

***Worlds Without End: The Many Lives of the Multiverse*¹**
by Mary-Jane Rubenstein: A Review in Relation to the Work
of Wilhelm Reich

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I

The focus and flow of Mary-Jane Rubenstein's book is summarized, on the front cover: "... in which are discussed pre-, early-, and post-modern multiple-world's cosmologies; the sundry arguments for and against them; the striking peculiarities of their adherents and detractors; the shifting boundaries of science, philosophy, and religion; and the stubbornly persistent question of whether creation has been 'designed'."

Rubenstein tells us that although the idea of multiple worlds is not new, it has been "bubbling up" or considered as a scientific hypothesis by a number of highly respected physicists and cosmologists in the last few decades. However, she also points out that most remain highly skeptical of the idea that what is, is a vast, perhaps infinite number of universes, that *the* universe is actually *a* multiverse.

Rubenstein reviews what she identifies as the earliest sources of this idea, the Greek Atomists of the 5th century B.C.E., and then works her way through the history of philosophy, science, myth and theology as it pertains to those who advocated the idea of

multiple worlds and others who criticized it. A central interest of hers is the question of boundaries between philosophy, science and religion, which, in the end, she thinks needs "reconfiguring" as the multiverse hypotheses (there are more than one) merge into philosophy and religion.

Rubenstein's important narration of the changing boundaries between philosophy, science and religion provides us a window into how the mathematical-mechanical perspective of most current physics/cosmology functions to produce highly speculative and unverifiable (or falsifiable) theories, far removed from experience, that are yet taken by many scientists as serious science. Wilhelm Reich, whose research methods and discoveries and theories are discussed in more detail below, and whose work has yet to be taken or studied seriously (or at all) by the larger scientific community, focused his way of doing science on direct observation, on contact with the phenomena being studied, thus on theories rooted in experience, on verifiability / falsifiability. Reich did engage in speculation. When he did, he was clear that this was what he was doing

¹ Rubenstein, M.J.: *Worlds Without End: The Many Lives of the Multiverse*, New York: Columbia University Press, 2014.

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and on what observations his speculations were based.

Worlds Without End does a valuable service for those interested in Reich's work and how it was pre-figured in the history of philosophy, science and religion. The book is filled with quotes and references from these histories that, when viewed in the light of Reich's discoveries, appear to anticipate them. The book also reveals limitations in the current way of doing physics and cosmology that are not found in Reich and so offers an opportunity to compare and contrast these two very different ways of thinking and understanding the practice, method and function of scientific research.

In the Introduction to *Worlds Without End*, Rubenstein cites philosopher / psychologist / historian William James (d. 1910) as the one who first coined the term "multiverse" and tells us that, at first, James viewed nature not as ordered, but rather as a "disorganized aggregate of incoherent ... processes." (page 4) Later, Rubenstein points out that James amended his position to a kind of metaphysical pluralism that affirmed that things are related, but not under a single principle; that the world is irreducibly a set of different phenomena, relations, and connections that cannot be assembled under a single principle. There is coherence in the world but not an all-is-oneness kind of coherence. Its unity is a strung-along type says James.

This brings up another of Rubenstein's focal points: the relation between Unity and Multiplicity, the One and the Many, or, as some would have it, God and the Created World. As she moves through the history of those whom she sees as having dealt with this issue,

Rubenstein touches on a variety of approaches to the One and the Many, a few of which appear to have come close to the kind of understanding we find in Reich. Rubenstein does not mention Reich, however, and does not appear to understand the kind of relation between the One and the Many that Reich came to understand via his concept of the Common Functioning Principle (CFP) which represents Unity behind or within the myriad things. More on this below.

II

Rubenstein says that for William James, "multiverse" referred to our one world, our one universe which is constituted by many worlds, but for contemporary multiverse physicists, there are many universes that may or may not have the kind of strung-along type relations that James proposed. And, as she points out many times, there is no scientific consensus as to whether there is a multiverse at all. She also points out that there is an ensemble of multiverse models, some of which are totally incompatible with one another.

Rubenstein tells us that contemporary models of the multiverse tend to come in 4 major types. The first sees universes *spatially*, which she sees as resonant with ancient Greek Atomism. In this model, universes are spread out over space, often seen as infinite space, in the way the Atomists of old envisioned the atoms that they postulated to exist. The second type of model understands the multiverse *temporally*, which Rubenstein sees resembling a cyclic model like that of the ancient Stoics. On this model, universes appear in time, in sequence. A

contemporary example is one imagined by Lee Smolin (which I discuss later). A third type of model is based on the *Many Worlds Interpretation* of quantum mechanics (which Rubenstein thinks lacks philosophical precedents in the ancient or early modern worlds). This model is a recent one developed as an alternative to the Copenhagen Interpretation of quantum mechanics developed by Werner Heisenberg and Niels Bohr.

The last model, the *Mathematical Universe Hypothesis*, Rubenstein sees as the outer reaches of theoretical cosmology where infinite copies of every mathematically possible world physically exists outside of space and time. She does point out that most multiverse theorists do not go along with this model since they still value some of the central tenets of scientific procedure: observation, testing and simplicity, all of which are violated by this model which entails an infinite number of all possible worlds actually existing outside of space and time. Rubenstein devotes a good amount of space discussing each of these theories in chapters 5 and 6. In the first 4 chapters, she tries to answer the question as to what put modern cosmology on this particular path. Why the multiverse? She identifies a number of streams of thought, scientific ones such as subatomic physics and cosmology, and philosophic ones as well.

One of the scientific streams Rubenstein identifies as having eventually led to contemporary multiverse theories is rooted in recent conceptions of what are thought of as the *fundamental laws* of the universe. This refers to what are considered the numerical values of what are conceived as the “*constants*” of nature such as the

strength of gravity, the mass of the electron and the strength of nuclear forces. Each of these appears to have a value that seems precisely calculated to allow life to emerge. If, for example, as Rubenstein points out, the nuclear force was just a little bit stronger than current theory allows or has been determined to be, then hydrogen atoms in the infant universe would have fused together to make helium, which would have meant no hydrogen, and so no water, and so no life. If the nuclear force had been weaker, atoms needed for biological organization would not have been possible.

Similar differences in calculated values for gravity and electron mass would have similar results in terms of the possibility of life evolving anywhere in the universe. This represents what physicists call the “*fine-tuning-problem*.” each of these “constants” of nature seem to be set, or, have been set, just right to condition our existence. Rubenstein does not get into the processes that physicists use to come up with these figures, which would involve discussing how the numbers are derived and the relationship between these mathematically derived values and physical reality.

She does point out that physicists do not simply accept these mathematically derived number-values, but, assuming that they are correct, physicists try to develop theories that might explain them. A few physicists, she points out, have accepted the notion that an all-powerful deity “set” the values of the constants. Most do not, she tells us, and some find the idea enraging. (Rubenstein writes of the roots of this idea in the philosophies of Saint Thomas Aquinas and William

Paley, as well as critics of it such as David Hume and Kant.)

Some scientists, Rubenstein tells us, have recourse to what is called the “*anthropic principle*” (in both weak and strong forms), viz., that the universe is tuned just right so that intelligent beings like us could be created to come to know about the universe. This principle has been proposed in order to explain the values of the constants. Rubenstein calls this principle the most promising and most controversial strategy (for decades, she tells us, most physicists avoided it). For many physicists, this principle appears as another form of the argument from intelligent design—not God doing it but the universe doing it to itself, so to speak, so that life and intelligent life can emerge.

III

Rubenstein reports on what is called the “discovery,” and gigantic miscalculation that followed, of what is called “dark energy,” in 1998. This energy came to be seen as the *cosmological constant* (which Einstein had postulated). It is viewed by some physicists as the cause of what is now viewed as the constant expansion of the universe. This discovery is now taken as evidence that what used to be thought of as empty space is not empty. What it is filled with remains a mystery to physicists and cosmologists, however, although it appears that the tendency of current physics is to think of this energy in terms of some kind of particle (for some, as what is called “virtual particles,” particles that go in and out of existence). Rubenstein tells us that this discovery has

disconcerted physicists tremendously in that the calculated value of the cosmological constant appears to have been off by a gigantic amount which throws into confusion the notion that it has to have the value that it has, whatever that actually is, for the universe to have emerged at all.

Physicists like Leonard Susskind, Rubenstein tells us, believe that to explain the now calculated value of the constant, dark energy (the nature of which remains unknown), requires the *anthropic principle*. Other physicists, reports Rubenstein, such as Stephen Weinberg, claim that the need to explain how the cosmological constant is so improbably small without appealing to God or luck (which means accepting the anthropic principle), requires the hypothesis of the multiverse. His thinking, reports Rubenstein, is that if there are a whole slew of universes, each with a different value of the cosmological constant, then *every possible value of the constant exists*, some with just the right value to allow stars and planets to form (and so life and eventually, intelligent life).

Rubenstein then reports on developments in *String Theory* (another scientific stream of thought), that, when added to the calculated values of dark energy and the hypothesis of the anthropic principle, further some physicists’ belief in the multiverse. One key development in String Theory that Rubenstein explains that is relevant here is that equations that make up the theory indicate that there might be 10^{500} or even 10^{1000} different what are called “string vacuum states,” each corresponding to a different type of universe. That’s a lot of universes!

The multiverse idea, Rubenstein tells us, redeems the anthropic principle argument, saving it from tautology and God. Why? Because we can now say that because we postulate an infinite number of universes (or just very many of them) at least one, by mathematical probability alone, was bound to produce the conditions for life. For some multiverse theorists, this hypothesis finally takes science out of the realm of religion. Rubenstein quotes one: “If you don’t want God, you’d better have a multiverse.” (page 17) This means that what Rubenstein calls “the twin powers” of *infinity* and *accident* does the trick. (I find it notable that there is no reference, in this context, to a third possibility, viz., that patterns or laws of nature prevail that account for the formation of conditions suitable for the emergence of life, as we find in Reich).

Rubenstein, however, does not appear to be fooled by this attempt to create a sharp boundary between science, philosophy and religion. She thinks that these scientific theories are “rearranging”—I would say blurring—these relationships. Rubenstein indicates that she is not at all bothered by this rearranging. In her final chapter, she appears to think that these issues cannot be adequately understood via scientific analysis alone.

IV

Rubenstein begins her historic survey of the relation of the One and the Many with Plato’s *Timaeus* where the world is pictured as both singular or one, unified and everlasting, and yet is also or nevertheless composed of pluralities, i.e.,

the universe is *both* one and many. Rubenstein seems to see this as a contradiction: that logically, one must view the universe as either a unity or a multiplicity. She appears to equate multiplicity with chaos, disorder, or at least sees Plato doing this in the *Timaeus*. She sees Aristotle attempting to “fix” Plato’s apparent inconsistency by consolidating the unity or order and favoring it over multiplicity, or disorder. She then contrasts this perspective with what she sees as the spatial multiplicity of the Atomists, especially Lucretius, and the temporal multiplicity of the Stoics. She tells us that the Unity cosmologists “won,” as from Aristotle to Einstein the mainline philosophical and scientific traditions maintained that the world is singular and unchanging (as if it were impossible to consider that the world is constantly changing and that these changes are grounded in a common functioning principle which is where the Unity can be found).

Rubenstein discusses philosopher / theologians who in the past appeared to favor the idea of multiple worlds, such as Nicholas of Cusa and Giordano Bruno. After this, she discusses the development of this issue as a more scientific perspective evolved with Galileo, Kepler and Newton who, she tells us, focused on the *one world* they could observe. Others, she notes, continued to think in terms of multiple worlds, such as Descartes and the young Kant. She then moves into the 20th century where the singularity and eternity (unity) of the cosmos was accepted, she says, until the mid-century rise of the *Big Bang* hypothesis and then the discovery of *dark energy* in 1998. After going into some detail about various contemporary multiverse

theories, Rubenstein ends with a discussion focused on the ongoing debate regarding the scientific status of multiverse cosmologies. I go into more detail regarding these issues below.

V

Worlds Without End, as mentioned, is filled with quotes and references that appear to anticipate the work of Wilhelm Reich. For example, she quotes Marcus Aurelius: “All things are interwoven with each other. Everything is coordinated, everything works together in giving form to the one universe. The world-order is a unity made of a multiplicity; God is one, pervading all things.” Another ancient philosopher she quotes wrote: “God himself exists in matter.” (pages 82 – 83) As we shall see, Reich’s concept of the common functioning principle grounds these kinds of insights scientifically.

She reports on the ideas of Nicholas of Cusa: every creature is a finite infinity, or created god; everything shares the essence of God, yet everything is irreducibly itself; while God is equally present to all parts of the universe, God also remains distant from the universe; creation is the expression of God and yet creation (things, the world, the universe, etc.) is not God; God is unity itself, the universe unity contracted in plurality. As those who are familiar with Reich’s work know, when “God” is viewed in light of Reich’s discovery of cosmic orgone energy, Cusa’s insights take on a more scientific aura.

Rubenstein also points out that Saint Thomas Aquinas, whose five arguments for the existence of God have remained

influential in philosophy and religion, was concerned that the idea of a plurality of worlds would compromise the singularity of the Creator. But again, if you substitute Reich’s concept of the functioning of cosmic orgone energy for “God” or the “Creator” in these locutions, we can see that the singularity of the creator, or the common functioning principle of creation (“God”) is not compromised in the least by the fact that it underlies the creations.

Rubenstein, as mentioned, seems to worry that if one favors unity one must reject plurality, and vice versa. She asks, e.g., how would Cusa answer the *perennial question* of whether there is one world or many. She doesn’t appear to face the possibility that this may be a *false dilemma*. There is a many, whether we are speaking of things, planets, or universes even (of which, of course, there may be many for all we know), and also, I would say, with Reich (and others), there is a unity, viz., the common function principle that is behind it all (whether or not Reich’s version is the correct one). As Cusa says, and Rubenstein reports, the unity of God is therefore not different from plurality, but a “*unity to which neither otherness nor plurality nor multiplicity is opposed.*” (page 85) In other words, there is no contradiction or opposition between the unifying factor (CFP) and what emerges from it.

Rubenstein also tells us about the philosophy of Giordano Bruno who explains that the void that is space is not nothing; it is simply the space in which worlds come to be. (pages 93 – 94) Bruno’s void is the “bosom”, in which the world has its being, and for him, she reports, all things are both radically

particular and radically *co-implicated*. Bruno sometimes calls space or the void an “ether, and for him, each planet or star has an “animating principle” and matter eternally generates an infinity of forms from within itself. For Bruno, God is both father and mother, matter and intellect, the total coincidence of opposites from which the universe eternally unfolds.¹

Rubenstein also discusses Descartes’ theories and how he rejected the concept of space as an empty void. For this philosopher, as she points out, there is no place without “matter,” which he referred to as a “plenum,” anticipating both Reich and recent physics / cosmology based on the concept of dark energy and dark matter. Rubenstein points out that Descartes’ idea was short-lived due to the publication of Newton’s *Principia* that hypothesized that for gravity to function as it appears to us, it must occur through empty space.

Newton himself, reports Rubenstein, appealed to God to account for creation, distribution and repulsion of matter (as did Descartes) and also to maintain and keep the cosmos in balance (unlike Descartes). She also tells us about the young Kant’s hypothesis of the existence of Descartes-like “vortexes” which, for Kant, are a function of the attraction and repulsion of atoms which “fall” in empty space (as per the Epicurians and Lucretius) but then “swerve” and form a vortex when the repulsive force occurs. Rubenstein also reports that Kant argued that there must be a single system of systems, or there would be no

overarching force to regulate attraction among different systems. Kant also apparently vacillated between seeing the universe as finite, since it has a single system aspect to it, or infinite. As we have seen, it can be both single or unified and infinite (and multiple) as others have seen (especially, philosophically speaking, Spinoza).

VI

In chapter 5, Rubenstein moves into the 20th century as she discusses discoveries and hypotheses such as those of Edwin Hubble, Einstein, the mathematician Alexander Friedman and others up to the hypothesis of the Big Bang. This hypothesis includes the notion that the whole universe would have to have been squeezed into a “point” of no size containing everything in nothing, with an infinite density where most laws of physics hypothesized by current physics / cosmology break down. This point is thought of as a “singularity” where $t = 0$, meaning that time does not exist. It was this theory, says Rubenstein, that opened the floodgates that, depending on how you look at it, either let philosophy and (what was worse for most scientists) religion, into science, or moved science over towards philosophy and religion (she reports that Pope Pius XII was very happy with it).

As Rubenstein indicates, the Big Bang hypothesis implies the Judeo-Christian idea of *creatio ex nihilo*: that the universe

¹ Why Rubenstein doesn’t discuss the 17th century philosopher Spinoza, whose metaphysics is built on the compatibility and even the *logical necessity* of the One and the Many prevailing at the same time and place, in this context, or

anywhere else in this book, boggles my mind and I think would for anyone familiar with Spinoza’s metaphysics—but she makes up for it in her following book, *Pantheologies* (1).

came out of nothing. Theories that postulated an eternal or at least a prevalent “stuff” out of which created things came and comes (such as Fred Hoyle’s Steady State theory) are repudiated by the Big Bang hypothesis. Rubenstein reports on a discovery, that of the cosmic microwave background (CMB) in 1965, that further cemented the Big Bang theory in most cosmologists’ minds (it “proved” it is how it is often put).

But many cosmologists were not satisfied with the Big Bang theory, Rubenstein tells us, for one reason, that it is too remnant of the religious idea of a first cause and first mover, and so they began to attempt to develop alternative models of creation such as an *oscillating universe* which involves a Big Crunch, or a Big Bang backward, in a cycle with the Big Bang that repeats eternally (in a likeness with Hindu cosmology). This model was abandoned, however, Rubenstein tells us, when confronted with those who showed that the *Law of Entropy*, mathematically or logically speaking, when added to the equations that make up the Big Bang theory, leads to a universe of no length at all, i.e., to an absolute beginning when $t = 0$, a theory that appears to deny the possibility of an oscillating universe. With the demise of this theory, says Rubenstein, the Big Bang returned to prominence and she spends a few paragraphs trying to explain it.

She follows with a somewhat detailed description of the hypothesis of dark energy where it is estimated that 73% of the energy of the universe and 23% of the matter is dark, i.e., unobservable, unverifiable, and unknown. She tells us that we can see or observe a meager 4%

of all that is. Because this discovery revealed the extent of our cosmic insignificance, physicist Lawrence Kraus has called it “the ultimate Copernican Revolution” (one wonders what he would say if he came to understand Reich’s discoveries and theories).

Rubenstein next discusses Alan Guth’s hypothesis that, at an early moment after the Big Bang, the universe experienced a massive *inflation* or exponential growth, a theory that Guth proposed as a way of explaining what happened at or just after the Big Bang. Guth’s hypothesis is used to explain what is deemed to be the “flatness” of the universe. One aspect of the problem inflation is supposed to try and address is how to explain the following, summarized by Paul Steinhardt and Neil Turok, as Rubenstein quotes them:

“The universe is simply assumed to have appeared out of nothing, filled with all kinds of exotic matter and energy at nearly infinite temperature and density.” (page 154) Apparently, these physicists do not think that current theories of the Big Bang by itself can account for this. Rubenstein then quotes Brian Greene on the flatness issue:

“... some mechanism must have tuned the matter/energy density of the early universe extraordinarily close to the critical density.” (page 154) The Big Bang hypothesis, with Guth’s inflation idea added, however, apparently offers no explanation of these things other than luck, Rubenstein tells us.

A similar situation prevails with what is called the “horizon” problem, she tells us, viz., the striking *homogeneity* of the early universe where regions so far apart appear to have almost identical temperatures, are so similar to one

another. Rubenstein here again points out that these problems are familiar, that they have to do with the *mystery* of matter's creation and distribution; that one could resort to an *intelligent designer* such as God or posit an immanent cosmic principle as Kant did with his repulsive force and Einstein did with his cosmological constant.

Inflation was brought in by Guth in 1980 as another way to explain the *repulsive* force, a force that blew up the universe right after the Big Bang by a factor that Rubenstein reproduces with lots and lots of zeros in an amount of time also with many zeros that represent fractions of a second. (page 156) How one would attempt to verify such a theory is not clearly stated here. The theory opened up many new questions, of course, and these helped to further the perceived need to develop various multiverse models, including those (the 4th type of multiverse model) of mathematician Max Tegmark, whose theories, mentioned above, are referred to by Brian Greene as "Ultimate Multiverse theories."

Rubenstein also tells us about critics of the inflation theory, such as Steinhardt and Turok, who are also skeptical about the anthropic principle which, as they see it relies on a host of assumptions that cannot possibly be tested. They adopted an aspect of String Theory, its notion of "membranes," or "branes" as they are called, up to 9 dimensional objects of varying topologies, to try and explain what they think Inflation and the anthropic principle cannot explain. Rubenstein tells us that, on their theory, for each postulated brane there is also postulated an anti-brane partner, which they think might mean that our universe

could be a 3-dementional membrane with a partner. If so, they ask, where would that partner be? And what if they were to collide?

This model, Rubenstein reports, has undergone many modifications. One notion is that gaps exist between universes and that their membranes close and collide at times in a cycle. When they collide and separate, you get a Big Bang. This model, we are told, is a form of temporal multiverse (rather than spatial). None of this is verifiable or observable, however, and, as Rubenstein points out, few theorists have been converted to it. Other cyclic cosmological models have emerged that Rubenstein describes, each of which is as unverifiable as the others.

VII

In chapter 6, Rubenstein follows the logic and history of the multiverse theories up to the "*Ultimate Multiverse*" mentioned above, where *all possibilities* must also be *actualities in some universe* since, according to the mathematical equations and cosmic laws deduced from them and the assumptions made in the deductions, there must be an infinite number of universes. She discusses various Quantum Mechanical theories including the Copenhagen Interpretation and how theories that emerged from them lead to various models of the Ultimate Multiverse including Stephen Hawking's *Model-Dependent Realism* model which connects what is called the "Many World's Interpretation" of Quantum Mechanics, a rival to the Copenhagen Interpretation, with certain models of String Theory.

Other multiverse models have emerged, reports Rubenstein, one leading to what is called the “*Multiverse Bath*.” Other scenarios are then discussed, including Lee Smolin’s idea that universes might be born on the “other side” of black holes, another theory that defies observation or verification. Smolin sees his theory as better than others in that it avoids the anthropic principle and includes a *natural selection* model where universes are born out of parent black holes. No need for God here. (Rubenstein does not mention Smolin’s book *The Trouble With Physics* (2), where he criticizes String Theory for being completely and theoretically unverifiable, thus not a scientific theory at all.) Rubenstein points out that Smolin’s proposal, though not widely adopted, has produced a number of what she calls “physiophilosophical” speculations, including the above-mentioned models of Tegmark, one of which he calls the “*Mathematical Universe Hypothesis*,” i.e., that every possible universe actually exists physically in some kind of Idea-scape outside of space and time.

In the final chapter, as mentioned above, Rubenstein discusses the controversy as to how close multiverse theories come to religion and appears to think that this is the case but that it’s not a problem since the issues involved do take us into different areas of query and always have (as she illustrates via her discussion of the history).

VIII

In order to make the contrast between the mathematical/mechanistic way of

doing science that Rubenstein reports on and the way Reich conceived of and carried out his scientific research, I would like to summarize some of his hypotheses and discoveries and trace, to some extent, his way of doing science.

The discoveries and theories of Wilhelm Reich, as students his work know, was triggered by his work as a psychoanalyst. Over the years, his method of therapy became more interactive than the way psychoanalysis was practiced in the early years as he came to believe that patients expressed their neurotic symptoms in their physical expressions such as the ways they stood, walked, spoke, and generally expressed themselves, i.e., in their character as a whole. Thus, his method came to be called “character analysis.”

Freud had postulated the existence of some kind of “stuff” or energy which he had first called “Sexualstufte,” and then “libido” that he hypothesized became blocked in its natural movement in the body leading to neuroses. Over time, Reich came to take this concept more seriously than any of the other psychoanalysts, including Freud himself (who had originally believed it to be an actual, perhaps chemical substance, not just a metaphor). Reich noticed that his patients breathed very shallowly and / or in a controlled manner, and eventually incorporated a deeper breathing method into his practice along with other ways of stimulating his patients to become more mobile, more alive as they expressed themselves, their deeper feelings, such as sadness, anger, feelings of love, anxiety and so on.

Reich also noted that his patients were sexually inhibited in various ways, but that via this more active therapeutic

technique, they could become more able to experience pleasure in sex (and in every aspect of life). As their bodies became more alive and expressive, involuntary movements would occur in therapy that sometimes eventually led to what he termed the “orgasm reflex” (not an orgasm per se, but simply a reflex that could also occur during sex). Putting such observations together with the libido concept, Reich began to wonder if there is an actual energy involved that had gotten bound up or blocked (as Freud had speculated) but that became more mobile as the patients were able to express themselves more fully and allow more involuntary movements of their bodies.

Reich developed a variety of experiments to see if he could discover if some form of energy was involved in what he was observing in his clinical practice. One area of research was the *bioelectrical* experiments, where he came to the theory that there really is a form of energy that expands and contracts in individuals and is felt subjectively as pleasure (in expansion) and as anxiety (in contraction). He summarized his understanding of this function as “the function of tension and charge,” also known as the “orgasm formula” where a bioelectric charge is felt as pleasurable excitation and bioelectric discharge leads to pleasurable relaxation. As mentioned, an important impetus for this kind of research was Reich’s observation in his clinical practice that neurotic patients were unable to feel gratified in their sexual lives (as well as in other areas of life), were inhibited orgasmically (and in many other ways as well), but could regain some of this as what Reich came to call their “armoring” was reduced. The armoring, or chronic contraction of the

body’s musculature, prevented full pulsation of their energy and the ability of their bodies to surrender. Reich’s research into the source of the armoring is discussed in a number of his books, including *Character Analysis* (3), *The Function of the Orgasm* (4), *The Mass Psychology of Fascism* (5), *The Invasion of Compulsory Sex-Morality* (6), *People in Trouble* (7) and others.

Reich conducted various experiments that led to the theory that bioelectric charge and discharge is not really electrical, as such, but rather a function of what he later called “orgone energy.” He began research on the *cellular level* with single-celled organisms, paramecia and amoebae, at a magnification of 2300x to 3000x (in order to view preparations in their live state). He developed the ability to use time-lapse photography in the laboratory which enabled him to witness swelling hay (and later wood, coal, dust, metal, dead plant matter ground into small particles and swelled in water) disintegrate into what appeared to be some form of living organisms similar to the amoebae he had been studying. He eventually came to see these organisms as a kind of proto-life and called them “bions.” This finding was revolutionary, of course, for it appeared that these experiments had enabled Reich to witness *biogenesis* or the formation of life from non-living matter. This kind of research eventually lead him to study the formation of cancer cells and how this is related to armoring, which he discusses in *The Cancer Biopathy* (8).

The bions, Reich reports, pulsated, indicating to Reich, via his research in the bioelectric experiments, that the bions might be governed by bioelectric processes. He developed ways of testing

for this possibility, and, via these experiments as well as others too numerous to cite here, observed that the bions appeared to emit a form of radiation. Experiments were devised to test for this which led him to conclude that they *were* emitting a form of radiation, indicating that there is definitely a form of energy involved. He then conducted a series of experiments that indicated to him that the energy involved was not a form of nuclear radiation, x-ray radiation, ionization in general, or electromagnetism, but a form of energy as yet unknown to science which he named “orgone” in reference to its history of discovery through the study of the orgasm and the energy’s biological effect of charging organic substances.

Later Reich developed a way of controlling and isolating the energy for further experimental study as well as concluding that the energy is ubiquitous in the atmosphere as well as in organisms, is absorbed by organic substances and living organisms, and that emotionally stronger persons emit a stronger charge. He also developed theories via observation and experiment to determine this energy’s relationship to other forms of energy such as nuclear radiation, magnetism and electromagnetism. (Obviously, for anyone to be able to verify for themselves whether or not Reich’s work was carried out using proper scientific method, as I am implying it was, they would have to study all of Reich’s writings and probably have to attempt some of his experiments and / or apply his theories to their own experience).

Other experiments and observations led Reich to determine that humans and living organisms in general, as well as the Earth, are surrounded by an orgone energy field and that light is a function of orgone energy lumination. He also carried out weather-control experiments and experiments with using orgone energy to drive a motor.

The results of such work lead to his theory that this energy functions in certain characteristic patterns (as witnessed, for example, in the functioning of live colpidia¹ cells under the microscope) in the everyday life of organisms as well as in the evolution of organisms and organs in what he called the “orgonome” (or a kind of egg) shape, a function of the *way orgone energy moves* in organisms, which Reich determined has a tendency to expand, which process tends to expand membranes over time. He theorized that the functioning of the energy, the way it pulsates and moves, creates the structure of organisms: function proceeds structure evolutionarily speaking.

Based on such observations and experiments, and then observations on an astronomical scale, Reich developed the hypothesis that the universe is not empty, but is filled with mass-free orgone energy; that it constitutes an “ocean,” the “primordial cosmic orgone energy ocean” where eventually, due to these same fundamental properties of this energy observed on smaller scales, pulsating streams emerge and can be seen in various stages of galaxy formation. He hypothesized that 2 or more such streams of spinning waves eventually approach

¹ A reference to *Colpidium*, a genus of protists in Phylum Ciliophora. [Ed.]

one another and superimpose forming a spiral nebulae with 2 or more arms which form matter at the core. Reich traced stages of galactic formation using current (at the time) photographs of galaxies. This research was furthered via his study and consequent hypotheses regarding the formation of hurricanes, the Ring of the Aurora Borealis, the Equatorial and Galactic streams and gravity.

Reich saw these processes as reminiscent of the formation of cells in other of his experiments. The matter formed via the superimposition of galactic energy streams, he hypothesized, takes the form of the energetic movement like the orgonome form in organisms. Further research led Reich to the hypothesis that formation of galaxies, individual stars, solar systems, individual planets, moons, formation of bions, protozoa and living organisms of all kinds, as well as the merger of two orgone energy systems when lovers merge in the genital embrace, are all products of the same energy, the “stuff” of creation as such. (Reich’s discovery that opened the door to so many others, as mentioned above, was the function of the orgasm which he came to understand better and better over time, especially once he discovered the existence of orgone energy and of superimposition). Every created entity, on this theory, is created from the superimposition of oppositely charged streams or systems of this energy. Thus, Reich’s most general hypothesis is that cosmic superimposition of this energy is the common functioning principle of all creation. On this theory,

matter is continually being created as streams of orgone energy approach one another, luminate or become excited, and merge bioenergetically in an orgasmic convulsion.

IX

I’d like to conclude with a discussion of Reich’s way of doing science and how it relates to some of the key issues covered in *Worlds Without End*. I’ll be working in this section mostly with two of Reich’s later books, *Ether, God and Devil* (9: 3 – 161) and *Cosmic Superimposition* (9: 163 – 308).

What Reich called his “functional technique of thinking” led, Reich tells us, to the discovery of cosmic orgone energy. This involves, for one thing, the need to describe the *process of work*; how we get to where we got to, so to speak, to better understand what we have or where we are. (9: 3)¹ Rubenstein does not describe the processes that lead mathematically centered physicists / cosmologists to their theories. She provides only the theories with some attention to the conceptual or theoretical reasons, but no attention is given to the mathematical processes themselves. Not that I blame her for this; nor would I expect her to get that deep into the process of discovery: one would have to understand the mathematics involved at the level of the physicists that utilize it to be able to do so.

Reich tells us that the relation of the human animal to the universe is a central discovery of his, and that all he

¹ Page numbers cited here for both *Ether, God and Devil* and *Cosmic Superimposition* refer to the combined 1973 edition (9).

discovered is based on one discovery: *the function of orgasmic plasma pulsation*. (9: 4) His study of the history of philosophy and science led him to believe that orgone energy was sighted by some but then overlooked or argued away because the discovery came out of the discovery of orgasmic plasma pulsation. (9: 5 – 6) Why was the existence of the energy, seen by some, so widely ignored? For Reich, this has to do with the fear of examining sexuality and the orgasm function due to a deep-seated sex-negativity that prevailed in the character structures of human beings in most of the civilizations in the world. Reich developed a theory as to why this occurred which he discussed in his *The Invasion of Compulsory Sex-Morality* (6), as well as in *The Mass Psychology of Fascism* (5) and other books. This connects with Reich's observations, reported in a number of publications, that the ability of researchers to observe orgone energy functions is tied to their character structures since the ability to make such subtle observations can be inhibited or limited by armoring which prevents pulsation and contact of the researcher's orgone energy with that of the object or subject being observed.

Reich names others whom he believed thought functionally: Nietzsche, Darwin, Engels, Bergson, Freud, Malinowski, among others. He contrasts this way of thinking with what he calls "mechanistic and mystical" interpretations of living matter. (9: 8) For Reich, his concept of functional thinking is not a philosophy but a *tool of thought*. He tells us that mechanical and mystical perspectives lead to a splitting up of the human animal in a way that undermines our health and intelligence. Functional thinking, for

Reich, is not simply developing a theory of the cosmos for its own sake, but is interested in protecting and nurturing life. (9: 9) For Reich, mechanistics and mystics have cruelly failed as tools of human existence as these ways of thinking are rooted in the negation of life. (9: 13) Ancient thought systems, on the other hand, for Reich, did accent life but were displaced by the mechanistic and mystical. Much of Reich's life and work was focused on trying to understand why.

Reich, like Rubenstein, discusses Kepler; how he did away with the need for perfection such as perfect circular uniform motion of the celestial spheres, and how he found a clue to cosmic orgone energy when he asked himself which force was responsible for the attraction of the earth to the sun. But, says Reich, Kepler retained some rigidity in his notion of a fixed sun which is retained in today's calculations of planetary motion, whereas if a moving sun were included, as it is in Reich's model of the cosmos, planetary motion would not form a closed ellipse but would be open. (9: 18)

A basic conceptual principle of organomy, Reich's name for his way of doing science, he says, which is relevant to Rubenstein's project, is that scientists should reject as unscientific thought techniques that have no factual foundation. (9: 19 – 20). Reich's work, as I have mentioned, is rooted in experience, in sensory perception and awareness, unlike much of what Rubenstein reports on. For Reich, as he puts it: "The scientist will increase his errors in proportion to the neglect of his own system of sensory perceptions and awareness. He must know how he himself functions when he perceives and thinks." And then: "...one of the most important sources of human

error: the ignorance of the scientist or thinker with regard to his own conceptual system and his sensory perceptions.” (9: 20)

For Reich, the terms “God” and “Ether” refer to the same reality from the different standpoints of religion and science. (9: 39) And once we realize this and substitute “cosmic orgone energy” for both, many of the statements of philosophers, theologians and scientists that Rubenstein discusses can be seen, as I have pointed out above, as anticipating Reich. Reich didn’t think that new theories are what is needed, but rather control over our thought technique. As *Worlds Without End* illustrates, multiverse theories proliferate and, to some scientists (like Lee Smolin), appear out of control since they are not connected to observation and cannot be tested.

Before the discovery of dark energy, Reich wrote: “It must be decided whether nature is an ‘empty space with a few widely scattered specks’ or whether it is a space full of cosmic primordial energy, a continuum that functions dynamically and obeys a generally valid law of nature.” (9: 81)

For Reich, people he calls “technicians of physics ... have abandoned reality to withdraw into an ivory tower of mathematical symbols.” (9: 82) Reich claims that he does not blame them, but he also points out how much harm such a way of doing science does. It has “...excluded the human being, mysticized life, and, intentionally or not, invariably returned to explosive substances because of its research orientation.” (9: 82) More primitive or animistic views of nature, for Reich, are closer to his own understanding. “Nature

was regarded as ‘animated,’ but this animation was derived from man’s own real sensations and experiences.” (9: 87) Reich saw aspects of animism in Kepler and Newton which mechanized science dismissed as mysticism. (9: 89) Reich characterizes a basic difference between organomic functionalism and all other conceptual methods as follows: “organomic functionalism not only sees an interrelation of functions but seeks a *common third*, a deeper functional relation.” (9: 103)

Here is an interesting statement of Reich’s that pertains to Rubenstein’s view of the relation of multiverse theories to philosophical and especially to religious ways of thinking:

“Since the mechanist does not understand the living organism, he must resort to mysticism. Therefore, all mechanistic philosophy is, and invariably must be, mystical as well.” (9: 117) It seems to me and to Rubenstein that this is what has happened with regard to the multiverse theories of physicists and cosmology.

Relevant to this notion is Reich’s understanding of the roots of religion. He writes: “All true religion corresponds to the cosmic, ‘oceanic’ experience of man. All true religion contains the experience of a unity with an omnipresent power, and simultaneously of temporary, painful separation from this power.” (9: 121) The roots of the disconnection, for Reich, is “the armored, biologically disrupted human structure.” (9: 124)

In *Ether, God and Devil*, Reich goes further into how his discovery of orgone energy functioning relates to cosmic questions. One experiment that is usually cited that “proved” there is no ether, that space is empty, is the so-called

Michelson-Morley experiment which Reich claims was based on incorrect assumptions. (9: 140 – 142) Rubenstein does not talk about this experiment and how its conclusions have been incorporated (or not) by cosmologists since 1998, when dark energy was discovered.

From pages 142 through pages 161 of *Ether, God and Devil*, Reich discusses how orgone energy is demonstrable, penetrates everything; how some of its properties invalidate the Law of Entropy, how it is present everywhere, that it is not of a material nature, that it's always moving, wavy, pulsating and that pulsation is the common functioning principle of creation. He also discusses its property of lumination and of heat production, and also, again, the importance of the sensitivity of the observer. Finally, he summarizes the functions as required for the concept of the Ether and compares them systematically with the functions observed in cosmic orgone energy. (9: 159 – 161)

In *Cosmic Superimposition* Reich speaks of the concepts of God and universal natural law: "In recent times, more and more human thinking has come to assume that the idea of a universal natural law and the idea of 'God' are pointing to one and the same reality." (9: 169) This, of course, is his point of view.

In the following remark he comments on his move from the human to the cosmic: "Hurricanes, galaxies, and the aurora borealis come into the view of a human being who deals with the mentally sick and with newborn infants if he follows consistently the red thread of inquiry and reasoning that leads outward from unhampered observation of man's

behavior toward his origin in the cosmic realm of functioning." (9: 171) Reich tells us that his research and subsequent theories start from the observable "and measurable functions in the cosmic orgone ocean; from which all being, physical as well as emotional, emerges. Man, from this viewpoint, is, together with all living beings, a bit of specially organized cosmic orgone energy." (9: 176)

Reich asked: "whence stems the overpowering drive toward superimposition of male and female orgonotic systems?" (9: 180) And answers: "Ample evidence has indicated that superimposition is due to bioenergetic forces functioning beyond voluntary control. The two orgonotic systems involved are driven to superimpose by a force that, under natural conditions, i.e., not restricted by outer or inner hindrances, is beyond their control. It is involuntary bio-energetic action." (9: 181)

He begins to explain how he came to his theory of superimposition on a cosmic level: "Reduced and abstracted in its purest form, superimposition in the biological realm appears as the approach through attraction and full bio-energetic contact of two orgonotic streams." (9: 182) This process is illustrated and analyzed on page 183. On page 184 Reich tells us that his theory of cosmic superimposition, from this point of his research onwards, functions as *speculation*, as a sweeping generalization. He hypothesized, for example, that orgone energy is mass-free and that mass emerges from it from the superimposition of two or more energy streams. He hypothesized that planetary motion is also a function of orgone

energy streams, that the planets are carried on streams of orgone energy, thus that “The orgone ocean appears as the primordial mover of the heavenly bodies.” (9: 187)

Gravity was also seen as a function of the ocean: “The sun and the planets move in the same plane and revolve in the same direction due to the movement and direction of the cosmic orgone energy stream in the galaxy. Thus, the sun does not ‘attract’ anything at all. It is merely the biggest brother of the whole group.” (9: 191)

In sum, for Reich the properties of cosmic orgone energy, viz., pulsation, its expansion and contraction, its tendency to form streams that become attracted and superimpose; that matter forms via this tendency, its tendency to expand within organisms, and so on, express the fundamental *unifying* process or natural law that underlies existence. The same common functioning principle, for Reich, explains or is behind our quest for *knowledge*:

“The quest for knowledge expresses desperate attempts, at times, on the part of the orgone energy within the living organism to comprehend itself, to become conscious of itself. and in understanding its own ways and means of being, it learns to understand the cosmic orgone energy ocean that surrounds the surging and searching emotions.”

“Here we touch upon the greatest riddle of life, the function of self-perception and self-awareness.” (9: 279)

XI

Rubenstein’s final position regarding the multiverse seems to flow from the

way she treats them. Given that none of them are verifiable, she argues that there seems to be no way to choose among them. Some theories will be more internally coherent, mathematically reliable, and observationally demonstrable than others, she believes, but she does not appear to believe that we will be able to say that one theory is right, the one is the correct theory. As she says: “...I doubt very much that we will or should emerge with only one of these theories. Would it even make sense to have a single account of cosmic multiplicity?”

As she says, the many-worlds cosmologies have failed to disentangle physics from metaphysics from religion and from science. I certainly agree with her on this and I think that she has done a marvelous job in this book illustrating it. I also agree with the point of view that one derives from studying Reich’s work, that the reason for this lies in the approach that physicists / cosmologists have taken and that to bring the issues back to the realm of science would require a whole new way (for them) of thinking.

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