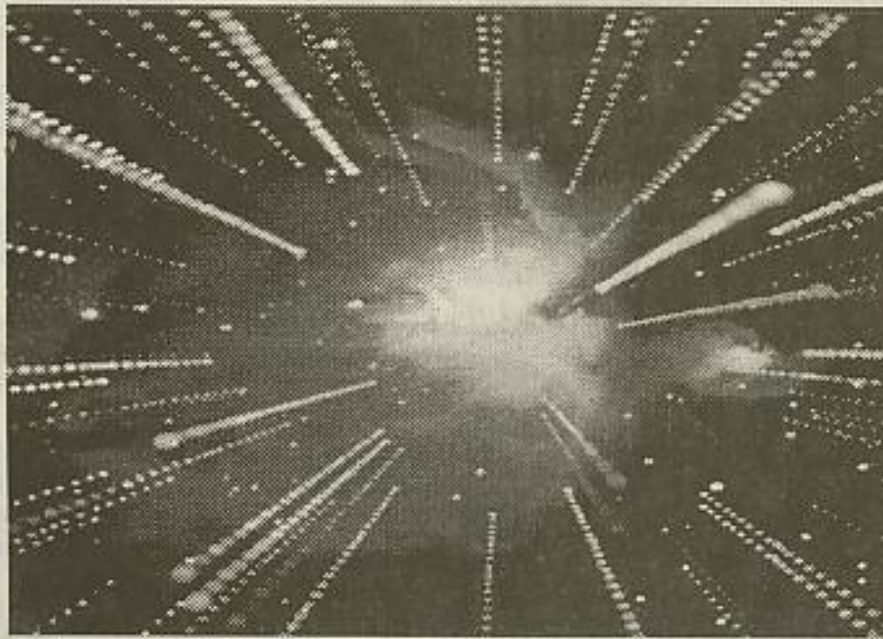




Science, Anthropology, and
Archaeology in
The Urantia Book

What is the significance?



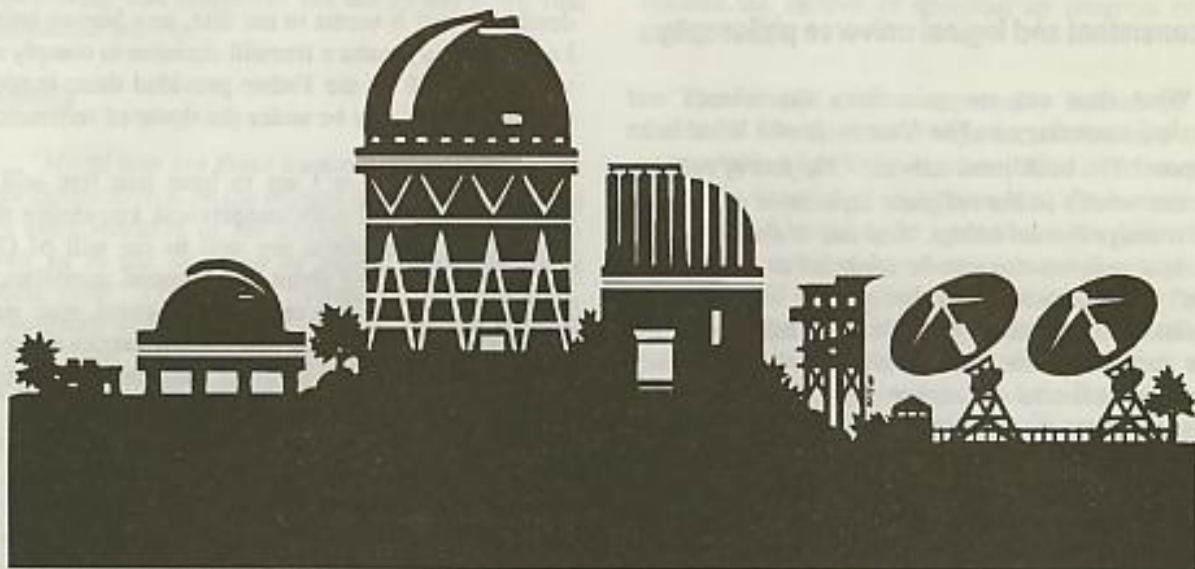
Science, Anthropology, and Archaeology in *The Urantia Book*

(A publication for students of the Urantia Papers from The Brotherhood of Man Library, Australian Branch,
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SCIENCE, ANTHROPOLOGY, AND ARCHAEOLOGY IN THE URANTIA BOOK

[A partial revision and update by Ken Glasziou of material contained in *The Science Content of The Urantia Book* edited by R. Bain, K. Glasziou, M. Neibaur, and F. Wright, 1991]



1. Introduction—Expectations

The expectations of readers about the content of *The Urantia Book* are manifold. Some may expect that the revelatory status of the book would be verified by the accuracy of its science content. Others may believe that if only the science community embraced the book, exciting new scientific discoveries would eventuate. Some are emphatic that a revelatory status carries the guarantee that all of its assertions, scientific or otherwise, will be divine truth. Many consider that even a single error nullifies any claim to be a revelation. So what does the book itself say?

On page 24 we read: *"The existence of God can never be proved by scientific experiment or by the pure reason of logical deduction. God can be realized only in the realms of human experience... Those who know God have experienced the fact of his presence; such God-knowing mortals hold in their personal experience the only positive proof of the existence of the living God which one human being can offer to another. The existence of God is utterly beyond all possibility of demonstration except for the contact*

between the God-consciousness of the human mind and the God-presence of the Thought Adjuster that indwells the mortal intellect and is bestowed upon man as the free gift of the Universal Father." And on page 1106: *"Reason is the proof of science, faith the proof of religion, logic the proof of philosophy, but revelation is validated only by human experience. Science yields knowledge; religion yields happiness; philosophy yields unity; revelation confirms the experiential harmony of this triune approach to universal reality."*

You're on your own? Not necessarily

The book, then, throws us back upon our own resources. What benefits we derive from it will not come from any "divine dictation" status we may wish to assign to the book. Like everyone else, we are expected to progress via the normal pathways of personal experience with an indwelling God-presence and through conforming our will to the dictates of that presence. And the basis for our decisions will still be an act of pure faith, unsupported by confirmable miracle or any other confirmable supernatural means. In other words, we must not expect to find absolute proof of the revelatory status of the book within its

pages by means other than personal experience with our indwelling God-presence. The book terms this our Thought Adjuster and reminds us that Jesus' Spirit of Truth is always available to guide us into all truth. Both are referred to in the Gospel of John where Jesus says: "If a man loves me he will keep my word: and my Father will love him, and we will come unto him and make our abode with him." (John 14:23)

A consistent and logical universe philosophy

What then can we gain from the science and physical cosmology in *The Urantia Book*? What is its purpose? The book itself tells us: "*The fact of religion consists wholly in the religious experience of rational and average human beings. And this is the only sense in which religion can ever be regarded as scientific or even psychological. The proof that revelation is revelation is this same fact of human experience: the fact that revelation does synthesize the apparently divergent sciences of nature and the theology of religion into a consistent and logical universe philosophy, a co-ordinated and unbroken explanation of both science and religion, thus creating a harmony of mind and satisfaction of spirit which answers in human experience those questionings of the mortal mind which craves to know how the Infinite works out his will and plans in matter, with minds, and on spirit.*" (1105)

Even if some of its science is now outdated, there can be no doubt that *The Urantia Book* provides us with a synthesis of cosmology, philosophy, and the theology of religion that is unequalled in its extent and scope. It provides us with an overview of our universe careers never before provided on this planet. But it has had to do so within a fixed set of universe laws in respect to revelation. One of these is that the free will of mortal beings such as ourselves is sacrosanct. Not even the indwelling Thought Adjuster, a fragment of God himself, can control or annul our free will.

What is free will? Freedom from threat of retribution?

What constitutes free will? Can I make a free will decision on whether I will, or will not, murder my neighbor if I know for certain that to do so will inevitably be punished by my own execution—if not in this world, then the next? I think the majority of us would say, "No—I only have a truly freewill decision available to me if there is no threat of retribution."

The Urantia Book tells me that my eternal universe career is dependent on my free will eventually becoming coincidental with the will of the Father. If I consciously and irrevocably reject the Father's will, my destiny is to *become as though I had not been*. (37) Knowing that for certain, how can I make a truly freewill decision? Am I not in a similar position as when pondering on whether to murder my neighbor—full knowing that to do so will inevitably bring the death penalty? It seems to me that, as a human being, I can only truly make a freewill decision to comply my will to the will of the Father provided there is room for doubt that I may be under the threat of retribution.

Logically then, if I am to have true free will, I cannot be provided with unequivocal knowledge that to elect not to conform my will to the will of God ultimately will bring about my eventual annihilation. Logically also, neither can I be provided with such knowledge in a revelation that I know carries absolute divine authority. So, in order that our human free will be unencumbered, certain knowledge of unacceptable consequences must be forbidden—our decision to conform to God's will must be made in faith. If this is a universe fact, then, to protect free will, authoritative revelation impinging on free will cannot be provided. There must be room for doubt. *Urantia Book* readers may perceive that the rebellion of Lucifer makes sense only if he doubted that the eventual consequences would be his own demise. (603) Lucifer, too, had to have free will.

"If we had reason for faith, then it would not be faith at all, it would be logic. Faith can only be unreasonable." (B. Appleyard)

Not Inspired?


The mandate given to the revelators is outlined on pages 1109-1110. There we find: "*The laws of revelation hamper us greatly by their proscription of the impartation of unearned knowledge. Any cosmology...is destined to be outgrown in a very short time. Accordingly, future students of such a revelation are tempted to discard...it...because they discover errors...we are not at liberty to anticipate the scientific discoveries of a thousand years...the cosmology of these revelations is not inspired...*" Permitted though is the: "*reduction of confusion by the authoritative elimination of error...co-ordination of known or about-to-be-known facts and observations ...restoration of important bits of lost knowledge...the supplying of information which will fill in vital missing gaps in otherwise earned knowledge*

...presenting cosmic data in such a manner as to illuminate the spiritual teachings contained in the accompanying revelation."

The question that now arises is how the revelators could fulfill their assignment without contravening the laws of revelation? We need also to be aware of an additional restriction—they had to use the best of human sources wherever possible and they inform us that approximately three thousand such sources were utilized, two thousand being used in Part 4. If we allow that the final drafts of the papers were received in the mid-1930's, and only minor editing allowed subsequently, then we can expect that most science material will be at the mid-1930's level of knowledge and that much of this may contain error. We can also expect that, despite error, it will be put together in such a way as to give us a clear overview of universe cosmology. How could it be otherwise if such a cosmology must: "*synthesize the apparently divergent sciences of nature and the theology of religion into a consistent and logical universe philosophy.*" (1106)

Because of the book's acknowledged error content of its 1930's science material, it would appear to be much more productive for those with a science bent to look for material that might fit the mandate that permits the reduction of confusion, co-ordination of knowledge, restoration of lost knowledge, supplying of information to fill vital missing gaps and the presenting of cosmic data to illuminate the spiritual teachings.

"Let there be light"—a cosmic overview



The Urantia Papers were first received at a time when most people had an extremely limited view of the enormous extent of the universe and no knowledge of its purposes. Even today, we have yet to come to terms with the knowledge that our planet is but one of billions of planets that may be inhabited by beings similar to ourselves. In well-informed scientific circles many people hold the view that we may be alone in the universe.

And behold! There was light

The Urantia Papers provide us with a cosmic viewpoint that not only dispels our loneliness but also provides us with a detailed concept of an adventurous and exciting universe career spanning all eternity. In

doing so, it provides a reason to find value in our present circumstances whatever they may be, and an incentive to make spiritual progress in this our earthly life (including the knowledge of how to do so). Further, it provides the knowledge to eliminate the fear of death because of its promise of an ongoing and highly desirable existence in which unselfish service to our fellow beings motivates us, protects us from boredom, and assures us of continuing worthwhile and meaningful activity.

It makes little difference if, in this picture of our potential cosmic careers, some of the physical details of the material cosmos provided in the Papers are based upon outdated mid-1930's knowledge. For example, the overall picture, as it specifically affects us, would be virtually unaltered if a Big Bang view of creation, perhaps 15-20 billion years ago, turned out to be correct (but it probably won't).

This work will concentrate upon those items of scientific knowledge imparted in the Urantia Papers that appear to come within those categories defined above as being "permitted." Even though some of these appear to be "unearned" or "prophetic," it will always be found that someone somewhere will find a way to avoid either classification. The inevitability of this reaction is beautifully described by author Bryan Appleyard, in his book entitled *Understanding the Present* (Pan Books Ltd., London, 1992). In researching material for this work, Appleyard interviewed prominent academics in fields such as—philosophy of religion, zoology, history of science, physics, mathematics, etc. Included were such notable figures as Roger Penrose, Professor of Mathematics at Oxford University and Stephen Hawking, Lucasian Professor of Mathematics at the University of Cambridge. The book covers a wide range of issues, and is well worth reading by anyone wishing to get a layman's grasp of subjects such as quantum theory, logic, computers and their limitations, and artificial intelligence.

On being open-minded

Appleyard works as a newspaper columnist, a job that requires him to interview protagonists holding opposing views upon many of the issues fortuitously related to science material mentioned in the Urantia Papers. He states that he feels obliged to make up his own mind, hence argues at length with the protagonists: "The pattern is always the same," he says, "no matter what the issue. Each side advances

arguments arising from a basic conviction one way or another. But the arguments themselves are almost always irrelevant, a distraction designed to persuade but not really believed in as such. What is believed in is the basic conviction, one way or another...the beliefs will be held because of the irrational demands of temperament, upbringing and self-interest and they will, therefore, be irreconcilable." The author cites an interview with Stephen Hawking, who, in a recent book, had used an important quotation from philosopher Ludwig Wittgenstein, in order to trivialize modern philosophy. Appleyard told Hawking that the quotation was taken out of context, and, read correctly, had a quite different meaning with immense and profound implications. Appleyard says, "But he (Hawking) simply would not listen. 'I do not think so' was his only response."

Fact, faith, prejudice, or obsession?

Appleyard's observations concerning the opinionated intransigence of human nature will undoubtedly apply to many who dedicate themselves to debunking the revelatory status of *The Urantia Book*. But it will also apply to fundamentalist readers of the book who are dedicated to upholding its status as infallible divine truth.

The book itself tells us that our acceptance of all or part of its text as revelatory cannot be other than an act of faith. A thorough study of what Appleyard says should inform opponents of the book that their opposition is also an act of faith, rather than an act of knowing.

On that pessimistic note let us press on to enumerate observations upon what appears to be prophetic information in matters of science and cosmology in the Papers. In presenting this work, there will be occasion to mention omissions and shortcomings in the recently published critique by Martin Gardner entitled *Urantia: The Great Cult Mystery* (Prometheus Books, 1995). Despite his knowledge of what presents as unimpeachable statistical evidence for multiple authorship of the Urantia Papers (documented later), Gardner has persisted with his claim that the Papers are the result of editing by Dr W. S. Sadler (and perhaps others) of materials emanating from the mind of Wilfred Kellogg, ostensibly during sleep. Since he is the author of a number of books, Gardner should be aware—undoubtedly is aware—of the enormous amount of research necessary to produce the wealth of

scientific, archaeological, anthropological, historical, sociological-historical, biblical-historical, theological, and philosophical materials in the Urantia Papers.

The Urantia Papers, revelatory or not, are a work of intense and arduous scholarship, beautifully written, a work that would require many years of toil for even a gifted scholar. There is no possible way that such a work could derive directly from the subconscious mind-meanderings of a sleeping subject. The statistical work already mentioned has provided evidence that Dr Sadler was not a major author.

In a short acknowledgment—but not a whit of further information—Gardner identifies a Seventh Day Adventist, Iola Martin, as the source of his speculation that Wilfred Kellogg was the "sleeping subject." In a letter to me, dated May 30, 1993 (original available), Gardner states, "I do think both Lena (Sadler's wife) and Bill Jr. (their son) had a hand in the writing. Wilfred had no skill whatever in writing, although his wife Anna collaborated with Lena on a book about nursing."

Bill Sadler Jr. is known to have prepared the "Table of Contents" for *The Urantia Book*, but there appears to be no evidence whatsoever that he participated in the writing. Wilfred is acknowledged to have been incapable of writing the material supposedly pouring forth from his subconscious sleeping mind. Statistical evidence shows that Dr Sadler could only have contributed minor editing. What then is left?

Some alternative hypotheses

The article in this survey on archaeological information from Part 4 demonstrates dedicated scholarship by its author(s) in seeking out the names and locations of villages and towns in first century Palestine and other parts of the Roman world. More



than one hundred and fifty items are catalogued, again demonstrating that the Urantia Papers cannot be the subconscious babblings of a slumbering human mind. If these Papers are not what they purport to be, then they are the work of a group of erudite men and/or women, probably all distinguished scholars. The difficulty with this latter hypothesis is the complete lack of evidence for any such group in

the face of recognition that the successful maintenance of secrecy regarding their identity and participation would have been an exceedingly difficult achievement. Added to that, the high idealism demonstrated in the text of the Papers, together with the dedication to honesty and truth advocated therein by their authors, makes it difficult to comprehend how the Urantia Papers could have been the secret work of a group deliberately engaging in a conspiratorial deception.

Personally I am not overly concerned with who wrote the Papers nor how they got here. My interest is in the truth to be discovered therein. For me, these papers contain higher spiritual, theological, philosophical, and cosmic truth than any other work I have ever read. Again for me, that is a revelation. In my mind and with the passage of time, the science content, evolutionary history, etc. in the Urantia Papers have diminished in importance. What has become paramount is their revelation of the true nature of the Universal Father and what that implies for my present life on this planet. A long time prior to finding the Urantia Papers, I had already learned the basics from experience with dedicated and forward looking Christians, as well as from Christian, Buddhist, Taoist, and Hindu literature, and from the essence of the Fourth Epochal Revelation that many Christians have discerned by reading between the lines of the New Testament. The Urantia Papers go forward from the highest truths I had previously encountered, and also present a new dimension of breathtaking enlightenment regarding what lies beyond our present stage of mortal existence.

I believe

After examining logically conceivable alternatives, the hypothesis remaining is that the Urantia Papers are what their authors say they are—a revelatory gift to the people of this planet designed to elucidate, interpret, and augment previously revealed knowledge relating to our individual cosmic destiny, and to hasten social progress towards a planetary destiny which the authors nominate as the Age of Light and Life. That is what I conclude, but with the knowledge that this is an act of personal faith. The decision others make is up to themselves.

The Gardner Hypothesis

In his recently published book entitled *Urantia: The Great Cult Mystery*, Martin Gardner has attempted to debunk the science content of the book using a variety of ploys including diverting attention from good and reasonable evidence by focussing on irrelevancies. For anything that might indicate that the authors had more advanced knowledge than contemporary Urantia scientists, he has used the following hypothesis:

If any statement about science in the Urantia Papers turns out to be prophetic prior to their publication in 1955 then it was surreptitiously written into the original text by Dr Sadler, unnoticed by the Forum. However if it was already in the text at any time after the Forum was formed (early 1920's), and subsequently turned out to be outdated or incorrect, then it was impossible for Dr Sadler to remove it because the Forum would have noticed his editing.



Having made this hypothesis, Gardner assumes that his saying so makes it so. No justification is necessary. In attempting to discredit the significance of a Urantia Paper's comments on continental drift, Gardner implies they must have been made in the 1920 period when Wegener's theory of continental drift had, according to Gardner, achieved

respectability with at least some American geologists. Accordingly, it could not be removed when it fell into disrepute in the late 1920's. However, he fails to mention the enormous differences in Wegener's theory and the detailed account given in the relevant Urantia Paper. Significantly, the time of commencement of drift is also ignored—about 200 million years ago according to Wegener and 750 million years ago according to the Urantia Paper. It is the latter date that now coincides with current thinking. What were the chances for a human source such as Wilfred Kellogg, or a practicing psychiatrist such as Dr Sadler, or for that matter even a geologist among Sadler's associates, backdating the despised (in the USA) continental drift theory by the 500 million years that has become the favored concept during the last decade? Virtually zero.

2. Urantia Book Statements that may fill Missing Information Gaps, etc.

The articles presented in this Section appear to come into one of the categories defined on p. 1110 of *The Urantia Book* by which the Revelators were permitted to eliminate error, restore lost knowledge, fill missing gaps or supply cosmic data to illuminate spiritual teachings.

What Makes Stars Shine?

"In those suns which are encircled in the space-energy channels, solar energy is liberated by various complex nuclear-reaction chains, the most common of which is the hydrogen-carbon-helium reaction. In this metamorphosis, carbon acts as an energy catalyst since it is in no way actually changed by this process of converting hydrogen into helium. Under certain conditions of high temperature the hydrogen penetrates the carbon nuclei. Since the carbon cannot hold more than four such protons, when this saturation state is attained, it begins to emit protons as fast as new ones arrive. In this reaction the ingoing hydrogen particles come forth as a helium atom". (464)

"All of these phenomena are indicative of enormous energy expenditure, and the sources of solar energy, named in the order of their importance, are: "1. Annihilation of atoms and, eventually, of electrons...." (463)

In 1934, when the Paper providing this information about sources of solar energy was received, the detail of the conversion of hydrogen to helium, as postulated by J. Perrin in 1920, was unknown. Two main processes for this conversion are the proton-proton chain proposed by H.A. Bethe and C.L. Critchfield in 1938, and the carbon-nitrogen cycle proposed independently by Bethe and by von Weizsacker in 1939. Naturally, Gardner claims that Dr Sadler added the information on the carbon cycle subsequently to Bethe's publications.

The carbon-nitrogen cycle that converts hydrogen to helium with the release of energy is a catalytic reaction in which carbon enters and leaves the reaction apparently unscathed. In actuality, it is a very complex reaction in which several isotopes of carbon,

nitrogen, and oxygen are generated before ordinary carbon is regenerated and helium emerges. The simplicity of the wording of the Urantia Paper quotation from p. 464 arouses no confidence in the postulate that the writer was familiar with Bethe's work.

The quotation from p. 463 is also mentioned by Gardner (p. 189) but in this instance it is misquoted in an attempt to ridicule the science content of the Urantia Papers. Gardner sets this in the context of being in the original text, hence (according to Gardner) could not be altered or removed. He states:

*"It is now known that the sun's radiant energy is produced by a thermonuclear reaction in which hydrogen is converted into a variety of helium. No electrons or protons are destroyed by this process. When the Urantia Papers were written it was widely believed that the sun's radiant energy came from the annihilation of atoms and protons. As Sir James Jeans says in *The Universe Around Us*, the sun's energy 'originates out of electrons and protons. The sun is destroying its substance in order that we may live.' This notion is the view taken by the UB. The main source of the energy, the UB asserts (on page 463) is 'the annihilation of atoms and eventually, of protons.'"*

Gardner got it wrong

The actual wording in the Urantia Papers is "the annihilation of atoms and, eventually, electrons." Gardner has substituted "protons" for "electrons" apparently in conformity with his quotation from Jeans. The comment that no electrons or protons are destroyed in the process seems to be his own and is incorrect. The overall process is that four atoms of hydrogen, consisting of four protons and four electrons, become a single atom of helium having two protons, two neutrons, and two electrons. Whether the process is the proton-proton chain (thought to be dominant in stars such as our sun) or via the carbon-nitrogen cycle (dominant in larger, hotter stars), in each process two positrons (anti-electrons) are released and annihilate by interacting with two electrons. Hence the statement in the Urantia Paper that the annihilation of atoms and, eventually, of electrons is of first importance for the production of solar energy is quite correct and perhaps is also prophetic concerning the proton-proton chain



for helium production proposed by Bethe and Critchfield in 1938.

Some Particle Physics

1. *"The charged protons and the uncharged neutrons of the nucleus of the atom are held together by the reciprocating function of the mesotron, a particle of matter 180 times as heavy as the electron. Without this arrangement the electric charge carried by the protons would be disruptive of the atomic nucleus."*

2. *"As atoms are constituted, neither electric nor gravitational forces could hold the nucleus together. The integrity of the nucleus is maintained by the reciprocal cohering function of the mesotron, which is able to hold charged and uncharged particles together because of superior force-mass power and by the further function of causing protons and neutrons constantly to change places. The mesotron causes the electric charge of the nuclear particles to be incessantly tossed back and forth between protons and neutrons. At one infinitesimal part of a second a given nuclear particle is a charged proton and the next an uncharged neutron. And these alternations of energy status are so unbelievably rapid that the electric charge is deprived of all opportunity to function as a disruptive influence. Thus does the mesotron function as an 'energy-carrier' particle which mightily contributes to the nuclear stability of the atom." (479)*

For me, the statements reviewed in this article, coming from a Urantia Paper said to have been written in 1934, are truly remarkable. I first read them in the early 1970's, and recognized paragraphs 1 and 2 as the basic postulates of a theory for which Japanese physicist, Hideki Yukawa, was awarded the Nobel Prize in 1948. From the 1950's to the 1970's, particle physics was in a state of confusion because of the multitudes of sub-atomic particles that came spewing forth from particle accelerators. As new concepts and discoveries were announced, I kept noting them in the margins of page 479, which eventually became somewhat messy and confusing. At times I felt that there was not much that was right on this page, at other times I marveled at its accuracy.

In recent years, a considerable amount of

information has been forthcoming on the history of development of the present "standard model" for atomic structure. Though recognized as being incomplete, the standard model has enormously increased our understanding of the basic nature of matter. The electromagnetic force and the weak force of radioactive decay have been successfully unified to yield the "electroweak" theory. As yet this has not been unified with the theory of the "strong" force that holds the atomic nucleus together. The force of gravity remains intractable to unification with the others.

Photon exchange in electromagnetism provides a model

In the quantum theory of electromagnetism, two charged particles interact when one emits a photon and the other absorbs it. In 1932 Yukawa had decided to attempt a similar approach to describe the nuclear force field. He wrote, "...it seemed likely that the nuclear force was a third fundamental force, unrelated to gravitation or electromagnetism...which could also find expression as a field...Then if one visualizes the force field as a game of 'catch' between protons and neutrons, the crux of the problem would be to find the nature of the 'ball' or particle." This work was first published in Japanese in 1935, but was not well known in the U.S.A.

At first, Yukawa followed the work of Heisenberg and used a field of electrons to supply the nuclear force between protons and neutrons. This led to intractable problems. In 1934 he decided "to look no longer among the known particles for the particle of the nuclear force field. He wrote: "The crucial point came one night in October. The nuclear force is effective at extremely small distances, on the order of 0.02 trillionth of a centimeter. My new insight was the realization that this distance and the mass of the new particle I was seeking are inversely related to each other." He realized he could make the range of the nuclear force correct if he allowed the ball in the game of "catch" to be heavy—approximately 200 times heavier than the electron.

For a short time, Yukawa's "ball" became known as a "mesotron" but was soon shortened to meson. The word came to apply to a range of energy-carrying particles with similarities to the photon.



3. "The presence and function of the mesotron also explains another atomic riddle. When atoms perform radioactively, they emit far more energy than would be expected. This excess of radiation is derived from the breaking up of the mesotron 'energy carrier,' which thereby becomes a mere electron. The mesotronic disintegration is also accompanied by the emission of certain small uncharged particles." (479)

This statement extends Fermi's 1934 theory of radioactive decay of the neutron. Yukawa had considered that a "mesotron" might also act as the "ball" in the "catch" game during radioactive decay. After re-running his calculations, in 1938 he published a paper predicting the properties of such a mesotron which he now called a "weak" photon. Eventually it became known as the "W" particle.

Two different "mesotrons"

Since it is destined to give rise to a negatively charged electron, this "mesotron" of radioactive decay, as described in the Urantia Paper, is obviously differentiated from the "mesotron" that shuttles positive charge between protons and neutrons. The Paper also connects it to the production of small uncharged particles, which would receive the name "neutrinos."



Para's 1-3 come close to being the contemporary, but incredibly speculative, science of the middle to late 1930's. They describe three hypothetical particles—the pion "mesotron" (found 1947), the W particle "mesotron" (found 1983), and the small uncharged particles, "neutrinos" (found 1956).

The para 2. comment stating, "the alternations of energy status are unbelievably rapid..." is interesting. Because of its placement in the text, it qualifies only that "mesotron" that shuttles charge between the protons and the neutrons and not the "mesotron" of radioactive decay. According to Nobel Prize winner, Steven Weinberg (1992), these alternations occur in the order of a million, million, million, millionth of a second. In contrast, the "mesotron"-mediated radioactive decay process described in para. 3 takes about a hundredth of a second. Together these three statements in the Urantia Paper indicate that the author had an extensive knowledge of theoretical nuclear physics—a rare individual indeed, and especially so prior to the race

to build the atomic bomb.

An unknown component of the nuclear binding force

4. "The mesotron explains certain cohesive properties of the atomic nucleus, but it does not account for the cohesion of proton to proton nor for the adhesion of neutron to neutron. The paradoxical and powerful force of atomic cohesive integrity is a form of energy as yet undiscovered on Urantia." (479)

This statement from the Urantia Paper definitely states that the "mesotron" that shuttles positive charge between protons and neutrons does not account for certain special cohesive properties of the atomic nucleus. It then tells us that there is an aspect of this force that is as yet undiscovered on Urantia.

Leon Lederman was a young research worker in 1950 who later became director of the Fermi Laboratory. He was awarded the Nobel Prize in 1988. In his book, *The God Particle*, he comments: "The hot particle of 1950 was the pion or pi meson (Yukawa's mesotron), as it is also called. The pion had been predicted in 1936 by a Japanese theoretical physicist, Hideki Yukawa. It was thought to be the key to the strong force, which in those days was the big mystery. Today we think of the strong force in terms of gluons. But back then (i.e. 1950's), pions which fly back and forth between the protons to hold them together tightly in the nucleus were the key, and we needed to make and study them."

This force, unknown in 1934, (and for that matter in 1955 when *The Urantia Book* was published) is now known as the color force. Writing about it in their book, *The Particle Explosion*, Close, Marten, and Sutton state, "Back in the 1940's and 1950's, theorists thought that pions were the transmitters of the strong force. But experiments later showed that pions and other hadrons are composite particles, built from quarks, and the theory of the strong force had to be revised completely. We now believe that it is the color within the proton and the neutron that attracts them to each other to build nuclei. This process may have similarities to the way that electrical charge within atoms manages to build up complex molecules. Just as electrons are exchanged between atoms bound within a molecule, so are quarks and anti-quarks—in clusters we call 'pions'—exchanged between the protons and neutrons in a nucleus."

The quest for the "ultimon"

The mandate to the revelators permitted "the supplying of information which will fill in vital missing gaps in otherwise earned knowledge." (1110) Whether any physicist ever effectively utilized the information in para. 4 of page 479, we will probably never know. But there are "more things on heaven and earth"... For example, "Physics, it is hoped, will one day reach the ultimate level of nature in which everything can be described and from which the entire universe develops. This belief could be called the *quest for the ultimon*." (from E. David Peat, 1988, *Superstrings and the Search for the Theory of Everything*.) There is a curious coincidence here. The particle the Urantia Papers called a mesotron became shortened to meson. It calls the basic building block of matter an *ultimon*. Will it one day be identified with the *ultimon*?

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Neutrinos, Neutrons, and Neutron Stars.

"In large suns when hydrogen is exhausted and gravity contraction ensues, and such a body is not sufficiently opaque to retain the internal pressure of support for the outer gas regions, then a sudden collapse occurs. The gravity-electric changes give origin to vast quantities of tiny particles devoid of electric potential, and such particles readily escape from the solar interior thus bringing about the collapse of a gigantic sun within a few days." (464)

No tiny particles devoid of electric potential that could escape readily from the interior of a collapsing star had been shown to exist in 1934. In fact, the reality of such particles were not confirmed until 1956, one year after the publication of *The Urantia Book*. The existence of particles that might have such

properties had been put forward as a suggestion by Wolfgang Pauli in 1932, because studies on radioactive beta decay of atoms had indicated that a neutron could decay to a proton and an electron, but measurements had shown that the combined mass energy of the electron and proton did not add up to that of the neutron. To account for the missing energy, Pauli suggested a little neutral particle was emitted, and then, on the same day, while lunching with the eminent astrophysicist Walter Baade, Pauli commented that he had done the worst thing a theoretical physicist could possibly do, he had proposed a particle that could never be discovered because it had no properties. Not long after, Enrico Fermi took up Pauli's idea and attempted to publish a paper on the subject in the prestigious science journal *Nature*. The editors rejected Fermi's paper on the grounds that it was too speculative. This was in 1933, the year before receipt of the relevant Urantia Paper.



An interesting thing to note is the *Urantia Book* statement that tiny particles devoid of electric potential would be released in vast quantities during the collapse of the star. If, in 1934, an author other than a knowledgeable particle physicist was prophesying about the formation of a neutron star (a wildly speculative proposal from Zwicky and Baade in the early 1930's), then surely that author would have been thinking about the reversal of beta radioactive decay in which a proton, an electron and Pauli's little neutral particle would be squeezed together to form a neutron.

Radioactive beta decay can be written...

1. neutron \longrightarrow proton + electron + LNP
 where LNP stands for little neutral particle. Hence the reverse should be:

2. LNP + electron + proton \longrightarrow neutron

For this to occur an electron and a proton have to be compressed to form a neutron but somehow they would have to add a little neutral particle in order to make up for the missing mass-energy. Thus, in terms of speculative scientific concepts in 1934, *The Urantia Book* appears to have put things back to front, it has predicted a vast release of LNP's, when the reversal of radioactive beta decay would appear to demand that LNPs should disappear.

The idea of a neutron star was considered to be

highly speculative right up until 1967. Most astronomers believed that stars of average size, like our sun, up to and including stars that are very massive, finished their lives as white dwarfs. The theoretical properties of neutron stars were just too preposterous; for example, a thimbleful would weigh about 100 million tonnes. A favored alternative proposal was that large stars were presumed to blow off their surplus mass a piece at a time until they got below 1.4 solar masses (known as the Chandrasekhar limit) when they could retire as respectable white dwarfs. This process did not entail the release of vast quantities of tiny particles devoid of electric potential that accompany star collapse as described in the cited *Urantia Book* quotation.

Neutron stars: Undetectable figments of the imagination

Distinguished Russian astrophysicist, Igor Novikov, has written, "Apparently no searches in earnest for neutron stars or black holes were attempted by astronomers before the 1960s. It was tacitly assumed that these objects were far too eccentric and most probably were the fruits of theorists' wishful thinking. Preferably, one avoided speaking about them. Sometimes they were mentioned vaguely with a remark yes, they could be formed, but in all likelihood this had never happened. At any rate, if they existed, then they could not be detected."

Acceptance of the existence of neutron stars gained ground slowly with discoveries accompanying the development of radio and X-ray astronomy. The Crab nebula played a central role as ideas about it emerged in the decade, 1950-1960. Originally observed as an explosion in the sky by Chinese astronomers in 1054, the Crab nebula became the subject of increased interest when, in 1958, Walter Baade reported visual



The Crab Nebula

observations suggesting moving ripples in its nebulosity. When sensitive electronic devices replaced the photographic plate as a means of detection, the oscillation frequency of what was thought to be a white dwarf star at the center of the Crab nebula turned out to be about 30 times per second.

A rapidly rotating white dwarf star would disintegrate

For a white dwarf star with a diameter in the order of 1000 km, a rotation rate of even once per second would cause it to disintegrate due to centrifugal forces. Hence, this remarkably short pulsation period implied that the object responsible for the light variations must be very much smaller than a white dwarf, and the only possible contender for such properties appeared to be a neutron star. Final acceptance came with pictures of the center of the Crab nebula beamed back to earth by the orbiting Einstein X-ray observatory in 1967. These confirmed and amplified the evidence obtained by prior observations made with both light and radio telescopes.

The reversal of beta-decay, as depicted in equation 2 [previous page] involves a triple collision, an extremely improbable event, unless two of the components combine in a meta-stable state—a fact not likely to be obvious to a non-expert observer.

The probable evolutionary course of collapse of massive stars has only been elucidated since the advent of fast computers. Such stars begin life composed mainly of hydrogen gas that burns to form helium. The nuclear energy released in this way holds off the gravitational urge to collapse. With the hydrogen in the central core exhausted, the core begins to shrink and heat up, making the outer layers expand. With the rise in temperature in the core, helium fuses to give carbon and oxygen, while the hydrogen around the core continues to make helium. At this stage the star expands to become a red giant.

After exhaustion of helium at the core, gravitational contraction again occurs and the rise in temperature permits carbon to burn to yield neon, sodium, and magnesium, after which the star begins to shrink to become a blue giant. Neon and oxygen burning follow. Finally silicon and sulfur, the products from burning of oxygen, ignite to produce iron. Iron nuclei cannot release energy on fusing together, hence with the exhaustion of its fuel source,



Stars begin life as a large, relatively cool mass of gas as in the Orion nebula (left). Contracting under gravity, the gas heats to ignition point where hydrogen fuses to helium, producing enormous heat. Perhaps 10 billion years later, a star like our sun will run out of fuel and contract to end its life as a dense white dwarf. Larger stars may contract further, finally exploding in a supernova as in a star in the Large Magellanic Cloud (right) seen with the naked eye from the Earth in 1987. Enormous numbers of neutrinos escape in the explosion which also leaves a dense core of closely packed neutrons, a neutron star.

the furnace at the center of the star goes out. Nothing can now slow the onslaught of gravitational collapse, and when the iron core reaches a critical mass of 1.4 times the mass of our sun, and the diameter of the star is about half that of the earth, the star's fate is sealed.

Within a few tenths of a second, the iron ball collapses to about 50 kilometers across and then the collapse is halted as its density approaches that of the atomic nucleus and the protons and neutrons cannot be further squeezed together. The halting of the collapse sends a tremendous shock wave back through the outer region of the core.

Tiny particles, devoid of electric potential, readily escape from the solar interior

The light we see from our sun comes only from its outer surface layer. However, the energy that fuels the sunlight (and life on earth) originates from the hot, dense thermonuclear furnace at the Sun's core. Though sunlight takes only about eight minutes to travel from the sun to earth, the energy from the sun's core that gives rise to this sunlight takes in the order of a million years to diffuse from the core to the surface. In other words, a sun (or star) is relatively "opaque" (as per *The Urantia Book*, p. 464) to the energy diffusing from its thermonuclear core to its surface, hence it supplies the pressure necessary to prevent gravitational collapse. But this is not true of the little neutral particles, known since the mid 1930's by the name *neutrinos*. These particles are so tiny and unreactive that their passage from our sun's core to its exterior takes only about 3 seconds.

It is because neutrinos can escape so readily that they have a critical role in bringing about the star's

sudden death and the ensuing explosion. Neutrinos are formed in a variety of ways, many as neutrino-antineutrino pairs from highly energetic gamma rays. Others arise as the compressed protons capture an electron (or expel a positron) to become neutrons, a reaction that is accompanied by the release of a neutrino. Something in the order of 10^{57} electron neutrinos are released in this way. Neutral current reactions from Z^0 particles of the weak force also contribute electron neutrinos along with the "heavy" muon and tau neutrinos.

Escape of the tiny neutral particles enables a supernova explosion

Together, these neutrinos constitute a "vast quantity of tiny particles devoid of electric potential" that readily escape from the star's interior. Calculations indicate that they carry ninety-nine percent of the energy released in the final supernova explosion. The gigantic flash of light that accompanies the explosion accounts for only a part of the remaining one percent! Although the bulk of the neutrinos and anti-neutrinos is released during the final explosion, they are also produced at the enormous temperatures reached by the inner core during final stages of contraction.

The opportunity to confirm the release of the neutrinos postulated to accompany the spectacular death of a giant star came in 1987 when a supernova explosion, visible to the naked eye, occurred in the Large Magellanic Cloud that neighbors our Milky Way galaxy. Calculations indicated that this supernova, dubbed SN1987A, should give rise to a neutrino burst at a density of 50 billion per square

centimeter when it finally reached the earth, even though expanding as a spherical "surface" originating at a distance 170,000 light years away. This neutrino burst was observed in the huge neutrino detectors at Kamiokande in Japan and at Fairport, Ohio, in the USA lasting for a period of just 12 seconds, and confirming the computer simulations that indicated they should diffuse through the dense core relatively slowly. From the average energy and the number of "hits" by the neutrinos in the detectors, it was possible to estimate that the energy released by SN1987 amounted to $2-3 \times 10^{53}$ ergs. This is equal to the calculated gravitational binding energy that would be released by the collapsing core of a star of about 1.5 solar masses to the diameter of a neutron star. Thus SN1987A provided a remarkable confirmation of the general picture of neutron star formation developed over the last fifty years. Importantly, it also confirmed that *The Urantia Book* had its facts right long before the concept of neutrino-yielding neutron stars achieved respectability.

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Addendum to "Neutrinos, Neutrons, and Neutron stars."

"In large suns when hydrogen is exhausted and gravity contraction ensues, and such a body is not sufficiently opaque to retain the internal pressure of support for the outer gas regions, then a sudden collapse occurs. The gravity-electric changes give origin to vast quantities of tiny particles devoid of electric potential, and such particles readily escape from the solar interior thus bringing about the collapse of a gigantic sun within a few days." (p. 464)

For the mid-thirties that was quite a statement. These tiny particles that we now call neutrinos were entirely speculative in the early 1930's and were required to account for the missing mass-energy of beta radioactive decay.

Hypotheses on the possible origins of the Urantia Paper's statement on solar collapse

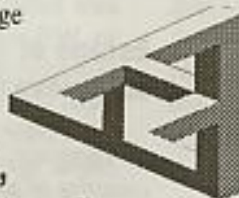
In the early 1930's, the idea that supernova explosions could occur and result in the formation of neutron stars was extensively publicized by Fritz Zwicky of the California Institute of Technology (Caltec) who worked in Professor Millikan's dept. For a period during the mid-thirties, Zwicky was also at the University of Chicago. Dr. Sadler is said to have known Millikan. So alternative possibilities for the origin of *The Urantia Book* quote above could be:

1. The revelators followed their mandate and used a human source of information about supernovae, possibly Zwicky.
2. Dr Sadler had learned about the tiny particles devoid of electric potential from either Zwicky, Millikan, or some other knowledgeable person and incorporated it into *The Urantia Book*.
3. It is information supplied to fill missing gaps in otherwise earned knowledge as permitted in the mandate. (1110)

Zwicky had the reputation of being a brilliant scientist but given to much wild speculation, some of which turned out to be correct. A paper published by Zwicky and Baade in 1934 proposed that neutron stars would be formed in stellar collapse and that 10% of the mass would be lost in the process. (Phys. Reviews, Vol. 45)

In *Black Holes and Time Warps: Einstein's Outrageous Legacy* (Picador, London, 1994), a book that covers the work and thought of this period in detail, K.S. Thorne, Feynman Professor of Theoretical Physics at Caltec, writes: "In the early 1930's, Fritz Zwicky and Walter Baade joined forces to study novae, stars that suddenly flare up and shine 10,000 times more brightly than before. Baade was aware of tentative evidence that, besides ordinary novae, there existed superluminous novae. These were roughly of the same brightness but since they were thought to occur in nebulae far out beyond our Milky Way, they must signal events of extraordinary magnitude. Baade collected data on six such novae that had occurred during the current century.

"As Baade and Zwicky struggled to understand supernovae, James Chadwick, in 1932, reported the



discovery of the neutron. This was just what Zwicky required to calculate that if a star could be made to implode until it reached the density of the atomic nucleus, it might transform into a gas of neutrons, reduce its radius to a shrunken core, and, in the process, lose about 10% of its mass. The energy equivalent of the mass loss would then supply the explosive force to power a supernova.

"Zwicky did not know what might initiate implosion nor how the core might behave as it imploded. Hence he could not estimate how long the process might take—is it a slow contraction or a high-speed implosion? Details of this process were not worked out until the 1960's and later.

Zwicky believed cosmic rays accounted for the mass-energy loss in supernova explosions

"At this time (1932-33), cosmic rays were receiving much attention and Zwicky, with his love of extremes, managed to convince himself that most of the cosmic rays (correctly) were coming from outside our solar system and (incorrectly) that most were from far outside our Milky Way galaxy—indeed from the most distant reaches of the universe—and he then convinced himself (roughly correctly) that the total energy carried by all of the universe's cosmic rays was about the same as the total energy released by supernovae throughout the universe. The conclusion was obvious to Zwicky. Cosmic rays must be made in supernova explosions."

Baade and Zwicky's paper of 1934 asserted unequivocally the existence of supernovae as a distinct class of astronomical objects different from ordinary novae. It estimated the total energy released (10% of solar mass), and proposed that the core would consist of neutrons, a speculation that was not accepted as theoretically viable until 1939 nor verified observationally until 1967 with the discovery of pulsars—spinning, magnetized neutron stars inside the exploding gas of ancient supernovae.

Information, extracted from Thorne's recent book, indicates that Zwicky knew nothing about the possible role of "little neutral particles" in the implosion of a neutron star, but rather that he attributed the entire mass-energy loss to cosmic rays. So, if not from Zwicky, what then is the human origin of *The Urantia Book's* statement that the neutrinos escaping from its interior bring about the collapse of the imploding star? (Current estimates attribute about

99% of the energy of a supernova explosion to being carried off by the neutrinos).

In his book, Thorne further states: "Astronomers in the 1930's responded enthusiastically to the Baade-Zwicky concept of a supernova, but treated Zwicky's neutron star and cosmic ray ideas with disdain...In fact it is clear to me from a detailed study of Zwicky's writings of the era that he did not understand the laws of physics well enough to be able to substantiate his ideas." This opinion was also held by Robert Oppenheimer who published a set of papers with collaborators Volkoff, Snyder, and Tolman, on Russian physicist Lev Landau's ideas about stellar energy originating from a neutron core at the heart of a star. Oppenheimer ignored Zwicky's speculative proposals, though he must have been familiar with them as he worked about half of each year at Caltec.

The Oppenheimer papers were mainly theoretical in nature and based upon the principles of relativistic physics. In a 1939 paper of Oppenheimer and Snyder, since they had neither the detailed knowledge nor the computational machinery to formulate a realistic model of a collapsing star, they took as their starting point a star that was precisely spherical, non-spinning, non-radiating, of uniform density and no internal pressure. Their conclusions included that, for an observer from a static external reference frame, the implosion of a massive star freezes at the critical circumference of the star (i.e. where gravity becomes so strong that not even light can escape) but, as considered from the reference frame of the star's surface, it may continue to implode (ultimately to a Schwarzschild singularity—the term "black hole" had yet to be invented).

Einstein and Eddington opposed neutron star concept

These Oppenheimer papers, which concluded that either neutron stars or black holes could be the outcome of massive star implosion, were about as far as physicists could go at that time. As a further deterrent to speculation on the fate of imploding massive stars, the most prominent physicist of the time, Albert Einstein, and the doyen of astronomers, Sir Arthur Eddington, both vigorously opposed the concepts involved in stellar collapse beyond the white dwarf stage. Thus the subject appears to have been put on hold coincident with the outbreak of war in 1939.



During the 1940's, virtually all capable physicists were occupied with tasks relating to the war effort. Apparently this was not so for Russian-born astronomer-physicist, George Gamow, a professor at Leningrad who had taken up a position at George Washington University in 1934. Gamow conceived the beginning of the Hubble expanding universe as a thermonuclear fireball in which the original stuff of creation was a dense gas of protons, neutrons, electrons, and gamma radiation which transmuted by a chain of nuclear reactions into the variety of elements that make up the world of today. Referring to this work, Overbye⁴ writes: "In the forties, Gamow and a group of collaborators wrote a series of papers spelling out the details of thermonucleogenesis. Unfortunately their scheme didn't work. Some atomic nuclei were so unstable that they fell apart before they could fuse again into something heavier, thus breaking the element building chain. Gamow's team disbanded in the late 40's, its work ignored and disdained."

Among this work was a paper by Gamow and Schoenfeld that proposed that energy loss from aging stars would be mediated by an efflux of neutrinos. However they also noted that "the neutrinos are still considered as highly hypothetical particles because of the failure of all efforts to detect them. Their proposal appears to have been overlooked or ignored until the 1960's."

Conservation of energy "law" under fire

Pauli's suggestion about the necessary existence of the tiny unknown particle devoid of electric potential that we now call the neutrino was made just prior to Chadwick's discovery of the neutron in 1932. The name, neutrino, was suggested by Enrico Fermi. In beta decay, when a neutron breaks down to a proton and an electron, the loss in mass is 0.00029 on the atomic weight scale, approximately the mass of half an electron. In some decay events, the electron gets most of the missing mass-energy in the form of kinetic energy. Since the missing particle must also have kinetic energy it became clear that it must be massless or very close thereto. Many thought it must be massless like the photon and travel with the velocity of light. Although no one wanted to abandon the law of conservation of energy, there was considerable doubt about saving it by means of a particle without charge and probably without mass, a particle that could never be detected and whose sole reason for existence was merely to save a law. [Note: In 1957, the 30-year old law of



conservation of parity was shown to be violated during neutrino emission in beta radioactive decay.]

As time went by, the need for the neutrino grew, not only to save the law of conservation of energy, but also conservation of momentum, angular momentum (spin), and lepton number. As knowledge of what it ought to be like grew, and as knowledge accrued from the intense efforts to produce the atom bomb, possible means of detecting this particle began to emerge. In 1953, experiments were begun by a team led by C.L. Cowan and F. Reines.¹ Fission reactors were now in existence in which the breakdown of uranium yielded free neutrons that, outside of the atomic nucleus, were unstable and broke down via beta decay to yield a proton, an electron, and, if it existed, the missing particle. The fission reactor chosen at Savannah River, North Carolina was estimated to provide 1,000,000,000,000,000 each second. These should be antineutrinos.

Detection of the elusive neutrino

The Cowan and Reines team devised a scheme to feed the antineutrinos from the reactor into a target consisting of water. Each water molecule consists of two hydrogen atoms and one oxygen, and the nuclei of the hydrogen atoms are protons. A scintillator substance was added to the water contained in a series of tanks surrounded by scintillation detectors. If an antineutrino was absorbed by a proton, the expectation was that a neutron and a positron (antielectron) would be formed. In such an environment the positron should collide with an electron within about a millionth of a second, and the two should annihilate with the production of two gamma ray photons shot out in exactly opposite directions. An added refinement was detection of the newly formed neutron which, in the presence of cadmium ions, would immediately be taken into the cadmium nucleus with emission of photons with combined energy of 9 Mev. Detection of this sequence of events would herald the existence of the antineutrino. In 1956 this system was detecting 70 such events per day with the fission reactor operating over and above the background noise with the reactor shut off. It now remained to prove that this particle was not its own antiparticle, as is the case with the photon. This was done by R.R. Davis in 1956¹, using a system designed specifically to detect expected neutrino properties, but testing for those properties with antineutrinos deriving from a fission reactor. The negative results so obtained provided

evidence for there being two different particles. Confirmation of the existence of the neutrino (as distinct from the anti-neutrino) was obtained in 1965 when neutrinos from the sun were detected in huge perchloroethylene tanks placed far underground.

Renewal of the search for the neutron star

The subject of the fate of imploding stars reopened with vigor when both Robert Oppenheimer and John Wheeler, two of the really great names of physics, attended a conference in Brussels in 1958. Oppenheimer believed that his 1939 papers said all that needed to be said about such implosions. Wheeler disagreed, wanting to know what went on beyond the well-established laws of physics.

When Oppenheimer and Snyder did their work in 1939, it had been hopeless to compute the details of the implosion. In the meantime, nuclear weapons design had provided the necessary tools because, to design a bomb, nuclear reactions, pressure effects,



shock waves, heat, radiation, and mass ejection had to be taken into account. Wheeler realized that his team had only to rewrite their computer programs so as to simulate implosion rather than explosion.

However his hydrogen bomb team had been disbanded and it fell to Stirling Colgate at Livermore, in collaboration with Richard White and Michael May, to do these simulations. Wheeler learned of the results and was largely responsible for generating the enthusiasm to follow this line of research. The term 'black hole' was coined by Wheeler.

The theoretical basis for supernova explosions is said to have been laid by E. M. Burbidge, G.R. Burbidge, W. A. Fowler, and Fred Hoyle in a 1957 paper². However, even in Hoyle and Narlikar's text book, *The Physics-Astronomy Frontier* (1980), no consideration is given to a role for neutrinos in the explosive conduction of energy away from the core of a supernova. In their 1957 paper, Hoyle and his co-workers proposed that when the temperature of an aging massive star rises to about 7 billion degrees K, iron is rapidly converted into helium by a nuclear process that absorbs energy. In meeting the sudden demand for this energy, the core cools rapidly and shrinks catastrophically, implodes in seconds, and the

outer envelope crashes into it. As the lighter elements are heated by the implosion they burn so rapidly that the envelope is blasted into space. So, two years after the first publication of *The Urantia Book*, the most eminent authorities in the field of star evolution make no reference to the "vast quantities of tiny particles devoid of electric potential" that the book says escape from the star interior to bring about its collapse. Instead they invoke the conversion of iron to helium, an energy consuming process now thought not to be of significance.

Following on from the forgotten Gamow and Schoenfeld paper, the next suggestion that neutrinos may have a role in supernovae came from Ph.D. student Hong-Yee Chiu, working under Philip Morrison. Chiu proposed that towards the end of the life of a massive star, the core would reach temperatures of about 3 billion degrees at which electron-positron pairs would be formed and a tiny fraction of these pairs would give rise to neutrino-antineutrino pairs. Chiu speculated that X-rays would be given off by the star for about 1000 years and that the temperature would ultimately reach about 6 billion degrees when an iron core would form at the central region of the star. The flux of neutron-antineutrino pairs would then be sufficiently great to carry off the explosive energy of the star in a single day. The 1000-year period predicted by Chiu for X-ray emission was reduced to about one year by later workers. Chiu's proposals appear to have been first published in a Ph. D. thesis submitted at Cornell University in 1959. Scattered references to it are made by Philip Morrison³ and by Isaac Asimov¹.

No neutral current, no supernova

Dennis Overbye, in his book *Lonely Hearts of the Cosmos*⁴ records that, for supernovae, almost all the energy of the inward free fall comes out in the form of neutrinos. The success of this scenario (as proposed by Chiu) depends on a feature of the weak interaction called the neutral currents. Without this, the neutrinos do not supply enough 'oomph' and theorists had no good explanation for how stars explode. In actuality the existence of the neutral current for the weak interaction was not demonstrated until the mid 1970's.

A 1985 paper (Scientific American) by Bethe and Brown entitled "How a Supernova Explodes" shows that understanding of the important role of the neutrinos was well advanced by that time. These authors attribute this understanding to the computer

simulations of W. David Arnett of the University of Chicago and Thomas Weaver and Stanford Woosley of the University of California at Santa Cruz.

In a recent report in *Sky and Telescope* (August, 1995) it is stated that, during the past decade, computer simulations of supernovae have bogged down at 100 to 150 km from the center and failed to explode. These models were one dimensional. With more computer power becoming available, two dimensional simulations have now been carried out and model supernova explosions produced. The one reported was for a 15 solar mass supernova that winds up as a neutron star. However the authors speculate that at least some 5 to 15 solar mass implosions might wind up as black holes. There is still a long way to go in understanding the details of stellar implosions.

Who dunit? Paring away the alternatives

Referring to our three alternatives to explain how the reference to the role of the tiny uncharged particles in supernova explosions got to be in the *Urantia Papers*, ostensibly in 1934, our investigation showed that Zwicky is unlikely to have been the source as he firmly believed X-rays, not neutrinos, accounted for the 10% mass loss during the death of the star.

Remembering that neutron stars were not demonstrated to exist until 1967, that some of the biggest names in physics and astronomy were totally opposed to the concept of collapsing stars (Einstein, Eddington), and that, well into the 1960's, the majority of astronomers assumed that massive stars shed their bulk piecemeal prior to retiring respectably as white dwarfs, it appears that it would have been a preposterous notion to attempt to support the reality of a revelation by means of speculation about the events occurring in massive star implosion at any time prior to the 1960's. If it is assumed that, on what would have needed to be the expert advice of a knowledgeable but reckless astrophysicist, Dr Sadler wrote the page 464 material into the *Urantia Papers* subsequent to the concepts on neutrinos appearing in the Gamow et al. publications, then it becomes necessary to ask why was it not removed when that work lost credibility later in the 1940's?—and particularly so since, in their conclusions, Gamow and Schoenfeld drew attention to the fact that the neutrinos were still considered to be highly hypothetical particles as well as noting that "the dynamics of the collapse represents very serious mathematical difficulties."

Printing Plates for *The Urantia Book*

Documents held by the *Urantia Foundation* show that the contract to prepare the nickel printing plates from the manuscript of the *Urantia Papers* was accepted during September, 1941. The galley proofs from the plates were checked for typographical errors by members of Dr Sadler's group, known as the Forum, in 1942. The Sherman affair described in Gardner's book included an attempt by Sherman to get control of the printing plates in 1943. These plates were held in the vaults of the printers, R.R. Donnelley & Sons until the actual printing of *The Urantia Book*. Wartime regulations prevented an early printing of the book. Later it was delayed by the revelators.

It has already been indicated that the highly speculative 1942 paper of Gamow and Schoenfeld was unlikely to have been the source of the book's p.464 statement on star implosion. The evidence for the printing plates contract makes it even less likely.

Invoking Occam's Razor



The language, level of knowledge, and terminology of the page 464 reference, together with the references to the binding together of protons and neutrons in the atomic nucleus, the two types of mesotron, and the involvement of small uncharged particles in beta radioactive decay as described on page 479, is that of the early 1930's period, and not that of the 40's and 50's. It is what would be expected from authors constrained by a mandate not to reveal unearned knowledge except in special circumstances. Applying the Occam's razor principle of giving preference to the simplest explanation consistent with the facts, the most probable explanation for the aforementioned material of page 464 must be that it is original to the *Urantia Papers* as received in 1934, hence comes into the category nominated in the revelatory mandate as information supplied to fill missing gaps in our knowledge.

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Continental Drift

"There is a curious parallel history between the histories of black holes and continental drift. Evidence for both was already non-ignorable by 1916, but both ideas were stopped in their tracks for half a century by a resistance bordering on the irrational...but [resistance to] both began to crumble around 1960." Werner Israel, quoted in K.S. Thorne (1994) *Black Holes and Time Warps* (Picador, London).

The Urantia Book states quite categorically that all land on earth was originally a single continent that subsequently broke up, commencing 750 million years ago (663), followed by a long period of continental drifting during which land bridges were repeatedly formed and broken.

Wegener's theory

The idea of continental drift was mooted in the 19th century and first put forward as a comprehensive theory by Wegener in 1912. It was not well accepted, being classified as pseudoscience. For example Rollin T. Chamberlin wrote in 1928 just 6 years prior to receipt of the *Urantia Papers*: "Wegener's theory in general is of the foot-less type...It plays a game in which there are few restrictive rules..."



Chamberlin went on to list 18 points that he considered were destructive of the drift hypothesis, and actually began his book with, "Can we call geology a science when there exists such a difference of opinion in fundamental matters as to make it possible for such a theory as this to run wild?" The theory remained discredited in the opinion of most geologists until the 1960's. The story of the earlier conflict and later acceptance of continental drift has been recently recorded by science historian H.E. Le Grand (see ref.).

New Evidence

The change in attitude by geologists, particularly in America, was initiated by the careful bathymetric, paleomagnetic, and seismological surveys in the region of long mountain ranges on the ocean floors, such as the mid-Atlantic ridge that stretches from

Iceland to Antarctica. During the 1960's, geophysical surveys of the ocean floor revealed that the rock from the earth's mantle is being melted, then forced upwards resulting in sea floor spreading. This upwelling would be expected to push the continents apart, and thus provided the missing evidence for a physical mechanism that could bring about continental drift. Gradually the term continental drift was replaced by a new terminology and today it is known universally as plate tectonics.

Against the current!

The *Urantia Papers* that mention continental drift were presented in 1934, and published in book form in 1955. The writers of the *Papers* could not have been unaware of the very tenuous nature of the theory and would have known that it was held in disrepute by most American geologists. Hence, unless these writers had access to pre-existing knowledge, they would appear to have been doing a very foolish thing in going against strongly-held scientific opinion.

The Urantia Book is at variance with many published estimates of geological time, for instance for the Carboniferous and Devonian periods where the discrepancy may be about 100 million years. In some areas there is good agreement; for example the book (683) talks of the disappearance of land bridges between the Americas and Europe and Africa in the era between 160 and 170 million years ago, and an article in *Scientific American*, June, 1979, places this break at 165 million years ago. However land bridges connected these continents again at later times via Greenland, Iceland, and the Bering Strait and also connected South America to Australia via Antarctica, and directly to Africa (*The Urantia Book*, pp. 694, 695, 698; *Scientific American*, January 1983, p. 60).

Time of break-up of continents

A most remarkable aspect of *The Urantia Book* account is the statement that the breakup of the supercontinent commenced 750 million years ago. Wegener placed it at 200 million years ago. The 1984 edition of *Encyclopaedia Britannica's* "Science and Technology" presented what was then purported to be an up-to-date series of maps depicting the progress of continental drift from 50 to 200 million years ago which is at variance with a similar portrayal in the April, 1985 issue of *Scientific American* by about 100 million years in aspects of the progression. Nevertheless, both versions still placed the

commencement of continental drift in the vicinity of 200 to 250 million years ago.

Somewhere around 1980 some geologists were having a rethink about the commencement of continental drift, and in a book entitled *Genesis*, published in 1982, J. Gribbin reported the view that there may have been a pre-existing continent, Pangea 1, roughly 600 million years ago that had broken up into four new continents by about 450 million years ago, at the end of the Ordovician age. Then about 200 million years ago, the continents were thought to have converged to form Pangea 2, which quickly broke, first to Laurasia and Gondwanaland; further breakup then occurred at the end of the Cretaceous to give an appearance much like the present world. A different opinion was expressed in an article in *Scientific American* (1984) 250 (2), 41 which stated the view that a breakup occurred in late Rhiperian times between 700 and 900 million years ago; but a 1987 article (*Scientific American* 256, 84) is more conservative and placed the breakup of Pangea 1 at somewhere near the beginning of the pre-Cambrian, in the order of 600 million years ago.

Addendum

The further development of the theory of continental drift is reviewed by I. W. D. Dalziel in *Scientific American* 272 (1) 28 (1995). The date proposed for the commencement of break-up of the first supercontinent is now estimated as 750 million years ago—the same as is given in *The Urantia Book*. Co-incidence, lucky guess, or something else???

REFERENCES: *The Urantia Book*, p. 663; *Scientific American* 250 (2), 41, 1984; *Scientific American* 256 (4), 84, 1987; H.E. Le Grand, *Drifting Continents and Shifting Theories*, 1988. (Cambridge University Press)

Continental Drift and Land Elevation



The Urantia Book account of the geological history of our planet tells us that, following the breakup of the supercontinent about 750 million years ago, there have been repeated cycles of land elevation and submergence. Between approximately 400 and 200 million years ago, the periodicity appears to average very roughly 25 million years, with periods of much more frequent cycling

during the Carboniferous and Cretaceous periods.

Changes in sea level have often been attributed to advance and retreat of the polar ice caps, but this would not appear to account for the movements described in *The Urantia Book*. More recently a mechanism has been proposed involving the accumulation of heat beneath the great land masses that is thought to cause the elevation, doming, and breakup of continents, and their subsequent rejoining. Although the concept has been put forward mainly to explain transverse movement, it also provides a physical mechanism that could account for the vertical movement described in *The Urantia Book*.

The mechanism proposed indicates a relatively slow build up of heat, but the subsequent blow off can occur in a number of ways, hence considerable deviation from sine wave periodicity would be expected.

This theory will be of interest to *Urantia Book* readers who have been puzzled by its account of the alternate elevation and depression of continents on such a large scale.

REFERENCE: "The Supercontinent Cycle" R.D. Nance et al. *Scientific American* 259(1), 44-51 (1988).

3. Who Wrote the Urantia Papers?

Ken Glasziou

Various skeptics have put forward the names of a number of single authors who they think may have been responsible for the Urantia Papers. Among those suggestions are Dr W. Sadler, Wilfred Kellogg, Carl Jung, H.G. Wells, and Robert Millikan. I first read the book in response to a request to give an opinion on the claims by its author(s) for a revelatory status. My initial attitude was highly skeptical and my first reaction was that it must have been written by a group of well-meaning academics on a save-the-world mission.

Consistency

As I became more familiar with the Papers, I was impressed by the consistency of their content. I had previously participated in the writing of two text books on science subjects in which a number of

authors contributed chapters relevant to their particular specialties. Thus I had become aware of the extra difficulties involved in maintaining consistency when multiple authors contribute to the same work. This would have been particularly so for a 2000-page work, such as *The Urantia Book*, written at a time before computers, data bases, and search-and-find computer programs became available. The problem would have been infinitely greater if such a work was a product of the imagination rather than a collation of facts.

However, at this early stage of my interest in *The Urantia Book*, I was not prepared to suggest that this book was anything other than the work of human beings. Part 4, "The Life of Jesus," impressed me as being an outstanding exposition. For the remainder, I had noticed a number of statements, mainly on matters of science, that were remarkably prophetic if made in the mid-1930's. Some of these would even have been remarkable at the time of first publication of the book in 1955. So to my inquirers, I recommended that they take what they found valuable from its content and keep an open mind about its revelatory status.

TABLE 1. A COMPARISON OF WRITING STYLES IN DIFFERENT SECTIONS AND PAPERS IN THE URANTIA BOOK

Word	Comparison made	Probability of difference (%)
How	Part 4 & Parts 1,2,3	0.1
When	Part 4 & Parts 1,2,3	0.1
When	Divine Counselor & whole book	1.0
When	Life Carrier & whole book	1.0
When	Melchizedek & whole book	0.1
And	Foreword & Divine Counselor	0.1
And	Foreword & whole book	0.1
And	Foreword & Part 1	1.0
And	Part 1 & whole book	0.1
And	Part 2 & whole book	0.1
And	Solitary Messenger & whole book	5.0
And	Solitary Messenger & Part 3	5.0
And	Part 4 & whole book	0.1
And	Part 4 & Parts 1,2,3	0.1
For	Part 4 & Parts 1,2,3	0.1
For	Life Carrier & Part 3	1.0
But	Part 3 & Parts 1,2,4	0.1
But	Life Carrier & Parts 1,2,4	1.0
But	Melchizedek & Parts 1,2,4	5.0
But	Solitary Messenger & Parts 1,2,4	0.1
But	Part 4 & Parts 1,2	0.1
But	Part 4 & Part 1	0.1
But	Part 4 & Part 2	0.1
But	Part 4 & Part 3	0.1
This	Foreword & whole book	1.0
This	Life Carrier & whole book	0.1
This	Foreword & Divine Counselor	0.1

Methodology for determining authorship

About 15 years later I came upon a book entitled *The Computation of Style* by Anthony Kenny that discussed various ways of checking on works in which authorship is in doubt—for example, the various epistles attributed to Paul in the New Testament. Some methods depended on the rate of occurrence of unusual words or phrases, others on statistical analysis of the length of sentences, or other characteristics that gave "style" to a particular author. The favored method, where it could be applied, was one used by Mosteller and Wallace that depended, not on unusual words and phrases, but on the way authors use common words to commence sentences or to join clauses and phrases. Such words were classed as "marker" and "function" words and included *also*, *an*, *by*, *but*, *the*, *and*, *when*, etc. Experience soon showed that unusual words were virtually useless for statistical purposes. It is the way authors habitually use frequently occurring words that best distinguishes one from another.

While reading about the work of Mosteller and Wallace, I realized that the tools were already available to shed light on multiple authorship for the *Urantia Papers*. These tools were a data base for the book (Folio views), plus the means of transferring the text of the book to a word processor equipped to give word counts for individual papers. With these tools, it is relatively easy to obtain statistics on the number of sentences that commence with marker words and to quantify these in terms of word count.

The first investigation had the limited goal of deciding whether a single or multiple authors wrote the book. The results (Table 1) were printed in the Australian newsletter *Six-O-Six*, Vol. 13 (2), 1992 and indicated that there may have been in excess of nine authors. Later, my son, Paul, who has a Ph.D. in maths and statistics, suggested that a more rigorous investigation could be done for those authors to whom multiple papers were attributed. Such an analysis permitted the inclusion of estimates of variance both within and between authors. Five sets of four or more papers from five authors were chosen in which there was reasonable certainty that each set was attributable to the same author. The results for this investigation were printed in *Six-O-Six*, Vol 14 (3), 1993, and clearly distinguished between each of the five authors. Besides the data given in Table 2, a global likelihood ratio test in a logical regression analysis showed that for the marker word *And*, the results indicated four or

Author	Brilliant Evening Star	Solonia	Chief of Seraphim	Archangel of Nebadon
Solonia	And, P = .025; The, P = .001 A or An, P = .001			
Chief of Seraphim	And, P = .05; The, P = .001 But, P = .005; A or An, P = .001	And, P = .001; The, P = .005 A or An, P = .025; But, P = .05		
Archangel of Nebadon	And, P = .025; The, P = .005 But, P = .001	And, P = .001; The, P = .001 A or An, P = .005; But, P = .05	And, P = .005; But, P = .025 This P = .005	
Perfector of Wisdom	And, P = .05; The, P = .005 But, P = .001; A or An, P = .001	And, P = .001; A or An, P = .05 As, P = .025	The, P = .005; But, P = .01 Many, P = .001	And, P = .001; This, P = .001 It, P = .001

Table 2. The probabilities that pairs of authors of multiple Urantia Papers are different individuals as indicated by the frequency of sentences commencing with the marker words *And*; *The*; *But*; *A or An*; *This*; *Many*; *It*. All five authors are distinguishable from one another.

more authors at a probability level of 0.0003. For the marker word *The*, three or more authors were indicated at a probability level of 0.0001.

Was Dr Sadler an author?

For the first investigation, in addition to attempting to demonstrate multiple authorship, an effort was made to throw light on whether Dr Sadler may have been the single author postulated by others. The only work of Dr Sadler then available to me in Australia was a short essay entitled, "Evolution of the Soul," in which about half of the text was direct quotation from *The Urantia Book*. The essay was too short to use the Mosteller and Wallace methods. However, after separating *The Urantia Book* text from the remainder, the two sections were subjected to a computerized style analysis program that provided scores on the basis of sentence length, sentence structure, and the Flesch Reading Ease Index. Each of these characteristics differentiated two distinct writing styles at statistically significant levels, thus indicating that Dr Sadler was not the author of *The Urantia Book* quotations from that essay.

The investigation on the involvement of Dr Sadler in the authorship of *The Urantia Papers* has come under some criticism on the basis of the small sample size of the essay, "Evolution of the Soul." Recently, courtesy of Dr Matt Neibaur, I have been provided with "The Mind at Mischief," a book published by Dr Sadler in 1929 that has permitted a more extensive investigation. I scanned a little more than fifty pages of this book, almost 20,000 words, into my computer, with which to test Dr Sadler's writing style against the data already accumulated for the Mosteller and

Wallace type of investigation on authorship. The Sadler text material was converted into a FolioViews database, then tested against the data for those five *Urantia Book* authors accredited with multiple papers. From 37 tests, 35 distinguished between Dr Sadler and the *Urantia Paper* author at odds of 20 to 1 or better, 30 being at 100 to 1 or greater, and 14 being better than 1000 to 1. Only two of the tests failed to attain significance (less than 20 to 1).

The Urantia Book material quoted in Dr Sadler's aforementioned essay had been drawn from Papers 5, 110, and 111. Again using Mosteller and Wallace methodology, in two tests, the *Mind at Mischief* sample was compared with these Papers and showed significant differences at the 100 to 1 and 1000 to 1 levels. In his book "Urantia: The Great Cult Mystery," Martin Gardner offers the opinion that Dr Sadler wrote Part 4 of *The Urantia Book*. To check this suggestion, a further two tests were made of the "Mind at Mischief" material against Papers 195 and 196 from Part 4 of the book with the result that both tests showed significant differences at the 1000 to 1 probability level.

It is a fact that some of the same unusual words and expressions are to be found in both the writings of Dr Sadler and in the *Urantia Papers*. This is hardly surprising since Sadler admitted to being continuously exposed to the content of the various *Urantia Papers*, or their precursors, certainly since 1911 and possibly since 1906, long before the final drafts of the Papers were completed. I have been reading these papers for about twenty years, have an appalling memory for poetry, literature, quotations, etc., yet still find that some of the book's "peculiar" words and phrases

have become my own. Many other readers have had the same experience. While the possibility of a degree of editing cannot be excluded, this statistical evidence rules out extensive authorship of the Papers by Dr Sadler.

Could a single human mind be the main source for the Urantia Papers?

The statistical evidence accumulated to date shows that any proposal that nominates a human source for the Urantia Papers must take multiple authorship into account. Matthew Block's investigations to uncover the human sources that the Papers themselves state have been utilized indicate that the actual authors have usually imposed their own styles in incorporating this material, and that the extent of quotation of contiguous material is such that it would have little effect on the statistical analysis reported herein.

There is no way that Gardner's proposal that the subconscious mind of a sleeping human subject was itself the source of the textual material of the Urantia Papers can be reconciled with the statistical evidence presented. The evidence is consistent with many different authors having been heavily involved in the writing of the Urantia Papers, probably far more than the minimum of about nine suggested by this investigation. Neither is the hypothesis of very extensive editing by Dr Sadler and others consistent with these findings.

This work does not rule out the involvement of a substantial committee of well qualified and erudite people as the real authors. But if there was such a committee, it becomes necessary to account for the truly remarkable consistency of this 2000 page work, plus the fact that extensive investigations by Gardner and others have failed to uncover the slightest hint of such involvement, nor to explain how total secrecy could have been maintained. I leave the readers of the Papers to draw their own conclusions.



References.

- Anthony Kenny (1982), *The Computation of Style* (Pergamon Press Ltd)
 Mosteller, F. and D.L. Wallace (1984), *Applied Bayesian and Classical Inference. The Case of the Federalist Papers* (Springer Verlag, N.Y.)

4. Science topics of interest in the Urantia Papers.

[The articles in this section contain scientific material of interest, some of which may have a prophetic content.]

The Birth of the Solar System

An image from the Hubble Space Telescope shows that newborn stars may emit jets of material as gravitation pulls in gas and dust from a rotating disk. One jet, HH-47, is about 3 trillion miles long and 1500 light years away. "Bends in the jet appear to be caused by wobbling of the central star but its tight focus remains a mystery. Theorists will need new models to explain the Hubble data." (New Scientist.¹)

Discussing the origin of the solar system, *The Urantia Book* states: "As Angona more closely approached the sun, at moments of maximum expansion during solar pulsations, streams of gaseous material were shot out into space as gigantic solar tongues. At first these flaming gas tongues would invariably fall back into the sun, but as Angona drew nearer and nearer, the gravity pull of the gigantic visitor became so great that these tongues of gas would break off at certain points, the roots falling back into the sun while the outer sections would become detached to form independent bodies of matter, solar meteorites, which immediately started to revolve about the sun in elliptical orbits of their own." (656)

The book informs us that this state continued, "for about 500,000 years until Angona made its closest approach; whereupon the sun, in conjunction with one of its periodic internal convulsions, experienced a partial disruption; from opposite sides and simultaneously, enormous volumes of matter were disgorged." (656)

As described above, the initial periodic internal convulsions of the embryonic sun may have been independent of the approaching Angona, the sun's partial disruption occurring only with its close approach.

The book states that the Angona system captured none of the solar matter, but our sun did capture

material from Angona, among this being three tributaries which included three major planets. It adds, "the impact of the three tributaries injected new and foreign directional forces into the emerging solar system with the resultant appearance of retrograde motion." (657)

The Angona system is portrayed as a passing dark giant of space, solid, highly charged and possessing tremendous gravity pull. At our present state of knowledge this could be a description of an astronomical system accompanying either a black hole or a neutron star. In the mid-1930's, both of these ideas belonged to the realm of science fiction, and even at 1955, the year the book was published, the concepts were more fictional than scientific (Novokov, 1990⁴).

Evidence for participation of a secondary system in the birth of our solar system

Evidence for the participation of a secondary system during the birth of our solar system comes from the studies of meteorites (Dyson, 1992²). In a supernova explosion, a small fraction of its energy may be converted into the nuclear energy of unstable atoms of thorium, uranium, and plutonium, and small amounts of these radioactive elements may be injected into the interstellar gas. This appears to be the only mechanism that can create the special conditions for the production of such fissionable nuclei.

According to Dyson, the evidence that a local violent environment existed immediately before the birth of the solar system is contained in the presence of xenon gas in certain ancient meteorites which has the isotopic composition characteristic of the products of spontaneous fission of plutonium 244. It is likely that this violent environment and the origin of the solar system were part of the same sequence of events. Supporting evidence is provided by radiation damage in the form of fission tracks that can be made visible by etching. The meteorites do not contain enough uranium or thorium to account for either the xenon or the fission tracks. They must have contained plutonium at the time that they solidified. Plutonium 244 has a half life of only 80 million years, hence the meteorites must be as old as the solar system and must have originated close, in both time and space, to the event that gave birth to the sun. A possibility would be that the Angona system was the result of a

supernova explosion, perhaps one involving a twin star system inclusive of planets, occurring in the order of about 100 million years before the time of the formation of the solar system.

The Urantia Book states that retrograde motion in any astronomical system is always accidental and the result of collisional impact of foreign space bodies. In our solar system, retrograde motion is exhibited by Venus, Uranus, and Pluto, as well as the four outer moons of Jupiter which orbit it in the opposite direction to its other twelve moons.³

Evidence for the capture of "space bodies" by our planet

The Urantia Book also states that 2 billion years ago our planet captured enormous space bodies that markedly increased its mass. (659) In *The Planets*, Henbest tells us that the peculiar composition of planet Mercury, plus other parallel evidence, has caused astronomers to now think that the birth of the "rocky" planets (Venus, Mercury, Earth, and Mars) involved collisions between bodies we can think of as giant asteroids or small planets.³

The Hubble Space Telescope has uncovered evidence that must cause theorists to re-think ideas about the formation of planetary systems and the involvement of jets of material originating from newborn stars. In studying what *The Urantia Book* states about the origin of the solar system, readers need to keep in mind that it remarks that most planetary systems have an entirely different origin. (466) Readers also need to keep in mind that because of their mandate, the revelators were obligated to use outdated mid-1930's scientific opinions but were also permitted to supply certain key pieces of enlightening information. (1110)

Urantia older than the universe?

One example of key information may be the time given for the origin of the solar system at about 4.5 billion years ago. (655) In the mid-1930's, Hubble's measurements of interstellar distances had indicated an expanding universe having an age of only about 2 billion years. These measurements underwent major correction in 1952 due to the discovery of two classes of Cepheid variable stars, a discovery that doubled the estimated universe age, but still left the solar system as old as the universe.



The first radiometric dating of meteoric material was done in 1955, the result giving an age of about 4.6 billion years. This finding, now considered correct, could hardly have been the source for information in *The Urantia Book*, since its metal printing plates had been completed long before that time. To incorporate such information would have required a last minute, major rewrite of the section on the origin of Urantia, and on the basis of unverified information supplied by an untested methodology that gave the meteorite material an age greater than the then current estimated age for the universe. However, as with all such information, truth is in the eye of the beholder, and its meaning is a decision for the individual.

References.

1. New Scientist No. 1982, June, 1995.
2. Dyson, Freeman. (1992) *From Eros to Gaia* (Pantheon Books, New York)
3. Henbest, Nigel. (1992) *The Planets. Portraits of New Worlds* (Penguin Books, London)
4. Novikov, I. (1990) *Black Holes and the Universe* (Cambridge University Press)

Black Holes



The Urantia Book (173) tells of "dark islands of space" that are the remains of dead suns, devoid of light and heat, and their density is "well-nigh unbelievable." Only white dwarf stars, neutron stars,

and black holes would appear to be candidates for such high density bodies. Being devoid of light and heat increases the probability of their being black holes, the remnants of massive stars that have undergone gravitational collapse when their nuclear fuel has run out. Neither light nor heat can escape beyond the event horizon of black holes. The Angona system that helped to give birth to our solar system (655) is described as a "dark giant of space, solid, highly charged, and possessing enormous gravity pull." Angona may have been a black hole, or possibly a neutron star system of some kind.

The concept of material bodies of mass so large that light could not escape from their gravitational clutches arose as a speculative idea following the discovery of Newton's laws of gravitation. One of the first to come up with a prediction about this kind of invisible star was French mathematician and

astronomer, Pierre Laplace. Having the profound conviction that gravitation affects light in the same way as other objects, Laplace wrote, "A luminous star, of the same density as the Earth, and whose diameter should be two hundred and fifty times larger than that of the Sun, would not, in consequence of its attraction, allow any of its rays to arrive at us. It is therefore possible that the largest luminous bodies in the universe may through this cause be invisible." A star of that size and density would have about 64 solar masses, hence a very short life time, and would end its career as a black hole. British priest and geologist, John Michell, made a similar proposition in 1783.

No earnest search for black holes (and neutron stars) before 1960

The concept of stars undergoing gravitational collapse to become neutron stars or black holes was not taken very seriously until well after *The Urantia Book* was published. Eminent Russian astrophysicist Igor Novikov, who worked extensively in this field, wrote, "Apparently no searches in earnest for neutron stars or black holes were attempted by astronomers before the 1960's. It was tacitly assumed that these objects were too eccentric and were most probably the fruit of theorists' wishful thinking...in all likelihood they never happened. At any rate, if they existed, then they could not be detected." Today, it is accepted that heavenly objects, called pulsars, that are the source of intense radio and/or X-ray beams are, in actuality, neutron stars. However, neutron stars are thought to be relatively rare compared with black holes that must form from the collapse of massive stars. The detection of these is difficult, but may be done through their gravitational effects in binary systems. The first to qualify was a dead star of about 10 solar masses in the constellation Cygnus, known as Cygnus X-1. Objects known as quasars are also thought to be huge black holes at the centers of galaxies. It is reasonably likely that our Milky Way has a black hole at its center.

Black holes might be useful

There are many references in *The Urantia Book* to dark gravity bodies that match up with black holes. Some of these may be used by the Power Directors to improve gravitational stability of many different systems, and also in the control of energy flow. It should be kept in mind that the universe described in *The Urantia Book* is quite dissimilar to the theoretical universe as studied by astrophysicists. The former is one in which energy flow is continuously monitored

and controlled by intelligent beings. The latter assumes that there is no intelligent control, and that, overall, energy always flows "downhill," in the direction of increased entropy. Perhaps the only exception to this occurred at the beginning of a theoretical Big Bang occurring at a timeless instant when the present laws of physics were not operative.

On page 170, the book states, "Some of the dark islands of space are burned out isolated suns, all available space-energy having been emitted. The organized units of matter approximate full condensation, virtual complete consolidation; and it requires ages upon ages for such enormous masses of highly condensed matter to be recharged in the circuits of space and thus to be prepared for new cycles of universe function following a collision or some equally revivifying cosmic happening." This appears to be a description of a controlled recycling of black holes. Current thought is that colliding black holes would simply coalesce.



A process that might contribute to recycling of black holes was proposed by S. Hawking. A black hole is considered to have a boundary, the event horizon. From the black hole side of the boundary, nothing can escape. On the other side, escape is possible. Quantum theory allows that pairs of virtual particles, such as an electron and its anti-electron, the positron, can come into existence momentarily at the boundary. If one escapes, it becomes real and will cause leakage at the event horizon.

A phenomenon termed superradiance associated with rotating black holes was proposed by Y.B. Zel'dovich by which rotational energy may be extracted from the black hole through irradiation of electromagnetic waves or, if they exist, gravitational waves.

The rate of leakage for large black holes via the Hawking process is trivial. For superradiance, an amplification factor of 4.4 percent is predicted for irradiation with electromagnetic waves, contrasted with about 140 percent with gravity waves. Perhaps the Power Directors are better at physics and can speed things up a little.

Reference: I. Novikov, 1990. *Black Holes and the Universe* (Cambridge University Press)

A Galaxy Too Far

Dick Bain

Using the latest generation telescopes, astronomers continue to find ever more distant galaxies. The most recently discovered record-holder was reported to be between 12 and 15 billion light years from Earth, based on the red shift of light from this galaxy. This galaxy is apparently five times the size of M31, the giant spiral galaxy in Andromeda¹. Astronomers feel that these most distant galaxies were formed close to the time of the Big Bang. But if so, there is a small problem.

The telescope is in effect a time machine. The further light travels from a distant galaxy, the earlier in the history of the universe we are seeing that galaxy. Since the newly discovered galaxy is perhaps 15 billion light years distant, we are seeing it as it was 15 billion years ago. The problem is that this galaxy is fairly well developed. It even appears to have either old stars or dust clouds from a past generation of stars¹. If the Big Bang happened about 15 billion years ago, then this galaxy would have to have developed in a few hundred millions of years rather than in billions of years like later galaxies have. Now someone has to explain how the first galaxies could develop many times faster than later galaxies, or another crack may appear in the Big Bang edifice.

1. R. Cowen, Keck "Goes the Distance," Science News, Jan 14, 1995.

The Jupiter Problem

Dick Bain

Jupiter has always been fascinating to astronomers and non-astronomers alike. For Gustav Holst, Jupiter was the bringer of joviality in his composition *The Planets*. But some solar system theorists may not feel so jovial when considering a recent theory about the likelihood of Jupiter's existence. A group of astronomers have found evidence that giant gas planets like Jupiter may be rare in other solar systems, and this may say something important about the origin of our solar system.

The author of Paper 57 in *The Urantia Book* informs us that our solar system formed from material pulled out of our sun by a passing dark giant of space, Angona. (657.) This theory of origin, known to astronomers as the catastrophic or dualistic theory,

was proposed independently by Thomas Crowder Chamberlin and Forest Ray Moulton in the early part of this century.¹ Another source² says that a revised version of the theory was first suggested early in this century by astronomer Sir James Jeans and geophysicist Sir Harold Jeffreys. The astronomic community eventually rejected this theory for several reasons, one being that such an encounter would be quite rare. In fact, we are told on page 466 that most planets did not have such an origin. *The Encyclopaedia Britannica* gives an additional reason for rejection of the catastrophic theory: "...the realization that hot gases stripped from a stellar atmosphere would simply dissipate in space; they would not condense to form planets."¹ It seems to me that the idea in *The Urantia Book* sounds more reasonable; some of the material pulled out would fall back into the sun, some would be captured by the body passing by the sun, but some material would stay in orbit. Perhaps this orbiting material formed a disc around our sun, and from this disc the planets of our solar system formed.

Another problem was found with the catastrophic theory, namely the distribution of angular momentum in the solar system. Angular momentum is a measure of the speed of rotation of a body around a center and its distance from that center of rotation. Though the sun has 99.9% of the solar system's mass, it has less than .5% of its angular momentum. Jupiter, with only a fraction of one percent of the mass in the solar system has about 99% of the angular momentum of the solar system. This situation would not be expected if the solar system had a catastrophic origin. Significantly however, this unexpected distribution of angular momentum is also an unresolved problem for the other major theory of planetary formation, the nebular or monistic theory.

In the eighteenth century, the philosopher Immanuel Kant proposed that our planetary system coalesced from a cloud or nebula of dispersed particles. About twenty years later, the mathematician Pierre Laplace proposed that a cloud of dust and gases around a sun would form into rings from which planets would coalesce.¹

In fact, this idea of ring formation is mentioned in *The Urantia Book* on page 170. The author does not specifically say that the rings form into planets, but the entry is under the heading "The Origin of Space Bodies," so that planetary formation from the rings is

intimated. Astronomers are now finding many young stars with discs of dust and gas around them, and this tends to support the idea that planets form from such rings. But in the case of our solar system, the nebular hypothesis has problems other than that of the distribution of angular momentum.

One of the unusual features found in our system is retrograde motion (or more correctly, retrograde rotation) of some planets, and moons of several planets. If a planetary system formed from a uniform disc of material, we would expect the planets and their satellites to all lie in the same plane and rotate in the same direction. If a planet rotates in the opposite direction from the others, that phenomenon is an example of a type of retrograde motion. Both Venus and Uranus exhibit retrograde rotation in our solar system. Astronomers have not found an explanation to account for this retrograde motion that is satisfactory to everyone. The problem of retrograde motion in our solar system is mentioned on page 657 where the Life Carrier author tells us, "Retrograde motion in any astronomic system is always accidental and always appears as a result of the collisional impact of foreign space bodies. Such collisions may not always produce retrograde motion, but no retrograde motion ever appears except in a system containing masses which have diverse origins." According to the author, the masses which caused the retrograde motion were captured by our sun from the passing Angona system. And in addition to the problems already mentioned, the nebular hypothesis now has a Jupiter problem.



A recent article in *Science News*³ reported that a team from MIT examined 20 nearby, sun-like stars one to ten million years old and reported that even these very young stars did not have enough molecular hydrogen in their vicinity to form a planet the size of Jupiter. The researchers conclude that either a planet like Jupiter would have to form very quickly before the hydrogen was lost, or more likely there is only a small chance of such planets forming in the first place. If, on the other hand, material were pulled out from our sun as claimed in *The Urantia Book*, there would be plenty of material to form the two gas giant planets, Jupiter and Saturn.

The catastrophic origin hypothesis/Angona theory may still have more strikes against it than the nebular hypothesis, but it looks like the score is beginning to even up. Perhaps early in the third millennium inning astronomers will resurrect the catastrophic hypothesis and come to the same conclusion as the author of Paper 57.

- (1) *Encyclopaedia Britannica Macropaedia*, 1993
- (2) Preston Cloud (1978). *Cosmos, Earth and Man*, (Yale University Press)
- (3) "The Importance of Being Jupiter", *Science News*, Feb. 18, 1995

Mitochondrial Eve and the Origins of Andon and Fonta

Conventional wisdom on the origin of the human species is that, 4 million years ago in Africa, a little creature just over a meter tall emerged from the evolutionary melting pot, and stood up.

The first such creature to be discovered received the name "Lucy"—later changed to *Australopithecus afarensis*. Lucy had knee joints that allowed her to straighten her legs. Also she made footprints that confirmed that she stood up. Dating of fossils beyond 200,000yrs old is not easy. It is generally done indirectly by dating the ground where they are found—for Lucy at about 4 million years B.P. (before the present).

Lucy had a skull more ape-like than human and was probably no smarter than the average ape. Fossil remains of two other primate-like species found in Africa, *Paranthropus boisei*, and *Paranthropus robustus* are thought to have been evolutionary dead ends.

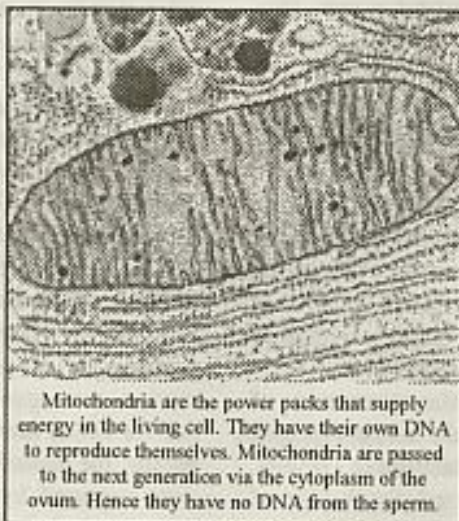
Supposedly Lucy and her buddies gave rise to the next step, named *Homo habilis* (handy man). *H. habilis* was a tool maker, may have appeared about 2.5 million years B.P., looked something like Lucy, but had a larger brain. He/she was about 1.5 meters tall, under 45 kg, probably a scavenger, and supposedly gave rise to the next evolutionary jump called *Homo*

erectus. This guy was more advanced so is measured in feet and inches—5ft 6in. to be precise. He was almost indistinguishable from modern man except for a flattened forehead, prominent brow ridges and no chin (remind you of anyone?). Conventional wisdom has him originating in Africa around 2 million B.P. He was supposed to have taken a long time to get out of Africa and to migrate to Java (1 million B.P) and Peking. When Java man was re-dated to 2 million B.P. in 1970, the work was at first ignored. New dating putting two Java fossils at 1.8 and 1.7 million B.P., is probably reliable, but was unwelcome as it did not fit conventional wisdom.

Oldest human fossils??

The oldest "human" fossils from Africa and the Middle East were put at 120,000 B.P. until new, also unwelcome reports from China came up with a 200,000 year old human skull. Neanderthal man is still in trouble. Dated from 200,000 - 20,000yrs B.P. he/she is thought to be either unrelated to modern man, or to have evolved independently into Europeans, or at least be ancestral to some Europeans. Take your pick.

How does this tie in with the announcement about the recent African genesis of humans from a single "mitochondrial Eve" 200,000 yrs ago? (Wilson and Cann, *Scientific American*, April 1992). And how does that tie in with Andon and Fonta (about 1,000,000 B.P.) or Adam and Eve (37,898 B.P.)?



Mitochondria are the power packs that supply energy in the living cell. They have their own DNA to reproduce themselves. Mitochondria are passed to the next generation via the cytoplasm of the ovum. Hence they have no DNA from the sperm.

Mitochondrial DNA

There are more ways than one of breaking eggs—but they may not all produce the same result. Mitochondrial Eve is based on the concept that the DNA of little energy-producing organelles in living cells derives only from the egg. The male part of the fertilization package contributes about half of the chromosomal DNA but none of the mitochondrial DNA. If we can measure the average rate of mutation of mitochondrial DNA and get some line on diversity, then maybe we can extrapolate backwards to when all mitochondrial DNA was one - or something like that. Wilson and Cann came up with Mother Eve having

spawned the human species 200,000 yrs B.P.

Another way of breaking eggs looked at a different class of DNA, and combined this with the coalescence theory of population genetics to come up with the conclusion that all human alleles (variations of the same gene) date back no further than 400,000 yrs—which is twice as old as Mitochondrial Eve.

There are problems with both these methods. Taking the last one first, the idea is to select "neutral" genes randomly and do much the same thing as the Mitochondrial Eve job to date back to the ancestral gene. The problem is whether the genes are truly neutral. To be so there must be no selective advantage in comparison with other genes. The work that gave the 400,000 yr. answer was shot down in flames as being a vast underestimate. Now here's the bit that takes a swipe at Eve:

"In fact, the study demonstrated no such thing. What the authors did claim to establish—although contested by several investigators—is that all mitochondrial DNA variants are derived from an ancestral molecule borne by a female who lived some 200,000 years ago. This conclusion, even if true, would not mean that the human pedigree began with a single mother but only that the extant mitochondrial DNA alleles coalesce to a single ancestral molecule extant 200,000 years ago."

What this says is that even if the data are correct it only means that there could have been a large population of Eve's at that time, all with the same brand of mitochondrial DNA.

Evidence from the human immune system

Of more interest to *Urantia Book* readers are the other scraps that have come from these studies. Most of the work has been on the "MHC" genes of the human immune system concerned with "self-recognition." These ensure that if you get a skin graft from your neighbor, it will drop off. But if you get it from your identical twin, it might stick. Besides telling us that we derive these genes from a cross species ancestry going back at least 65,000,000 years, it also permits an estimate of the size of breeding populations that give rise to a species, including the human species. Klein et al state "The MHC data imply that the early hominid line split, at some stage, into at

least two populations—one of which led to modern *Homo sapiens* (us). This population consisted of at least 500 but more likely 10,000 breeding individuals who carried most of the MHC alleles and allelic lineages now found in human populations."

Andon and Fonta were not our sole human ancestors

Many (most?) readers think that *The Urantia Book* claims that Andon and Fonta were the sole ancestral parents of all of us. In fact, it does not. It says: "*Even the loss of Andon and Fonta before they had offspring, though delaying human evolution, would not have prevented it. Subsequent to the appearance of Andon and Fonta, and before the mutating potentials of animal life were exhausted, there evolved no less than seven thousand favorable strains which could have achieved some sort of human type of development. And many of these better stocks were subsequently assimilated by the various branches of the expanding human species.*" (734). Which would account quite nicely for the present polymorphism of the MHC alleles, as well as the estimates of the initial size of the breeding population at between 500 and 10,000. Ain't that marvellous?

Reference: Klein, J., N. Takahata, & F.J. Ayala. "MHC Polymorphisms and Human Origins." *Scientific American* 269 (6) 46-51. 1993.



When Did the Red Man Arrive in the Americas?

Prepared from material supplied by:
Dr Edmund Roache, Watertown, N.Y., U.S.A.

Clovis, New Mexico is the home of the archaeological site, discovered in the 1930's, that has given its name to the people thought to have first set foot in America. Buttressed by radiocarbon dating, this event was supposed to have been 11,200 years ago. The migration of the first Americans was thought to have been timed to the rhythm of glaciers. Twenty thousand years ago, glaciers are thought to have completely blocked routes south from Alaska. Only around 11,200 years ago when the glaciers had retreated sufficiently did a passable route reopen more or less along the present borders of Alberta and British Columbia.

That is the standard model—but it has problems. It appears that these people had reached the

southernmost tip of South America 10,000 miles away within 300 years! Apparently that is four times faster than the current world record for pre-historic hunter gatherers. It has other problems. In 1978, researchers in southern Chile started to excavate a site at Monte Verde that they claim was occupied 2000 years earlier than the Clovis site. This site has now been well documented but it appears that the supporters of the standard model do not want to know about it.

Trouble from mitochondrial DNA

Further trouble for the standard model has now arisen due to investigations using the mutation rate for mitochondrial DNA as a time clock. Investigations at Emory University on North American Indians indicate that these people belong to four distinct groups that diverged from a common maternal ancestor who presumably walked across the land bridge connecting Siberia and Alaska. The genetic clock places this event at upwards of 21 to 41 thousand years ago. But that is not the worst blow for the standard model. Another project using mitochondrial DNA has been carried out on the Nuu-Chah-Nulth tribe of Vancouver Island by workers from the Universities of Utah and Munich. This revealed an astonishing degree of diversity - 28 separate molecular variants in just 63 individuals. Measured by the mitochondrial DNA clock it seems that the ancestors for these people must have left Siberia up to 78,000 years ago. *The Urantia Book* tells us that the actual time was 85,000 years ago. Only time will tell.

Primate ancestry

An article appearing in *Natural History* (8/92)



indicates that the ancient North American lemur (*Northarctus*) was previously thought to be more primitive than the European variety and

not to have contributed directly to the primate and the human lineage. Recent fossil discoveries made at Bitter Creek, east of the Bridger Basin, Wyoming, have completely altered this view. Formerly described as a fox-faced little primate similar to today's ring tailed lemur, the finding of an almost complete skull shows *Northarctus* to have had a much smaller muzzle

than either extinct adapids or many living lemurs. Its discoverer states that it may have independently evolved a few features of the anthropoids, such as the reduced lachrymal bone of the face, and that, in some ways, *Northarctus* more closely resembles the ancestral stock that produced the monkeys and apes than the line that led to the Malagasy lemurs and sifakas of Madagascar. *The Urantia Book* states:

"Slightly to the west of India, on land now under water and among the offspring of Asiatic migrants of the older North American lemur types, the dawn mammals suddenly appeared. These small animals walked mostly on their hind legs, and they possessed large brains in proportion to their size and in comparison with the brains of other animals. In the seventieth generation of this order of life a new and higher group of animals suddenly differentiated. These new mid-mammals - almost twice the size and height of their ancestors and possessing proportionately increased brain power - had only well established themselves when the Primates, the third vital mutation, suddenly appeared. (At this same time, a retrograde development within the mid-mammal stock gave origin to the simian ancestry; and from that day to this, the human branch has gone forward by progressive evolution, while the simian tribes have remained stationary or actually regressed.)" (700)

The Origin of Life on Urantia

What is life?

In recent times, the sheer complexity of many viruses, and their counterparts in the bacterial kingdom (the phages), has induced many scientists to include them as life forms. At the other end of the scale the simplest of the plant virus particles appear to consist of a single molecule, a strand of RNA (ribonucleic acid). Furthermore, under appropriate conditions, some RNA molecules have the rudimentary capacity to synthesize new RNA molecules. Hence the extreme view that a single RNA molecule can constitute "life" is a defensible argument, but brings with it the impossibility of defining death.

The fact is that we do not know precisely what we mean by the word "life", nor can there be a totally satisfactory definition of the term. What is of interest to *Urantia Book* readers is what the book means by "life," and is there a conflict between the book's

version of the origin of life on this planet and that of current scientific concepts? Of relevance is this quote:

"The material self, the ego entity of human identity, is dependent during the physical life on the continuing function of the material life vehicle, on the continued existence of the unbalanced equilibrium of energies and intellect which, on Urantia, has been given the name, life." (1229)

Life according to *The Urantia Book*

The Urantia Book tells us that:

"550,000,000 years ago the Life Carrier corps returned to Urantia. In co-operation with spiritual powers and superphysical forces we organized and initiated the original life patterns of this world and planted them in the hospitable waters of the realm. All planetary life (aside from extraplanetary personalities) down to the days of Caligastia, the Planetary Prince, had its origin in our three original, identical, and simultaneous marine-life implantations. These three life implantations have been designated as: the central or Eurasian-African, the eastern or Australasian, and the western, embracing Greenland and the Americas." (667)

Much earlier in *The Urantia Book* we are told:

"The original life plasm of an evolutionary world must contain the full potential for all future developmental variations and for all subsequent evolutionary changes and modifications." (398).

For Urantia, this could mean nothing less than that the original "life" plasm must contain the necessary informational content that would, at some later stage of evolution, lead to forms of life possessing intellect (1229), and be responsive to the ministry of the adjutant mind-spirits. Thus, a simple, relatively small RNA molecule such as exists in some plant viruses would not qualify, and on the basis of present-day knowledge, the original life plasm would need to have been an exceedingly complex system.

What then are we to make of the claims of some scientists that life has existed on earth for about 3.5 billion years? Could there have been some form of organized protoplasm in existence prior to the time

nominated in the *Urantia Papers* for the introduction of life to this planet, and could the anomaly be due to a different definition of what constitutes life?

The term 'life' as used in *The Urantia Book* is something very special. The book tells us:

"Things material may enjoy an independent existence, but life springs only from life. Mind can be derived only from pre-existent mind. Spirit takes origin only from spirit ancestors. The creature may produce the forms of life, but only a creator personality or a creative force can supply the activating living spark."

"Life Carriers can organize the material forms, or physical patterns, of living beings, but the Spirit provides the initial spark of life and bestows the endowment of mind. Even the living forms of experimental life which the Life Carriers organize on their Salvington worlds are always devoid of reproductive powers. When the life formulas and the vital patterns are correctly assembled and properly organized, the presence of a Life Carrier is sufficient to initiate life, but all such living organisms are lacking in two essential attributes—mind endowment and reproductive powers. Animal mind and human mind are gifts of the local universe Mother Spirit, functioning through the seven adjutant mind-spirits, while creature ability to reproduce is the specific and personal impartation of the Universe Spirit to the ancestral life plasm inaugurated by the Life Carriers." (403,404)

A living system of original protoplasm on Urantia as introduced by the Life Carriers 550 million years ago would have to have been 'activated' and endowed with both mind and reproductive potential. Could there have been pre-existing protoplasm, perhaps similar, but not endowed with all of these vital qualities?

In describing "mind," *The Urantia Book* states:

"Mind such as man comprehends is an endowment of the seven adjutant mind-spirits superimposed on the nonteachable or mechanical levels of mind by the agencies of the Infinite Spirit." (399).



DNA

So, besides the mind endowment derived from the adjutant mind spirits, there is another form of mind that is mechanical - non-teachable. On page 402 we are told that the spirit of intuition is the only one of the adjutants to make extensive functional contact with the nonteachable levels of mechanical mind, and then on page 403 we may read the following:

"These mind-adjutants of a local universe Mother Spirit are related to creature life of intelligence status much as the power centers and physical controllers are related to the nonliving forces of the universe. They perform invaluable service in the mind circuits on the inhabited worlds and are effective collaborators with the Master Physical Controllers, who also serve as controllers and directors of the preadjutant mind levels, the levels of nonteachable or mechanical mind."

"Living mind, prior to the appearance of capacity to learn from experience, is the ministry domain of the Master Physical Controllers. Creature mind, before acquiring the ability to recognize divinity and worship Deity, is the exclusive domain of the adjutant spirits." (403)

These two paragraphs tell us that physical controllers have domain over a form of 'living mind' that is non-teachable and mechanical, and compare the relationship of the mind-adjutants to creature life to the relationship these physical controllers have to certain nonliving forces. How does creature life relate to nonliving 'forces'? There is nothing in these statements that would preclude the interpretation that nonteachable mind can exist in protoplasmic material that is 'nonliving' according to the essential attributes required for 'living' systems as defined by *The Urantia Book*.

Prokaryotes and Eukaryotes

There is a very distinctive difference between the prokaryotic organisms and those that are classified as eukaryotic that could embrace the differences required by *The Urantia Book* statement that the original life plasm of an evolutionary world must contain the full potential for all future developmental variations and for all subsequent evolutionary changes and modifications. Besides having their genetic material, the chromosomes, contained in a specialized cell compartment, the nucleus, the eukaryotes have a unique and remarkable system of transcribing genetic information contained in the DNA of the

chromosomes and subsequently translating that information into the multitude of cellular proteins. This system includes pieces of apparently nonsensical DNA (deoxyribonucleic acid) being inserted into the DNA of the gene. This strange system is then copied into the messenger RNA that defines the structure of a protein. However, before leaving the nucleus, all of this nonsense material present in the RNA message, is snipped out and the free ends of the pieces of RNA are joined in such a manner as to give a single molecule that specifies the correct pattern for copying into a particular protein molecule. The snipped out pieces have been labelled introns, and the pieces that are rejoined to form the correct messenger RNA molecule are called exons. A single gene may have as many as 50 introns that must be snipped out before a correct 'message' is obtained.

The strangeness and the complexity of the system of introns and exons quite staggers and perplexes the imagination. But the evolutionary facts are that the prokaryotes' relatively simple and straight-forward means of copying genetic information from the DNA of their genes into their functional proteins must nevertheless be considered as evolutionary failures when compared to the remarkable advances made by the eukaryotes. One such advance is that by splitting a gene into segments, the opportunity arises to join together specific segments from different genes that specify such things as the binding sites of enzymes and in this way producing totally new enzymes. Such a system has the potential to increase the rate of evolution by an enormous factor when compared with a system of accumulating random point mutations, the system that may have proved to be so restrictive for the prokaryotes. (One analogy is the way a learner assembles a computer program one step at a time, whereas the professional often uses sub-routines—program pieces that are already tried and tested.)



Blue-green algae

If the introduction of eukaryotic organisms marks the point when the Life Carriers introduced life to Urantia, then the prokaryotes may be a group that were utilized to prepare the planet for the later introduction of life plasm that has *"the full potential...for all subsequent evolutionary changes and modifications."* One such preparatory task may have been performed over billions of years by the prokaryotic blue-green algae in the evolution of an atmosphere low in carbon dioxide and high in oxygen content.

Some new research findings

Between the mid 1930's and 1950's (the years of receipt and publication of the *Urantia Papers*), evolutionists considered that all mutations were random events, and those that conferred a selective advantage were likely to be perpetuated by being passed on to progeny that were thus better equipped to meet the exigencies of the battle for survival. The planned development of life forms endowed with will are not envisaged in this scheme of things.

New techniques accompanying advances in the science of genetic engineering are producing evidence that is at least consistent with *The Urantia Book* account. For example, genes have been isolated from a number of homeotic mutations in the fruit fly, *Drosophila*



melanogaster. A homeotic mutation causes a body part to be replaced with a structure normally found elsewhere in the body. Antennapedia mutants have extra legs where the antennae should be. In 1983, Gehring and McGinnis found that the Antennapedia gene contained a DNA sequence that was also present in other homeotic genes, thus indicating a sequence concerned with development that was conserved in different genes. The conserved region in each homeotic gene was named a homeobox and the sequence of 60 amino acids specified by the homeobox was named a homeodomain.

A radioactively-labelled DNA probe was prepared from the Antennapedia homeobox and used to locate the same DNA sequence in hybridization experiments with DNA from other sources. Besides being present in other homeotic mutations, it was also found in DNA from a range of invertebrates including centipedes and earthworms that are thought to be ancestral to insects. When the Antennapedia DNA probe was mixed with DNA from a vertebrate, the frog *Xenopus laevis*, to the surprise of all concerned, it again hybridized with a DNA sequence which was subsequently isolated and labelled *XLHbox 1*. The work was quickly extended to include mice which were shown to have many genes containing homeoboxes. The proteins that contain homeodomains were found to include transcription factors that regulate the expression of target genes.

There from the beginning?

This work suggests that *XLHbox 1* is an ancient gene whose function antedates the appearance of tetrapod structures such as digits. The same gene is functional in the regulation of leg development in the fruit fly and is present in lower orders thought to be ancestral to insects including earthworms.

Currently (1995), 38 different homeobox (Hox) genes have been identified in mammals. Interference with these genes can uncover ancestral body plans. Before about 400 million years ago, the most advanced ancestors of mammals were fish with inflexible, jawless mouths. Interference with a gene called *Hoxd-4* in mice embryos can cause development of embryos having jaw structures like their ancestral jawless fish—all of which is consistent with the statement in *The Urantia Book* that the blueprint for the emergence of man was present from the beginning.

That something strange happened on *Urantia* at about the time the Life Carriers are stated to have introduced their life plasm is indicated by an article from *Time* magazine, December 1995: "Until about 600 million years ago, there were no organisms more complex than bacteria, multicelled algae and single celled plankton. The first hint of biological ferment was a plethora of mysterious palm-shaped, frond-like creatures that vanished as inexplicably as they appeared. Then, 543 million years ago, creatures with teeth and tentacles and claws and jaws materialized with the suddenness of apparitions. In a burst of creativity like nothing before or since, nature appears to have sketched out the blueprints for virtually the whole of the animal kingdom. This explosion of biological diversity is described by scientists as biology's Big Bang." Amazing!!

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The Urantia Book, 398, 733.

Computer Analysis of Dates in *The Urantia Book*

In 1572, a former professor from Bologna named Ugo Buoncampagni became Pope Gregory XIII; ten years later the Gregorian calendar was introduced. The Julian calendar, founded 16 centuries earlier by Julius Caesar, was inaccurate and the need for reform was widely recognized. Its principal failure was the discrepancy between the mean length of its year, 365.25 days, and the tropical year, then averaging 365.24232 days. This is nearly eleven minutes and four seconds shorter than the Julian year. This small discrepancy had continued to accumulate until it was no longer a matter of minutes but days. By the time of the Gregorian reform, the error had grown to eleven days. Understandably this was of concern to the Pope. If the calendar had continued unchanged, Easter would eventually be celebrated in the summer.

The attempts at reform set off a wide range of debates, both academic and religious. At one point, excommunication was threatened against anyone who refused to accept the new calendar. The details about this reform are to be found in the May 1982 issue of *Scientific American* by G. Moyer.

In Part 4 of *The Urantia Book* there are more than one hundred citations in which a date in the first century is given together with the day of the week for that date. In the pre-computer days prior to the publication of *The Urantia Book*, ascertaining this information was a monumental task. A number of algorithms that took into account the Gregorian reform had been published but at least one of them did not give the correct day of the week for the stated date, being out by one day.

Opponents of the revelatory nature of *The Urantia Book* have proposed that the papers were initially channeled and subsequently edited by Dr Sadler and associates. If the channeled information originated in the subconscious mind of the medium, then it appears to be impossible that the initial dates and days would have been correctly stated. It would seem then, that

Dr Sadler or his associates must have undertaken the extremely tedious task of determining which day of the week corresponded to each date. We might then ask why would they do it? It was almost forty years



before anybody even realized the difficulty of such a task at a time when computers were unavailable for its performance.

Using information obtained from *Astronomical Formulae for Calculators* by Jean Meeus, Dr Matt Neibaur wrote a computer program to check the correctness of the calendar data in Part 4 of *The Urantia Book* and found that for each of more than 100 instances, the day of the week was correctly assigned for the particular date quoted. Admittedly there is nothing prophetic or impossible about this fact. However, along with information that has been gathered about the multitude of archaeological facts also contained in Part 4 and listed later in this study, it does illustrate that these Urantia Papers cannot be less than the work of knowledgeable and dedicated scholars who have expended an almost unbelievable amount of time and effort in getting their facts right even to the minutest of detail.

Reference: Dr Matt Neibaur. *Scientific Symposium I*, published by The Fellowship for Readers of *The Urantia Book*, 1988

Planetary Atmospheres

"Beings such as the Urantia races are classified as mid-breathers; you represent the average or typical breathing order of mortal existence. If intelligent creatures should exist on a planet with an atmosphere similar to that of your near neighbor, Venus, they would belong to the superbreather group, while those inhabiting a planet with an atmosphere as thin as that of your outer neighbor, Mars, would be denominated sub-breathers." (561)



Prior to the visits of the Russian and American space probes from 1967 and onwards, little was known of the planetary atmospheres of Venus and Mars other than that cloud could be detected on Venus and that something resembling ice was present on the polar caps of Mars. The probes determined that atmospheric pressure on Venus is about 96 times that of Earth and consists of 97-98% carbon dioxide and

2-3% nitrogen. The cloud consists of concentrated sulfuric acid.

The atmospheric pressure on Mars is about 0.6% of Earth and also consists predominantly of carbon dioxide (95%), nitrogen (2.7%), argon (0.2%) and traces of carbon monoxide and other noble gases. The ice caps consist of frozen carbon dioxide. There is one chance in four of guessing the relative atmospheric pressures correctly.

Dinosaurs in Australia

"The largest of the dinosaurs originated in western North America. These monstrous reptiles are buried throughout the Rocky Mountain regions, along the whole of the Atlantic coast of North America, over western Europe, South Africa, and India, but not in Australia." (687)

Although dinosaur fossils have been found in Australia, as of 1996 it remains true that no fossil remains of the giant (monstrous) dinosaurs have been found there.

Marsupials

An article in Scientific American has discussed whether marsupials originated in Australia and radiated to the Americas via Antarctica, thence Europe—or the reverse. It states that marsupials flourished about 50 million years ago, and comments that proponents of continental drift think that Australia was connected to the Americas about that time. *The Urantia Book* tells us that the ancestors of kangaroos roamed Australia 45 million years ago, and that 35 million years ago the southern land bridge was extensive, reconnecting the then enormous Antarctic Continent with South America, South Africa, and Australia.

Marsupial fossils have been found in Australia in strata designated as *Upper Oligocene* (about 35-40 million years ago), and in the Americas in strata from the *Cretaceous* more than 65 million years ago. The fossil evidence indicates that marsupials could not have reached Australia from Asia or from Africa. Recently marsupial fossils have been



found on Seymour Island in Antarctica.

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The Urantia Book pp. 694, 695.

5. Contentious Materials

There are some much discussed statements in *The Urantia Book* that have achieved notoriety over a long period. A few of these are presented in this Part.

One Hundred Stable Elements

"Not every world will show one hundred recognizable elements at the surface, but they are somewhere present, have been present, or are in process of evolution. Conditions surrounding the origin and subsequent evolution of a planet determine how many of the one hundred atomic types will be observable. The heavier atoms are not found on the surface of many worlds. Even on Urantia the known heavier elements manifest a tendency to fly to pieces, as is illustrated by radium behavior." (541)

"In Orvonton it has never been possible naturally to assemble over one hundred orbital electrons in one atomic system. When one hundred and one have been artificially introduced into the orbital field, the result has always been the instantaneous disruption of the central proton with the wild dispersion of the electrons and other liberated energies." (478)

(The quoted text is from the first edition printing. The second and subsequent printings state, "well-nigh instantaneous")

For proton in the second quotation, read nucleus. The neutron was not discovered until 1932 and the original for this paper possibly existed well before that time. Electrons and protons had been known from much earlier times. Perhaps the original said "central

protons" meaning the central body or nucleus of the atom, and was overlooked when updated after 1932.

There are two other bothersome words in the second paragraph, the first being *naturally*, the second, *instantaneous*. Element 100 is fermium. It was first detected in the debris of a hydrogen bomb explosion in 1952. Its most stable isotope has a half life of 80 days. It would be expected to occur "naturally" at some stage during the life time of many stars—and perhaps on planets as a result of activity of fissionable materials.

Element 101 is mendelevium. Mendelevium 256 was first produced in 1955 by bombarding an isotope of element 99, einsteinium 253, with alpha particles accelerated in a cyclotron. It had a half life of 1.3 hours. Mendelevium 258 has since been synthesized and has a half-life of 54 days. Whether either is produced by a "natural" process in a star is a matter for debate, but whether they would ever occur on a world (planet) via a natural process appears to be unlikely.

What is considered to be an "artificial" process on Orvonton for introducing one hundred and one electrons into an atomic nucleus is unknown to us. If such a process only produces the more unstable isotopes, then "instantaneous" may be a suitable word to describe their disruption. If mendelevium 256 with a half life of 1.3 hours is produced, then the use of that word is either inaccurate or had a different meaning to what it has now acquired in the latter part of the twentieth century. No material physical process can be timeless. Whereas a hundredth of a second may have passed for instantaneous a few years ago, technology has now shifted its meaning by many orders of magnitude. However for a "sleeping" survivor awaiting a planetary dispensation, on awakening, even two thousand years is but an instant. Certainly the unstable radioactive elements commence to disrupt "instantaneously" once produced but, in this case, the use of a word such as rapid would appear to have been more appropriate.

Perhaps it is worth noting that the word "instant" gets a dictionary definition (Collins) of "urgent; pressing; immediate; belonging to the current month."

Many elements of atomic number greater than 101 have now been produced. All demonstrate a "tendency to fly to pieces." All have very short half lives.

Chromosome Numbers

"The life circuits caused the chromosomes of the specialized Urantia pattern to reorganize..." (857)

"On Urantia there are forty eight units of pattern control in the sex cells of human reproduction." (397)

Until 1954, it was believed that the human chromosome count was forty eight. In that year, Hintjio and Levan showed that the correct count is forty six. Hence, many have argued that the forty eight units of pattern control mentioned in *The Urantia Book* is a mistake. However, since the mandate proscribed the supply of unearned knowledge, others believe that the revelators simply gave us the best available information at the time of receipt of the Papers. Some argue that the mention of sex cells has some significance, that double-stranded DNA carries genes on both strands and, including two strands each from the sex chromosomes (X and Y), there actually are 48 units of pattern control.

Why is it that the revelators use the word "chromosome" on page 857 but refer to forty eight units of "pattern control" on page 397? Obviously the term "chromosome" was known to them.



Assume we have two vehicles, both of them four wheel drive jeeps. Neither has enough power to move a particular log, so we link them together to accomplish the task. Did we use two vehicles or one?

Quoting from *The Language of the Genes* by S. Jones (1993), "Humans share many genes with the ape family. About a thousand distinct stained bands can be seen in the human chromosome set. Every one is also found in the chimpanzees. The main difference is not the amount of chromosomal material but in its order. Many of the bands have been reshuffled and, in humans, two of the chromosomes have been fused together in the line leading to humans. Thus we have forty six chromosomes in each cell, while the chimps and the gorillas have forty eight."

Personally I have no problem in looking upon the forty six chromosomes of the human race as the same thing as the forty eight units of pattern control of the

ape family. After all, humans and chimps share 98.4 percent of their DNA.

In our article "The Origin of Life on Urantia," the significance of the homeobox genes is discussed. These are units of control that direct embryonic development of animals and insects. In mammals, 32 homeoboxes have currently been recognized. Could there be 48? Are these the units of pattern control? Perhaps—but it would be quite a coincidence that there are also forty eight chromosomes in the ape family. It must be kept in mind also, that any serious attempt at an explanation for the 48 units of pattern control must also include an explanation for the series, 12, 24, 48, 96, 192, 384, 768 based upon the primeval 12 inheritance carriers mentioned in *The Urantia Book*. (397)

Reference. S. Jones (1993). *The Language of the Genes*. (HarperCollins Publishers, Great Britain)

Mercury and the Moon

"The planets nearest the sun were the first to have their revolutions slowed down by tidal friction. Such gravitational influences also contribute to the stabilization of planetary orbits while acting as a brake on the rate of planetary-axial revolution, causing a planet to revolve ever slower until axial revolution ceases, leaving one hemisphere of the planet always turned toward the sun or larger body, as is illustrated by the planet Mercury and by the moon, which always turns the same face toward Urantia". (657)



Ever since it was discovered that the planet Mercury is still slowly rotating (period of axial revolution is 58.7 days), readers of the Urantia Papers have entered into a polemic about whether the statement on page 657 is, or is not, an error. An answer to that is that the statement may be ambiguous, capable of being taken in several different ways. One way is "...causing a planet to revolve ever slower {as is the case with the planet Mercury}, until axial revolution ceases leaving one hemisphere always turned towards the larger body as is illustrated by the moon which always turns the same face towards Urantia."

Without further evidence, there is no way to reach a conclusion that would be satisfactory to everyone. Hence it must be left to individual readers to draw their own conclusion.

6. An Index of Archaeological and Historical Information in Part 4. *The Urantia Book*.

Introduction

This material is provided both as a matter of interest and to further demonstrate to readers that the Urantia Papers are a work of dedicated scholarship that, besides their theological and spiritual content, provide an enormous amount of information on a range of subjects that includes biblical and historical archaeology. This fact is utterly inconsistent with any hypothesis which asserts the Urantia Papers are the direct product of the subconscious mind of a sleeping human subject.

Index

[Statements of an archaeological, geographical, or historical nature in Part 4 of the book are indexed by page number. A *Remarks* section follows each item, providing relevant information gleaned from a variety of reference works. Several appendices contain further information on items of interest.]

P. 1333. *"And more than half of this caravan traffic (connecting East and West) passed through or near the little town of Nazareth in Galilee."*

Remarks: Hastings' *Dictionary of Christ and the Gospels*², p. 236 states that, though retired from the great highways of commerce, Nazareth was within easy reach, within sight of them. In the New Testament (NT), it was referred to as a city, not a village (Mt 2,23; Lk 1,26;2,4).

P. 1333. *"Even the temple at Jerusalem possessed its ornate court of the gentiles."*

Remarks: Reference 3 mentions the Court of the Gentiles at the temple in Jerusalem. There is also an

oblique reference in Revelations 11:2.

P. 1338. "The renaissance of Judaism dates from the Greek translation of the Hebrew scriptures...Though the Hellenized Jewish beliefs were very little influenced by the teachings of the Epicureans, they were very materially affected by the philosophy of Plato and the self-abnegation doctrines of the Stoics. The great inroad of Stoicism is exemplified by the Fourth Book of the Maccabees; the penetration of both Platonic philosophy and Stoic doctrines is exhibited in the Wisdom of Solomon. The Hellenized Jews brought to the Hebrew scriptures such an allegorical interpretation that they found no difficulty in conforming Hebrew theology with their revered Aristotelian philosophy."

Remarks: The Septuagint was a translation of the Pentateuch into Greek made in about 250 B.C. by Jewish scholars in Alexandria. A later scholar, Philo, used allegory to interpret the meaning of the Jewish Scriptures and was much influenced by Homer, the Pythagoreans, Plato, and the Stoics¹.

P. 1339: "Philo taught deliverance from the doctrine of forgiveness only by the shedding of blood."

Remarks: For Philo, the Logos was the instrument through which God created all things. The Logos intercedes for the sinner but there is no need for an atonement nor a sacrifice to offer as the basis for His intercession, least of all that of Himself (ref. Edersheim,⁴ Bk 1, Chapter iv)

P. 1342: *Luke, the physician of Antioch in Pisidia.*

Remarks: There were two cities named Antioch. One was in Pisidia (in modern Turkey). (see Acts 13:14). Another Antioch was situated in Syria.

P. 1349/50. Describes geography in the neighborhood of Nazareth—a high hill just north of Nazareth, the highest of all the hills of southern Galilee save the Mount Tabor range to the east and the hill of Nain which was about the same height. The road to Sepphoris passed by the base of the hill. Jesus was fond of climbing the hill that rises on the northerly

side of Nazareth.

Remarks: Nazareth sits in a basin 1300 feet above sea level. Mount Tabor rises out of the great plain to the east. Three to four miles to the north of Nazareth a hill rises that, in Jesus' day, was dominated by the gentile city of Sepphoris. The village of Nazareth nestles around its pleasant spring. A ten-minute walk from the Nazareth spring to the top of the north ridge provides a magnificent vista of the valley below. (Biblical Archaeology Review, May/June 1992).⁵

P. 1350. "In the month of March, 8 B.C. Caesar Augustus decreed that all the inhabitants of the Roman Empire should be numbered...in the Palestinian kingdom of Herod...it was taken in 7 B.C., one year later."

Remarks: Augustus initiated enrolment which were "numberings" of the people according to households and had nothing to do with valuation for taxation.² The year, 7 B.C., is currently a favored year for the birth of Jesus. (David Hughes, BBC T.V. documentary which reviewed the evidence and favored 7 B.C.)



Outside the city walls, Jerusalem

P. 1350/1. "Joseph and Mary set out early on August 18, 7 B.C. and reached the river Jordan just past the foothills of Mount Gilboa where they camped for the night. [between 30 and 40 miles]. They left very early on August 19 and arrived at Jericho for the night (appears to be about 50 miles)... They reached Jerusalem by noon next day and Bethlehem in mid-afternoon."

Remarks: The journey appears to be amazingly fast, as well as being incredible for a woman on the verge of giving birth. But some women (in India, for example) will work in the fields almost to the moment of birth, then cease work to give birth. Mary could have ridden on their donkey for part, even most, of the journey.

P. 1357. "[Mary] bundled up both her children and fled to the country home of her brother, several miles south of Nazareth on the Megiddo road near Sarid."

Remarks: Sarid is located where stated and has the

modern name of T. Shadud.⁶

P. 1360. "The next few years Joseph did considerable work at Cana, Bethlehem (of Galilee), Magdala, Nain, Sepphoris, Capernaum, and Endor, as well as much building in and near Nazareth. As James grew up to be old enough to help his mother with the housework and care of the younger children, Jesus made frequent trips away from home with his father to these surrounding towns and villages. Jesus was a keen observer and gained much practical knowledge from these trips away from home; he was assiduously storing up knowledge regarding man and the way he lived on earth." Also P. 1410: "Jesus left James in charge of the repair shop...while he went over to Sepphoris to work...."

Remarks: "The Joint Sepphoris Project directed by Ehud Netzer of Hebrew University and Eric and Carol Meyers from Duke University⁷...began to excavate the site in 1985...The significance of Sepphoris...is becoming increasingly evident...In short, Jesus lived in a Galilean culture much more urban and sophisticated than previously believed. To acknowledge this fact is to see the man and his ministry from a radically different viewpoint...The construction of an influential Roman capital city so near Jesus' home in Nazareth re-defines the carpenter's occupation in central Galilee. To erect Herod Antipas' new capital, many skilled workers from surrounding towns and villages came to Sepphoris and found employment. Artisans from Nazareth would have surely been among them...whether or not he (Jesus) actually labored there, his presence in the city on various occasions can scarcely be doubted; and the fact of such contacts during the formative years of his young manhood may account for attitudes and opinions that show themselves conspicuously during his public ministry."

P. 1364. "From four directions, Jesus could observe the caravan trains as they wended their way in and out of Nazareth."

Remarks: The statement is a little ambiguous as it can be taken to mean Jesus could observe to the north,

south, east, and west and see caravan trains or it can mean he could see the caravan trains which were coming from four directions. To the north, south, and west there are uninterrupted views from the Nazareth hill, but not so an easterly direction which is obscured by other hills (Mt. Tabor). However, caravans coming from the east could be seen: "The Midianite caravans

could be watched for miles coming up from the fords of Jordan and the caravans from Damascus wound round the foot of the hill on which Nazareth stands." (George Adam Smith, *The Historical Geography of the Holy Land*.⁶)

P. 1370. "Jesus had often gazed curiously upon this magnificent Greek city [Scythopolis] from the hill of Nazareth."

Remarks: *Urantia Book* reader, David Kantor, who has stood upon the hill, states that the ruins of Scythopolis are visible even though about 18 miles away.

P. 1378. "The Temple [Jerusalem] precincts could accommodate over 200,000 worshippers at a time."

Remarks: A map (Josephus. *The Jewish War*.⁷) of the Temple shows the area of the precincts (less the area occupied by the Temple itself) to have been about 125,000 square yards. At a packing density of two persons per square yard it would accommodate 250,000 people.

P. 1411. "They journeyed to Jerusalem by way of the Decapolis and through Pella, Gerasa, Philadelphia, Heshbon, and Jericho."

Remarks: Pella was about 20 miles south of the Sea of Galilee and a couple of miles east of the Jordan; Gerasa was a further 12 miles south of Pella and about 20 miles east of the Jordan; Philadelphia was about 23 miles east of the Jordan and about the same distance NE of the Dead Sea; Heshbon is mentioned several times in the Old Testament. It was located on the Kings' Highway, east of the northern banks of the Dead Sea, and was an important city in much earlier times; Jericho was about 5 miles west of the Jordan and about 7 miles north of the Dead Sea.



Doorway in Nazareth

P. 1419. "In January of this year, A.D. 21...he [Jesus] spent one week at Tiberias, the new city which was soon to succeed Sepphoris as the capital of Galilee."

Remarks: Herod Antipas had rebuilt Sepphoris, essentially as a Greek style city, starting about 4 A.D. Later he decided on Tiberias for his new city and dedicated it in A.D. 18. It took about 9 years to complete. Sepphoris was about 5 miles from Nazareth; Tiberias was on the west bank of the Sea of Galilee.

P. 1419/20. "He [Jesus] spent one week at Tiberias...and finding little to interest him, he passed on successively through Magdala and Bethsaida to Capernaum."

"Zebedee's boat-building shops were on the lake to the south of Capernaum and his home was situated down the lake shore near the fishing headquarters of Bethsaida."

Remarks: This Bethsaida is clearly not the Bethsaida-Julias referred to in *The Urantia Book* which was east and slightly north of Capernaum. Magdala was about 4 miles north of Tiberias and 7-8 miles south of Capernaum. On p. 1548, referring to Andrew, "His father, now dead, had been a partner of Zebedee in the fish-drying business at Bethsaida, the fishing harbor of Capernaum." And on p.1552, the book states, "He [James Zebedee] was married, had four children, and lived near his parents in the outskirts of Capernaum, Bethsaida." Hence this "Bethsaida" was a suburb of Capernaum. MSeCarta¹ indicates there were 2 villages named Bethsaida but places both in Philip's territory east of the Jordan. It locates Bethsaida-Julias near the mouth of the Jordan on the Sea of Galilee. Hastings² p.204 indicates the major part of the evidence for Bethsaida in Galilee is from the Gospels and considers it convincing. The favored archaeological site is Ain et-Tabigha which appears to be a natural site for fishery activity and was still in use in Hastings' day (i.e. 1908). Bethsaida-Julias appears to have been east of Capernaum and a few miles inland. (see also p.1761 reference)

P. 1427. "From Jerusalem they went by way of Joppa...boat to Alexandria...sailed for Lasea in Crete...for Carthage...for Naples, stopping at Malta, Syracuse, and Messina. From Naples...went to Capua and by the Appian Way to Rome."



The Dead Sea at Sunrise

Remarks: All locations check out to be present 2000 years ago. Lasea is mentioned in Acts 27:8. In 1853, an expedition led by a Captain Spratt to Crete located ancient ruins near Fair Havens claimed to be those of Lasea.³

P. 1427. "From Rome...overland to Tarentum...sail for Athens, stopping at Nicopolis and Corinth...from Athens to Ephesus by way of Troas...to Cyprus putting in at Rhodes on the way...thence Antioch in Syria...to Sidon...to Damascus...by caravan to Mesopotamia passing through Thapsacus and Larissa...to Babylon, Ur, Susa, Charax."

Remarks: Historicity O.K. There was a Larisa (or Larissa) in ancient Thessaly. A Larissa was also located on the Tigris. Thapsacus was a city on the Euphrates on the route of Alexander's conquests.

P. 1429. "During the evenings Jesus and his friends strolled about on the beautiful wall which served as a promenade around the port. Ganid greatly enjoyed Jesus' explanation of the water system of the city and the technique whereby the tides were utilized to flush the city's streets and sewers. This youth of India was much impressed with the temple of Augustus, situated upon an elevation and surmounted by a colossal statue of the Roman emperor. The second afternoon of their stay the three of them attended a performance in the enormous amphitheater which could seat twenty thousand persons, and that night they went to a Greek play at the theater. These were the first exhibitions of this sort Ganid had ever witnessed, and he asked Jesus many questions about them. On the morning of the third day they paid a formal visit to the governor's palace, for Caesarea was the capital of Palestine and the residence of the Roman procurator."

Remarks: Herod the Great built the theater and amphitheater. The sewerage system is mentioned by the first-century Jewish historian Josephus. A map of Caesarea is presented in the *Readers' Digest Atlas of the Bible*³ (p.196/7) which conforms with the above description except that it does not mention the statue to Augustus. It cites a Joint Expedition to Caesarea led by Robert J. Bull. (for further information see Appendix 1.)

P. 1430. "...a Roman centurion, Cornelius, who became a believer through Peter's ministry."

Remarks: See Acts, chapter 10.

P. 1432. *"As they approached the city's harbor [Alexandria], the young man was thrilled by the great lighthouse of Pharos, located on the island which Alexander had joined by a mole to the mainland, thus creating two magnificent harbors and thereby making Alexandria the maritime commercial crossroads of Africa, Asia, and Europe. This great lighthouse was one of the seven wonders of the world and was the forerunner of all subsequent lighthouses."*

Remarks: The location of Pharos on an island which was joined to the mainland by a mole, plus the formation of the two harbors is correct. A detailed account is apparently contained in Frost, H. (1975) "The Pharos Site." I.J.N.A. 4, 126-130. It would be interesting to know the dates of archaeological missions that unravelled the evidence.



P.1432 At Alexandria, *"...the city's chief attractions—university (museum), library, the royal mausoleum of Alexander, the palace, temple of Neptune, theater, and gymnasium...the library, greatest in the world. Here were assembled nearly a million manuscripts."*

Remarks: Library and museum confirmed, also the mausoleum of Alexander. Several palaces were built by the Ptolemies. The temple of Poseidon, the god of the sea, was built by the Greeks. However the Romans identified Poseidon with Neptune, the Roman god of the sea. Possibly the temple was renamed by the Romans. The library contained almost 500,000 volumes early in the 3rd century B.C. A later figure estimated 700,000, including duplicate copies. Apparently it was housed in a number of buildings. Fire broke out in one of these during the reign of Julius Caesar.

P. 1432 *"...the translation of the Hebrew scriptures into Greek at this place."*

Remarks: The early Greek translation of the Pentateuch was made by (reputedly) 70 elders of Israel living in Alexandria's Jewish community (hence

called the Septuagint). It was completed by about 250 B.C.³

P. 1432...[at Alexandria] *"Philo was engaged in the laudable but exceedingly difficult task of harmonizing Greek philosophy and Hebrew theology."*

Remarks: Philo attempted to demonstrate the correspondence between the Old Testament and the Greek world view as propounded by Greek philosophers and scholars. He conceived of God as a being so exalted

above the world that an intermediate class is required to establish contact between him and this world—not merely "ideas" in the Platonic sense, but real active powers, the "Logos."

P. 1432. [at Crete] *"One thing happened on a visit to Fair Havens which Ganid never forgot."*

Remarks: Jesus, Gonod, and Ganid arrived in Crete by sea

at Lasea. The visit to Crete was a holiday *"to play, to walk over the island, and to climb mountains."* Fair Havens was on the southern coast of Crete near Cauda.

P. 1437. [at Crete] *"Could you inform me as to the best route to Phenix?"*

Remarks: Phoenix was on the southern coast of Crete about 50 miles east of Cauda and Fair Havens.

P. 1444. *"The Kenites of Palestine salvaged much of the teaching of Melchizedek."*

Remarks: Hobab, the father-in-law of Moses was a Kenite, a nomad tribe of the land that the Lord gave to Abraham (Genesis 18:19)

P. 1450 *"Suduanism [Jainism]"*

Remarks: Fairly extensive accounts of Jainism make no reference to Suduanism. No reference found.

P. 1477. [at Ephesus] *"They made many trips to the famous temple of Artemis of the Ephesians...famous goddess of all Asia Minor...a perpetuation of earlier mother goddess of ancient Anatolian times...The*

crude idol exhibited in the temple...was reputed to have fallen from heaven...the fertility goddess of Asia Minor."

Remarks: The gigantic temple of Artemis was constructed about 560 B.C. It was 115 x 55 meters, and contained a forest of marble columns. Hastings² states, "The Ephesian goddess was represented by a rude idol which was said to have fallen from heaven."

P. 1478 [Ephesus] "*Paul, who resided here for more than two years...conducting lectures...chamber of school of Tyrannus.*"

Remarks: see Acts 19:19

P. 1480. [Antioch, Syria.] "*visited everything except the grove of Daphne.*"

Remarks: In Greek mythology, Daphne was a nymph, the daughter of the river god, Peneus. Daphne dedicated herself to Artemis, goddess of the hunt (also fertility). The grove of Daphne is referred to in the 5 vol. edition of Hastings² under the heading of Antioch. Original references were from Josephus Ant. XVII,ii,1; Pliny HN v.18; 2 Macc. 4:33.

P. 1485. "*Jesus had stopped for several days of rest and recuperation at the old Persian city of Urmia on the western shores of Lake Urmia.*"

Remarks: Urmia, formerly Rezaieyeh, near Lake Urmia, is the traditional birthplace of Zoroaster.

P. 1492. "From Joppa he [Jesus] travelled inland to Jamnia, Ashdod, and Gaza, thence to Beersheba."

Remarks: Inland Jamnia was about 12 miles south of Joppa (there was also a sea port of Jamnia about 5 miles apart). Ashdod was about 20 miles north of Gaza and Beersheba was about 30 miles inland from Gaza.

P. 1492. "*Jesus started on his final tour...from Beersheba in the south to Dan in the north...stopped at Hebron, Bethlehem, Jerusalem, Beeroth, Lebonah, Sychar, Shechem, Samaria, Geba, En-Gannim, Endor, Madon, Magdala, Capernaum, Waters of Merom, Karahta to Dan, or Caesarea Philippi...to*

Mount Hermon."

Remarks: Beeroth was about 4-5 miles NW of Jerusalem; Lebonah about 12 miles N of Jerusalem; Sychar about 12 miles N of Lebonah; Shechem 31 miles N of Jerusalem; Samaria 34 miles N of Jerusalem; Geba (see note below); En-Gannim (see Joshua 15:34, 19:21, 21:29) was a few miles south of Mt. Tabor⁶; Endor about 55 miles N of Jerusalem; Madon (see Joshua 11:1, 12:19) was 4-5 miles inland from the Sea of Galilee between Magdala and Tiberias⁶; Magdala on western shore of the Sea of Galilee; Capernaum on north shore of Sea of Galilee; Waters of Merom about 17 miles N of Capernaum; Karahta cannot locate; Dan about 23 miles N of Capernaum; Caesarea Philippi about 1 mile E



Temple of Artemis

of Dan; Mount Hermon rises about 25 miles north from the northern tip of the Sea of Galilee. [Note: Geba in the Old Testament was situated about 6 miles north of Jerusalem, hence Jesus would have had to backtrack almost 30 miles from Samaria to visit this Geba. However another Geba is mentioned in the Book of Judith in the Apocrypha (JDT 3:10) located somewhere in the neighborhood of the Jezreel Valley and is probably the place visited by Jesus on this trip. Geba is shown on a map of Palestine in Hastings² and located about 12 miles NW of Megiddo in Samaria.

P. 1493. "*He proceeded along the Damascus' road to a village sometime known as Beit Jenn.*"

Remarks: Beit Jenn not located.

P. 1496. "*John becomes a Nazarite.*"

Remarks: Hastings² states, "John the Baptist, in some respects at least, resembled the Nazarites."

P. 1496. "*Engedi...the southern headquarters of the Nazarite brotherhood.*"

Remarks: Is there any record of the Nazarites at Engedi? (Engedi was an oasis near the western banks of the Dead Sea about 8 miles N of Masada.)

P. 1498. "*He [John the Baptist] talked much with Ezda, an orphan lad of Beth-Zur.*"

Remarks: Beth-Zur was the location where Judas Maccabeus routed a Syrian army. It was about 16 miles south of Jerusalem on the road to Hebron.

P. 1500. "About 100 years before the days of John and Jesus, a new school of religious teachers arose in Palestine, the Apocalyptists. These new teachers...accounted for the suffering and humiliations of the Jews on the grounds that they were paying the penalty for the nation's sins."

Remarks: The Book of Similitudes is thought by some to have arisen in the Maccabean period about 95 B.C. and qualifies as Apocalyptic literature.

P. 1502/3. "John preached four months at Bethany ford."

Remarks: John's gospel put the baptism of Jesus at Bethany ford "beyond the Jordan." Some Christian tradition places this at Hajlah ford directly east of Jericho. Other tradition places the baptism at Bethabara not more than a day's journey from Cana in Galilee. A map in Hastings² shows Bethabara on the Jordan about 5 miles north of Pella. The Urantia Papers place the baptism of Jesus as near Pella in the Decapolis. (1503) (see also P. 1869 reference)



The Jordan River

P. 1508. "As John was working in southern Perea when arrested he was taken immediately to the prison of the fortress of Machaerus where he was incarcerated until his execution."

Remarks: The Jewish historian, Josephus, relates that John was arrested and shut up in the fortress of Machaerus because he had criticized Antipas' marriage to Herodias.

Page. 1508. "In celebration of his birthday Herod made a great feast in the Machaerian palace..."

Remarks: Machaerus was both a fortress and a palace. [Josephus BJ VII v1 1-3; Pliny Hist. nat. V. xvi, 72]

P. 1510. "The Jews had been brought up to believe in the doctrine of the 'Shekinah.'"

Remarks: Can mean the localized presence of the Deity—God's visible presence or glorious manifestation which dwells among men. In the NT it is used symbolically i.e. "the glory of the Lord shone around them" (Luke 2:9), and "a bright cloud overshadowed them, and behold a voice out of the cloud saying..." (Mark 9:7)

P. 1526. "And the group continued to baptize in John's name and eventually founded a sect of those who believed in John but refused to accept Jesus. A remnant of this group persists in Mesopotamia even to this day."

Remarks: Possibly refers to the Mandaean sect south of Baghdad that considers Jesus to have been a false prophet but reveres John the Baptist.¹

P. 1534. "The Essenes were a true religious sect, originating during the Maccabean revolt..."

Remarks: The Essenes are referred to in the writings of Josephus, Pliny, and Philo. They came into existence in the 2nd century B.C. but disappeared in the 2nd century A.D. They were virtually unknown before the discovery of the Dead Sea Scrolls in 1947.

P. 1535. "The Zealots were a group of intense Jewish patriots..."

Remarks: The Zealots came into being during the reign of Herod the Great. Some factions were extremists (the Sicarii). The movement died out at Masada with the suicide of all of its defendants in A.D. 73.

P. 1538. "Phillip and Nathaniel went to Tarichea."



Dead Sea Scroll scraps

Remarks: see P. 1668 reference.

P. 1541. "On the morrow all nine of them went by

boat over to Kheresa."

Remarks: Smith⁶ has Kersa [Kheresa] on the eastern shore of the Sea of Galilee. A Urantia Foundation map has it opposite Magdala. (see also PP. 1694,1723 references)

P. 1546. "The apostles carried on their personal work in Capernaum, Bethsaida-Julias, Chorazin, Gerasa, Hippos, Cana, Bethlehem of Galilee, Jotapata, Ramah, Safed, Gischala, Gadara, and Abila."

Remarks: Capernaum and Bethsaida-Julias have been checked previously. Chorazin was about 3 miles north of Capernaum; Gerasa was about 15 miles SE of Pella; Hippos (Hippus?) was close to the eastern shore of the Sea of Galilee; Cana--First-century Jewish historian, Josephus, said he resided for a time in a village of Galilee which is named Cana. The most favored site is about 6 miles N of Sepphoris, others place it about the same distance but to the east of Sepphoris; Bethlehem of Galilee about 6-7 miles west of Nazareth and Sepphoris. Referred to in the OT as being assigned to Zebulun (Jos.19:15); Jotapata was the Greco-Roman name for Jotbah and was about 15-16 miles NNW of Tiberias; Ramah--There was a Ramah a few miles north of Jerusalem and another in Galilee about 6 miles south of Zebulun. Referred to in the OT as being assigned to Naphthali (Jos. 19:36); Safed also known as Zefat or Safad was 12-13 miles NW of Capernaum (ref. *Encyclopaedia Britannica*); Gischala was about 12 miles NW of Capernaum towards Iron; Gadara was in Gilthead about 6 miles SE of where the Jordan leaves the Sea of Galilee; Abila was about 17-18 miles E and slightly S of where the Jordan leaves the Sea of Galilee.

P. 1548. Referring to Andrew, "His father, now dead, had been a partner of Zebedee in the fish-drying business at Bethsaida, the fishing harbor of Capernaum."

Remarks: Defines exactly the function and location of this Bethsaida in Galilee as distinct from Bethsaida-Julias in the territory of Philip to the east of the Jordan.

P. 1554/5/6 Re John the apostle.

Remarks: That John died at an advanced age at Ephesus where he was bishop accords with tradition (see Hastings² p. 868, 869) including "for years his only utterance was, 'My little children, love one

another.'" It is also tradition that John wrote the Book of Revelation while exiled on the Isle of Patmos.

P. 1557/8. Re Philip and his wife: "Their eldest daughter, Leah, continued their work, later on becoming the renowned prophetess of Hieropolis. Philip...was finally crucified for his faith and buried at Hieropolis."

Remarks: Hastings² p.359, says: "And it was there [Hieropolis] according to Polycrates [bishop of Ephesus c. 190 A.D.] that he was buried along with his two aged virgin daughters. The same authority adds that another daughter, who lived in fellowship with the Holy Spirit, was buried at Ephesus."

P. 1589. "The Sojourn at Amathus."

Remarks: Amathus was a city of Perea situated on a tributary of the Jordan, a little more than half way from the Sea of Galilee to the Dead Sea.

P. 1593 "...down the Jordan to the ford near Bethany in Perea, the place John first made proclamation...second week of the sojourn at Bethany beyond Jordan, Jesus took Peter, James, and John into the hills across the river and south of Jericho for a three days rest."

Remarks: It appears unlikely that Jesus and the three apostles walked from the Pella region to the hills south of Jericho (about 45-50 miles) to take a three-day rest. Hence the location of Bethany beyond the Jordan may have been much nearer Jericho, perhaps at Makhadet Hajlah, one of its traditional locations. *The Urantia Book* places the baptism of Jesus in the Pella region, indicating that the location given in John's gospel at Bethany beyond Jordan is an error, or else this group really did walk 50 miles to take a three-day rest.

P. 1595. "Throughout the four weeks' sojourn at Bethany beyond the Jordan, several times each week Andrew would assign apostolic couples to go up to Jericho for a day or two."



Theater at Ephesus

Remarks: This would appear to confirm that Bethany beyond the Jordan was within easy walking distance of Jericho, close enough to go there and back on the same day. It is possible that the name, Bethany beyond the Jordan, was a colloquialism used by Galileans for the last river ford before heading for Jericho and Bethany. This would explain why no ford or place of that name has been identified in the Jordan valley. (but see P. 1869 reference)

P. 1605. "The Master and his apostles decided to leave Jerusalem for a while and work in Bethlehem and Hebron."

Remarks: Hebron was about 10 miles south of Bethlehem which was another 4 to 5 miles south of Jerusalem.

P. 1607. "Going north into Samaria, they tarried over the Sabbath at Bethel...preached to people from Gophna and Ephraim. A group of citizens from Arimathea and Thamna...many of whom came from as far as Antipatris to hear the good news..."

Remarks: Bethel was about 12 miles north of Jerusalem; Gophna was the Hellenistic name for Ophni, a village in the hills of Samaria assigned to Benjamin (Jos 18:24). Ephraim was about 13 miles north from Jerusalem on a road that led to Jericho. Arimathea was inland from Joppa, about 5 miles west of Thamna. It is also cited as another name for Ramah, a town about 6 miles north of Jerusalem. Thamna was the Greco-Roman name for Timnath-Serah, a village in the hill country of Ephraim and the place where Joshua was buried. (Jos 19:50) Antipatris was the name of a town rebuilt by Herod the Great, and was the Roman name for Aphek, a town at the source of the Yarkon river west of the hills of Ephraim.

P.1607. "...the apostolic party made its headquarters at the Greek cities of Archelais and Phasaells."

Remarks: Phasaellis was a town in the lower Jordan valley north of Jericho and named by Herod the Great for his deceased older brother. Archelais was about 10 miles SE of Phasaellis and 11 to 12 miles E of

Ephraim.

P. 1612. "For more than six hundred years the Jews of Judea, and later on those of Galilee also, had been at enmity with the Samaritans. This ill feeling between the Jews and the Samaritans came about in this way: About seven hundred years B.C., Sargon, king of Assyria, in subduing a revolt in central Palestine, carried away and into captivity over twenty-five thousand Jews of the northern kingdom of Israel and installed in their place an almost equal number of the descendants of the Cuthites, Sepharvites, and the Hamathites. Later on, Ashurbanipal sent still other colonies to dwell in Samaria."

Remarks: "The emperor of Assyria took people from the cities of Babylon, Cuth, Ivvah, Hamath, and Sepharvaim, and settled them in the cities of Samaria in place of the exiled Israelites." (2 Kings 17:24) "During the siege [of Samaria], suffering increased daily and desperation mounted by the hour, until the



Satellite photo of Dead Sea area

Assyrians finally breached the walls and took the city. The year was 721 B.C. After two centuries the northern kingdom of Israel had come to an end. In his annals Sargon boasts of taking away as booty 27,290 inhabitants of Samaria, scattering these people to Upper Mesopotamia and Media. He also brought into Israel peoples conquered elsewhere...the newcomers, in time, merged with the remaining Israelites to become the Samaritans of the New Testament."

The Assyrian king, Ashurbanipal, died in 627 B.C. He is not mentioned by name in the Old Testament. Shalmaneser was the king who commenced the siege of Samaria, but died before its capture and was succeeded by Sargon, the second. Sargon gets a mention in Isaiah 20:1, but not in relation to Samaria.

Page 1612 "...they [the Samaritans] continued this worship up to the time of the Maccabees, when John Hyrcanus destroyed their temple on Mount Gerizim."

Remarks: John Hyrcanus destroyed the cities of Shechem and Samaria. The temple at Mount Gerizim was also destroyed but that it was due to John Hyrcanus has yet to be confirmed.

Page. 1612. "The water of Jacob's well was less mineral than that from the wells of Sychar..."

Remarks: In notes to the 4th edition of George Adam Smith's *The Historical Geography of the Holy Land* (1894)⁶ a Dr Bailey, who was a medical missionary in the region for 2 years, states that the water at Jacob's well was renowned for its purity and flavor whereas the numerous springs in the area are mostly of very hard water. He states the copious fountain at El Askar (Sychar) gushes from the very bowels of Mt Ebal (limestone) and is particularly hard.

Page. 1617. "September and October were spent in retirement at a selected camp upon the slopes of Mount Gilboa."

Remarks: Mount Gilboa was on the southern side of the Jezreel valley which separates the hills of Galilee from Samaria. The town of Jezreel was at the foot of Mount Gilboa.

P. 1626. "The twenty four worked quietly in the Greek cities of the Decapolis, chiefly in Scythopolis, Gerasa, Abila, and Gadara."

Remarks: Scythopolis was the Greco-Roman name for Beth-shan (Macc. 12:29,30) and was located within the part of the Decapolis to the west of the Jordan and about 13 miles south from the Sea of Galilee. Gerasa was on the eastern side of the Jordan on the road to Damascus about 28 miles from Scythopolis. Abila and Gadara were also east of the Jordan, in the vicinity of the southern tip of the Sea of Galilee.

P. 1627. "...later giving it [body of John the Baptist] burial at Sebaste, the home of Abner."

Remarks: Sebaste was Herod the Great's name for the Samaritan city of Samaria.

P. 1637. "The first public preaching tour of Galilee...preached the gospel and baptized believers in Rimmon, Jotapata, Ramah, Zebulun, Iron, Geschala, Chorazin, Madan, Cana, Nain, and Endor."

Remarks: Rimmon (alternate names were Rimmono,

Dimnah, En-Rimmon) was a town in lower Galilee assigned to Zebulun (Jos. 19:13). A city named Zebulun² existed in the region of Sepphoris. Iron is the KJ bible name for Yiron, a fortified town in N. Galilee, probable site being the modern town of Yaron⁸—others described previously.

P. 1637. "The small city of Rimmon had once been dedicated to the worship of the Babylonian god of the air, Ramman."

Remarks: Unconfirmed

P. 1648. "...they pitched their tents at Gethsemane and the Master would go back and forth from Bethany."

Remarks: The garden of Gethsemane was at the foot of the Mount of Olives immediately below the Temple in Jerusalem.

P. 1649. "The Pool of Bethesda."

Remarks: The exact location of the pool is disputed among various authorities. It may have been near the sheep gate at the north of the temple.⁷

P. 1668 "...tour of Galilee...visited Ptolemais, Japhia, Dabritta, Megiddo, Jezreel, Tarichea..." (others already noted)

Remarks: Ptolemais was the seaport city about 30 miles north of Caesarea. Japhia was about 6 miles south of Sepphoris. Megiddo was about 10 miles south of Japhia and 15 miles inland from the coast. Jezreel was at the foot of Mount Gilboa. Tarichea is a problem. According to the *Readers' Digest Atlas of the Bible*³, Tarichea was the Greco-Roman name for Magdala supposedly situated about 3 miles north of Tiberias. IDB maps⁴ also place Tarichaea at the approximate location of Magdala but maps accompanying Hastings², Smith⁶, and Josephus⁷, place it at the southern tip of the Sea of Galilee as does an 1894 map from the Palestine Exploration Society. *The Urantia Book* (p.1561) places it on the west bank of the Jordan where it flows out of the Sea of Galilee which would be about 6 miles south of Tiberias. In a book by H.V. Morton, *In the Steps of the Master*¹⁰, the author describes towns on the Sea of Galilee stating that Magdala was the site of a dyeing industry while Tarichaea in the south had an industry for the



Jezreel Valley from Mt. Gilboa

salting of fish. (Note: multiple towns/cities having the same name appear to be common—Abila, for example, one being almost opposite Jericho and 7 miles E of the Jordan, the other about 10 miles SE of Gadara in the Decapolis near the sea of Galilee. IDB⁴ gives 3 different locations of towns named Aroer. Towns named Bethlehem were in Judea and Galilee. The two Bethsaida's are a further example.) (see Appendix 2 for more on Tarichea)

P. 1670. "... rich widow of Tyre..."

Remarks: Tyre was a Phoenician sea port about 25 miles north of Ptolemais and 20 miles south of Sidon.

P. 1694 "The Visit to Kheresa."

Remarks: May be the town Kersa mentioned by Edersheim⁴ as being on the shore of the Sea of Galilee opposite to Magdala. An alternative name is Gergesa⁵.

P. 1705. "At Gennesaret."

Remarks: Gennesaret was about 3 miles south of Capernaum on the shores of the Sea of Galilee.³

P. 1723. "They rowed over to near the village of Kheresa...going from Kheresa up to Caesarea-Philippi."

Remarks: This Kheresa has to be on the eastern shore of the Sea of Galilee (see above—P.1694)

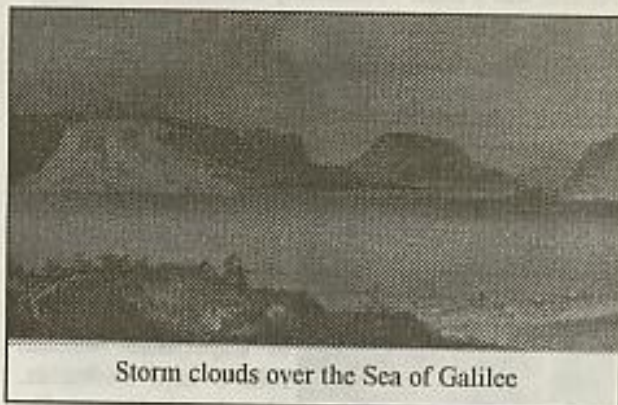
P. 1725. "Soon after landing near Kheresa...went a little way to the north, where they spent the night in a beautiful park south of Bethsaida-Julias."

Remarks: This would fit in with Edersheim's⁴ Kersa as being Kheresa (see P. 1694 reference)

P. 1728. "...left Caesarea-Philippi to begin their journey to the Phoenician coast. They passed around the marsh country, by way of Luz, to the point of junction with the Magdala-Mount Lebanon trail road, thence to the crossing with the road leading to Sidon...pausing for lunch under the shadow of an overhanging ledge of rock, near Luz, Jesus delivered one of the most remarkable addresses..."

Remarks: Luz, within a morning's walking distance from the location of Caesarea-Philippi, is shown on a Palestine Exploration Survey map as on the Jordan about 4 miles north-west of Dan. It should be adjacent

to marsh country. Near the site of Luz, there has to be an overhanging ledge of rock large enough to shade twenty five people in mid-summer with the noonday sun almost directly overhead. Of course the rock could have been quarried in the meantime, but traces may still be present. It would be tremendous to be able to identify such an overhanging rock. (The OT in Judges 1:26 speaks of a man who went into the land of the Hittites and built a city and called it Luz which would locate it in Syria or Lebanon⁶)



Page. 1736. "...left Sidon, going up the coast to Porphyreon and Heldua...paying a visit to the coast city of Beirut."

Remarks: Porphyreon?? Heldua ?? Beirut was established in the 15th century B.C.—also known as Bayrut and Beyrtu.

P.1737. "...returned to Sidon...departed for Tyre going south along the coast by way of Sarepta."

Remarks: Sarepta (OT city of Zarephath where Elijah was sent (Kings 17:9) was a town of the narrow rocky Phoenician coast 9 miles SW of Sidon (OT Zidon) and 17 miles N of Tyre. Mentioned in Luke 4:26.

P. 1737. "Joseph, a believer, who lived 3 or 4 miles south of Tyre not far from the tomb of Hiram who had been king of the city-state of Tyre during the times of David and Solomon."

Remarks: Hiram gets several mentions in the OT. Can find no information on the whereabouts of his tomb.

P. 1737 "...entered Tyre via Alexander's mole."

Remarks: The Phoenicians originally formed a harbor at Tyre by building a mole. Later it was completed when Alexander captured Tyre in B.C. 332. (ref. a 5

vol. version of Hastings² under "Tyre.")

P. 1737. At Tyre—"...the doors of the Melkarth temple were opened to him."

Remarks: "Ahab's wife, Jezebel, a princess of Tyre, attempted to incorporate her pagan deity, the Phoenician god, Melkarth, into the religion of Israel." (from MSEncarta¹ which also tells us that each Phoenician city had its own god known as Baal. Astarte was a Baal. Presumably Melkarth was the Baal of Tyre and is referred to in the OT by that name. The name, Melkarth, does not appear in the KJ version of the OT). Herodotus states that the priests of Melkarth founded Tyre.²



Synagogue ruins at Capernaum

Page. 1761. "At Peter's house...in Capernaum."

Remarks: Mark's gospel states Peter's house was in Capernaum whereas John's says Bethsaida. The description in *The Urantia Book* of the apostolic party moving through back streets to Peter's house is consistent with the

hypothesis that Bethsaida was the colloquial name given to a "Fisherton" at Capernaum, "Fisherton" meaning the section of the town where the fishing industry was located.⁴

P. 1762. "...twelve groups labored at (among other places) Zaphon, Edrei, Philadelphia, Dium."

Remarks: Zaphon was close to the east bank of the River Jordan almost mid-way between the Sea of Galilee and the Dead Sea.³ Philadelphia was about 25 miles ENE of the northern tip of the Dead Sea; Edrei, (Palestine Exploration Survey map) was about 15 miles ENE of Capitolas; Dium was 6-7 miles north-east of Abila and was a Greek city captured by the Hasmonean kings from the Seleucids.

P. 1764. "Master, yesterday I [John] went over to Ashtaroth to see a man..." (Jesus was at Gamala)

Remarks: Ashtaroth is referred to in Joshua, "And half Gilead, and Ashtaroth and Edrei, cities of the kingdom of Og in Bashan." In Judges and Samuel, Ashtaroth is a god, the female version of Baal.

Location has not been identified. *An Interpreter's Dictionary of the Bible* map⁸ places Ashtaroth at about 15 miles NW of Edrei.

P. 1765. "...raised up a considerable company of believers at Kanata before going on to Mesopotamia."

Remarks: Kanata is shown on a Palestine Exploration Survey map as about 40 miles east of the southern tip of the Sea of Galilee.

P. 1794. "...another group marched down below Jerusalem to near Maza to cut the willow branches for the adornment of the sacrificial altar...third group formed a procession to march from the temple...out through Ophel to near Siloam...golden pitcher filled at the pool of Siloam."

Remarks: Edersheim,⁴ vol 2, p. 157-159 describes this scene but spells Maza with an 'o' (Moza), the 'Kolonia of the Jerusalem Talmud.' Edersheim also describes the procession through Ophel following a priest with a golden pitcher to the pool of Siloam where he fills the pitcher with water.

P. 1795. "He [Jesus] addressed the worshipers immediately after the chanting of the Hallel."

Remarks: See Edersheim⁴ vol 2, p.157-159 for a description of the Feast of the Tabernacle ceremony.

P. 1797. "Jesus and his associates left the city of Ephraim..."

Remarks. According to Edersheim⁴, it is not possible to locate the city of Ephraim. However, *Readers Digest Atlas of the Bible*³ places it about 10 miles due north of Jerusalem.

Page. 1815. "Teaching in Solomon's Porch."

Remarks: The eastern portico was called Solomon's Porch. It belonged to an earlier building which tradition ascribed to Solomon².

Page. 1817. The Perea Mission. "...and some fifty additional villages." --those not mentioned previously were: Macad, Bosora, Caspin, Mispheh, Ragaba, Succoth, Adam, Penuel, Capitolas, Dion, Hatati, Gadda, Jogbehah, Gilead, Beth-Nimrah, Tyrus, Elealah, Livias, Callirrhoe, Beth-Peor, Shittim, Sibmah, Medeba, Beth-Meon, Areopolis, Aroer.

Remarks: Bosora (?Bosor was a city in Gilead—1

Macc 5:26) possibly about 50 miles east of the Jordan and about the same latitude as Scythopolis³; Caspin was a city east of the Sea of Galilee (2 Macc 12:13); Mizpeh (?Mispel) was about 14 miles east of the Jordan and 5 miles south of the Jabbok River; Succoth was in the vicinity of where the river Jabbok enters the Jordan; Adam was close to the Jordan, about 35 miles from the Dead Sea; Penuel was on the Jabbok River about 5 miles east of the Jordan; Jogbehah was 20 miles east of the Jordan and ESE of Adam; Gilead is shown as

a district but not as a town; Beth-Nimrah was on the plains of Moab near the Jordan—assigned to Gad (Jos. 13:27); Elcalch was a city in Moab, NE of Heshbon; Livias (Beth-ramatha) was about 5 miles inland east of the Jordan and the Dead Sea; Beth-Peor was a town in Moab near Mount Nebo; Shittim was on the Plains of Moab across the Jordan from Jericho; Sibmah was on a plateau east of the Plains of Moab, probably between Heshbon and Nebo; Medeba was on the tableland of northern Moab on the King's Highway; Beth-Meon (also called Baal-Meon) was a town in Moab assigned to Reuben (Jos. 13:17); Areor was on the King's highway opposite the mid-point of the Dead Sea. A *Zondervan Atlas*⁹ map places Ragaba about 8 miles east of the Jordan and ESE of Amathus, Capitoliias about 6 miles south of Abila and 16 miles east of the Jordan; Gilead about 12 miles south-east of Capitoliias; Beth-Nimrah and Tyrus east of the Jordan and between Jericho and Philadelphia; Callirrhoe close to the east bank of the Dead Sea near Machaerus, and Areopolis further south and about 10 miles east of the Dead Sea. Dion, Macad and Hatita remain unlocated.

P. 1869. "Jesus and the company...arrived at the Bethany ford of the Jordan, sometimes called Bethabara..."

Remarks: The whereabouts of Bethany ford and/or Bethabara has been a subject for dispute since the second century. Edersheim⁴ discusses it in vol. 1 of *The Life and Times of Jesus the Messiah*.

P. 1875. "...inasmuch as the house of Zaccheus in Jericho was very near the ornate palace of Archelaus..."



Mount Hermon, site of the Transfiguration.

Remarks: Edersheim⁴ (vol.2, p.358) mentions the palace of Archelaus at Jericho.

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Appendix 1. Josephus on the building of Caesarea by Herod the Great (from *Antiquities of the Jews*).

"This city is situated in Phoenicia in the passage by sea to Egypt, between Joppa and Dora, which are lesser maritime cities and not fit for havens on account of the impetuous south winds that beat upon them, which, rolling the sands that come from the sea upon the shores, do not admit of ships lying in their station; but the merchants are generally there forced to ride at their anchors by the sea itself. So Herod endeavored to rectify this inconvenience, and laid out such a compass towards the land as might be sufficient for a haven wherein the great ships might lie in safety; and this he effected by letting down vast stones of above fifty feet in length, not less than eighteen in breadth, and nine in depth, into twenty fathoms deep; and as some were lesser, so were others bigger than those dimensions. This mole which he built by the seaside was two hundred feet wide, the half of which was opposed to the current of the waves, so as to keep off those waves which were to break upon them, and so was called Procyatia, or the first breaker of the waves; but the other half had upon it a wall, with several

towers, the largest of which was named Drusus, and was a work of great excellence, and had its name from Drufus, the son-in-law of Caesar, who died young. There was also a great number of arches, where the mariners dwelt; there was also before them a quay which ran around the entire haven, and was a most agreeable walk to such as had a mind to that exercise; but the entrance or mouth of the port was made on the north quarter, on which side was the stillest of the winds of all in this place; and the basis of the whole circuit on the left hand, as you enter the port, supported a round turret which was made very strong, in order to resist the greatest waves; while on the right hand as you enter, stood two vast stones, and those, each of them larger than the turret, which was over against them: these stood upright and were joined together. Now there were edifices all along the circular haven, made of the most polished stone, with a certain elevation, whereon was erected a temple, that was seen a great way off by those who were sailing for that haven, and had in it, two statues, the one of Rome, the other of Caesar. The city itself was called Caesarea, which was also itself built of fine materials, and was of a fine structure; nay, the very subterranean vaults and cellars had no less of architecture bestowed on them than had the buildings above ground. Some of these vaults carried things at even distances from the haven and to the sea; but one of them ran obliquely, and bound all the rest together, that both the rain and the filth of the citizens were together carried off with ease, and the sea itself, upon the flux of the tide from without, came into the city, and, washed it all clean. Herod also built therein a theater of stone; and on the south quarter, behind the port, an amphitheater also, capable of holding a vast number of men, and conveniently situated for a prospect to the sea."

Note: Josephus states that the statue of Caesar (Augustus) was in the temple along with the statue to Rome (goddess) whereas *The Urantia Book* has the statue surmounting the temple. The plan of Caesarea presented in RDAB does not accord with Josephus' description of the temple as being on an elevation and visible a great way off by those sailing to the haven.

In contrast, in George Adam Smith's *The Historical Geography of the Holy Land* (1894), quoting ostensibly from Josephus, *Hist.ii.* 78, on Caesarea, "The procurator had his seat in it, there was an Italian garrison, and on the great white temple that shone out over the harbor to the far seas, stood two statues—of Augustus and of Rome."

Appendix 2. Tarichea

The word Tarichea means salting or pickling place. At one time, when the pickled fish from Galilee was known throughout the Roman Empire, the name was applied to the whole of the Sea of Galilee. It may also have been used by locals to identify the location of the pickling industry at a number of towns on the lake shores. Arguments occurring during the last few hundred years on where a place named Tarichea was located during the early part of the first century appear to have been conducted in ignorance of the fact that the exit of the Jordan from the Sea of Galilee was, in 1000 A.D., several miles north of its later outlet at a town earlier known as Senneret. It seems that the exit silted up at the end of the first millenium and moved much further south. A number of ancient harbors have been located in this area. The evidence for the first century location of Tarichea needs to be reconsidered in the light of this new information.

Appendix 3. Tin in Turkey

"Gold was the first metal to be sought by man; it is easy to work and, at first, was used only as an ornament. Copper was next employed but not extensively until it was admixed with tin to make the harder bronze. The discovery of mixing copper and tin to make bronze was made by one of the Adamsonites of Turkestan whose highland copper mine happened to be located alongside a tin deposit." (904)

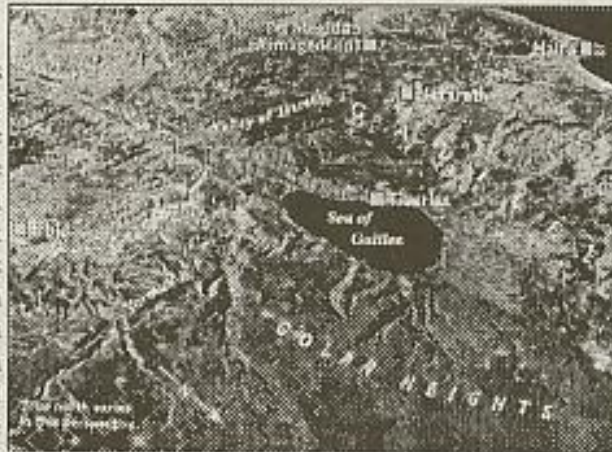
[Matt Neibaur contributed the following review of material originating from the University of Chicago.]

For the first time, researchers have found a local bronze-age source of tin in the Middle East, a discovery that proves that the metal that made the important alloy possible was not entirely imported from regions outside the area as had been thought, a University of Chicago archaeologist says. Assistant Professor, Aslihan Yener, in the University's Oriental Institute believes a mine and an ancient mining village she has found in the central Taurus mountains in Turkey demonstrate that tin mining was a well developed industry in the area as long ago as 2870 B.C. at the dawn of the bronze age. The site of the mine, Kestel, is about 60 miles north of Tarsus. Yener's work at the mine and at nearby Goltepe, an ancient miner's village, provides new insights into the development of the tin industry. Perhaps most important is her discovery that tin can be smelted at

relatively low temperatures in crucibles. Other tin sites known to exist throughout the Mediterranean area could also have been sources of tin through the labor-intensive smelting the team recreated....

Despite the importance of bronze and the role tin played in its production, scholars have long believed that tin was not readily available in the Middle East. Cuneiform texts on clay tablets speak of sources to the distant east and researchers have believed that perhaps Afghanistan was the only likely location of tin mines. Yener's discovery shows that tin came from local as well as imported sources. Yener's work is part of a study begun in 1980 to identify sources of metals used in the production of weapons and other objects in the ancient Near East. Yener, an American of Turkish descent, began her work as a member of the faculty of Bosphorus University in Istanbul. "I had not set out to find tin," she said, "When I was being trained as an archaeologist, the standard view was that tin did not come from Turkey but from elsewhere during the bronze age...."

Although the researchers had found tin ore at Kestel, some skeptics thought there was not enough tin to prove that the mine was actually a tin mine. Working last summer with tin experts from Cornwall in southwestern England, an area famous for its tin deposits, Yener discovered industrial debris at the mining village of Goltepe (near Tarsus) that provided clues about how the tin was probably smelted. Instead of evidence of only low-grade tin, one ton of tin-slugged crucibles with a 30 percent tin content was discovered at Goltepe. This establishes beyond doubt that tin-metal was being produced, and was the motivation for the mining and smelting industry.



The classical radius for the electron (current at the time of receipt of the Urantia Papers) was $2.8 \times 10^{-15}m$, a difference in the order of one million-fold. However modern estimates for the upper limit is given by Nobellist Hans Dehmelt as $1 \times 10^{-19}m$ and a lower limit is given by high energy collision experiments as $1 \times 10^{-22}m$. Hence *The Urantia Book* illustrative estimate

the earth. If the volume of a proton--eighteen hundred times as heavy as an electron--should be magnified to the size of the head of a pin, then, in comparison, a pin's head would attain a diameter equal to that of the earth's orbit around the sun". (477)

First, let us check out how this matches up with modern estimates of the electron radius.

Electron rest mass is estimated as $9.1 \times 10^{-28}g$
 0.1 of an ounce is 2.8g
 Radius of the Earth is 6.4×10^6m

Let k represent proportionate magnification. Then

$k \times 9.1 \times 10^{-28} = 2.8$1
 Radius of electron (re) $\times k = 6.4 \times 10^6$2

Dividing 1 by 2, we get

Radius of an electron = $2 \times 10^{-21}m$

presented in 1935 falls in between these modern values.

Let us now try out the relative comparison between a proton magnified to the size of the head of a pin being equivalent to a pin's head having a diameter of the earth's orbit around the sun.

Let n be the magnification factor for a proton sized up to a pin head of radius 1 mm.
 The radius of the Earth's orbit around the sun is taken as $1.5 \times 10^{14}mm$. Then :

$n \times r_p = 1mm$1
 $n \times 1 mm = 1.5 \times 10^{14}mm$2

Solving for the proton radius gives $7 \times 10^{-15}mm$

Appendix 4. The Radii of the Electron and Proton . A Urantia Papers' "Prophecy."

Source: Stefan Tallquist, Finland

"If the mass of matter should be magnified until that of an electron equaled one tenth of an ounce, then were size to be proportionately magnified, the volume of such an electron would become as large as that of

which is $7 \times 10^{-18}m$. A modern value given in the November 1983 volume of *Physics Today* estimates the Bohr radius for a quark system (a proton) as $7.7 \times 10^{-18}m$.

Thanks are due to Stefan Tallquist of the Technical Research Center, Finland for going to the trouble of making these remarkable comparisons.

Stefan also has a stab at the upper limit for the radius of the ultimatons through dividing the electron radius by $5 \times$ square root of 2 giving a value of $3 \times 10^{-22}m$. It will be some time yet before a direct confirmational measurement is made.

Some Conclusions

One purpose of this review has been to demonstrate that the compilation of the Urantia Papers required an enormous input of scholarly research on the part of their authors. Furthermore, the masterful presentation of the Papers indicates a degree of literary skill normally gained only through much toil and long experience. Therefore the hypothesis put forward by Martin Gardner that the Papers were the product of the subconscious mind of Wilfred Kellogg, a person acknowledged by Gardner to have been devoid of writing skills, is inconsistent. Gardner also proposed a high degree of editing by Dr Sadler. The statistical investigation using writing style analysis presented herein provided strong evidence that Dr Sadler was not an author, though a small editorial contribution by him is not excluded. Sadler, of course, consistently denied any editorial involvement.

A secret society?

An alternative possibility is that a group of erudite scholars secretly compiled the Papers in collusion with Dr Sadler and associates. While this cannot be ruled out by direct evidence, there is considerable, contrary circumstantial evidence. For example, there has been a total failure to uncover any believable suggestions about who any of these people might be. Nor have any

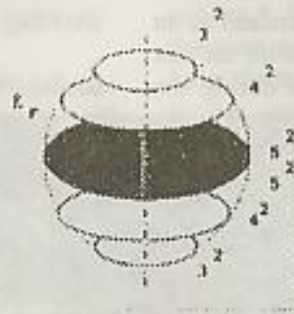
members of their families ever come forward to suggest participation by such a group. Evidence against the hypothesis is contained within the textual content of the Papers. Such a group of scholars must have had a motive. What could it have been?

Greed? Fame?

That monetary gain was not the motive to write the Papers is demonstrated by the history of their publication and marketing. That fame was not the motive to write them is demonstrated not only by the secrecy surrounding their writing but also by the fact that no name has ever been associated with their production.

Revolution?

It may have been that a group of honest, deeply concerned people who were fearful about the future of mankind wrote the Papers in an attempt to redirect human societies along saner pathways of development. Perhaps the group were all intensely forward-looking and Christian in their beliefs. That would certainly be consistent with the textual content of the Papers. These people may have considered that their portrayal of the life of Jesus of Nazareth, as presented in the Papers, had some chance of becoming the basis of an all-embracing religion.



The Stefan Tallquist model of the 100-ultimaton spherical electron. The model minimizes momentum and fulfils all the quantum laws of Fermi energy.

The end justifies the means?

If the Urantia Papers were the invention of the minds of such a group then a number of anomalies present themselves. All of its members would have known that the subject matter of the text was largely fabrication and that the manner of its presentation was deceitful. Their justification for such an action would have to have been similar to that of other well-intentioned men and women from history—that it is logically possible to pursue an altruistic end via dishonest and deceitful means. Taken to its extreme, as it has been in many instances in the history of mankind, this concept embraces the idea that a desirable end justifies the use of all possible means for

its attainment. There is no hint in the content of the Urantia Papers that their real authors would have condoned false, deceitful, dishonest, or unethical means to attain even a desirable goal. In many places in the Papers, statements are to be found suggesting that the justification for any act must be judged by its motivation. But nowhere in the Papers is it ever implied that such motivation can be the sole reason for making that judgment. On the contrary, we find statements such as:

Reality

"Moral acts are those human performances which are characterized by the highest intelligence, directed by discrimination in the choice of superior ends as well as in the selection of moral means to attain these ends." (193) And, "Virtue is righteousness—conformity with the cosmos. To name virtues is not to define them, but to live them is to know them. Virtue is not mere knowledge nor yet wisdom but the reality of progressive experience in the attainment of ascending levels of cosmic achievement. In the day-by-day life of mortal man virtue is realized by the consistent choosing of good rather than evil, and such choosing ability is evidence of the possession of a moral nature." (193)

Is it possible for people who hold the supremely altruistic views that unfold in the Urantia Papers to,



Mount Hermon and the River Jordan head waters

at the same time, be dishonest deceivers? What kind of thoughts might have motivated such a group? Perhaps they were in a hurry to save the world before it destroyed itself. If this were so, why then did they repeatedly expound upon the virtues of slow social development via evolution? And why did they condemn the actions of those involved in the Lucifer rebellion and the Adamic default, both of which claimed the motive of speeding up progress of the human races?

The Urantia Papers repeatedly inform us that ambitions of men must always be subordinated to the unknowable ways and purposes of God. The whole of Part 4 is devoted to the theme that the actions and decisions of Jesus, as he went about his daily tasks, were on a moment by moment basis in compliance with the will of the Father. Nowhere do the Papers inform us that Jesus made plans whereby he took the responsibility for the success of his mission upon himself. Always, so the authors of the Papers tells us, Jesus went to enormous lengths to discover the will of the Father before he committed himself to a course of action. So how do our hypothetical authors justify their own action in taking it upon themselves to modify the course of human progress? Could they really claim to be submitting to the will of God by following a policy of serving up a package of what, in these hypothetical circumstances, would have been falsehood to those they ostensibly desired to save? If so, then again they have demonstrated an extraordinary ability to preach one thing while practicing another. The God they portray in the Urantia Papers would never condone such action. Such behavior is both inconsistent, irrational, and amoral. Whatever else they may be, these Papers are not the product of devious, twisted minds.

Finale

What then can we conclude from this survey? Only that we do not have a sensible, rational proposal about human authorship of the Papers. But any conclusion claiming other-than-human authorship is unprovable. As the Papers themselves tell us—our personal decision must be an act of faith. That is the way it is meant to be. For me personally, I find that the spiritual content of the Urantia Papers makes them self-authenticating.

Ken Glasziou

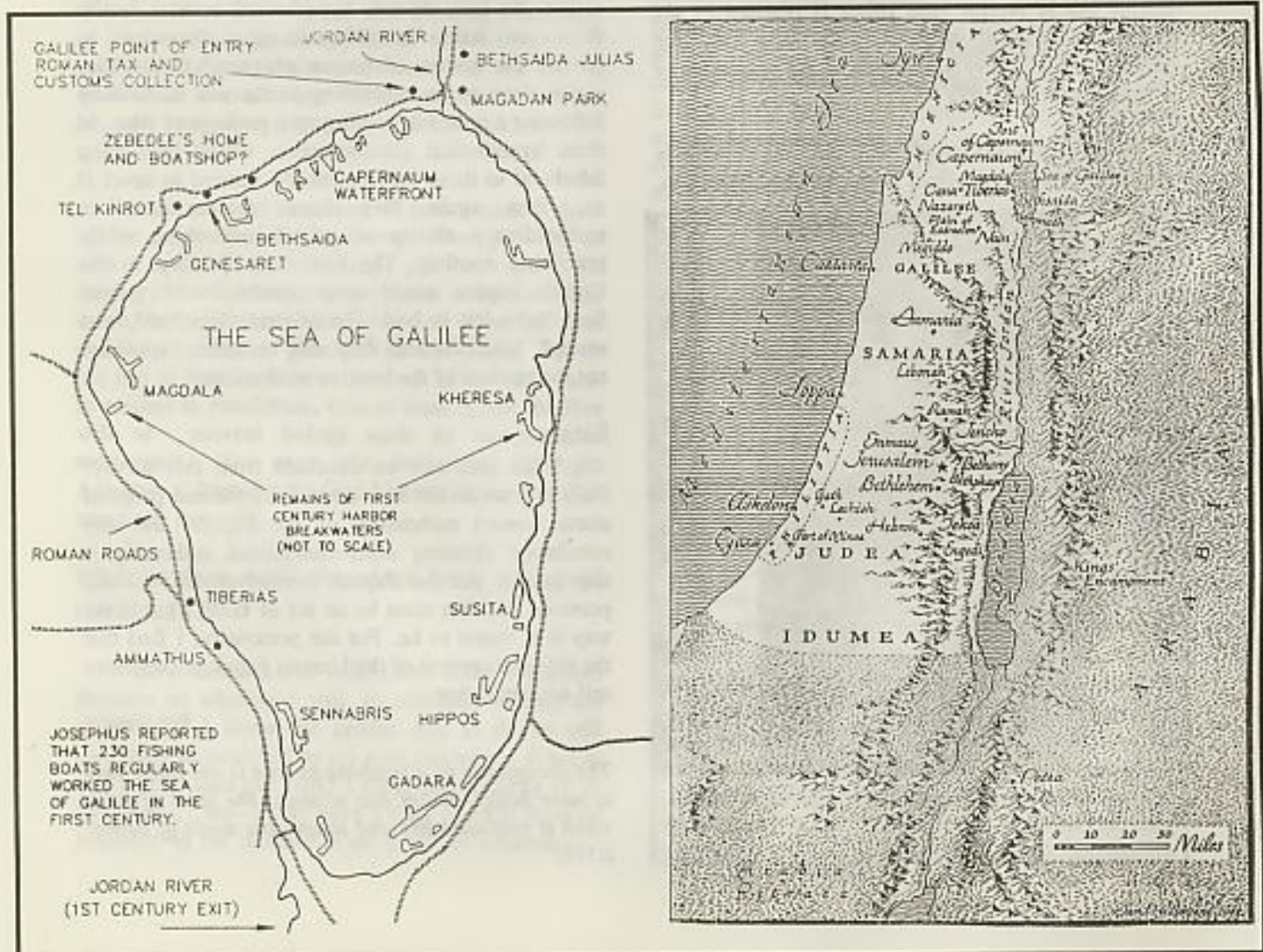
The acceptance of a teaching as true is not faith; that is mere belief. Belief has attained the level of faith when it motivates life and shapes the mode of living. (1114)

Acknowledgments

Many thanks are due to those *Urantia Book* readers who read the draft manuscript and aided in its improvement and the elimination of errors. Matthew Block, in particular, did a marvellous job in both of these departments, then voluntarily undertook that dreadfully tedious copy editing task on the final manuscript. The errors that remain are my own responsibility. Thanks, Matthew, for your valuable contribution. I also owe a deep debt of gratitude to David Kantor who supplied me with copious maps, photos, and tables of data to help locate and verify the archaeological information on first century Palestine.

I have no training or skills in either anthropology or archaeology. This material was included partially because it highlights something that is completely overlooked by Martin Gardner in his published criticism of *The Urantia Book*—to wit that whoever the authors of Part 4 of the book may have been, its anthropological and archaeological content demonstrates that those authors were dedicated, knowledgeable, and experienced scholars. Any speculation about authorship of *The Urantia Book* must account for the incredible amount of work required to compose the text of Part 4, not only from records already held, but also from the wide variety of human sources, more than 2000, acknowledged to have been used in its composition (p.1343). These are still being tracked down by Matthew Block and others. My hope is that the index supplied herein will encourage interested readers to do what needs doing in this area. One purpose for such work is to help dispel from the public mind, the quite false notion being promulgated by such as Martin Gardner—that this incredible book is merely the dream-state mind meanderings of a fairly nice but average human being, Wilfred Kellogg. On the contrary and regardless of its authorship, for those who are prepared to study it in a sincere, faith-driven search for knowledge of our Maker and his divine purposes, this book is a never-ending source of wonderment that no amount of study can completely exhaust.

Ken Glasziou



Letter from Matthew Block on Science and Archaeology in the Urantia Papers.

"Let me weigh in with the opinion that archaeological studies should be included with the new booklet. Sure it deals with minutiae, but it is not trivial and there must be room in the movement for microanalytic research (it's not surprising that I should be saying this!). Your booklet should be published as you originally envisaged it—an investigation of a broad range of topics treated in appropriately different ways.

"We are still in the early stages of (Urantia Book) science research. My work on the human sources for the Papers will fill an important gap. But that is not enough. Our goals should be:

- to track down all the direct and indirect human sources of the science material.
- to become thoroughly familiar with the history of the science of the 20th century, decade by decade.

"Ultimately, then, we will be able to classify the science statements in a four-item typology embracing:

- statements that reflect mid-30's science and are still supported by contemporary science.
- statements that reflect mid-30's science that are no longer held (charting when and why science discarded the theories in question).
- statements that were not held by the mid-30's science but are held today (i.e. prophetic or "about-to-be-known" facts (1109) and observations.
- statements that were not supported by mid-30's science and are still not considered tenable.

"We will also be able to tag every science-related sentence and/or paragraph and/or section in the book according to whether it:

- is direct superhuman information or commentary, unmediated by humanly derived references.
- is directly based on specific human source materials.
- is an assemblage of humanly known information probably culled and distilled from a variety of unspecified sources.
- is a composite of revealed and unrevealed information.

"I agree that the "mixed bag" nature of the book's science ("about-to-be-known" facts interspersed with

obsolete statements and with surprisingly unconventional assertions) is somewhat baffling. But actually, it won't be as baffling once the Papers are subjected to a thorough comparative analysis with human sources. Patterns will probably emerge (actually are already emerging), shedding light on the intentions of the Revelators.

"For instance a recurrent motif in the first five papers of Part 111 is sudden speciation. The Revelators are so intent on emphasizing this that they expressly gloss over (ignore) contraindications of transition species cited by Chamberlin and Schuchert. As a case in point, both Chamberlin and Schuchert maintain that placental mammals derived from insectivorous non-placental mammals, and were already in evidence in the late Mesozoic. But the Revelators say no such thing, stating rather that the placentals sprang directly from an earlier line of mammal-like reptiles, emerging only at the beginning of the Cenozoic. Why the divergence? I don't know exactly...but it does tie in with the Revelators' previous statements about the life-modification experiment involving mammals. The mammals, especially the placental ones, had an unusual emergence on this planet, somehow tied in with the purposeful plans (and failed experiments) of the Life Carriers. So the Revelators' surprising statement about the emergence of the placental mammals is not so wild and unaccountable after all.

"Martin Gardner's jaundiced and harsh review of the book's science has given us an indication of what to expect from the skeptics. We'll never be able to sell agnostic scientists on the book by the science alone. (I realize that's never been your hope.) ...What we can hope to expect is that the science of the book will be respected by scientists as an important element in the whole revelatory presentation, which is primarily an attempt to portray a *synthesis* of science, religion, and philosophy. One must already appreciate the philosophic excellence and spiritual beauty of the Papers to give the science its proper due. Papers 41-42 and 57-61 (as well as some other science-related ones), for all their errors and obsolete information, are still beautifully written and conceived. I'm so impressed by how the Revelators distil hundreds of pages from geological textbooks into 50 scintillating pages, interweaving humanly derived observations with revelatory insights, and showing the glory of the evolutionary process in a cosmic, transplanetary context. There's really nothing like these papers in the human literature. Nevertheless, they definitely contain some little mistakes and outdated information."

Science and *The Urantia Book*

Science teaches man to speak the new language of mathematics and trains his thoughts along lines of exacting precision. And science also stabilizes philosophy through the elimination of error, while it purifies religion by the destruction of superstition. (907)

Gradually science is removing the gambling element from life. But if modern methods of education should fail, there would be an almost immediate reversion to the primitive beliefs in magic. These superstitions still linger in the minds of many so-called civilized people. (972)

*Ancient magic was the cocoon of modern science, indispensable in its time but now no longer useful. And so the phantasms of ignorant superstition agitated the primitive minds of men until the concepts of science could be born. Today, *Urantia* is in the twilight zone of this intellectual evolution. One half the world is grasping eagerly for the light of truth and the facts of scientific discovery, while the other half languishes in the arms of ancient superstition and but thinly disguised magic. (973)*

Man's greatest spiritual jeopardy consists in partial progress, the predicament of unfinished growth: forsaking the evolutionary religions of fear without immediately grasping the revelatory religion of love. Modern science, particularly psychology, has weakened only those religions which are so largely dependent upon fear, superstition, and emotion. (1090)

The philosophic elimination of religious fear and the steady progress of science add greatly to the mortality of false gods; and even though these casualties of man-made deities may momentarily befog the spiritual vision, they eventually destroy that ignorance and superstition which so long obscured the living God of eternal love. The relation between the creature and the Creator is a living experience, a dynamic religious faith, which is not subject to precise definition. To isolate part of life and call it religion is to disintegrate life and to distort religion. And this is just why the God of worship claims all allegiance or none. (1124)