SCIENTIFIC BASIS FOR WORLD CIVILIZATION

UNITARY FIELD THEORY

The origins, evolution, current operation and future destiny of the universe, life, mind, and the social group.

By

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"Science is the soul of prosperity of nations and the living source of all progress."
Pasteur

THE CHRISTOPHER PUBLISHING HOUSE
BOSTON, U.S.A.

Library of Congress Catalog Card Number 60-6474

Printed in the United States of America

DEDICATION

To the men, women, and children of the world who, through their learning of science, grow in the understanding and knowledge of themselves, their universe, the earth and all its peoples, and through this understanding bring forth in our time a community of nations dedicated to living in peace, progress, prosperity, and freedom.

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ACKNOWLEDGEMENTS

I should like to express my gratitude to Professor Lawrence W. Gulick and Dr. Richard Borg who read and commented on portions of the manuscript. In addition I would like to express my thanks to the following individuals who have been a source of inspiration and who have assisted me in innumerable ways. The late Professor Karl ver Steeg; Professor Irving E. Alexander; Professor William M. Smith;the late Professor Albert Einstein; Mr. Earl Weiner; Mrs. M. Garas; the late Professor George W. Hartmann; Professor Carroll C. Pratt; Professor Walter Rahm; Miss Freda Kirchwey; Professor Harold F. Blum; Mr. Arthur L. Assum; Professor William F. Kieffer; Professor Benjamin Burack; Professor Jacob Hirning; Mr. Michael J. Chandler; Mr. Garland Y. DeNelsky; Mr. Thomas E. DuBois; Dr. Hans H. Toch; Dr. Edward Engle; Professor Frank George; Dr. Mervyn W. Perrine; Dr. Paul Oppenheim; Mr. John Aebischer; Professor Charles F. Haner; Professor Homer R. Norton; Mr. and Mrs. Henry J. Woessner; Miss Rosemary Hibbard; Professor Silvan S. Tompkins; Professor Franklin P. Kilpatrick; Professor Michele Boudart; Professor Hadley Cantril.

I would like to thank Mrs. Winifred Gulick who typed a considerable portion of the manuscript.

I also owe an indefinite debt to the many teachers, friends, and students from whose active minds I have borrowed at the College of Wooster; Roosevelt University; Princeton University; and Grinnell College.

To my wife, Dorothy Baranski, I also owe a special debt of gratitude; during more than a decade she has managed our home and family and yet still found time to help with the preparation of this book as a researcher, persistent critic, typist, and in doing an immense job of typing the material preparatory to the writing of this book.

I would also like to extend my appreciation to my father, Stanley Baranski, who throughout the long past years of labor consistently encouraged me in these endeavors.

To Lancelot Law Whyte and to the Henry Holt Publishing Company my thanks for their kind permission to quote extensively from Whyte's work. I would also like to thank the various other authors and publishers from whose publications I have quoted.

Grinnell, Iowa L. J. B

April, 1959

Scientific Basis for World Civilization

I

PREFACE

This book had its beginnings in the well-springs of human emotions and was shaped by the socio-cultural milieu in which the author lived. When the writer was eight years old, his mother suffered an incapacitating and lingering illness which led to her subsequent death. "What were the causes of human suffering and what lies beyond the grave for one's loved ones?" This was the precipitating situation and the questions which were to awaken the speculative curiosity in the author.

At about the time of the above emotional situation, I remember reading three books: Jean's *The Universe Around Us,* Darrow's *Story of Chemistry,* and the Catholic catechism. Darrow's book so stimulated my imagination that I adopted as a life goal the aim of pure science: the dedication to the pursuit of truth as it is to be found by scientific method. This aim later developed into the pursuit of a unitary theory with which to understand ourselves and our universe. Due to Jean's beautiful book, I started on this search for truth with the problem of trying to understand how the universe was created. How did the universe begin, I wondered. I was told by the sisters and I read in the catechism (half the block on which I lived was occupied by a Catholic Church and a convent), that God first made Himself and then made the universe. But how did God make Himself and then the universe? And why did a loving God allow human suffering to take place?

As I walked through the beautiful woodlands near my home, I actually generated so much tension by trying to answer these questions that the effort would leave me emotionally exhausted. I sought the answers in my social environment but I soon found that my sources of information either lacked interest in these questions or implied that it was not my place to so inquire. Since my social environment did not have the answers I resolved to pursue these inquiries until I knew their answers. This "emotional tension", this "need to know" led to a long search for truth which turned out to be a long period of sifting through many concepts. This period has covered almost twenty-five years of persistent study which has culminated in this book.

Several years later, perhaps generalizing my concern over family problems to social problems, I made a resolution to turn the knowledge that I acquired in this search for truth toward alleviating human problems. At the time, moreover, I was being reared as a Catholic but was also being strongly influenced by the Presbyterian faith. Becoming attached to both groups, I was disturbed by the social and cultural gulfs that existed between these two groups. This led me to seek a common (cultural) basis for understanding between them both in order to bring

them together. In these childhood experiences and aims arose the writer's interest in the social and cultural problems which the reader will find are the writer's primary interests to this day.

Gradually, as the years passed, the simple goal to pursue truth as it is to be found, became the pursuit of a unitary theory which pursuit, of course, is the aim of pure science as a whole. From the other two naive aims—to apply my knowledge toward solving real social problems and to find a unifying (cultural) basis for my two religions—gradually arose the notion that it was the task of science as a whole to assert itself in the entire gamut of the field of human values, along with a declaration of independence from religion and philosophy in the realm of human values, and the necessity for science to apply itself to the task of unifying the human family. I gradually came to the conclusion that human values and the pursuit of the empirical unification of the human family were goals as important for pure science as was the pursuit of a unitary theory. This conviction came about as I realized that neither religion nor philosophy could provide a rational basis for a system of human values upon which a stable, growing and progressive modern society and culture could be based and that neither of these cognitive systems could hope, nor had the knowledge or the methodology, to unify the diverse peoples of the human family. Gradually, therefore, the above convictions and the pursuit of a unitary theory merged into one goal. I was seeking, and science as a whole must seek, a unitary theory, not only to unify the sciences but also to provide a rational and universal cognitive system which could in turn lead to both a viable system of human values and the empirical unification of the human family.

As I slowly gained the perspective yielded by such fields as archaeology, anthropology, and ancient history, the realization dawned upon me that not only had God (of the Bible) not created the universe but that God was in reality a concept just like any other concept and 17
was not the absolute being in which I had been taught to believe. The more my knowledge grew of, not only my own religion and its historical background, but of other religions of the world and their historical backgrounds, the more my dis-esteem for religion as a system of knowledge and as a modern system of values grew in direct proportion. This situation led to a conflict that has continued to this day—the rejection of religion as a system of knowledge and as a source of modern values on the one hand and a respect and affection for the humble and dedicated religious workers on the other had. With the passing years my conviction has been strongly reinforced: because of the illusionary character of its concepts religion can never be dedicated to humanity as a whole. (The great religions of the world tried to unify humanity and failed. Their now numerous deities, holy books, and myriad array of competing sects represent that tradition in chaos.) As a system of knowledge and values, religion offers only the very beginning of both.

I remember feeling at the time as if I were treading "the loneliest road in the universe" for one does not escape easily from the psychological defenses that each religion must of necessity erect to guard itself against enlightenment. One is made to feel alone. Nor does one easily give up a system of values one has been taught to cherish; nor can one easily bypass absolute concepts without which, one has been taught to believe, nothing exists. But for me, the aim and spirit of pure science was to be too much for the religious tradition.

Subsequently (after an excellent training in the liberal arts and sciences at the Tilden High School in Chicago) I enrolled as an engineering student at the Illinois Institute of Technology and, as part of the training, studied semantics under Hayakawa. This training in semantics proved to be the turning point in my pursuit of a unitary theory. Semantics led to the developing of a prevailing attitude—always relate one's symbolic concepts to empirical referents; without empirical referents one's concepts are apt to be symbolic illusions. Due to my long study in the various religions and related fields, I already knew the great wisdom of this cognitive orientation. The study of semantics led me to realize why religion could never develop a system of knowledge or a modern system of values: its central concepts, being without empirical referents, simply afforded no basis for the accumulation of valid knowledge and the establishment of a modern system of values. Semantics also provided the conceptual tools which led me to believe that the universal human tendency to reify concepts was a cognitive invariant in human psychological behavior and as such offered a means to pursue unitary theory. 18

After a brief stay at the Institute, I entered the Army which provided me with much valuable time for study in the next three years. I was sent overseas and became a member of the 36th Mechanized Cavalry practically as they were linking up with the Russian Armies near Wittenberge on the Elbe River. The men of the 36th Cavalry were rough and tough, yet without brutality, and as a whole were an exceptionally fine group of men. (During a short period I had an excellent opportunity to observe and study that group which was to be one of the major determinants of the future of Europe and perhaps the world—for better or for worse—the Russian Army.) I only briefly saw modern warfare at first hand and also saw one of the horrible German concentration camps. Despite these experiences, I remain convinced of the essential goodness of the human personality. Modern science has shown that man is essentially good and that aggression, brutality, and cruelty (including such horrible examples as the German concentration camps) arise from frustrating circumstances, which are in turn often due to human immaturity and socio-cultural disorder.

In the short six months I spent in Europe, I traveled to many of the European countries and these peoples, even with ravaged lands and under extreme privations, and despite their faults, won my admiration.

PREFACE

At the end of six months I volunteered for duty in the Pacific and was returned to the United States when the war was abruptly ended by the dropping of the two atomic bombs. (Despite the fact that the dropping of the bombs hastened the end of the war and probably saved many lives in the process possibly including my own, I am of the opinion that the dropping of the bombs was a cynical or a short-sighted political act that was intended to cower the Japanese populace. I doubt if more than a few scientists concurred in the manner in which the bombs were eventually used—to destroy two cities of people when this could have been avoided. However this may be, the dropping of the bombs marked the beginning of the nuclear era which brought the religious and philosophical systems as viable systems to an abrupt half, and ushered in the age of science in both social and cultural organization.) My main motive was to get to the East in one piece and then to travel in Japan, China, Indonesia, India, the Middle East and Africa, to study their cultures and social organizations first hand. But with the end of the war, I was sent instead to an instructors school, then to officer's training school and then discharged from the service. I regret not having had the opportunity to visit the East and Middle East for one must supplement even the best of scholarly books on a people or culture by personal contact with the people or culture. Many of the conclusions recorded below, however, are based on personal conversations with Eastern scholars and visiting students and American scholars who have been in the East. 19

While in the Army, I was introduced to philosophy via Bertrand Russell's *History of Western Philosophy*. I had read various philosophical works before but I had never had the opportunity to grasp the field as a whole. (A short but encouraging letter from this great scholar was a source of inspiration at this time.) Still feeling a void because of the absence of both a system of values I could respect and a view of the universe I could hold to be true, and not being quite sure just where the pursuit of a unitary theory lay, I found the careful study of this work to be on the order of a "religious experience." Here, I thought, was not only an alternative to religion as a system of values but here was the very field that placed its highest regard on truth and knowledge.

In a short time, I was discharged from the Army and entered the beautiful little College of Wooster as a student of physics and chemistry. While there, I also went to the original sources of many of the great philosophers—Western and Eastern, classical, neo-classical, and contemporary. And yet, aided by the powerful methodology of modern semantics, in the subsequent study of system after system of philosophy including modern systems such as Capitalism and Communism, I found that many of these philosophical systems (like religion) were based on reified concepts (and may of these concepts could be traced to very primitive beginnings with alchemy playing a peculiarly important role). Religion arrived at its "eternal truths" by a

mysterious process called “divine revelation” and philosophy arrived at its “eternal truths” by an equally mysterious process—the exercise of “pure reason” and logic which often were detached from empirical referents. I found that the mystical and metaphysical problems, which are made to seem more mysterious and grander than the queries of science, almost invariably existed due to a failure to correlate concepts with empirical referents or due to a failure to differentiate concepts adequately in accordance with their empirical referents. Thus, I concluded that philosophy with its methods of reasoning and logic could acquire a stable, reliable, and verifiable body of knowledge only if given infinite time to apply its methods. Philosophy could not offer in the forseeable future a stable basis for a modern organization of society and culture, for it afforded neither a method nor a body of knowledge that could lay the basis for common agreement and cooperation. Philosophy might in the distant future arrive at a unitary theory but not with its dualisms and reified concepts of the present. From this study, I acquired a warm respect for philosophy as a discipline (as contrasted to religion) despite its faults. Most of the criticism in this book is directed toward the various forms of dualism and reified concepts in philosophy rather than toward philosophy itself.

During this study in philosophy I found the above “loneliest road in the universe” to be instead a broad and well-traveled highway. Many men and women of both Eastern and Western civilizations had long ago reached the same conclusions about the concept of deity, developed the same attitudes toward religion, and had long since left both for either philosophy or science.

Thus, the road ahead was clear—science must furnish a system of values for the modern world; it was the only discipline wherein the quest of pure science was to be fulfilled. Science was the only system of knowledge that had a large body of stable, reliable and verifiable knowledge and, most important of all, it had a powerful methodology in scientific method. Self-evident, many would say! However, I had no one in my social environment to direct my cognitive footsteps and no one to reveal that this was self-evident, so the cognitive trail led from religion, to philosophy, to science. Moreover, that this above insight is far from being self-evident is attestified by certain current events. This long cognitive development and the acquired experiences, for example, have prevented the reflection of the current cultural decay due to the intense psychological stresses and tensions of our time. A number of our current scientists, on the other hand, even some of our most distinguished scientists, due to the lack of an organized system of values in science to cope with these current stresses and tensions, are not looking to science to develop these values. They are instead displaying a regression to the values of philosophy and religion and, in the course of this value-seeking, are reintroducing into their work religious and philosophical concepts which they know to be erroneous

and even harmful and which have taken science four centuries of long hard-fought labor to remove from their disciplines.

These conclusions and judgments were reached more than a decade ago when I had already acquired an extensive background in most of the sciences. By this time and with each advancing year of the nuclear age, it was becoming increasingly evident to scholars the world over that a [21] civilization based upon science had passed the point of being a theoretical necessity and had become a practical necessity for the very survival of the human race.

Gradually the quest for a unitary theory was conceived in the following way. My studies and observations in religion, philosophy, archaeology, semantics, current politics and social observation in general—including self-introspection—convinced me that the human's tendency to reify concepts, taken as a whole, was a cognitive invariant of human psychological behavior and similar to the invariants studied by the physicists, the only difference being that one was in the psychological sphere and the others in the physical sphere. (Taken very simply, reification of concepts refers to the fact that we humans tend to put things into our thinking about ourselves and our environment that are not empirically in either ourselves or in our environment. This sort of thinking leads us to develop ideas, attitudes, values, belief, cognitive systems—upon which we base our actions—that are not related to ourselves or our environment as it objectively is. These ideas, attitudes, values, etc. which contain illusionary referents are given the collective name of reified concepts. These reified concepts have been, and are, universally used by the human race in space and time. These cognitive invariants must play a profound role in the human for oftentimes peoples and societies prefer destruction or oblivion rather than part with their reified concepts which can easily be shown to be illusions.) Gradually, after a long study of the literature in various fields of science, I concluded from the properties of this cognitive invariant (the phenomenon of reification) that it must be the resultant or the effect of some general causal process operating in all humans and that it is not simply due to our ability to symbolize and verbalize or due to a function (e.g., value seeking) provided by our more highly differentiated nervous systems. (For example, psychological and anthropological studies showed that the higher apes display reification behavior. Thus, since the higher apes symbolize but do not verbalize, the factor of verbalization was eliminated as a factor in reification behavior.) Gradually, it was further concluded that the phenomenon of reification was actually the manifestation of a universal process operating not only in humans but in all living systems and the cognitive phenomenon of reification was simply this universal process appearing in one of its most complex but most clearly differentiated forms. This latter feature was of fundamental importance for, in this most highly differentiated form, the various properties of this universal process were being most clearly manifested. Thus, by determining the

fundamental properties and characteristics of the phenomenon of 22
reification taken as a whole, one was actually determining the properties and characteristics of this universal causal process. All that one would have to do to obtain a unitary theory would be to have these fundamental properties and characteristics in hand and look for such a general-type process at the most basic level which would possess all these features. The intrinsic mode of operation of this general-type causal process, expressed in words, would be unitary theory per se. (Although I went through the above sequence of steps in my thinking, an indication that the insight was neither clear nor sudden is the close to 200 papers and the 50,000 index cards that I accumulated in the pursuit of a unitary theory via this method.)

The phenomenon of reification thus offered a means to attain a unitary theory that would serve a dual purpose. It was reasoned that if I could find a process at the most basic level which would include all the properties of the cognitive invariant of reification, a unitary theory might be had at one stroke which would be general enough to incorporate all other partial theories in science and which would simultaneously permit pure science to challenge all other reified concepts and cognitive systems in religion, philosophy and in science itself. I deemed this challenge of especial importance for if science was to assert its partnership type of leadership in the field of human values and to declare its independence of religion and philosophy, these reified concepts and cognitive systems must of necessity be challenged in no uncertain terms. Otherwise it would take generations and perhaps centuries for science to provide the partnership type of leadership that it has to provide in the immediate present and especially in the near future. Moreover, if these reified concepts and cognitive systems in and out of science went unchallenged, a unitary theory, even if it were achieved, would very likely go unnoticed or be inapplicable because of the vast complexity and confusion created by the numerous reified cognitive systems. The quest of pure science would be fulfilled but its aim to unify the sciences and its dedication to the human family would be thereby thwarted.

Where to look for such a process? Of course, in physics and chemistry. Yet, I already had a fairly good background in physics but recalled no such process in this field. So the next step was to go deeper into physics through quantum theory (via Planck's *Treatise on Thermodynamics*) and the newer statistical quantum mechanics (via Heisenberg's *The Physical Principles of the Quantum Theory*). After a 23
study of both of these extremely difficult texts, I concluded that modern physics did not offer either the empirical referent or a conception of the basic causal process I was looking for.

During this theoretical activity in physics, I read Munn's elementary textbook in psychology in the course of the regular curriculum at Wooster. In this textbook I found the first hint of a general-type causal

process in Cannon's physiological concept of homeostasis. This concept led to Cannon's original work and then to a long and systematic search in modern physiology which eventually led to modern micro-biology (especially muscle and nerve thermodynamics and metabolism), biochemistry, and physical chemistry. In the course of this study, I encountered Oparin's *Origin of Life* under two gifted professors at Wooster, Spencer and ver Steeg, and the two branches of physical chemistry dealing with processes—kinetics and the field of free energy—under the equally gifted Kieffer. (The concept of homeostasis gradually came to be regarded as a partial theory. The reification of concepts is a creative affair and quite often the human or his social group form such concepts for self- or group-actualization. Neither aspect could be explained as a tendency towards dynamic equilibrium without reifying the homeostatic concept as outlined by Cannon himself.)

At this point, I began to believe that such a general-type causal process was simply not yet available in science so the logical step was to develop a conceptualization of this basic process, utilizing basic principles and concepts in physics, chemistry, and biology. (By this time I had graduated from Wooster and since one of my prime interests was human values I switched my Ph.D. interests from physical chemistry to psychology. I completed undergraduate work in psychology during one summer and entered Roosevelt College as a graduate student that fall. From the onset, I acquired a "mental block" toward one of the great theoretical systems in psychology. The head of the department at Roosevelt was George Hartmann, one of the early researchers in Gestalt psychology who demonstrated several of the Gestalt experiments the first day of class. This aroused my interest which led to the reading of Professor Hartmann's book. But unhappily, almost at the core of Gestalt theory lay the doctrine of holism, a vitalistic concept which happened to be the very concept modern micro-biology rebelled against in the 1890's to declare biology's independence of philosophy and establish biology as a field of science based on physics and chemistry. I rejected Gestalt psychology and Köhler's field theory in toto due to this apparent close connection of Gestalt psychology with vitalism.) Based on data and theory from these various disciplines, I began to develop a conception of the unitary process. For 24
example, by now I knew that it must basically involve the thermo-dynamic property of free energy (in addition to the properties deduced from the cognitive invariant) but in a peculiar and unusual way. That is, peculiar and unusual in reference to the second law of thermodynamics which states, in one of its aspects, that all natural processes tend toward a minimum of free energy. A vast amount of research in micro-biology indicated that the unitary process must be, if anything, a free energy maximizing process.) In time, I provisionally conceptualized the process as a "free energy protective process" or a "free energy level restoring process." (I developed these concepts in preparing a synthetic work for the thesis requirement at Roosevelt which was aimed at

developing this notion of a general-type process and, via synthesizing the theory from many fields, it was aimed at unifying the various fields of psychology. The thesis met with the warm interest but not with the approval of the faculty of Roosevelt College. The faculty voted to waive the thesis requirement and thereby did not pass on its merits.)

One of the salient characteristics of living processes was a free energy maximizing feature but this was clearly contradictory to the second law of thermodynamics. Therefore, the general-type process had to be developed in such a way that it incorporated both the second law and this maximizing feature. Consequently, utilizing Oparin's theory, the origin of a "free energy protective process" (which I equated with the salient event in the origin of life) was envisioned in a nucleoprotein system in the primary ocean. The postulation was that, when the nucleoprotein system first originated, there was an abundant supply of free energy substance in its environment. The great supply of free energy substance in the environment of the aboriginal nucleoprotein system acted as an unbalanced force (Le Chatelier's principle) driving the processes upward (thus investing the system with a free energy maximizing feature despite the operation of the second law) that could be initiated by the nucleoprotein system such as reproduction. The presence of this unbalanced force for millions of years led to the development of a differentiated (structure and process) nucleoprotein system which tended to continue its intrinsic operations even when the source of the free energy substance gradually began to disappear, so as to offset any diminution in this aboriginal unbalanced force. As the basis of these continued operations, I postulated a property of these aboriginal systems to be "chemical inertia." That is, the unbalanced force had operated so long that the processes and structural organizations which had been developed in the interim tended to 25
continue their intrinsic activities by offsetting any factor causing the diminution in this unbalanced force. This counteractivity of the processes and structural organizations of the nucleoprotein system that so acted to offset diminutions in this unbalanced force, I termed the "free energy protective process" for, in effect, the system's free energy level was being sustained. Over long geological ages (since the source of free energy upon which the unbalanced force depended constantly changed) this process operated developing metabolistic sub-processes and structural organizations which, over this long period time, provided living organisms with their free energy maximizing feature.

From this viewpoint, the human taken as a whole (from the genetic level to the neural level) was actually a differentiated expression of this "protective process" with good reasons: all the sensory modalities of the human's sensory nervous system (with the exception of the anterior frontal) had correlates in free energy formulae and it had been established that both the neural and genetic systems were apparently based on a nucleoprotein system. (Thus, the aboriginal "free energy protective process" which operated within a nucleoprotein system had

at the beginning all the primary liabilities to develop into the human nervous system and needed only a long and continuously acting "free energy stress" environment to differentiate out these primary liabilities.)

The postulation was that the anterior frontal lobes played a "principle of least effort" role in the "free energy protective process". They contained the memories of the energy expenditures which the human had used in the past to offset free energy stress or to utilize maximally the organism's free energy and which had become differentiated into our primary drives, emotions, and feelings. The anterior frontals were conceived to provide the "free energy costs" of experiences within the lifetime of the individual which were experienced as the primary drives, emotions, and feelings, and the anterior frontals also provide the "free energy costs" which are the basis for perceptual and cognitive meaning. Without the prefrontals, the "free energy costs" of experience would be lost. These "free energy costs" were conceived to be the basis of human motivation. Thus, behavior is not motivated or manifested in humans unless it, in some way, either protects or serves to maximize our free energy level and, in this way, the anterior frontals play an efficiency or "principle of least effort" role in the "free energy protective process" of the organism as a whole.

Thus, I was postulating that there is a dynamic process operating in all living organisms which arose with the origin of life on this planet and is 26
based on a "free energy protective" principle and which operates within a nucleoprotein system manifesting itself in the development of organismic structure and function and in the motivation of human behavior. It is this process which operates in all humans and which makes cognitive systems (reified or not) in humans basic thermodynamic necessities. That is, our cognitive processes permit us to lay a free energy stress on our free energy providing system (which is reflected in the primary drives, emotions and feelings) but the free energy protective-maximizing process (in the form of our cognitive processes) reacts over time to offset this source of free energy dissipation. Our reified concepts, personal or cultural, were postulated to be one of the first lines of defense against free energy dissipation. Thus, the reason behind the universal use and tenacious hold of reified concepts on the human is that such concepts serve thermodynamically to adapt us to our cognitive environments. (Humans, as individuals or social groups, thus create reified concepts and cognitive systems to control and secure fulfillment for their primary drives, emotions, and feelings but basically to protect and maximize their intrinsic free energy level. Concepts, illusionary or not, if they serve this function, are highly valued. But invariably, in time, the individual or social group tends to assume that these reified concepts are true and that they actually refer to something in the empirical world so these concepts with illisionary referents tend to undergo fantastic proliferation instead

of critical evaluation. Since our whole affective life and basic thermodynamic adaption are involved, we tend to cling to these concepts and cognitive systems even when we know they are illusions. But in this way we court disaster for we tend to base our thoughts and actions on cognitive concepts which are not related to the environment to which we must realistically adjust and adapt. The vast majority of the concepts in religion and many of the concepts in philosophy can be shown to be illisionary concepts of this type that are adjustive in the short run but maladjustive and disorder-producing in the long run. Thus, since such concepts in religion and philosophy are adaptive necessities and disorder producers at one and the same time, it became a basic conviction that the scientist must not simply refute and discredit these concepts but must, at the same time, put something better in their place. If this is not done and only refutation takes place, the human individual and society, deprived of their adaptive illusions, will become demoralized or hold more tenaciously to their illusions, and justifiably develop hostile and contemptuous attitudes toward the scientist, or descend to the cognitive level of superstition or attain their adaption in cognitive disorders.) When these and other psychological defenses fail, intense emotions and feelings are experienced and the second line of defenses come in: the psychosomatic, neurotic and psychotic disorders which were postulated to be defenses initiated by this master process against lowering the organism's free energy level as a whole. [27]

This explanatory process and principle proved to be a powerful concept and it could explain many of the dynamic features of biology, psychology, and sociology. Yet, I was distinctly dissatisfied with the concept of the "free energy protective process" for it was grounded in the living sphere, far removed from the basic type of causal process from which a unitary theory must be derived, and it lacked some of the properties of the above cognitive invariant. The postulate of "chemical inertia" was nebulous at best and upon this concept the whole idea of the "free energy protective process" rested. Gradually, it occurred to me that the source of error lay in the very attempt to conceptualize the process—the process was simply to be discovered and not constructed by conceptualizations. Thus, it was an error trying to account for the "free energy maximizing" feature by synthesizing basic physio-chemical principles for this property was very likely an intrinsic feature of this general-type process that must be discovered in operation. Perhaps at the core of this conviction lay the increasing suspicion that all natural processes do not spontaneously approach a state of minimum free energy as asserted by the second law of thermodynamics and that the laws and principles of thermodynamics may only be special cases of a more basic unitary process and apply only to particular systems. Moreover, the central concept being used, free energy, was essentially a quantitative concept which made it very difficult to deal with the structural characteristics of living organisms in an organized and

systematic fashion. I did not have the insight to realize that the unitary process must basically involve structure of a particular sort whose intrinsic tendency was the source of process and which possessed this free energy maximizing feature as one of its salient features.

The unitary process was to be discovered and not to be arrived at by synthesizing basic physico-chemical principles. This was not a novel insight, for the very reason I had attempted to conceptualize the process in the first place was the failure to find its existence in the basic sciences. Yet this experience was of value for it convinced me that model building was inadequate and that any concept of process arrived at by this means was apt to be erroneous. Thus, to be sure, the general- [28]
type causal process must be discovered but where was one to discover it? Perhaps a closer perusal of the empirical referents of the basic sciences would offer some hints.

The time of this dilemma happened to coincide with the termination of my studies at Roosevelt. I had several alternative universities at which to continue my Ph.D. studies in psychology and among these were the University of California at Berkeley and Princeton University. While visiting Princeton, I also chanced to visit the Institute of Advanced Study and had a unique opportunity to converse at length with the venerated mathematical physicist—Albert Einstein. (As events were to show, Professor Einstein was making a last and mighty attempt to achieve a unitary theory via a new theory in which the geometry of the world is characterized by a general tensor of the second order with sixteen functions.) In the course of the conversation Professor Einstein mentioned several advances in nuclear physics and astronomy which aroused my interest. Here, in the discovery of nuclear particles, was emerging a new dimension of the physical world that might directly bear on the modern problems of cosmology and throw light on the subject of my current interest. (In reflecting over this conversation with this pure scientist who had given a lifetime of unstinted devotion to science and to the pursuit of a unitary theory, I felt that Albert Einstein clearly sensed at that time that unitary theory was close at hand. Judging from several small indications, it seems that Professor Einstein suspected that the goal would be reached by quantum theory rather than via his own formulations.)

In turning to astronomy, I found the field to have changed dramatically. Everywhere the astronomers were talking of a universe in process—the birth and death of stars, the evidence of evolutionary sequences in stars and galaxies, the dynamic structure of our galaxy and of our universe, etc. The universe, in fact, seemed to display the very characteristics that one would expect if a unitary process were governing these astronomical bodies. [Since modern astronomy, like modern chemistry, is based on (astro-) physics it had not occurred to me that astronomy might possess some hints of a general-type causal process when physics did not.]

In time the notion of "a universe in process" led me to suspect that the unitary process could be discovered operating in this aspect of the physical sphere, for how else could one account for the orderly evolutionary characteristics of the universe and for the birth of new stars without postulating particulate hypotheses? Oparin had already suggested that the origin of life was due to a process of increasing carbon complexity which process could be traced to its beginning in the hottest and, hence, the youngest stars. Thus, one could conceive of a continuously operating process that leads to the development of new stars and then to the origin of life by a process of increasing carbon complexity (as the star's planets cooled) and then biological evolution to yield the billions of plant and animal species including man himself, and then in man to a progressive psycho-sociological evolution. Millikan and co-workers had shown long ago that cosmic rays have an extra-galactic origin; that is, must originate somewhere out in inter-galactic space away from the central plane of our galaxy, the Milky Way. These cosmic rays are identical to the nuclear particles themselves (except for their fantastic energies) so I began to suspect that this unitary process must exist somewhere in inter-galactic space and must somehow use these super-powered nuclear particles in its creative activity. But what sort of process could exist and operate in inter-galactic space and use such particles to create new stars and then lead to astronomical, biological, and then psycho-sociological evolutionary development? 29

Several weeks later I traveled to the University of California at Berkeley. At the time, I was looking for a more basic parameter for psychological activity than the pattern changes in the nucleoprotein molecule for I had recently become aware of an experiment in which an investigator succeeded in selectively impairing the side chains of the DNA molecule in a particular culture without the expected drastic genetic effects. (Zamenhof, *Science*, 12 Nov. 1954 p. 791). This was a revolutionary discovery for many theorists postulated that simply a small change (even as small as a quantum jump) in one of the atoms of the DNA side chains would be sufficient to cause a mutation but such apparently was not the case. (Due to research in micro-biological thermodynamics, the nerve impulse as the basic parameter of neuro-psychological activity had already been rejected and a hypothesis of nucleoprotein patterning put in its place. Thus, both genetic and neural activity were conceived to be mediated by nucleoprotein patterning.) While I was at Berkeley and describing various aspects of my theoretical development, one of the members of the department remarked that my views were similar to those of a member of their department whereupon I was presented with an unpublished paper by Sickles. The paper turned out to be similar to various aspects of my thesis and contained a brief exposition on nucleoprotein patterning as the basic genetic and neuro-psychological parameter (after Katz and Halstead). But Sickles pointed out that these "nucleoprotein memories" must be supremely

small microtraces rather than the large macrotraces envisioned by current theorists. Upon reading this statement, in one of the few rare flashes of insight in twenty years of study, I saw what I thought was the key to the suspected continuity of processes from the astronomical level to the psychological level. All levels displaying evolutionary characteristics must be based on supremely small structures—smaller than the nuclear particles that were being discovered at the moment. Thus, the basic neuro-psychological and genetic parameter was a sub-nuclear structure and not a pattern change in the nucleoprotein molecule.

In a little more than a year at Princeton, in the pursuit of a Ph.D., I made an extensive perusal of many of the theories in psychology and was more convinced than ever of the generality of my conception of a unitary process operating in nature and which, in one of its aspects, manifests itself in human psychological phenomena. (I am indebted for advanced theory to Professor Tomkins especially in reference to communication and information theory.) Early in this year Professor Pratt, one of the distinguished experimental-theorists in perception and many times editor of the *Psychological Review* encouraged me to submit a paper embodying my views to this journal for publication. I was somewhat dubious of the success of the paper for a short paper in psychology of this type must of necessity leave much unsaid of its background in physics, chemistry, and biology. The paper, my one and only attempt at publication, received the expected rejection "Grandiose. ..gambols in biological theory...o.k. if presented by a distinguished person in the field...effort to be encouraged." Practically at the time of receiving this rejection slip, I received a note from Professor Kieffer of Wooster telling me he did not have the time to peruse my thermodynamic development and advised me to read a good general treatment of the second law of thermodynamics which was in Blum's *Time's Arrow and Evolution*. Upon reading Blum's book, I was surprised to discover that Professor Blum's hypothesis on the "origin of life"—aside from being a lucid exposition on the free energy concept—bore a striking resemblance to my own conceptualization of the origin of life. My paper was submitted to Professor Blum via Professor Alexander of the psychology department who at the time advised me to read von Bertalanffy's theory on the steady states in the open system.

After a personal conversation with Professor Blum, I concluded that I indeed had anticipated somewhat the same conception of the "origin of life" as had this scholar. The significance of this simultaneous invention of ideas was not lost upon me—it was a tribute to the facts and theory made available by modern experimental biology and, secondly, a tribute to the power of the semantic methodology adopted as a habit of thought in my synthetic theorizing. Professor Blum had a much better grasp of the facts and theories in biology and clearer conception of thermodynamics which permitted him to write his erudite book, but I nevertheless had arrived at the same conclusion in this one

aspect of Professor Blum's book due to the utilizing of the denotative principles of semantics. This confirmation of the power of the semantic methods of conceptualizing and a growing realization that the theory was actually a reflection of wide-spread views in science, led me to decide that this was the time to publish the theoretical work as a whole.

I requested and was granted a leave of absence from my graduate studies thanks to Professors Tomkins and Cantril. Since the concept of free energy played so large a part in the general-type causal process I envisioned, I turned to advanced texts in classical and statistical thermodynamics for a more fundamental understanding of their laws and principles. Also, concurrently was begun a general survey of the field of science as a whole via reading all issues of *Science* and the *Scientific American* for five years back. As I learned more of advanced thermodynamic theory and of the current literature, more and more the conviction grew that the thermodynamic laws and principles were inadequate to explain what I knew of the purported unitary process and more and more important became concepts related in one way or another to structure. In one of the issues of *Science*, I encountered Bertalanffy's concept of the hierarchy of steady states in the open system but the concept was bypassed for, instead of finding one process or one conceptualization of a process that could serve to account for all the characteristics of this general-type process, Bertalanffy seemed to be creating more concepts.

References in the above two journals led deep into the literature and to various symposiums which were invaluable in obtaining up-to-date notions on various theories. In one symposium was found the discussion of the neuro-psychological reticular formations interpreted and outlined below. In another was found a article by Pringle whose ideas were astonishingly similar to my most advanced ideas on the "origin of life" but which employed statistical thermodynamics as a basic interpretive system. At the end of a year of this extensive perusal of the literature, I decided to stop and write up the theory. In this last perusal of the literature were found few further hints as to the nature of this general causal process but it was noted that many theorists the world over were converging upon what seemed to be a unitary theory. Shortly before initiating the actual task of preparing the manuscript, [32] there had been compiled a list of close to five hundred so-called master generalizations which were actually established concepts and theories abstracted from the various branches of science explained and synthesized by my view of the unitary process and which included concepts and theories that my concept of process could not explain.

The unitary process would have to contain at least the following properties and characteristics all in one process. It would have a free energy maximizing and a free energy protective feature; it would be a creative process; it would involve empirical referents more basic than those utilized by classical and statistical thermodynamics; it would

somehow basically involve discrete structures; it would operate on an efficiency or least-effort principle; it would be a process that could be found in inter-galactic space and which could be extrapolated to account for the suspected evolutionary continuity from the astronomical level to the psycho-sociological level in the human. One of the primary purposes of the projected book was to predict the future empirical discovery and theoretical elucidation of a unitary process and unitary theory whose characteristics could be fairly well delineated per the above criteria. The list of "master generalizations" was to be used to indicate that a complete knowledge of this unitary process would yield a unitary theory which could relate and unify all of the sciences.

Several days later, a momentous discovery was made (momentous in reference to the pursuit of a unitary theory); unitary theory had already been written! In the process of acquiring dictionaries in the physical sciences for the projected manuscript, Whyte's work *The Unitary Principle in Physics and Biology* was accidentally encountered. A brief look at the book led to an initial surmising that Whyte's "unitary principle" was just another vitalistic concept in a field of many. But on closer inspection it was noted that Whyte's book offered a table of conceptual equivalents relating his concepts (dealing with field theory) with concepts already established in physics, chemistry and biology. One of the concepts listed in the table was the free energy concept which played a very central role in my conception of the unitary process. The most interesting fact about Whyte's concept of free energy was that he offered a structural conception of free energy in terms of his unitary field theory. This key concept permitted the easy translation of the above "master generalizations" into Whyte's view of unitary theory.

In brief, Whyte's theory represents the merging of the field and structure concepts into one concept—the structured field—with the additional hypothesis that the field possesses an intrinsic formative tendency. In essence, Whyte postulates the existence of one structured field underlying the universe which possesses a unitary tendency with two aspects. In one of the aspects its structural asymmetry tends to disappear (in isolable processes) with the appearance of form (or with the appearance of structural aggregates which have particular forms). In the other aspect the field as a whole operates in such a way that it tends to restore its level of asymmetry. When the two aspects of the unitary field tendency act in cooperation, we have a process in which structural aggregates are formed and which is accompanied by a tendency to restore the aggregate's symmetry level to the asymmetry level of the field as a whole. (The aggregate, of course, is part of the field.)

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Whyte's concept is a creative process for, in the isolable process in which structural aggregates are formed, the formative product is different than the elements which went into its formation. The process has a free energy maximizing feature which tends to restore the free

energy level in a particular structural aggregate. (Whyte equates free energy with structural field asymmetry. Thus, the asymmetry level or norm in the structure field as a whole is the free energy level of the field per thermodynamic terminology. Since the field as a whole tends to restore the asymmetry level in the structural aggregates to the asymmetry level of the field, the field tends to bring the free energy level of structural aggregates up to that of the field as a whole—which feature has been referred to by me as a free energy maximizing feature.) The process has a free energy protective feature: every deviation from the norm evokes the function which eliminates that deviation. (In other words, the "free energy protective feature" is actually a manifestation of the free energy maximizing feature or the restoration of the asymmetry norm of the field as a whole.) The process has an evolutionary feature in that the normalizing process (the intrinsic tendency on the part of the field to restore its asymmetry level or norm) operates in such a way that the structural aggregates formed in the isolable processes are developed over time into processes and structural organizations which facilitate normalization (or which facilitate the free energy maximizing tendency of the field). Fields have long been known to operate on a least effort principle. The process could readily be conceived to operate in inter-galactic space and as readily conceived to underlie the evolutionary sequence from the astronomical level to the psychological level especially if the unitary process itself is based on the ultimate particles (as Whyte himself postulates) which would be free energy field structures and especially if these ultimate particles underlie all evolutionary processes on all levels of structural organizations (as indicated by the above criteria). Thus, the unitary process operating in inter-galactic space would use these free energy field structures first to form quantum field structures and nuclear particles and then nuclear sub-systems—the atomic nuclei—and then the various atomic elements by filling in the orbital electrons. Over time a huge aggregate of these would be formed within the field which would be observed as dust clouds and these would be moved by the process in some orderly manner to form new stars in various parts of the galactic group structure with the subsequent origin of life by an evolutionary process (of some sort) on individual planets and then to biological and psycho-sociological evolutionary development of the living organizations on these planets. In essence, Whyte's concept of unitary theory is modern quantum field theory with two additional bold hypotheses—that there is but one field and that this field is a structured free energy field which possesses an intrinsic tendency.

[34]

After several months of translating my theoretical generalizations into Whyte's concept of unitary theory, there was no other alternative but to conclude that Whyte's unitary field theory met the above criteria that had been anticipated and offered the most fundamental explanatory system in all of science and which should prove capable of unifying all the sciences.

It might be said that, aside from writing his book with a disarming simplicity indicative of a long acquaintance with fundamental scientific thought and a long acquaintance with pursuit of a unitary theory, Whyte presents unitary theory with an elegance seldom surpassed in scientific theorizing.[1] (What was most surprising was that Whyte wrote his book in 1948 without the benefit of the subsequent research published after that date and upon which the present formulations are based.) After reading Whyte's book many things began to fall into place. The reading of von Bertalanffy's *Problems of Life-—An Evolution of Modern Biological Thought* made it apparent that this scholar had not only anticipated my insights as to the inadequacy of thermodynamics as a basic explanatory conceptuology but that he was one of the prime movers behind unitary theory itself. Whyte's concept of the structured field explains Einstein's attempt to resolve the dualism between particle

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[[1]In a prior book, *The Next Development in Man,* written with scholarly quality equal to that of *The Unitary Principle,* Whyte recognizes the widespread phenomenon of reification and recognizes that the age of religion and philosophy has come to an end. Science with unitary theory, he asserts, must provide the cognitive basis for a world civilization. In this book Whyte sees a formative process working throughout history—the next step of which is the development of a world civilization.]

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and field; with this dualism unitary theory was impossible, but with it 35
resolved, unitary theory was close at hand. Upon re-reading some aspects of Gestalt psychology, the conviction was reached that, despite being involved with vitalism and employing a now archaic notion of field, Köhler,in his application of field theory to perception, anticipated unitary theory in psychology. It seems that many theorists anticipated various aspects of unitary theory such as the transactionalists at Princeton and Allport in his *Theories of Perception and the Concept of Structure*. As Boring, the distinguished historian of psychology, might say, unitary theory seems to be a product of the Zeitgeist or, more accurately (without detracting a bit from Whyte), unitary theory is a resultant of the knowledge slowly accumulated in the various branches of science especially within the last twenty-five years.

Thus, the great quest of pure science for unitary theory was coming to an end. (To be sure, Whyte's concept of unitary theory is far from being firmly established and faces formidable obstacles in unifying the sciences[2] and the unitary process remains to be discovered in operation but the securing of both goals, it now appears, is only a matter of time.) Many distinguished scholars have spent their entire lifetimes in pursuit of unitary theory but this goal has been reached first by Lancelot Law Whyte and by the tradition in science he represents.

[[2] The great advance of philosophy over religion was that it intellectualized the dualistic-transcendental invariants or reified concepts of religion and thereby gradually and largely overcame them. But philosophy, in declaring its independence from religion, created dualistic and reified concepts of its own. The various branches of science, differentiating from philosophy, have largely been established by revolting against these dualistic-reified concepts of philosophy. Most of these dualistic-reified concepts have been removed from the various branches of science by the persistent application of scientific method and those that remain have little prestige. But there is one dualistic concept which still has tremendous prestige in science and this is the notion of natural or mathematical law upon which the great theories of physics are said to be based. Due to the great role mathematics has played in developing the sciences, it is little noted that the notion of law upon which physics is said to be based in a dualistic concept. This dualistic concept has led to the development of laws which gradually acquired a greater importance than the empirical world of which they should be descriptive. Nature has been described not by concepts veridically related to empirical referents but by the characteristics of the quantitative techniques employed in dealing with these empirical referents. A good deal of the great confusion and complexity of theory in the sciences is due to this above dualistic concept and the reified conceptual doctrines that it has engendered. Quantitative technique, the backbone of scientific method, is also one of the last strongholds of dualism in science. It is the great complexity and confusion created by quantitative technique in the field of theory which unitary theory must challenge in its aim to unify the sciences.]

It was originally planned to write a series of books. First a general book whose [36] aim would be to show that unitary theory could apply to all the sciences; next would come the origin of the universe and the origin of life; next biological evolution up to the appearance of man on this planet; next psycho-social evolution from the era of superstition to the modern nuclear age; next the attempt to unify psychology with the development of a modern system of personal values; next an attempt to provide a unitary basis for sociology with the development of a modern system of socio-cultural values; lastly, a challenge of the world's religions and philosophical systems as modern systems of knowledge and values with the aim to supplant both by scientific knowledge and a system of values grounded in scientific knowledge and fully accessible to challenge, change and improvement by scientific method. All books were to be written within the frame of scientific knowledge, interpreted by unitary theory. However, the events of the nuclear age have moved so rapidly that it was realized that many Gordian knots had to be cut now and not ten to twenty years from now. So the series of projected books was telescoped into this one book with the slow scholarly development left until later.

As has been anticipated by many, the nuclear powers of the world's nations have transformed their armies from conventional arms to armies equipped with thermo-nuclear and biological weapons. Herein lies the crucial situation of our time which must be squarely and realistically faced and which overshadows all other considerations. The human race has the essentials for its own extinction on hand. Our political organizations called nations have become maladapted organizations in the nuclear era because each nuclear nation possesses the means to annihilate the other and perhaps the whole human family overnight. Modern diplomacy—still largely based on force, threat, and bluff—has already used the threat of nuclear warfare in its brandishments and has been successful, but only for the present. With nationalism rampant in the world, with many nations nursing real and imagined grievances, with human immaturity in the form of autocratic individuals or autocratic social groups still seeking to further their privileges and power at the expense of the

many or of the weak, the time is not far off when one nation will call the other's bluff—with weapons other than the conventional ones now employed. A nuclear attack, as it is well known, in order to avert the aggressor's own annihilation, must be an all-out, encompassing, surprise attack. If the attacked nation has the opportunity to counterattack before it is destroyed or crippled so badly that it can not 37
counterattack, the whole human race and all land-living species may be fated to disappear from the face of the earth. This may well be the destiny of the human family if our childlike institutions and current events are allowed to run their course. It is a practical necessity for the nations of the world to unite in a world community of nations that transcends individual national boundaries in the near future. This political federation must be based on a cognitive system whose concepts can lead to understanding and cooperation which in turn can lead to the development of a world civilization based on the highest of human values.

The current situation is complexed by the fact that humans under stress and tensions such that exist today go backward and re-espouse old illusions with an even greater tenacity than before instead of going forward from illusion to solve their problems and thus make realistic solutions to current problems even more remote. This cultural regression or re-espousing of old illusions (called de-differentiation of concepts in psychology) is also accompanied by heightened fear and hostility which increases the possibilities of armed conflict—a vicious cycle and a suicidal situation in the modern nuclear era.

Science, several centuries ago in declaring its independence from religion and philosophy, without foresight left human values to theology, history and philosophy on the grounds that that which was subjective was not amenable to scientific study. This was perhaps the greatest blunder science has ever committed and is at the core of the above almost impossible situation. Over the centuries, science has discredited and refuted the dualistic and reified concepts of religion and philosophy and has discredited these cognitive systems in the process but science has offered no organized system of values to take the place of those advocated by religion and philosophy. Thus, with the current stresses and tensions, we find great numbers of men and women retreating in the search of values and security to the very concepts and cognitive systems that science has refuted or discredited. These discredited systems can lead nowhere but to further cultural regression and decay. Actions, thoughts, and behavior in general based on these religious and philosophical systems will not lead to understanding, cooperation and realistic solutions to real problems but will lead to pseudo-unity and to illusionary solutions of problems. In practical reality they will lead to socio-cultural disorder and disunity such that has characterized these disciplines and the societies and cultures based upon them in the past and present.

Scientific knowledge is the only body of knowledge from which a cognitive system can be derived which can lay a real basis for understanding, cooperation, and unity. 38
Scientists are the only social group in the world that can hope to gain the trust and confidence of the world's peoples. Consequently, it is the responsibility of science as a whole not only to develop a world-wide cognitive system but it is also the responsibility of science to halt and reverse this retreat to the irrational by challenging the world's religions and philosophical systems for leadership in every

sphere of human activity. This latter challenge is an unhappy task for it will appear to the very men and women whose confidence and trust must be secured that science is violating their security and cherished system of values. The challenge of science therefore must be primarily of a creative and constructive nature; science must creatively develop systems of ideas and values that can take the place of those in religion and philosophy. Science, moreover, must recognize the positive contributions and accomplishments of religion and philosophy and must recognize their value as worthwhile traditions and must especially encourage those men and women engaged in religious and philosophical pursuits to play important roles in the modern society and culture envisioned by a unified science. Science, it should never be forgotten, belongs to all the men, women, and children of the human family.

Pure science, in developing unitary theory, has developed a cognitive system that may unify the sciences. A unified science is the cognitive key to a new modern civilization in all its aspects. A unified science offers the whole human family the cognitive basis for understanding and cooperation and offers enchantment and adaptation without illusion. A unified science in cooperative action with the liberal and fine arts and the men and women of modern communities can develop stable, growing and progressing modern societies and cultures and a world civilization that will ultimately embrace the human family as a whole. A unified science has the method—scientific method—from which a commonly shared viable system of values and a commonly accepted view of man and the universe can be derived and which can be revised and improved as we gain in knowledge and experience.

It is the task of the individual pure scientist, wherever he or she may be, to take as his responsibility the aim to unify the sciences, to develop a modern system of values based on scientific knowledge and amenable to change and improvement by scientific method and to dedicate a unified science to empirical unification, future peace, prosperity, and happiness of all the men, women and children of the human family.

The reader should be forewarned that, in dealing with human values, the root 39
causes of many delicate personal and socio-cultural problems must of necessity be discussed which will deeply involve one's emotions and feelings. If a more orderly and better future is to be had in all spheres of human living, science must bring these basic causes of human maladjustment into the open, not only deal with their diverse symptoms, and must positively affirm itself in the whole field of human values. In regards to the frame of reference for value judgments, the attempt has been made in this work to reflect the knowledge already gathered by science and the democratic-rational-humanistic spirit of pure science and the liberal arts in general. However this may be, the reader and the subsequent course of events are the final judge of whether this aim has been accomplished. In reading this book, it may behoove the reader to keep constantly in mind that we live in a severely maladjusted age that has developed the means either for its own destruction or for a great world civilization and that it is the ultimate aim of pure science and unitary theory to reach the latter objective without catastrophe.

In preparing for, and in the writing of, this book, the research and organizational task was of the first magnitude; consequently, financial aid was sought to relieve my wife and myself from an almost impossible burden of continuing my education and writing this book at the same time. This financial aid was not forthcoming from any

scholarly (humanistic) or scientific research organization in American society. This social resistance was not unexpected, considering the present political condition called McCarthyism, and the fact that most of the great innovations in pure science in the past were also not supported.

This book was written in the period May, 1954 to October, 1956. By the time it has reached the reader, the rapid course of events will afford the reader many opportunities by which to judge for himself the wisdom or folly of the ultimate goals and aims of pure science and unitary theory.

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The following was written on April 5, 1959. The writer has left Princeton and has been teaching at Grinnell College, Grinnell, Iowa, as an assistant professor of psychology. When the writer applied for positions while at Princeton, he believed in being frank and honest about his aims, intentions and especially about his work. But, as a result, almost all opportunities were found to be closed. (This reflects, the writer believes, a serious situation in American colleges and universities. The vast majority 40
of these institutions, as of the above date, are suffering from a conformity neurosis despite their verbalisms about creativity and the like. This situation, the writer believes, is far more serious in the colleges and universities than in the American high schools.) As a consequence, I considered myself very fortunate to obtain a position at one of the very few small colleges (Grinnell) in America that has consistently maintained the great liberal tradition characteristic of the humanities. I am most grateful for a very pleasant stay at Grinnell to my department chairman, Charles Haner, who should be an administrator of a large industrial concern instead of chairman of a small psychology department. However, due to the lack of emphasis on the spirit of pure science at Grinnell, the writer will only remain here for a short time.

I would also like to take this occasion to say a few words about Iowa. It is said that those who come to Iowa are soon stricken with “corn-fever” the main symptom of which is an over-powering desire to leave Iowa. Yet, despite the fact that Iowa is an unstimulating state, its people have a tremendous latent charm and are as handsome as any to be found in the whole United States. But “old Iowa” meant a moralistic-materialistic culture and values. In order to keep its young people and to attract industry into the state, Iowa, in the opinion of the writer, should bring out this latent romantic and musical spirit of its men and women. Iowa’s people and their latent romantic and musical spirit are Iowa’s main assets. Why not, for example, let the wonderful spirit of the cultural center at Iowa University pervade and become the spirit of the state? Iowans know that small quiet towns do not attract young people and industry but breed boredom instead. Youth wants to know that they are abreast of the age and are moving forward and are not just sticks in the mud.

The manuscripts also ran into a pattern of resistances. Many publishing houses refused even to look the book over—the majority asserting that the book would not sell or that the writer was an unknown author. The writer’s manuscript, moreover, met with a uniformly cold or indifferent reception from a long list of individual scholars and scientists and organizations in the United States. This is with the exception of the scholars and scientists who knew the writer personally and with the

exception of the journals published by the AAAS and the Scientific American. The writer's conviction is that this lack of response is due mainly to the stagnation of the scientific spirit which has been brought about by the legislative "investigations" and by the vested interests behind these "investigators". The main purpose of these 41
inquisitive investigators was, of course, not to ferret out Communists but to silence the liberal spirit of the humanities and to humble the spirit of pure science both of which are the true enemies of the reactionary.

The lack of domestic interest in the writer's book, however, was not matched by a lack of interest abroad. Before leaving Princeton, the writer decided to test international interest in the contents of the book by sending out a table of contents of the book and an accompanying letter explaining the work's aim and purposes. These were sent to 22 leading statesmen and scientific organizations of the world and solicited their comments. The writer was surprised to receive no less than 16 replies. For example, from India's Nehru came a letter, signed personally. It said in part: "I have no doubt that we have today to develop a world civilization or else we perish in international conflicts." The British Association for the Advancement of Science sent an interested reply saying that they were looking forward to the receipt of the book. The president of the Soviet Academy of Science answered personally and almost immediately, and not only replied, but passed on the table of contents to some of the leading scientists in the Soviet Union. The President of Switzerland sent the writer's letter to a Swiss institution that was interested in this work. The Pan-American Union displayed a continuing interest in the writer's work. The Swedish Prime Minister sent a reply. The secretary to the President of France sent a reply to the effect that it was not according to protocol for the writer to write to the President of France and that the letter should be sent to the Prime Minister instead. However, the very week I had sent a letter to the French Prime Minister he was again out of office. What is significant about these replies is that none of these men nor the journals mentioned above knew the contents of the writer's books but they were on the alert for new ideas. But the contrary impression was so evident from domestic (American) respondents. For example, a letter to the president of the American Academy of Science drew a reply from the secretary of this organization. From this letter, the writer gathered that he was regarded much like a supplicant of Zeus at Mount Olympus.

The writer must extend his apologies to the above scholars and scientists who replied to the writer but received no return reply. The writer, moreover, would like to extend apologies to the many friends to whom the writer sent copies of the manuscript but never solicited their return criticisms. The leisure time I had away from academic duties, I spent revising parts of the manuscript. The sections on 42
economics and field theory were revised last summer—other sections should be revised such as the one on romantic adventure. However, the manuscript has already been delayed too long.

* * *

It is the writer's wish that all author profits accruing from the sale of this book in countries other than the United States remain in these countries—to be set aside in a fund to erect colleges and universities that are dedicated to the nuclear age and its people. Part of the funds should go into designing and building the new Sciartoriums described in the text. Another part of the fund should be set up to train future unitary scientists. There are to be no restrictions whatsoever on the individuals who receive these scholarships. All that is required is a demonstrable, continual willingness and competence to contribute to a unitary science and unitary world and all that these imply. These scholarships are to be awarded by the rank and file pure science organizations in a particular country. In these aspirations, the writer, of course, is hoping that the small funds arising from the sale of this book will be considerably augmented by no-strings-attached contributions from other sources.

As soon as the writer has repaid the debts and discharged the family responsibilities that have accumulated in the long haul of preparing for and writing this book, the writer's profits in the United States will also be set aside for the same purpose.