time, it would have been a very acute issue to deal with. And, simply, what happened was that people got physically "sick" - but, without any physical or mechanical cause. The effects were real enough, but no "causes" could be found. These conditions "selected" or "called out" of the culture, a medical doctor, specializing in neurophysiology, called Freud.

Now, I want to point out that the discussion I am presenting in this section is purely speculation, but it is not critical to the overall treatise. Freud's "treatment" was one he stumbled on, called the "talking cure". The patients Freud saw were not manifesting the symptoms of "schizophrenia," or "possession," as it had been called since the Inquisition. The symptoms were localized and far less severe - and the "disease" had been termed "hysteria," or the problem of the "wandering womb." A caricature of Freud's approach is as follows. Begin a patient on a three-hour to five-hour-per-week schedule of lying on a couch in a darkened room. The patient is told to talk about himself or what is bothering him or her. This is not a normal state of affairs, and one would be hesitant to talk about personal issues, so one would begin talking about many unimportant items. Freud engages a process of differential reinforcement of his patient's verbal behavior (though he was not aware of what he was really doing). Statements of little interest to Freud would receive no response from the doctor, and they would eventually extinguish. It would be a good guess to assume that Freud was particularly "interested in" (or, reinforced by) talk about sexual matters. Eventually, Freud would have succeeded in extinguishing all a-sexual talk by the patients, who being quite frustrated at the lack of progress in engaging the man, may have decided to prick his interest by a little sexual remark. Once emitted, it is possible that such initial sexual comments were reinforced by Freud, which leads to much more of the same. My point here is that it may have been Freud's "interest" in sex, that short-circuited revealing what was actually at the basis of the problem of his patients. If Freud reinforced them for talking on this level, they would do so, and his theories would show this color - which they do. But, if the nature of the problems were really having to do with Darwin, science's new picture of man, the necessary decline of religion's believability, and, at bottom, fear of the real issue of death and dying in a material world, Freud could not have been able to demonstrate this. However, his followers, especially Rank and Jung, were quick to break from Freud's pan-sexuality, and offer their own assessment of what was occurring in such patients. And, their theories deal directly with the failure of religion and the concerns of death. It is often said that to see the real nature or trouble of a culture, one needs to look at the arts. I remind you that the literature of the time was assuming a remarkable new form (Existentialism) as a kind of limited evidence supporting my interpretation. I should like to address the issue of the connection of Existentialist literature with the philosophy of the time, but it would really be a side route.

To place this section into a statement, religious beliefs of the latter 19th century were rendered untenable by Darwin and the rise of a mechanistic science, and the shock lead to avoidance behaviors which were called "hysteria." Freud interpreted these responses as sexually motivated, and then proceeded to present us with an "analysis" of what was occurring. And, the major point here, Freud presented another version of dualism as an "explanation" of the phenomenon. He was remarkable insofar as he had a real point - that all behavior is not consciously caused or chosen by those acting. He invented the "unconscious mind." The problem was that he described the dynamics of the behavior in terms of a mentalistic interpretation - i.e., a story about creatures of the "mind" which interacted to then produce behavior on the part of the person. I call this "mentalism" and I invoke Freud as a villain only because his story became so influential in the verbal behavior of nearly all members of our verbal community when they talk about the behavior of people. So, Freud is relevant here because of his mentalistic influence, against which Skinner has had to fight for his point of view.

What I have attempted to show is how two of the major thrusts of American psychology, psychoanalysis and methodological behaviorism have come to naught-insofar as they have re-engaged mentalism or idealism in their attempts to deal with behavior (the first of people, the second of rats). The "Third Force" of American psychology, "Humanistic psychology, will emerge in the 1950's as a truncated, confused mixture of religion, social relationships and "meaning", which has no "meaning" at all as a part of a science of behavior. The only movement left without the idealistic blemish would be that of mechanistic materialism - the science of Newton, et al. But, alas, even this must fail; and it does during the first three decades of the present century. As "new" thinking arises, the "old" thinking will, in reaction, attempt to re-entrench itself. Religion, the old thesis, was confronted by Darwin and mechanistic materialism (Newtonian science), the new antithesis. Freud and psychoanalysis were the resulting "pseudo-synthesis," and it did not work, as we see after 50 years. We had not yet arrived at the point of synthesis - at least in psychology - during Freud's prime. This point may have been achieved for physics by Einstein. For biology, the point was reached by the thought of Darwin. But, for psychology, we are without a champion of synthesis - until Skinner.

We have one issue to address before getting to B.F. Skinner. The "death throes" of mechanistic materialism produced in both the U.S. and Europe, in both physics and philosophy, a strange creature indeed. We have been introduced to it previously, and it is called "Logical Positivism."

The Three Arms of "Positivism"

As noted before, it is absolutely essential to avoid mistakes to take care to be clear about what one is referring to when using the term "Positivism." Auguste Comte, the French philosopher often held to be the father of Sociology, first used the term "philosophie positive" during the middle of the 19th century. His position was that of a social positivism. By this he meant that the basic data were of a social nature, and that no true psychology of the individual was possible, since all that can be studied is the behavior of men in social groups. He rejected Wundt's and Titchener's introspection as a source of basic indispensible information. I called this form "good," meaning that it was the least problem-ridden. Skinner comes close to this position in his analysis of how the verbal community shapes up self-knowledge in individuals through differential reinforcement of acting of private events. However, Comte's position is far too extreme, for the individual does have direct and immediate access to his own private events, and he must "introspect" (in a vague sense) when describing such events. Skinner's only
limitation on self-knowledge is that the verbal community must use public (thereby, not wholly reliable) accompaniments of private events to differentially reinforce statements of self-knowledge. But, the restriction is on the verbal community - not upon an individual's access to his private events. For Skinner, people describe private events - that is given in the data, the verbal behavior. The problem is to account for the shaping of such behavior.

I also mentioned the “Positivism” of Mach, Avenarius and Pearson (England). This form was introduced in 1866 by Mach’s Analyse der Empfindungen. The move was to completely circumvent any reference to what was metaphysical (unobservable). Forgive me if I seem to give this school of thought short shrift; however, it is an absurd position for any scientist to assume. In their concern to avoid any metaphysical “objects” or statements about such “objects,” they were led to doubt that they really had access to the real physical world. All they could be sure of is their access to their own sensations which, we believe, reflect the material realm. Therefore, it was only possible to speak of those sense data - and nothing else. The material world was, for them, a metaphysical object. One is tempted to ask them how they “knew” they had access to sense data - since, for Skinner, one learns to speak about private events (or to speak at all) by means of the reinforcing practices of the verbal community. To assume that sense data copy the world, and then to retreat to the position of doubting that this material world even exists at all, is to re-adopt, at best, a weak Cartesian position. One might also liken them to Kant - had he been plagued with doubts about the existence of the “noumenal” realm. At worst, this position is simply a very uneconomical method of attempting to assert a pure subjective idealism, poorly distinguished from solipsism. In doing science, one is asked to make very few assumptions. One you are asked to make is an easy one - to assume that the world is real and that the business of science is to attempt to learn to describe it in more and more accurate and precise terms. In other words, if a scientist cannot admit to being a materialist, he admits to being a very poor philosopher. So, it is not difficult to imagine why this Machian Positivism never “got off the ground” (it was never “on the ground” to start).

Finally, there arose a third “positivism,” during the third decade of this century. However, I again wish to be precise in my terminology and to discriminate between “Logical Positivism” and “Operationalism,” though they are often lumped together as one movement. Logical Positivism is a product of European philosophers, known as the “Vienna Circle,” including Rudolph Carnap, A.J. Ayers, Herbert Feigl, A.E. Blumberg, Philipp Frank, Otto Neurath, Hans Hahn, Moritz Schlick, among others. Also associated with the group were Ludwig Wittgenstein and Karl Popper. I will be brutally simplistic and say that these were men who got caught up in their own verbal behavior - more precisely - in the grammar of language. Somehow, they came to consider the logical relationships in the grammar of statements about the world to be more basic than the world about which such statements are made. Or, in other words, they seemed to believe that the only door to the world was through a pure logical analysis of statements about the world. They reached this situation because of an attempt to reintroduce the positivism of Mach with the work of Poincare, so they inherited Mach’s distrust of the world. Some seemed to follow Mach into regarding the sense data as somehow sacrosanct:

... it seems advisable always to speak of the "occurrence" of sense-contents and sense-experiences in preference to speaking of their "existence", and to avoid the danger of treating sense-contents as if they were material things.

The answer to the question whether sense-contents are mental or physical is that they are neither; or rather, that the distinction between what is mental and what is physical does not apply to sense-contents. It applies only to objects which are logical constructions out of them. (Ayer) (7)

It is clear from this that Ayer could not be called a materialist. But, how does one proceed from sense-contents to the "logical constructions out of them?" One can only do so by examining the logic (or, grammar) of the propositions made about the sense-contents. Primacy is given to logic, but, how allowable is this move? An entire British school of philosophy (ordinary language analysis) has grown up with this assumption; however, the only thinker to subject even language behavior, itself, to, a scientific (though not yet empirical) analysis is B.F. Skinner - and he would not agree to this attempt to make grammar or logic primary to a scientific investigation. Let me offer an example of how Skinner’s analysis of verbal behavior leads to quite different conclusions than those of a logician. In logic, if one makes two propositions - "A" and "not-A" - one relies on a form of set theory, using the principle of exclusion. The first proposition is a set of all things belonging to category or label "A". "Not-A" is a set including all things exclusive of "A". Further, to propose a set "A" one logically implies an exclusive set "not-A"; unless "A" proposes the characteristic of "existence", which then leads to what I consider ridiculous logical contortions. If one, instead, follows Skinner’s lead in analyzing verbal behavior as behavior, a very different situation transpires. Skinner treats negation ("no" or "not") as a qualifying autolitic - or a verbal operant which serves to modify the over-all effect upon the listener of a larger operant unit within which the autolitic occurs. (8) In our example, a speaker will state "A", when confronted with a certain range of stimuli configurations, provided his verbal community has reinforced stating "A" in the presence of such a range of circumstances. He will state "A" throughout this range, and he may even generalize to circumstances beyond the reinforced range, stating "A". At the vague limits of such ranges, he may, depending upon his history, utilize other autolitics, such as "A-like" or "somewhat similar to A". If the circumstances were far enough removed from the range of circumstances within which he was differentially reinforced for "A", he may emit "somewhat like B", or "B", or possibly "I don’t know". We would not encounter "not-A" unless he had received some specific shaping by the community. The autolitic "not" will occur when the speaker is in a situation in which stating "A" is highly probable, but the community has shaped a discrimination (based upon small, but important differences to that community) between this new circumstance and others which occasion "A". So, in such a circumstance, though the person is inclined to tacit "A" editing will occur to yield "not-A". In teaching a child proper color-talk, the verbal community will reinforce "red" in response to a wide array of electromagnetic frequencies. As the child matures, it may become important to the parents to instill more subtle discriminations of color. A child is shown a ball and given the mand "What color?" He generalizes to the new situation, and asserts/tacts "red." The parents respond "No, not
red." In future instances, when shown the ball, the child (because of his early training) is still likely to say "red," but the parental discrimination training leads to the autotelic "no" - and he says "not-red." If the parents have provided an alternative tact, such as "No. Not red - it is orange," the child may produce the new tact, or he may just say "not red." But, additional shaping will result in a new color-tact "orange." In situational ranges involving more complex discriminations than just the use of color tacts, the more precise tact may not be supplied, and the use of the autotelic "not" may remain in force.

The point of this tedious discussion is to demonstrate just one difference between a logician's or philosopher's treatment of the behavior of negation and Skinner's understanding of the process. For the logician "A" and "not-A" are mutually exclusive catagories of an almost a priori nature. With Skinner's analysis, the entire logical exercise evaporates as verbal behavior is understood as more behavior to be analyzed. For Skinner, "A" and "not-A" do not imply mutually exclusive logical catagories - they involve very similar stimulus configurations presented in the material world. So, the power of the logician's concern with the "logic of propositions" disappears, and with it goes the importance or the need for the Logical Positivists' concern over such logic in scientific statements. The Logical Positivist, with their lack of understanding of verbal behavior, took their own far too seriously and turned themselves into flagrant subjective idealists. If one does not understand the real causes of one's verbal behavior, one can place too much importance upon it or its structure, and thereby lose all touch with reality.

Now, after all of that, I will grant to you that a "logical analysis" certainly seems to be an easier task than a Skinnerian analysis of verbal behavior. But, I remind you that the rendering of on-the-spot idealistic "explanations" or mentalistic "stories" about material phenomena is always a simpler task than to have to deal with the reality of the material world. But, Skinner would not claim to aspire to being more simple, just a bit more correct. This task might begin to become more easily accomplished if we practiced a rigorous materialistic approach, and ceased attempting to escape our difficulties by launching ourselves into such easily spun idealistic "explanations" of our behavior and the rest of the material world.

We acquire our verbal behavior about the world from the world - from outside, so to speak. To assume that it is, somehow, a primary datum, accruing from within, is - despite all of the possible verbal contortions to the contrary - to yield to subjective idealism. So, despite Boring's characterizations of Feigl's logical or operational positivism as "an attempt to get back to basic data and thus to increase agreement and diminish the misunderstandings that come about from unsuspected differences in meanings," (9) it is just idealism - and of no use to science. The Principle of Verification has nothing to do with empirical replication of scientific results; it becomes a matter of philosophers agreeing on what they "mean" by what they call "scientific" propositions, based upon their subjective sense data. This is harsh, but fairly accurate.

We see idealism, dualism or mentalism creeping into science continuously, during the period from roughly 1850-1940. Freud gave us a glaring mentalism. Though cast as a man of science, he was a physician, and unfamiliar with the issues we now engage. Hull and the other methodological behaviorists assumed they were being quite scientific with their reliance upon the hypothetico-deductive method of theorizing. Though they were studying behavior, in their ignorance of the subject matter, they lapsed into a verification of an imaginary conceptual nervous system or an invented physiology - which is nothing more than an idealistic "story" parading in scientific terminology. The Logical Positivists, despite their philosophical sophistication and their overwhelming concern not to fall into metaphysics, did fall into a kind of mentalistic metaphysics, by placing their emphasis on sense data and logical analysis of talk about those sense data. But, they had no way of knowing, at the time, that their very talk would succumb to a scientific analysis. It would be fair to say that, at least, certain portions of science were breaking down between 1900 and 1930 - especially psychology and physics. Other aspects of science were doing quite well, such as biology. When a science falters, idealism rushes in to fill the explanatory void left by initial materialistic explanations which had failed. I will say here that it was not a materialistic science that had failed-in all cases of idealistic influx. Rather, it was the explanatory paradigm of certain sciences that had failed to accomodate material phenomena taken under consideration. A "paradigm" is a method or design of explanation. The paradigm we will see falling is that of Newton and the mechanistic materialists. This does not impugn science or a materialistic position. It brings habits of investigation and presassumptions under re-examination. The problems encountered by physics (the "Queen" and most emulated of the sciences) during the first three decades of this century are well known to scientists and philosophers of this time. In glib terms, the 4000-year-old concept of Atomism was finally forced, by scientific advances, to "stand still" for a "face lift." In 1905, Einstein published three papers that rattled physics to its bones, or its "atoms". We do not need to go into these papers, here, except to say that they toppled the Newtonian paradigm out of physical research, and put it into mundane technological applications. In one sweep of the pen, Einstein reduced Newton's "cause-and-effect" mechanical world into "simply" a first approximation of a description of the material world.

Of course, it was not simply Einstein's articles that led to the coming of revolution in science, which culminated in the replacement of the "If-then"/"Cause-effect"/"S-R" paradigm. Scientists, demonstrating the "I'm from Missouri" point of view, continued in an attempt to reaffirm the old paradigm by their research - this was specifically true in physics. They had reached the atom, which was still a useful concept for chemistry, but in reaching more deeply into the material organization of the world, they began to be overwhelmed. Studies of the behavior of electrons confirmed that light quanta could be, rather, bad to be jointly described as particle and wave. Sub-atomic particle studies revealed that particulate physics was indeed in trouble-in fact, so was the classical model of atomic physics, that matter was just an accumulation of indivisibile little "pieces of some basic stuff." Einstein had stated that "matter" and "energy" were not basic distinctions, that they were really only patterns of behavior or action of some more basic kind of material. Now, their own research supported Einstein's contention. After the 1930's, physicists began to learn to live and work with this kind of contradiction. But, as always, just before such a maturation, idealism gets thrust out as an attempt at saving the old methodology. In 1927, a Harvard physicist, Percy Bridgman, published a book, The Logic of
Modern Physics, which introduced the notion of "Operationism". The reasons I include Operationism here are: (1) it became quickly assimilated into the Logical Positivist movement, (2) it was written for physicists, but appealed to psychologists of the time, and (3) it is a reflection of the kind of thinking that would have a large influence on American scientists of that time - Pragmatism. One might even venture so far as to suggest that Bridgman had been swayed by the Pragmatism of William James. In attempting to handle the state of utter disarray in physics because of Einstein's Relativity Theory, Bridgman proclaimed that the concepts of physics should only be defined by the techniques of measurement (observational operations) by which they are established or "observed." Put a little differently, any "objective" event or object in the material world is comprised of nothing more than the operations - is nothing more than these operations - by which it is observed or measured. Clearly, the move subordinates the material world to the thinking or acting of the physicist. The material world, somehow, cannot be gotten to - it is only a postulation of the physicist. We can know reality as it is presented in our sense-contents, and in this way only. Bridgman never took the argument this far; however, it is clear why we now see Logical Positivism and Operationism as almost identical. The move is quite clear - when reality confuses us by its complexity, we always attempt to deal with the complexity by falling back upon our own mentality as a source of the "observed" busy-ness of the world. The world is, after all, very simple (compared of just cause and effect - of balls bouncing off balls), and if complexity is seen, it must arise from our seeing of the world. Or, we must invent the world that we see, because given the supposed simplicity of a real world, any complexity is our offering. But, any move to subordinate the material world to human mentality is just a re-introduction of idealism. We don't create the world, it created/generated us; and, we don't project complexity onto it, we sometimes can learn to discriminate, because of complex contingencies, the complexity inherent in the world. This last statement has never been taken seriously in the U.S. by anyone except B.F. Skinner and those who have read and understood his works.

Boring, in his assessment of Skinner, went so far as to include him within the Operationists: "He was certainly a practicing operationist all along even when not a participant in a common concern." (10) This may very well be an accurate statement about the young Skinner, as a graduate student. After all, he was at Harvard during the time Bridgman was issuing Operationism. It may even be true of Skinner during the period after graduation, for the influence of one's verbal community is a lingering matter. But, Skinner is not an idealist. His entire career, between 1938 and 1953, was spent in the laboratory, confronted with the real world (of course, he worked with rats and pigeons, which seems questionable, at first - but, because of his behavioral subject matter, he was never led to the kind of confusing complexity which usually results in a re-introduction of idealism). It was because of Skinner's early work with "simple" animal subjects that he was able to understand the need for a paradigmatic revolution in science. Once those studies were finished, and once he had a grasp of the material processes underlying the behavior of "simple" organisms, he was able to turn his new understanding of behavioral processes to an analysis of man, himself. He eschewed idealistic/mentalistic "explanations" so strongly, that he was able to bring about another portion of the paradigmatic revolution in science. This portion was the most important of all - it was in psychology - in the study of mankind, itself. Before we could expect any other scientist to adopt a truly materialist approach to his subject matter, a science of scientific verbal behavior in the human species had to be developed. And, such a study was begun, by Skinner. With Skinner, we are, at last, freed from idealism as a retreat from social progress.

We are about to turn to Skinner, however, there is one more item to deal with before we can enjoy that change. I mentioned William James earlier, in conjunction with the American form of psychology called "Functionalism". Watson rejected both "Functionalism" and the other American school - "Structuralism" - because both were enthralled with "consciousness". Watson, adopting the model of Pavlov, tried to place American psychology on a scientific basis. Pavlov's study was in physiology, dealing with reflexive behavior. It was an absolutely "cause-effect" description of behavior - which worked well for reflexes, but could not deal with the full panorama of the behavior of organisms. The result was an eventual retreat into mentalism by later methodological psychologists. Skinner broke from this trend at the onset of his work. But, like all workers, he was influenced by some of those going before. He did retain the concepts of the stimulus and the response from the Pavlov-Watson line, and he also seems to be affected by Franz Brentano's "intentionality". But, some believe he was further responding to the work of William James. After all, Skinner does talk about "functional relationships" and James represented "Functionalist". James was totally taken by the work of Darwin, as is Skinner. However, James is best known as one of the originators of "Pragmatism," but I cannot see Skinner following James down this particular path. Behavior modification is the best known technological application of Skinner's writings, and the best known motto of "B-mod" practitioners is "It works!" (the implication is therefore, it must be right). In this sense, some of Skinner's technological followers are rather Jamesian. For, the best known motto of Pragmatism is something like "if it succeeds, it is 'truth'." I want here to definitely draw a line between what Skinner "means," and what "the B-mod Squad" states in their enthusiasm for their success. An important point of the current movement in Radical Behaviorism is to distinguish itself from "pragmatic" applications of its "Truth". Pragmatism asserts that anything, any philosophy or position that produces "results" is a "truthful" point of view. Unfortunately, what James overlooked, despite his good intentions, is that the power to generate "results" that someone is likely to call "good" always resides in the hands of those who have the economic "power" in any social system. They will define the "good" or the "truth" as it best suits their own ends. Plato defined his idealistic notion of the "good" in terms of his religious "consciousness." Modern Capitalism defines "good" in terms of the profit margins of its adherents. Idealism has gone woefully astray once again. But James was at first concerned with analyzing the function of consciousness with regard to its function in the survival of conscious beings. This is not a bad question for one engaged in scientific research - "consciousness" is, certainly, an important item to "understand" scientifically. James was correct in that matter, but when he lost materialism and opted for mentalism, he erred badly.

To illustrate the problem I have with James, I will call out someone who is basically on his side of the fence - Lord
Bertrand Russell:

What he (James) is denying might be put crudely as the view that consciousness is a "thing". He holds that there is "only one primal stuff or matter," out of which everything in the world is composed. This stuff he calls "pure experience." Knowing, he says, is a particular sort of relation between the two portions of pure experience.

Russell continues to demonstrate that this "pure experience" is really just a "neutral monism." We understand a "neutral monism" to mean something like what comes out of modern sub-atomic physics - i.e., a realization that the separation of matter and energy is a false doctrine that is inherited from mechanistic materialism. But, this interpretation of a "neutral monism" is not at all the intention James' had for his readers' understanding of his words, as Russell points out:

James himself did not develop this implication of his theory; on the contrary, his use of the phrase "pure experience" points to a perhaps unconscious Berkeleyan idealism. (12)

It seems that Russell has caught James with his philosophical trousers down. If, even Lord Russell, who through Wittgenstein is loosely tied to the Logical Positivist's (besides his endorsement of the Logical Atomistic theory of language), resorts to labeling James a Berkeleyan idealist, my case against Pragmatism should stand without question. But, Russell is wont to go even further in his impugnment of James, though - thankfully - without resorting to Freudian explanations, popular in 1945:

... James is concerned primarily with religion and morals. Roughly speaking, he is prepared to advocate any doctrine which tends to make people virtuous and happy; if it does so, it is "true" in the sense in which he uses that word. (13)

It is revealing, indeed, that James is willing to support "any" doctrine that makes people "virtuous" and "happy," Of course, "virtuous" remains for James to define, according to his preferences, or to his "interests." "Happy" is also his to delineate. I would presume that for James a "happy" person is one who does not act against his best interests, for non-action is a form of consent. James backs "any" doctrine producing such results (but, how does he know such results, since he has only access to his "experience?"), but we know the "doctrine" that James and those of his class probably supported at the turn of the century. To be brutal about the matter, "truth" for William James must be whatever doctrine maintained his well being and station. In other words, Pragmatism is no doctrine at all, for it is any philosophy in any society that maintains the status quo for those in such a position to engage in writing philosophy. One further statement by Russell will suffice:

(James) wants people to be happy, and if belief in God makes them happy let them believe in Him... James' doctrine is an attempt to build a superstructure of belief upon a foundation of scepticism, and like all such attempts it is dependent on fallacies. In his case the fallacies spring from an attempt to ignore all extra-human facts. Berkeleyan idealism combined with scepticism causes him to substitute belief in God for God, and to pretend that this will do just as well. But this is only a form of the subjectivist madness which is characteristic of most modern philosophy. 14

Goodness be! It appears that Lord Russell is doing my work for me. Talk about "God" versus "a belief in God" I will defer to Philosophy 1A. Perhaps Russell is miffed at James, because his Pragmatism may lead him so far as to suggest that a "belief in mathematics" would suffice for mathematics, itself. But, this would further lead us to believe that, perhaps, Russell still clung to a belief in Euclid, not having taken Einstein seriously when he demonstrated that Euclidean geometry is no absolute, but simply a way of describing the "space" within which material transactions occur. However, what is clear from this is that much of science at the turn of the century was infused with mentalism or, if you will, idealism.

The key element of understanding missing from all of the philosophical debating we have, thus far, stood patiently enduring is that man, himself, and all of his talk/philosophy is just as much a product of the activity of the material world as everything of which the talking was about.

Thus far, I have often talked about paradigms and a paradigmatic change or revolution, and I have successfully avoided directly discussing this issue. However, it is now necessary to do so.

The Paradigmatic Revolution in Science

If one reflects upon the history of the thinking of our species, as it has been outlined thus far in the article, the dialectic process is clearly in effect. We have been in the process of learning more and more effective ways of describing the world we inhabit. Theology, the early method of description, yielded a number of forms of idealism in philosophy. This move can be called the "thesis." The "antithesis" to idealism is materialism, which was brought to the front by Newton in his notion of the "If-then," "cause-effect" and, finally specialized as "Stimulus-response" psychology by Pavlov, Watson, Hull, et al. In physics, the act of specialization was achieved by the Logical Positivists and the Pragmatists (including Bridgman's Operationism). All of these modern reactions to the failure of the first materialist approximation to talking about the world (the "cause-effect" or "S-R" approach), leads their originators to assume idealistic "bandages" to patch up the problems inherent in that form of description. The resolution, or the "synthesis" of these divergent lines of thinking, I call the revolution in science - the turn of the paradigm. The ignored seeds occurred early in our history, (before Plato) but the effective growth of the movement, in modern times, began with Darwin in the science of biology. Quickly, Karl Marx followed with this thought in economics, sociology and "culturology." In physics, the move was decisively made by Albert Einstein. Finally, this somewhat unorchestrated revolution in thinking erupted in our own bacy yard - psychology. Though the real effects of his work have taken decades to develop, B.F. Skinner carried this paradigmatic revolution into psychology in the late 30's.

But exactly what was involved in this change? I would generally classify three basic modifications in approach. First, there is an absolute re-commitment to a rigorous materialism, or, to put another way, there was a complete disavowal of any attempt to introduce idealistic or mentalistic "variables" in the description of material phenomena. Secondly, there was a definite move away from Newton's practice of looking at "point centers" of action. Material phenomena were regarded as related to the surrounding environment in a way Newton had not conceived. "Point centers" gave way to a "field" interpretation, and the space dimension of material
interaction was greatly enlarged. With Einstein's treatment of time as part of the space-time continuum perhaps it was easier for Skinner to pay attention to the breakup after the response in the 'stimulus-response' paradigm (i.e., the consequences), without fear that he was relapsing into a kind of Aristotelian teleological causation. For Skinner the 'point center' stimulus as a 'gead' or reflex initiator is replaced by stimulus as an occasion for a discriminative response and stimulus as a reinforcing state of affairs transpiring in the environment, as a result of a discriminated response. Thus, we have Skinner's statement of the contingencies of reinforcement as a description of the functional relationships between an organism and its environment. Symbolically, Skinner replaces the S-R paradigm with the $S^R \rightarrow R \rightarrow S^R$ paradigm, which appears to be of little significance to many, but which bears a profound significance if one can see it as a part of the revolution against the Newtonian way of thinking.

The third characteristic of the revolution in thought is that the notion of "history" takes on importance as a source of variables useful in fully describing a material process. History is obviously important to Marx in his analysis of social evolution. For Darwin, the history of the species is represented by the form of currently living organisms. Through genetics and structure, Darwin rendered history as material. Freud had an inkling of this notion of the importance of history, but he was too heavily influenced by Newton to see the variable as material. Newton viewed "action at a distance" as some mysterious "force" acting on his "point centers," which existed within an absolute space (at a definite location). Newton regarded time as an absolute unfolding of events from the past to the future. Newton called his strange "force" gravity, and Freud had to deal with this. A person's distant past he observed to have an effect upon present behavior - but this appeared to be "action at a temporal distance." A Newtonian thinker could only handle such a proposition by resorting to some mysterious force, and as Newton had glued together events occurring at a distance with "gravity," Freud connected events acting at temporal distance by the "unconscious mind." So, the Newtonian "gravity" (action at a spatial distance) and the Freudian "unconscious" (action at a temporal distance) have the same ontological status as explanatory fictions. After Einstein and Skinner, both concepts are exposed for what they are. Gravity becomes a characteristic of a material space-time continuum, and the unconscious becomes the observed effects of a material modification of the structure on the organism.

Einstein's thought has been somewhat vindicated by the developments of modern physics. However, old ways are reluctantly dropped; and, some modern researchers in elementary particles have opted to discuss their work in terms of the interaction of the objective processes and the consciousness of the observer, which reminds one of Logical Positivism and Pragmatism ("sense-data" and "experience"). Such a move richly smacks of idealism, again. Other workers in the same field discuss their research in terms that seem to reach back to the Newtonian scheme of "point centers" of action. They attempt to salvage the integrity of the subatomic particles by speaking of "attractive forces" as exchanges among these particles of smaller particles. The names of these smaller particles of exchange are clearly determined by the nature of the "forces" they are supposed to explain or by a metaphorical extension that illustrates what the "forces" accomplish - respectively, "gravitons" and "glueons" (an exchange of gravitons explains gravity, and an exchange of glueons explains how three quarks are glued together to yield a proton). It seems that sub-atomic physics has got more work to do before the revolution to Einstein is completed.

In psychology, Skinner's work has been recently vindicated, by work we are all familiar with. But, he is also plagued by moves in reactionary directions toward idealism or mechanistic materialism. I have already mentioned cognitive psychology, which is a curious combination of both idealism and mechanistic materialism. There is humanistic psychology, mentioned before, which is hopelessly idealistic. A purely mechanistic psychology is currently rare, however, the work of Dollard and Miller provides at least one example, since it seems to be a return to Pavlovian thinking - admittedly contaminated with some Hjulian concepts.

The reason I find B.F. Skinner so vitally important to modern thought is because he is purely a product of this revolution. He alone in psychology, has resisted the temptation to regress to the traditional modes of thinking. He has maintained the only true scientific approach by simply observing the effects of independent variables upon the dependent variable, behavior. What he has observed has resulted in causing him to say some astounding things about human behavior - especially in this culture. The man is pregnant with novel insights about human behavior, yet the cultural inertia with regard to new concepts of human nature in the West has, so far, mitigated against his general acceptance.

Skinner's thought, I maintain, truly produces the bedrock of a revolution in this culture - not just in psychology, but within the very foundations of social institutions. His work completely undercuts the philosophy behind prisons and mental health institutions - even our basic understanding of criminal behavior and "mental illness." He challenges, with great promise, our notions of human freedom and dignity. He threatens to overturn the economic basis of our society. He does not just point out the ills of capitalism, he explains why this system is "sick." Today, there is no man who speaks with greater power to the "free" capitalist world, about the way to a constructive revolution of social practices.

Of the four great modern thinkers I align with social and scientific revolution, only one, Charles Darwin, is almost completely accepted - simply because he dealt with an innocuous area, "dumb" creatures. Marx (and Engels and Lenin) dealt with the social system of economics and the distribution of wealth. This is a far less popular area of change, so change as a result of their works is limited to non-capitalistic areas of the world. Einstein is, thus far, somewhat misunderstood - or not, understandable - by physicists. And B.F. Skinner has to deal with a "cultural inertia," a product of our capitalist system, so, he is not widely accepted here.

Before I move into discussing only Skinner, I want to stay with this so-called revolution in scientific thought and to contrast the move with what I call "Newton's world." As I have stipulated before, Newton's "cause-effect" paradigm was a mechanical metaphor, borrowed from the operation of clocks (or from the dynamics of a billiard or marble game). And, it served us well for 200 years as a first approximation toward an accurate description of the operation of the world. I grant Newton his success, yet I want to view the area within which it applies - closely enough to be useful - as a circle, enclosing most material processes. The center of the
circle is comprised of such events as Newton described, while the perimeter of the circle represents a level of structural complexity at which Newton's descriptions break down altogether. The radii of the circle represent increasing structural complexities (toward the boundary) of any number of qualities of complexity. So, as one progresses outward, along any radial line, Newton's mechanics become less and less descriptive, thus requiring additional descriptive approximations. Therefore, though Newton applies centrally, the further one travels distally along any radius, a new paradigm is an increasingly more pressing need; and, if one has clutched the "cause-effect" paradigm throughout the journey, one can either accept a new paradigm, or bolster the old one with idealistic explanatory fictions. But eventually, if science is to progress, a paradigmatic shift in descriptive practices must occur - the "must-occur" points lie on the circle's perimeter. Suppose one adopts the radius, "speed." At points approaching the speed of light, the paradigmatic shift occurs, as it did with Einstein. If one selects the radius of material "smallness," one is led to modify "atomism" to include sub-atomic particles, and eventually to talk of the smallest particulate "events" - the "quarks." Finally, the point is reached at which there is talk of the observer's "consciousness" (a retreat to idealism), or talk of even smaller particulate exchanges that must occur at or near the speed of light. Here, again, Newton has failed us - and a change is required, though, we have yet to see what it may be.

Suppose the radius you select is that of simple formal complexity of structure. At first, Newtonian description seems to be comfortable, as we deal with the behavior of atoms, then molecules, and even with that of large bodies of matter - such as marbles, planets and, perhaps, mountains and rivers of water. But, eventually, as we traverse this radius, we will encounter the virus, bacterium and the "living" cell. Newton will fail us again, for we seem to want to call the behavior of such entities "different" than what we had previously encountered. We even invented a term to signify this difference in behavior: "animate," as opposed to "inanimate." And, this difference in labels seems to be of great importance, because we now talk of "life," as some special "force". Yet, our verbal discrimination really tells us only one thing - this stuff behaves differently than we observe planets and mountains to behave. We coin the term "living" or "animate," but all we can say is Newton's description no longer applies - cause and effect doesn't tell the entire tale. It doesn't fully account for what we observe. If one continues along such a radius of structural complexity, one will be faced with explaining the behavior of creatures capable of a real quantum jump in complexity - those which can talk. At this point, if one clings to Newton, all manner of idealistic talk will occur. At this extremely removed position from the comfortable center of Newton's world, we encounter ourselves. And a "science" of description, based upon mechanics and idealism, will either attempt to remain mechanistic (by introducing pseudo-physiological explanatory fictions, and becoming idealistic), or it will openly embrace the old idealism, and talk of the "mind", and "free will", and "human dignity." Newton has failed us, and so we adopt other descriptions. The trouble with such a move is that it always involves a move back to idealistic talk - unless there occurs a truly paradigmatic shift.

There is, however, a considerable problem with idealistic talk. It always serves to support those with the money to fund continuations of such research and talk. In other words, an idealistic "science" is always a handmaiden to the monied class. With thanks to Skinner, I see his psychology as an actual step beyond capitalistic economic greed. He has made the paradigmatic shift to new descriptions of human behavior. Skinner alone in psychology has been able to retain a real scientific stance. He, alone, describes us as we are; and, in doing so, he has given us a new and unfettered materialism. And, accordingly, he joins the ranks of Darwin, Marx and Einstein in re-asserting science as the most hopeful action we could adopt.

In summary, this paradigmatic revolution in science is based upon three new developments. There was a re-affirmation of a sweeping materialism, designed to actively exclude further attempts to slip back into idealistic modes of explanation. Darwin excised the possibility of Divine action within the evolution of a natural world. Marx violently bridled at any hint of idealism, claiming it was a device of the privileged class aimed at preventing scientific progress, which might threaten their stations and free all people from economic oppression. Einstein redefined "matter", "energy", "space", and "time", in order to prevent the Newtonian notions of particle, force, absolute space and time as a one-way river divorced from material processes and the space they define. And, of course, there is Skinner's complete ban on any form of mentalistic descriptions of behavioral events. Secondly, the revolution embraced the rejection of Newton's "point centers" of action. For Darwin, changes in a species involved the selective actions of the environment. For Marx, individual consciousness which might lead to revolutionary action is to be explained by the cultural conditions, which give rise to changes of - or states of - consciousness in individuals. For Einstein, the physical processes which lead us to infer the existence of particles are more directly approached as related series of events occurring within a region of the space-time continuum. For Skinner, obviously, the behavior of individuals must be explained in terms of the effects of the physical and social environments. Finally, the revolution in science stressed a sense of history. Darwin stated that a species is, at any moment, a result of a long evolutionary history, preserved in the genetic code, which is passed from generation to generation. Marx founded his descriptions of the development of society squarely upon a history of progression from slavery to feudalism to capitalism (via industrial revolution), then through social revolution to socialism, which finally culminates in a true communism.

For Einstein, this sense of history is a bit more obscure, but it is present, none-the-less. Since historical "time" is usually understood in the Newtonian sense of an absolute one-way time flow, and since Einstein repudiates this notion of time, what use of any "history" has he? Just enough to save relativity theory from being made to serve Logical Positivism's ends. One must realize that Einstein was at deep odds with Newton's atomism of eternal, unchanging, indivisible and ultimate particles as a basic expression of materialism. Much as in S-R psychology, it was clear that an insistence upon such a description only resulted in idealistic excuses for definitional mistakes - ultimately, the material world does not present us with ultimate particles. This is just an empirical fact. So, the question should be asked, 'how does science deal with the world beyond what Positivism allows (sense data)?' Einstein's point was that what we infer to be particulate bodies is nothing more than a series of "events" that have been observed to occur in measurements we make. Now, this sounds very much like
"Operationalism," and well it should, because Bridgman designed his view to "handle" Relativity Theory. But, Einstein was not laboring under Logical Positivism's or Operationalism's guidelines. For Einstein, the real material world was still there to be observed; he just insisted upon a new latitude of description. He wanted to speak of a series of events, as opposed to particulate bodies. For Einstein, a "particle" is best defined as a history of material events that are related, as we observe such events. A history of material/physical/actual/real (these discriminations did not plague Einstein's thinking) "events" defines what Newton had simply referred to as a "particle". But, we observe the world, in his thinking, we do not create it by our thoughts. The events we observe are real - what needs changing is not our metaphysical assumptions about the nature of what we see. We only need to shift our descriptions of what it is that we see, to account for the observed relativity of material events. So, for Einstein, "particulate-ness" is simply replaced by a "history of observed events". For Skinner, it is quite obvious that he places great emphasis upon history. His emphasis of the ontogenetic history of reinforcement and the phylogenetic history of survival requires no further remark.

It should be clear that Skinner cannot be placed among the idealists, the mechanistic materialists, the Logical Positivists or the Pragmatists. I have left him classified as only one of a group of modern scientists, who have engaged a "revolution" in scientific thinking and methodology. These workers are all, basically, materialists, but only one has seen fit to coin a term for this neo-materialism-Karl Marx. His term is dialectical materialism. To ask if Skinner is a dialectical materialist is merely to ask if Skinner and Marx obtain compatible points of view - the name given the position is of minor importance, although Marx selected dialectical materialism because of a historical tie to Hegel and Plato. We will use Marx's term, because he chose it in order to recognize a similarity in logic between himself and Hegel and Plato, but also to point to a fundamental break between his position and that of Hegel and Plato. The distinction is that Marx was a materialist, whereas Plato and Hegel were idealists - but that is common knowledge. The similarity was the notion that a "dialectical logic," rather than a formal "Aristotelian logic," was the correct method of analysis of material phenomena. We saw that Aristotle's "If, Then" method led, ultimately, to Newton's "cause-effect" materialism. This is a bit queer, given the biases of Aristotle and Plato. Of the two, it was Aristotle who was more the materialist, and who set the tone for the future development of science. Plato was a full-blown idealist, whose thinking set up western religiosity and the philosophy of dualism - yet Marx sees Plato as an intellectual predecessor of dialectical materialism. This is a tricky problem, but the answer lies in the primitiveness of Greek philosophy of the time. The more sophisticated in-fighting of the next 2000 years had no effect on that thought.

The dialectical issue revolves about a proper notion of evolution. Although Aristotle is often spoken of as the first real evolutionary thinker, because he objected to Plato's idealistic causes and substituted development through successive changes toward an innate "potential," his short-coming was just that stress of an "innateness." Somehow, the "final cause" was in the developing entity, and it pulled it toward progress in the present from a future goal. This is teleology, a doctrine rejected by all scientists outright. Plato, on the other hand (though, a flaming idealist) could not place the causes of evolutionary change within the changing entity-the source of such improvements had to reside beyond the developing entity (mentalism, remember, is a more recent doctrine). Plato had situated the source of change in the realm of the Forms; but, at least, that was outside of the organism. As science progresses, the gods are replaced by the action of the environment. Plato would have objected vehemently to a modern interpretation, if he could have understood such an interpretation at all - which is extremely doubtful. But, because mechanistic materialism had proven itself to be in error, by Marx's lifetime, and because German idealism was in vogue at the time, mainly through Hegel's and Kant's work, it was not difficult for Marx to see a new methodology of a materialist science in the idealistic dogma of Plato and Hegel. Bury the idealism, but borrow the logic of the beast - this was what Marx must have entertained as a way out of Newton's mechanistic materialism. Marx must have recognized that, outside of the scope (or, circle) of "Newton's world", in the area of human social interaction, it is not the mechanistic, but the dialectical method of interpretation that will suffice to the task, first, of comprehending, and then of actually guiding the evolution of this society.

But, let me pose a simple question - "what, exactly, is the 'dialectic' process?" Many speak of it with a feeling of great familiarity, but when pressed to elaborate and offer examples of the process, they cannot. Some will speak of the development of a "thesis," a state of affairs, which contain "seeds of its own negation". They continue to say that the antagonistic interaction of the "thesis" and developed negative seeds, the "antithesis", will produce an evolutionary advancement, containing the best of both, called the "synthesis". In such cases, one can only sense that the answers are comprised of well-intentioned verbal behavior that is strongly under intraverbal control by the works of Marx; but, it is not contingency-shaped verbal behavior. The logic of dialectics is very simple - it is the application of dialectics that poses problems. Marx's verbal behavior was certainly (to a large degree) contingency-shaped; but, because most of us are not exposed to contingencies similar to Marx's time, the talk we engage in which topographically resembles Marx's talk is simply intraverbally controlled by Marx's talk. Intraverbal behavior "idles", in the sense that it does not map onto the environment (the physical or social) within which it is observed. The issues Marx addressed, regarding the economics of a class society, still prevail, but for most of us, they are comfortably disguised. In a society like ours, the only exposure some of us can obtain to real revolutionary issues, are found in such esoteric battles as deciding what the true form of scientific thinking should be. It is this particular battle which I have spent so much energy herein addressing. And, what, after so much "revolution" in scientific thinking, has science discovered? I think we have just discovered the dialectic.

The last statement should, perhaps, be put a bit differently. After nearly 300 years, conditions have developed that allow us to recognize that much of the science of the last century, that breaking from Newtonian thinking and finally realizing the insidious ways in which idealism can creep into interpretation, is dialectical in nature. This is especially clear in the Skinnerian revolt against positivism and S-R psychology. His new paradigm for describing behavioral processes is exactly a dialectic correction to that utilized by the methodological behaviorists before and during his research. The lingering influence of these old ways is still
with us as cognitive psychology; and, we should join Fred Skinner in repudiating that kind of "science." We are attempting to further the achievements of science, not the vested interests of power groups within professional psychology.

I will not label Fred Skinner a "Marxist", for the issues involved go far beyond squabbles over titles. It would be more accurate to state that both Skinner and Marx are portions of this paradigmatic revolution within science, of which I have spoken. Skinner had an advantage over Marx, in that he worked a half century later, and probably had the benefit of reading Marx's writings. It is obvious to me that, while Skinner addresses many of the same problems Marx engaged, Skinner is providing us with a much clearer resolution of these problems. Marx's program for societal changes provide no specific kinds of remedies for difficulties involving the behavior of people, while Skinner does this. Many Marxists view Skinner as a reactionary thinker because, first, he comes from the most highly capitalistic society in existence (thus, he must be the enemy); and, second, Skinner does not seem to find much merit in violent revolution by the working class against the state and the property class. While Marx and Lenin insist upon this method of change in society, Skinner seems to direct us toward individual changes of life-style (15) or toward a gradual lessening of aversive governmental control over individual behavior and an increase of local control by positive consequences, which are mediated by members of the community. (16) Skinner does not see solutions to society's problems to follow as consequences of political activity; and, he does not believe revolution is likely:

"... a Communist revolution in America is hard to imagine. It would be a bloody affair, and there is always Lenin's question to be answered: How much suffering can one impose upon those now living for the sake of those who will follow? And can we be sure that those who follow will be any better off?" (17)

The later question poses Skinner no real problems, because the implementation of a science of human behavior could design contingency equivalence throughout a culture, especially if the community units were kept small and the term "nation" applied only to a certain geographical area. The real issue, for Skinner, is how do we know that the science of human behavior will, in fact, be used and not just simply forgotten about in the name of a totalitarian regime? And as things stand now, with most Marxists completely mis-understanding Skinner's work and the science of human behavior, it is very unlikely that such a science would be implemented. And so we are left to trust in the inherent "goodness" of human nature to assure us that any post-revolutionary leadership will act in everyone's best interests - which is a bet Skinner is not happy making. (18) The first question in the previous quote is really a vacuous one, in light of Skinner's own analysis of "values" in Beyond Freedom and Dignity - especially, the "value" by which cultures are judged:

"The simple fact is that a culture which for any reason induces its members to work for its survival, or for the survival of some of its practices, is more likely to survive. Survival is the only value according to which a culture is eventually to be judged, and any practice that furthers survival has survival value by definition." (19)

Skinner places the survival of a culture as a value above other values (such as "personal good" and the "good" of others), because it is the value which selects these other values - insofar as they continue as "values" in a surviving culture. Survival of a culture is also called by Skinner the "good of the culture", which is, obviously, the "good of others who will follow". So, it seems that if sacrifice for the survival of the culture - for the good of those to follow - is needed, it should be made. So, I think Skinner's real objection to revolutionary change is that it is "hard to imagine", and that it would be a "bloody affair". Now, that is not to say that these are not valid objections - they are, especially for one who believes the needed changes can occur in other ways:

"The real mistake is to stop trying (to design a successful culture). Perhaps we cannot now design a successful culture as a whole, but we can design better practices in a piecemeal fashion. (20)

Such talk will certainly rankle most Marxists, and especially Marxist-Leninists. But, one needs to attend to the contingencies which generate both Skinner's position and that of modern Marxists. Modern Marxists have read Lenin railing at "revisionists", "reactionaries", and "enemies of the revolution", etc. But, Lenin was speaking to people who were actively opposing him in his efforts. Whatever they were doing to upset Lenin, would be reinforced by thwarting Lenin, which was obviously aversive to Lenin. But, Skinner's position on revolutionary change springs from very different variables than the positions of Lenin's antagonists. To mistake the two positions as identical, and then to label Skinner a "reactionary", would be to commit the "Formalistic Fallacy" (21) Skinner attributes to those who insist upon a structural analysis of behavior, as opposed to a functional analysis. No scientist should make that error. Obviously, Skinner's history is the psychological laboratory - not the political arena, and there is nothing in a laboratory resembling revolutionary change, except the chaos of an utter lack of design. Now, consider the following:

"Lastly, a culture will have a special measure of survival values if it encourages its members to examine its practices and to experiment with new ones.

A culture is very much like the experimental space used in the analysis of behavior. Both are sets of contingencies of reinforcement. A child is born into a culture as an organism is placed into an experimental space. Designing a culture is like designing an experiment; contingencies are arranged and effects noted. In an experiment we are interested in what happens, in designing a culture with whether it will work." (22)

One sees in Skinner the concern of a scientist for control, but one does not see reactionism. If a group of cultural designers had the complete control of a scientist over an experiment, and if these designers utilized the analysis of behavior Skinner has provided, then the design of the culture would proceed quite like Skinner describes above. The error in this analysis, however, is that in this century at this time all the control is in the hands of a very few reactionary capitalists, whose behavior is under the control of maximized profits; the control does not reside with well-wishing scientists or cultural designers, whose behavior is under the control of the "good of those to follow." Because of this analysis that "designing a culture is like designing an experiment," Skinner is led to suggesting change through design and experimentation in small communities, like Walden Two. In the novel of the same name, Skinner offers us a conversation between the community's designer, Frazier, and the incredulous visiting professor of philosophy, Castle. The