of culture experiments have been performed, and up to now it shows that, while the individual materials produce no cultures, their mixture predominantly produces them. This is not a model of Life, rather it is Life itself.

It seemed logical to perform culture experiments using swollen soil and charcoal. These established that, when swollen by boiling, soil and charcoal, too, and yes, even moss and different tissues produced cultures on bouillon, just not with the same frequency as the bion mixture, and on agar-culture medium they produced creamy, in each case varicolored growth. After charcoal and soil is dry-sterilized at 180° for an hour to ensure there are definitely no more living microorganisms present, that same charcoal and soil, after cooking in a solution that stimulates swelling, produces cultures. Growths from unsterilized charcoal and unsterilized soil are completely different from growths *after* sterilization. Apparently sterilization kills any life present in the charcoal and soil particles; however, while the one is killed off during this procedure, new and different forms of Life are created. You can see on hand from the cultures that growths from unsterilized charcoal and soil differ in color, form, and consistency from those of the same charcoal and soil that was highly-sterilized. This fact might surprise the supporters of mechanism or vitalism; however, following the completed experiments up to now, it is clearly evident that two different life forms are produced in relationship to cooking: one that is destroyed through boiling, and another that forms due to boiling. Correctly expressed: We must differentiate between Life that was already present through swelling or reproduction and *destroyed by heat* [p. 143] and the same or different Life forms created above an otherwise fatal temperature limit.

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After it has successfully organized, the same Life that was created through heat can later be destroyed by this same heat. This is also materialistic dialectic.

I will now cite the following experiment as rigorous proof of the opinion that there are two distinct forms of Life, and that the germs or spores themselves are produced from non-organized matter through swelling and charge. I undertook it in order to fully eradicate any objections that the observed moving structures were from any previously existing microorganisms:

One heats charcoal to incandescence for about one minute over a Bunsen burner. If one immediately places the so heated charcoal dust in a solution consisting of equal parts meat bouillon and 0.1 normal potassium-chloride, then

immediately after mixing in the incandescent charcoal, then one can observe an intense colloidal turbidity in the solution that can never be obtained through boiling or swelling. Non-incandescent charcoal mixed with potassium-chloride yields no moving charcoal particles when viewed microscopically. In contrast, one observes intense movement in the incandescent charcoal immediately after making the preparation. One is completely surprised when one examines the preparation after 24, 48, 72 hours etc. The turbid solution becomes cloudier and cloudier. One can observe vigorously moving, differently shaped, and various sized round vesicles, long rods, and contractile amoeboid structures under the microscope, especially well at a magnification of 3000X in immersion. The entire character of the structures, the manner in which they move, and the observed detachment leave no doubt that one is dealing with a genuine Life form. With the exception of two positive results, a dependable cultivation of these structures has yet to be obtained, most likely due to lack of enough compounding nutritive substances. ¹⁾

The incandescent charcoal experiment appears only absurd or improbable when one proceeds from a preconceived notion that the later discovered Life forms had to have been present from the beginning in the form of spores. The experiment assumes a fully logical place in our over-all work and viewpoint when we assume that by heating the charcoal dust to incandescence the charcoal particles were shattered, so to say, by the intense heat of 1000-1500⁰, disintegrating into the finest of small particles, which greedily sucked up the swelling and nutritional liquids when mixed with them. One can directly observe the absorption of liquids in the smallest particles microscopically by at first putting dry incandescent charcoal on a specimen slide and adding the solution during observation. Further proof for the validity of the experiment is that the charcoal structures one obtains show a very strong positive electrical charge, which occurs only individually, sparsely expressed, or not at all with non-incandescent charcoal particles.

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¹ noted in August, 1937: *In the meantime the cultivation of incandescent soot succeeded.*

This does not even remotely impact on upon Pasteur's sterilization theory. It endures, and rightly so, but the supporters of the abiogenesis hypothesis are also validated on the basis of the experiments. It was not possible to prove the validity of the biogenesis principle during the last century due to the poor quality of technology, for the phenomena verifying it needed a binocular magnification of 3000X, best of all in a dark field, to make correct observations and reveal the processes.

From now on, I ask you to refrain from spreading the tale that I have created "Life artificially." This would never be true. "Creation of Life artificially" requires that Life is something other-worldly, mystical, fully isolated from Non-living matter. To express it correctly, one must say that it was now possible to *reconstruct the Life formation processes through experimental means*. We create no Life, rather we reveal the processes of its formation through our experiments.

So much for my report on experiments. I am going to neglect many very interesting observations that we have made here in the laboratory, and would like to close this part with a hypothesis that begs to be stated: Up to now, one believed hypothetically that Life in the form of "spores" arrived on Earth from Outer Space; primitive beliefs speak of "flakes of protein." I believe that Life developed on-the-spot. We know that our planet was incandescent hot; therefore matter must have been completely dispersed. As it cooled, solid rock masses formed deep inside Earth's crust. However, there, where water found its way to matter and where sources of electrical charge could assert their influence, began the vesicular decomposition of matter and tension-release processes. I do not wish to place too much significance on taking these opinions all that seriously. It can be that they are correct, but certainty can only be obtained through the most exact examinations that take the tension-charge-process into account from a geological point of view.

Pasteur's Germ Theory does not exist in opposition to the theory of biogenesis any more than before because a piece of inorganic material is likewise a germ of Life as soon as it fulfills the swelling requirement, since it is "inorganic" if it does not swell and charge. A dust particle in the air does not "in principle" have a seed that begins to develop; rather it is during the fulfillment of specific conditions itself the seed of cocci or rods. The development of Life from non-organized matter

is naturally by no means contrary to the development of new Life through fission, the “procreation” [process].

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Let's now consider the general question affiliated with our experiments. Every project in the area of the natural sciences is sooner or later of social consequence. Talk of revolutionary, always forward marching science is very common. One is less clear concerning the meaning of the term “revolutionary.” It means to be ground-breaking, and ground-breaking is only a concept that “gets to the root of things”, meaning it is “radical” in a positive and authentic sense. Biological research and its theories when compared to the radical, social movement have been strongly discredited. This is due to the fact that “sociological” theories are compared to “biological” concepts. Marxist sociology explains that mankind's nature and reasoning come from social, existential conditions. The fascist theory of mankind, that now rules all of Germany, denies any social subordination of human behavior and reasoning at all. This is based on race theory, merely an extreme, absurd form of a vulgar, biological theory and its dominant tendency. When one says that something has a “biologic cause,” then one automatically thinks of its “non-changeability.” According to this way of thinking, there are “higher” races and “lesser” races; “members of a master race” and “subhuman beings”; people “born to rule,” and people “born to be ruled.” The ideology of fascism presents itself as biologically based. Racial theorists are specifically scientists of heredity. The science of heredity, though, despite the great respect that it is unjustifiably given in the thinking of mankind, similar to a tenpin that stands on its apex, has overbuilt a few extremely isolated heredity discoveries with a tangled mass of hypothesis and theories that have since been integrated – *unfortunately so* we must add – into peoples' everyday beliefs, even in the thinking of scientists who call themselves socialists. One must imagine that the characteristics of higher organisms as well as those of lesser ones are congenital, inherent in germ plasma in the form of material thought of as “genes.” The characteristics are, thus, eternal and never changing. *This* biology is very conservative in its essential feature, even if its representatives should independently produce the most prolific individual results. It divides the unity of Life's flow artificially into compartments where the individual

branches of unified Life are ordered nice and neatly, encapsulated, and labeled. In general, one seeks not for processes, functions, changes, rather for materials and chemical reactions, which, in principle, would not be wrong if they were encompassed in the development of general functional connections. Due to their good instincts, both the radical social movement and progressive natural science struggle against this conservative character of biology, which is at once both mechanical and metaphysical.

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For when everything is biologically “determined,” then there is nothing new, nothing uncertain, and there is also no conflict with any existing authorities. Behind this way of thinking stands fear of the new, fear of the uncertain, and fear of attack on the components of a biological natural science locked away from societal life by the primitive, uncivilized-thinking, so-called “inferior” social classes. That is a type of biological thinking that is simultaneously non-dialectic, mechanistic, and metaphysical.

In contrast to this stands the dialectic-materialistic thinking of all natural scientists, who often without knowing it search for, comprehend, and formulate the functions of Life’s flowing, moving, changing processes through their live experiments and life-experiences. It is worth contemplating that the greatest successes in microorganism research were brought in from outside the field of biology. I refer to Loewenhock, Spallanzani, Robert Koch, Louis Pasteur, and many others. Life’s process with all of its forms and areas cannot be forced into a framework, other than holding onto a cross-section for one fleeting moment. *Everything begins and ends again.* Unities split up; what was but a short time ago one unit and then divided now stands in opposition to another. There are new creations in nature. Based on the knowledge of the tension-charge-sequence, we can say today: Life cannot have come from *somewhere* at *some time*. It also could not have developed hundreds of thousands of years ago *one time* on *a single* location on Earth and then spread out. Each dehydration and new-swelling experiment with protozoa as well as daily observations of natural occurrences show: Life sprouts anew each spring under the influence of moisture and electricity. If it is correct that the development of primitive life begins in unorganized matter, out of the simplest

material of all material and energy conditions available everywhere, then the power of Life to form from anew cannot be suppressed. The biological principle, that of a never-ending splitting of Life's processes, which captures what Bergson attempted to describe in a most impressive manner in his book "*Creative Evolution*" cannot be conservative. Enormous possibilities open up to gain an overview of present events and of those reaching into the future by applying the laws of earlier Life development. Such a basic biological principle, actually dialectic-materialistic, does not contradict the sociological principle of the *development* of civilization and culture. Just the opposite: from the stand point of the dialectic-materialistic concept of nature...

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...the interplay of all things biological and societal in mankind and his institutions have brought man's ways of thinking about nature's processes to their most mature level yet. It is clear that a way of thinking that has to do with flowing processes, which sees and researches the creation and dissolution of living things, which encompasses the fragmentation of Life and the formation of its contradictions, disagrees with *any* conservative approach.

With these arguments, I am unintentionally entering into a field that apparently lies far away from exacting, experimental laboratory research. We are faced with the question whether there is or can ever be apolitical functioning biological research independent of Life's social processes. If Life, in spite of its endless fragmentation, essentially is one unit; if a unified biological law rules all Life, then science itself must necessarily be only one piece of the overall Life process. Science, after all, developed from nothing other than the necessities of life that had to be satisfied. It loses all meaning as soon as it loses contact with mankind's universal Life processes. It can only exist as natural science when it draws *from Life* and researches and works *for Life*. There is no such thing as a science that is apolitical, operating outside the realm of social processes. No one would dare to claim that the Science of Heredity, specifically eugenics, is not fully and completely permeated with political opinions. It doesn't matter at all whether science is political or not, rather of importance is only *which kind* of social attitude lies in the scientific research. One approach tries very hard to discover as little of the truth as

possible and to bend any truths discovered as quickly as possible. The other tries to find the truth regardless of the consequences. However, truth in the knowledge of nature and society is *the* political power in a positive sense. Either God created the world and all life forms, or the world and all its life forms developed according to the *laws of nature*.

We are neither godly nor from God and, hence, do not believe on divine creation and purpose. However, we are beginning to understand how people today feel when they speak of God and His will under the burden of great hardship and poverty. We already understand that the concept of God, where it is a genuine feeling and not a desire to profit, correctly grasps the unity of man and nature instinctively, albeit through highly irrational means. Here one sees the dual character of religion. It is the enemy of all natural sciences, yet at the same time it nurtures the love of nature in mankind in mysterious ways, and through this achieves a feeling of unity in natural events.

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However, it cannot practically achieve this and must in its powerlessness against exuberant Life relegate everything to the chance of an afterlife. We mean, though: *Life is from this world*. Otherwise trees and flowers would not blossom in the spring together with mankind's intoxication with Life and Love.

As dialectic materialists, our viewpoint is that philosophizing about the meaning of Life serves the function of masking Life's true meaning. Work is its basis. That which we call love in all of its forms is its substance. The so-called meaning of Life can be nothing more than the fulfillment of Life's processes itself, the fulfillment of mankind's desires for meaningful work and the need for love. But how should a natural science perspective help Life along when it behaves apolitically, places itself outside of social proceedings, and abstains from examining the most central field of activity of all life forms, namely sexuality? It is a triumph for sexual science that the formula for sexual function proved to be identical to the formula for vegetative Life altogether. It would now be extremely inappropriate to "look down upon" mechanism and vitalism with disdain. The mechanical techniques of experimentation as well as the vitalist theory-building regarding Life's processes have brought such a wealth of discrete facts and thought stimulations that

one cannot think of dialectic-materialistic Life research without including these contrasts. However, the differences in the basic principles of biological reasoning about nature that I tried to describe earlier remains. One can incorporate the “fight for survival” as a basic principle in biology and from this explain the “natural necessity” of the massacre of a city’s entire population like in Guernica by pilots doing it for sport. As opposed to this, one can make the creative process of Life the basic principle of one’s own outlook by doing everything to create Life, help the living progress forward, and preserve Life. However, attitude alone means nothing when faced with machine guns and people who have taken complete leave of their senses who consider themselves superior beings. Life must be *organized*; its safety must be *fought for*. Conservatism has an interest in the mechanical perpetuity of everything now existing; however, those who work and produce assets, disperse knowledge, and drive Life’s processes forwards are interested in the opposing sort of approach.

For or against Life! This is the point of separation for friend and foe of scientific philosophy and its mission.