THE VELIKOVSKY AFFAIR

SCIENTISM *VERSUS* SCIENCE

Alfred de Grazia, Editor

With contributions by

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(Note: English spelling is used in this edition of 1978.)

INTRODUCTION TO THE SECOND EDITION

Alfred de Grazia
January 1978

We dedicate this book to people who are concerned about the ways in which scientists behave and how science develops. It deals especially with the freedoms that scientists grant or withhold from one another. The book is also for people who are interested in new theories of cosmogony - the causes of the skies, the earth, and humankind as we see them. It is, finally, a book for people who are fascinated by human conflict, in this case a struggle among some of the most educated, elevated, and civilized characters of our times.

These lines are being written a few weeks after the launching of a carefully prepared book attacking the growing position of Immanuel Velikovsky in intellectual circles [1]. The attack was followed promptly by a withering counter-attack in a special issue of the journal, *Kronos* [2]. The events reflect a general scene which, since the first appearance of this volume, has been perhaps more congenial to the temperament of war correspondents than of cloistered scholars.

The philosophical psychologist, William James, who once proposed sport as a substitute for warfare, might as well have proposed science and scholarship for the same function. Scientific battles also have their armies, rules, tactics, unexpected turns, passions bridled and unbridled, defeats, retreats, and casualty lists. All of the motives that go into warfare are exercised. In the present controversy, the minds of the combatants must also carry into the fray images of a distant past when the world was ruined by immense disasters, whether or not they deny the images.

Unlike sport, the outcomes of scientific battles are as important, if not more so, than the results of outright warfare. At stake in

the controversy over Velikovsky's ideas is not only the system used by science to change itself - which is largely the subject of this book - but also the substantive model of change to be employed by future science - whether is shall be comprehended mainly as revolutionary and catastrophic or as evolutionary and uniform.

The controversy has had many striking facets. One has been the large participation of the public. It continues to increase. Velikovsky has managed to talk to people about mythology, archaeology, astronomy, and geology, *without doing injustice to those disciplines*, in an amazing and unprecedented manner. Socrates, Aristotle, Galileo, Freud, and Einstein - to name a few thinkers who were implicated in 'crowd phenomena' - were not public figures in the sense here taken. His public - a well-behaved, educated, well-intentioned and diversified aggregate - has supported Velikovsky on every possible occasion. That he was a foreigner with a Russian accent, a psychiatrist, unequivocably a Jew, denounced by some of the most respected scientists of America and Britain, unbending in his person and in his allegiance to science and in refusing every opening for support from demagogic or religious quarters: these facts hardly disturbed the favourable reception granted him by a large public.

That he is a charismatic figure is obvious: fourteen hundred people attended his talk and awarded him a standing ovation at a critical scientific symposium in San Francisco in 1974. But 'charisma' is a bit of jargon; the question remains 'why.' Although I must reserve the answer until another occasion, I would here suggest that his ideas have represented all the legitimate anxieties about present-day 'knowledge' that educated people possess, whether it be their own knowledge or that of their scientific tutors.

I have lived with '*The Velikovsky Affair*' for fifteen years. Often I have been asked how I came to be involved. Sometimes the question comes from my colleagues, who, like myself, have wondered how a million, perhaps two million, serious readers can find that a book like *Worlds in Collision* makes sense, while a great many scientists and scholars cannot even come to grips with the book, turn away from it angrily, and irritably

consign the whole lot of favourable readers to the ranks of religious revivalists who have received The Word.

But there was little heroic, charismatic, revelatory, or even extraordinary about my initiation. The year 1950, which saw the publication of *Worlds in Collision*, was a busy one in my younger life; I had several infants, a new professorship, and a more than passing engagement with psychological operations in the Korean War, then raging. So the scandal over the book's suppression and success left only a faint scratch upon my mind.

However, in 1962, when I was publishing and editing the *American Behavioral Scientist* magazine in Princeton, Dr Livio Stecchini, a historian of science also resident there, spoke to me more than once about a man named Dr Velikovsky who also lived in Princeton and had been victimized by the scientific establishment. I listened without enthusiasm to Stecchini, for the annals of science and publishing, like politics, are crowded with cases that are falsely or ineptly brought up, of hopeless theories trying to engage public attention, of feelings of persecution.

Then, one evening, as I was saying my goodbyes at the home of my brother, I espied a book entitled *Oedipus and Akhnaton*, by one Immanuel Velikovsky. The residual stimuli precipitated a gestalt of curiosity. I borrowed it. I read it from cover to cover, brooking no minor interruption. I thought that it was a master-piece of true detective literature (a judgement that I think is now confirmed), and telephoned Dr Stecchini to arrange a meeting.

As I talked with Dr Velikovsky - an impressive experience in a person's life - I was introduced to his archive of materials on the case. It was astonishingly rich and ordered. I concluded after several long meetings and much reading among his materials that the history of science had few, if any, cases that were so well documented. I decided to devote a special issue of the *American Behavioral Scientist* to '*The Velikovsky Affair*.'

It was this issue, finally appearing is September 1963 after prolonged, gruelling, and enlightening sessions with Dr Velikovsky and my co-authors, Ralph Juergens and Livio

Stecchini and after long hours spent amidst the archive of Velikovsky itself, that formed the basis for the present book. I would not go as far as some commentators in saying that the books brought the great controversy to life when the cause seemed lost; my concept of history is more Tolstoian. Still, the response to the issue was immediate. Eric Larrabee, a publicist, who had a long-standing contract with the Doubleday Company publishers to write a book on the subject, was spurred to publish an article in *Harper's* magazine about the Velikovsky case. The *American Behavioral Scientist* issue was expanded, with new contributions by Juergens and Stecchini, and published by University Books two years later. (In the present edition, Dr Stecchini has revised and added much new material to his contributions.)

With notable exceptions, to be described in the pages to come, the book was well received. It was resented by many in the underground of science, which includes the mysterious realms of foundations and government agencies. There, any association whatsoever with Dr Velikovsky is likely to provoke discrimination and reprisals. But the distinction of the panel of readers who endorsed my decision to publish its materials no doubt acted as a formidable obstacle to public assaults upon it. It is difficult for someone, in the face of the evidence offered, to contradict the book's two main ideas: that Dr Velikovsky was unjustly treated, and that he maintains a set of propositions that must be seriously considered by the sciences and humanities. A reading of the book apparently positions one reasonably to annoy many scientists encountered in classrooms, professional meetings and cocktail parties.

When my attention was first drawn to the sociological and legalistic aspects of *The Velikovsky Affair* in 1962, my interest in the substantive problems of catastrophism and uniformitarianism, or revolutionism and evolutionism, was that of a charmed spectator. However it was not long before a question began persistently to intrude upon my mind: 'Was there only misguidance and foolishness in the jungle-buried history of catastrophist thought or was there lurking in it an alternative model of cosmogony?' I have pursued now for over a decade the substance of what, for lack of a better term, I sometimes call 'holocene cosmogony' and at other times

'revolutionary primevalogy,' and am much more committed intellectually to Dr Velikovsky's approach than I was when this material was first published.

With the encouragement afforded by others who were travelling the same route, I have achieved a measure of confidence in a two-part reciprocal answer: there is no 'fact' in the great and varied growth of today's science that is 'true' enough to block a complete cosmogonic model that is antithetical to uniformitarianism; there is enough of 'fact' to supply the construction of a revolutionist model.

Dozens of pertinent incidents have marked my association with the realm of Velikovsky politics and science over the years. One of the neatest, and of course indirect and noncommittal, testimonials to the validity of the present book occurred lately. The new edition of the *Encyclopedia Britannica* has recently appeared. In its vast uniformitarian and evolutionist terrain there is set a biographical article upon Velikovsky, which I discovered to be on the whole acceptable in the general frame of the Encyclopedia. Nevertheless, two years or so later, Lawrence K. Lustig, the Managing Editor of the Encyclopedia's *Book of the Year*, was possessed to write an article there containing an orthodox, negative pronunciamento upon Velikovsky in the course of a general attack upon pseudoscience. I wrote to Dr Lustig, decrying his position; he replied without retracting his position by as much as a centimetre.

Yet, on the same day as the proposal to publish the present book arrived from Sphere Books, Ltd, in England, there arrived also a letter from Dr Lustig, now Editor-in-Chief of a large, new encyclopedia-in-the-making at Princeton, New Jersey. He asked me to write for the encyclopedia the articles on 'Freedom,' 'Freedom of Religion,' and 'Freedom of Speech.' If this story may be taken as a compliment to integrity of the present work, it may also be heartening to those scholars, young and old, who fear that their advocacy of the philosophical principles of the book would deny them certain fruits of their long and arduous studies and careers.

Professor William Mullen and I have separately published articles 'indexing in advance' the fallout of Velikovsky's ideas upon the many academic disciplines [3]. In the politics of exploiting this fall-out, the scholar-aspirant or scholar-turncoat can be shown two paths. For the cautious soul, who would evade controversy and is shy of ridicule, it will be relatively easy, now that many barriers are down, to introduce revolutionary hypotheses into scientific areas where the ruling order is evolutionary, provided that one avoids citing the works of Velikovsky and his school. One can, for example, speak of a revolutionary turn of mind on the part of *homo sapiens* without mentioning Velikovsky, and be applauded, as was Jaynes this past year [4]. One can discuss the catastrophically deposited layers on the ocean bottoms as has Worzel, with only a tiny escape hatch for 'the fiery end of bodies of cosmic origin'[5]. One need not cite Isaacson [6], either, in disposing of the century-old concept of the Greek 'Dark Ages,' especially since Isaacson does not exist, it being the *nom de plume* of a young scholar in fear for his career; one might criticize the concept without mentioning Velikovsky, given the new climate of thought.

A scholar can play safe in elaborating the evidence for hundreds of hypotheses in the Velikovskian literature that are already clearly stated and buttressed by evidence, and do so without mentioning him and with the indulgence of authorities who are ordinarily fanatic about the citation of sources. Scholars may now indulge in the heady alcohol of revolutionary theory, so to speak, provided that they label their brew as medicinal because, after all, the police are in cahoots, if indeed they have not already taken to drink themselves. There comes to mind the chemical geologist and Nobel prize winner, Harold Urey, who has on occasion reprimanded Velikovsky's supporters even though he has himself speculated that errant celestial bodies might be the great age-breakers in geological morphology and paleontology [7] (just as the ancients said that the ages were made and broken by the birth and death of the planetary gods).

Alternatively credit may be given where credit is due. A scholar may virtuously confess his research sources, hoping that the courts for criminals such as he will soon be too crowded for him to have to worry about being brought to trial for a long

time, trusting that before that time occurs the rapidly changing climate of belief will have transformed his crime into a propriety.

When will this Great Day befall? By 1973, a decade after *The Velikovsky Affair* was first published, his group was cheered by the news that the American Association for the Advancement of Science (AAAS) would stage a symposium upon his work. On February 25, 1975, the symposium took place before the greatest audience that this convention of the largest American scientific organization produced. A full volume about the activities preceding the symposium, of its proceedings, and of its aftermath would be a worthy objective of a sociologist of science; it is yet to be written. However, the two works alluded to at the beginning of this essay have already appeared, the one sharply anti-Velikovsky and the other just as strongly pro-Velikovsky. Both works related mostly to the substantive theories about the Venus and Mars scenarios that had been presented in *Worlds in Collision* [8].

Without presenting a mass of evidence, it would be improper for me to pass judgement here on the complicated hassle. I shall, however, go so far as to say that the reader of this book will experience few surprises should he happen finally to hear the full story. All the actors who were involved, both *pro* and *con*, including the group actors - the AAAS and the press - performed true to type.

The Scientific establishment, I should add, was now more subtle in preserving proper forms and a correct public posture - as if they had read the present book and were trying to conduct themselves accordingly. There was even some familiarity with Velikovsky's *Worlds in Collision* evident among the five panel-members (I include the Moderator) who opposed Velikovsky, he standing alone. As it developed, the establishment advocates were in a state of 'partial assimilation;' so Professor Harold Lasswell has termed the process by which a political revolution like the French or Russian is in part absorbed by its conservative opponents as a defensive measure.

Indeed here was an interesting development. Little cordiality was exhibited among the panelists. And no happiness was

displayed at exploring new realms of scientific inquiry. But apparently, without admitting so much, the critics of Velikovsky were being forced to move into combat upon his terrain. Science as a whole cannot help but benefit from this. For, as Adam Smith long ago pointed out, private competition may result in public gain. Velikovsky has enlarged the scientific marketplace, J.S. Mill's marketplace of ideas, by designing a new product. So we encounter the first halting steps of the so-called 'hard sciences' to deal with the 'soft' materials of legends, myth, psychology, archaeology, and history.

Scientists cannot any longer remain specialists and hope to deal for more than a moment in this marketplace with its changed conditions. I recall the weeks of intensive study that Velikovsky put in, not long ago, to master several points of chemistry for an article in reply to chemistry Professor Albert Burgstahler. Hence, we should add that the same is true of the 'soft' scientists - the Graves, the Schliemanns, the Freuds, the Jungs, the Campbells and the Eliades: these must treat of oceanography, geophysics, and celestial dynamics.

Also, and merely as one of 'the halt leading the blind,' I would suggest that scientists and scholars repair to the philosophical foundations of science and humanism upon which the disciplinary structures rest; upon reading and reviewing Plato, Hegel, Dewey, Bridgman and the like, and understanding the critical decisions of Galileo, Newton, Marx-Engels, Nietzsche, Darwin, Freud, Einstein and the like, they may prepare new footings and erect new structures. The history of science and natural history are composed of psycho-social-empirical problems, inextricably intertwined, approachable by a science that is neither 'hard' nor 'soft,' but malleable. If few persons can master learning of such scope and depth, does not such learning then constitute a principal goal for that vaunted 'collective enterprise,' science?

It is not that the broader view will only help understand and give support to Velikovsky's work; the broader view is also needed to criticize it adversely. I do not refer to his manner and style as worthwhile targets. His writings are vigorously assertive. He does not indulge in the polite and evasive mannerisms of most social scientists and humanists. Nor can he rightly

employ mathematics where the variables cannot be fixed or the data measurably assembled. He has granted that he is dealing in hypotheses - and what empirical scientist is not?

I mean that should one reasonably and incredulously ask: 'Is there nowhere an anti-Velikovsky treatise of serious consequence?' the answer, regrettably, is still 'no.' Not in general nor even in a special discipline such as astrophysics or archaeology. Thousands of scientists and scholars have impugned his work. A few have stepped up to bat against him or one of his team: they put on airs; they dance about; they come up unprepared; they take blundering swipes at the ball; they strike out. When all is done, they say that it was not a real professional ballgame.

In two cases major intellectual projects have been directed against Velikovsky. The aforesaid Cornell Press book was promptly shredded by the aforesaid special issue of *Kronos*. The second attack, indirectly launched to contradict Velikovsky and not even mentioning him, came earlier; it was *Hamlet's Mill* by G. de Santillana and H. von Dechand [9]; it concentrated upon mythology and the earliest scientific knowledge; its structure is mysterious; it is useful largely because it indeed goes to show that proto-historic mankind could be disciplined and scientific, and that mythology everywhere derives from the behaviour of the planets. Both books received ample support. Both are being cannibalized by the revolutionists, who are resource-starved and have become quite adapted to feeding upon the evidence and criticism offered by their opponents.

Writing at end of 1977, a historian of science, A. M. Paterson, declared [10]:

> Actually, the battle is over. Dr Velikovsky has emerged the victor because his scientific hypotheses that there have been physical planetary catastrophes in historical times has been proven to have enormous predictive power. For example, a few from very, very many may be listed: Radio noise from Jupiter, strong charge on Jupiter (1953); Earth's extensive magnetosphere (1956);

> an extensive magnetic field in the solar system extending to Pluto (1946); the Sun is charged (1950); Venus is very hot, has a heavy atmosphere, and was disturbed in its rotation and may have an anomalous rotation (1950); Mars' atmosphere contains quantities of argon and neon (1945); Mars is moon-like, battered and geologically active (1950); there have been many reversals of Earth's magnetic poles (1950); Some of Earth's petroleum was deposited only a few thousand years ago (1950).
>
> And successful deductions about the Moon: Hydrocarbons, carbides, and carbonates will be found (July 2 and July 21, 1969); strong remanent magnetism in rocks (May 19, 1969); pockets of radioactivity (March 14, 1967); excessive argon and neon in the regolith (leading to incorrect age estimate) (July 23, 1969); steep thermal gradient under the surface (July 2, 1969).

Perhaps Professor Paterson would be quick to agree that her first sentence was the hyperbole of an enthusiast. As she points out elsewhere in her article, 300 years of science may be used up in conflict over a great paradigm.

Furthermore, we have to contend with the possibility of real explosive warfare, occasioned by the inane and insane politics of the age, which would foreclose the warfare of science. Dr Velikovsky has been acutely aware of the threat of nuclear missiles. On the occasion of receiving an honorary doctorate of philosophy at the University of Lethbridge, Alberta, Canada, in 1974, he speculated that the threat to humanity as a whole could be traced to suppression of the memory of early catastrophes and the unconscious, typically neurotic urge of persons in power to recapitulate the terrible ancient scenes [11].

Here, however, we must assume that such a catastrophe will not occur. Then, if only because the present world, unlike the past, rushes into the resolution of issues, a vindication of Velikovsky's theories and hence a major shift in the ruling paradigm or model of science may take place in a fairly short period of time.

The challenge of the revolutionary to the evolutionary view is sharp and clear, no matter what synthesis evolves in the end. There are now available, yet unassimilated to either model of the world, hundreds of studies of catastrophic import performed by uniformitarians who shrink from drawing appropriate conclusions. Hence when the philosophical and ideological barriers are dropped, and an archway of revolutionary theory is erected over the cleared roadway, empirical studies will enter in veritable troops. The changeover-time from one to another model of holocene and early human history might not be long.

Notes (References cited in "Introduction to the Second Edition")

1. Isaac Asimov et al., *Scientists Confront Velikovsky*, (Ithaca, N.Y.: Cornell University Press, 1977).

2. *Velikovsky and Establishment Science*, Vol. III, no.2 (1977). *Kronos* (Glassboro State College, Glassboro, N.J., U.S.A.) and The Society for Interdisciplinary Studies, which published the *SIS Review* (c/o T. B. Moore, Central Library, Hartlepool, Cleveland, Eng.) carry continuously information on the controversies surrounding Immanuel Velikovsky, as well as publishing articles by him and associated scholars on substantive concerns of revolutionary primevalogy.

3. Mullen, 'The Center Holds' in *Velikovsky Reconsidered*, by the editors of *Pensée* (Abacus, 1978), p. 239-49; A. de Grazia, 'The Coming Cosmic Debate in the Sciences and Humanities,' in Nahum Revel, ed., *From Past to Prophesy: Velikovsky's Challenge to Conventional Beliefs*, Proceedings of the Symposium held at the Saidye Bronfman Centre, Montreal, Quebec, Canada, January 10-12, 1975.

4. Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, (Boston: Houghton Mifflin, 1977).

5. J. L. Worzel, 'Extensive Deep Sea Sub-Bottom Reflections Identified as White Ash,' *Proc. Nat. Acad. Sci*., 43:349-55, March 15, 1959, 355; B. Heezen, Ewing, and Ericson, 'Significance of the Worzel Deep Sea Ash,' *ibid*, 355-61.

6. Israel Isaacson, 'Applying the Revised Chronology,' *Pensée*, IV: 5-20 (1974).

7. 'Cometary Collisions and Geological Periods,' *Nature* 242:32 (March 2, 1973).

8. With what seems a comic touch, the science fiction author and popular science writer, Isaac Asimov, was brought

in, very much after the fact, to introduce the book of the 'serious' scientists and the 'non-commercial' Cornell University Press. Also added was a paper of Professor Donald Morrison, that had been tempered by earlier heated encounters with Velikovsky's associates. *Cf.* R. E. Juergens, 'On Morrison,' in *Kronos*, *loc. cit.*, 113.

9. Boston: Gambit, 1969.

10. 'Velikovsky versus Academic Lag,' in *Velikovsky and Establishment Science*, *Op. cit.*, pp. 121-31, p. 126.

11. 'Cultural Amnesia,' in Earl Milton, ed., *Recollections of a Fallen Sky* (Lethbridge, Can.: Lethbridge U. Press, 1978).

INTRODUCTION TO THE FIRST EDITION

Alfred de Grazia, 1966

In 1950, a book called *Worlds in Collision,* by Dr Immanuel Velikovsky, gave rise to a controversy in scientific and intellectual circles about scientific theories and the sociology of science. Dr Velikovsky's historical and cosmological concepts, bolstered by his acknowledged scholarship, constituted a formidable assault on certain established theories of astronomy, geology and historical biology, and on the heroes of those sciences. Newton, himself, and Darwin were being challenged, and indeed the general orthodoxy of an ordered universe. The substance of Velikovsky's ideas is briefly presented in the first chapter of this book.

What must be called the scientific establishment rose in arms, not only against the new Velikovsky theories, but against the man himself. Efforts were made to block dissemination of Dr Velikovsky's ideas, and even to punish supporters of his investigations. Universities, scientific societies, publishing houses, the popular press were approached and threatened; social pressures and professional sanctions were invoked to control public opinion. There can be little doubt that in a totalitarian society, not only would Dr Velikovsky's reputation have been at stake, but also his right to pursue his inquiry, and perhaps his personal safety.

As it was, the 'establishment' succeeded in building a wall of unfavourable sentiment around him: to thousands of scholars the name of Velikovsky bears the taint of fantasy, science-fiction and publicity.

He could not be suppressed entirely. In the next years he published three more books. He carried on a large correspondence. And he was helped by a very few friends, and by a large general

public composed of persons outside of the establishments of science. The probings of spacecrafts tended to confirm - never to disprove - his arguments. Eventually the venomous aspects of the controversy, the efforts at suppression, the campaign of vilification loomed almost as large, in their consequences to science, as the original issue. Social scientists, who had been generally unaware of Dr Velikovsky's work, and its importance, and who had been almost totally disengaged, now found themselves in the thick of the conflict.

The involvement of the social and behavioural sciences in the scientific theories of Velikovsky was higher than had been earlier appreciated. The social sciences are the basis of Velikovsky's work: despite his proficiency in the natural sciences, it is by the use of the methodology of social science that Velikovsky launched his challenge to accepted cosmological theories. No one pretends that this method is adequate. New forms of interdisciplinary research are needed to wed, for example, the study of myth with the study of meteorites. Nor does one have to agree that Velikovsky is the greatest technician of mythology, even while granting his great conceptual and synthesizing powers.

Whatever the scientific substance, the controversy itself could not be avoided or dismissed by behavioural science. The politics of science is one of the agitating problems of the twentieth century. The issues are clear: Who determines scientific truth? Who are its high priests, and what is their warrant? How do they establish their canons? What effects do they have on the freedom of inquiry, and on public interest? In the end, some judgement must be passed upon the behaviour of the scientific world and, if adverse, some remedies must be proposed.

It was in this light that, in a special issue, the *American Behavioral Scientist* published three papers dealing with the Velikovsky controversy. The first by Ralph Juergens, recounts the story of Dr Velikovsky from its beginnings to the present; tells something of the man and his works. The second, by Livio Stecchini, analyzes the roots of the controversy in the scientific past. A third, by the editor, searches for means by which new

discoveries may be brought into the corpus of science, and offers suggestions for reform of present procedure.

The *American Behavioral Scientist* did not enter the Velikovsky controversy heedlessly. The papers were read by a number of respected scientists and scholars, who did not necessarily share, of course, all of the views expressed by the authors, nor necessarily subscribe to Dr Velikovsky's views. They agreed, however, to the usefulness of their publication; their general help and encouragement in the original studies is now again gratefully acknowledged as the studies go to press in book format. Our thanks are owing to:

HADLEY CANTRIL, Chairman of the Board, Institute for International Social Research; past president, Society for the Psychological Study of Social Issues.

SALVADOR DE MADARIAGA, Honorary Fellow, Exeter College, Oxford University.

LUTHER H. EVANS, Director of International and Legal Collections, Columbia University, former Director General, UNESCO.

MOSES HADAS, Jay Professor of Greek, Columbia University.

R. H. HILLENKOETTER, Vice Admiral, U.S.N. (Retired); former director, Central Intelligence Agency.

HORACE M. KALLEN, Research Professor of Social Philosophy, New School for Social Research; past President, Society for the Scientific Study of Religion.

HAROLD D. LASSWELL, Professor of Law and Political Science, Yale University Law School; past President, American Political Science Association.

HAROLD S. LATHAM, former Editor-in-Chief and Vice-president, Macmillan Co.

PHILIP WITTENBERG, Partner, Wittenberg, Carrington and Weinberger.

Publication of the papers brought immediate response. Numerous scholars, both in the natural and social sciences, have written to the *American Behavioral Scientist*, commenting favourably, on the whole, upon the presentation of the matter to the scientific public. All documentation is being preserved, in the hope that the archives will be of use to future discussion.

The new material in the present book is considerable. Ralph Juergens has brought the story of the Velikovsky case up to date in a new paper. There is also a new paper by Dr Livio Stecchini, carrying on from his first paper, this time on the uses of historical data for astronomical theory. We publish here, too, Dr Velikovsky's own paper from the special issue of the *American Behavioral Scientist*.

The Velikovsky case is in no sense closed. There is no reason why it should be. Undeterred by the attacks upon him, and the obstacles placed in his way, Dr Velikovsky is pursuing his studies, and now has several books nearing completion: three on the substance of his theories, others of a general autobiographical character. He remains a faithful and indefatigable correspondent, and his letters point to new challenges.

It is our hope that the publication of these papers in the present volume will make it less easy for his new work to be suppressed, or lightly dismissed. We hope, too, that they will help scientists and interested laymen everywhere to rehearse the problems and to reform the errors of the vast enterprise of science.

1. MINDS IN CHAOS

by Ralph E. Juergens

Seventeen years ago the appearance of Immanuel Velikovsky's *Worlds in Collision* precipitated an academic storm. Prominent American scientists, roused to indignation even before the book was published, greeted it with a remarkable demonstration of ill will that included a partially successful attempt to suppress the work by imposing a boycott on its first publisher's textbooks. The reading public witnessed the unique spectacle of a scientific debate staged not in the semi-privacy of scientific meetings and journals, but in the popular press, with scientists - in rare accord - on one side and lay champions of free speech on the other. With the might of authority all on one side of the issue, the debate was resolved in a predictable manner; Velikovsky and his book were discredited in the public eye.

From the start there was more to the controversy than the simple question of a dissenting scholar's right to be published and read; the atmosphere generated by scientific consternation was charged with a peculiar emotion that Newsweek termed 'a highly unacademic fury.' Even if Velikovsky's books were, as one astronomer put it, the 'most amazing example of a shattering of accepted concepts on record,' the violence of the reaction against it seemed all out of proportion to the book's importance if, as most critics insisted, the work was spurious and entirely devoid of merit. Many nonscientist observers concluded that Velikovsky's work was not run-of-the-mill heresy, but a thesis that presented a genuine threat to the very ego of science. It seemed that *Worlds in Collision* was being attacked with a fervor 'reserved only for books that lay bare new fundamentals.' Caught up in this fervor, more than one scientist-reviewer of Velikovsky's book adopted tactics even more surprising than the overt and covert deeds of the would-be suppressors.

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Before attempting to trace the course of *The Velikovsky Affair*, we might first recall the unsettling message of the book that initiated that strange chain of events. In Britain, where *Worlds in Collision* was also rejected by almost all scientists, but with a lesser show of emotion, Sir Harold Spencer Jones, the later Royal Astronomer, summarized its thesis this way:

> The central theme of *Worlds in Collision* is that, according to Dr Velikovsky, between the fifteenth and eight centuries B.C., the earth experienced a series of violent catastrophes of global extent. Parts of its surface were heated to such a degree that they became molten and great streams of lava welled out; the sea boiled and evaporated;... mountain ranges collapsed, while others were thrown up; continents were raised causing great floods; showers of hot stones fell; electrical disturbances of great violence caused much havoc; hurricanes swept the earth; a pall of darkness shrouded it, to be followed by a deluge of fire. This picture of a period of intense turmoil within the period of recorded history is supported by a wealth of quotations from the Old Testament, from the Hindu Vedas, from Roman and Greek mythology, and from the myths, traditions and folklore of many races and peoples...
>
> These catastrophic events in the earth's history are attributed by Dr Velikovsky to a series of awe-inspiring cosmic cataclysms. In the solar system we see the several planets moving round the sun in the same direction in orbits which are approximately circular and which lie nearly in the same plane. Dr Velikovsky asserts that this was not always so, but that in past times their orbits intersected; collisions between major planets occurred, which brought about the birth of comets. He states that in the time of Moses, about the fifteenth century B.C., one of these comets nearly collided with the earth, which twice passed

> through its tail. [The earth experienced] the disrupting effect of the comet's gravitational pull,... intense heating and enormous tides... incessant electric discharges... and the pollution of the atmosphere by the gases in the tail... Dr Velikovsky attributes... oil deposits in the earth to the precipitation, in the form of a sticky liquid (naphtha), of some of the carbon and hydrogen gases in the tail of the comet, while the manna upon which the Israelites fed is similarly accounted for as carbohydrates from the same source.
>
> This comet is supposed to have collided with Mars... and, as the result of the collision, to have lost its tail and to have become transformed into the planet Venus...
>
> Further catastrophes... ensued... Mars was shifted nearer to the earth so that in the year 687 B.C.... Mars nearly collided with the earth.
>
> These various encounters are supposed to have been responsible for repeated changes in the earth's orbit, in the inclination of its axis, and in the lengths of the day, the seasons and the year. The earth on one occasion is supposed to have turned completely over, so that the sun rose in the west and set in the east. Dr Velikovsky argues that between the fifteenth and eight centuries B.C. the length of the year was 360 days and that it suddenly increased to 365 1/4 days in 687 B.C. The orbit of the moon and the length of the month were also changed...[1]
>
> In short, Velikovsky's research among the ancient records of man - records ranging from unequivocal statements in written documents, through remembrances expressed in myth and legend, to mute archaeological evidence in the form of obsolete calendars and sundials - and his examination of geological and paleontological

> reports from all parts of the globe led him to conclude that modern man's snug little world, set in a framework of celestial harmony and imperceptible evolution, is but an illusion. Velikovsky's reappraisal of world history ravages established doctrine in disciplines from astronomy to psychology: universal gravitation of masses is not the only force governing celestial motions - electromagnetic force must also play important roles; enigmatic breaks in the geological record denote, not interminable ages of languorous erosion and deposition gently terminated by cyclic submergence and emergence of land masses, but sudden, violent derangements of the earth's surface; the remarkably rapid annihilation of whole species and genera of animals and the equally remarkable, almost simultaneous proliferation of species in other generic groups bespeak overwhelming catastrophe and wholesale mutation among survivors; the mechanism of evolution is not competition between typical and chance-mutant offspring of common parents, but divergent mutation of whole populations simultaneously exposed to unaccustomed radiation, chemical pollution of the atmosphere, and global electromagnetic disturbances; ancient cities and fortresses were not brought low individually by local warfare and earthquakes, but were destroyed simultaneously and repeatedly in worldwide catastrophes; calamities described in clear-cut terms in surviving records of the past - records almost universally interpreted allegorically by late-classical as well as modern scholars - were common traumatic experiences for all races of mankind, and as such have been purged from conscious memory.

The author of this strange new concept of universal history was born in Vitebsk, Russia, in 1895. His formal schooling began in Moscow at Medvednikov Gymnasium, from which he graduated with full honours. Following a brief period of study at Montpellier, France, and travels in Palestine, he began pre-

medical studies in natural science at Edinburgh, Scotland, in 1914. When his schooling abroad was interrupted by the outbreak of World War I, Velikovsky enrolled in the Free University in Moscow and for a few years studied law and ancient history. Meanwhile, in 1915 he resumed work towards a medical degree at the University of Moscow, and in 1921 he received his medical diploma.

The next few years Velikovsky spent in Berlin, where he and Prof. Heinrich Loewe founded and published *Scripta Universitatis* with funds supplied by Velikovsky's father. In this series of volumes, conceived as a cornerstone for what would become the University of Jerusalem, contributions from outstanding Jewish scholars in all countries were published in their native languages and in Hebrew translation. The late Albert Einstein edited the mathematical-physical volume of the *Scripta.*

In Berlin Velikovsky met and married violinist Elisheva Kramer of Hamburg. Later the same year the young couple moved to Palestine, and the doctor began his practice of medicine. For fifteen years this practice - first as a general practitioner in Jerusalem, and later, after psychiatric training in Europe, as a psychoanalyst in Haifa and Tel Aviv - occupied most of Velikovsky's time. Nevertheless, he published a number of papers on psychology, some in Freud's *Imago*. In one paper, to which Prof. Eugen Bleuler wrote a preface [2], Velikovsky was the first to suggest that pathological encephalograms would be found characteristic of epilepsy; distorted and accentuated brain waves of epileptics were later found to be important clinical diagnostic symptoms. He also conceived a plan for an academy of science in Jerusalem and started a new series, *Scripta Academica,* to which Prof. Chaim Weizmann, president of the World Zionist Organization and noted scientist, contributed the first monograph in biochemistry. This series was dedicated to the memory of Velikovsky's father, who had died in Palestine in December 1937.

Velikovsky also had an idea for a book, and to complete the necessary research he decided to interrupt his practice for an extended visit to America. The Velikovskys and their two school-age daughters arrived in New York in the summer of

1939, and the doctor plunged into his library research. The intended book had been conceived as an analytic study of Freud's own dreams as recorded in his writings, and a comparative study of the lives of three personages - Oedipus, Akhnaton, and Moses - who had figured prominently in Freud's thoughts and works.

The research was nearly completed by the spring of 1940, and Velikovsky began to make preparations for the return home. Then, at the last moment before an already-postponed sailing, he chanced upon an idea that was to completely alter his life plans and keep him in America for decades.

Reflecting upon events in the life of Moses, Velikovsky began to speculate: Was there a natural catastrophe at the time of the Exodus of the Israelites from Egypt? Could the plagues of Egypt, the hurricane, the parting of the waters, and the smoke, fire, and rumblings of Mt Sinai described in the Bible have been real and sequential aspects of single titanic cataclysm of natural forces? If the Exodus took place during - or because of - an upheaval, perhaps some record of the same events has survived among the many documents of ancient Egypt; if so, might not such a record be a clue to the proper place of the Exodus in Egyptian history?

After weeks of search Velikovsky came upon the story he sought. A papyrus bearing a lamentation by one Ipuwer had been preserved in the library of the University of Leiden, Holland, since 1828. Translation of the document by A. H. Gardiner in 1909 had disclosed an account of plague and destruction closely paralleling the Biblical narrative, but the similarities escaped Gardiner's attention. Ipuwer bewailed the collapse of the state and social order during what seemed to be a calamity of natural forces. Mention of Asiatic invaders (Hyksos) made it appear that the sage Ipuwer had witnessed the downfall of the Middle Kingdom (Middle Bronze Age) in Egypt.

For nearly 2000 years scholars have conjectured and debated about the proper place of the Exodus in Egyptian history. But the end of the Middle Kingdom which is conventionally assigned to the eighteenth century B.C. had never been

considered; it seemed much too early according to Hebrew chronology. All efforts have been directed towards finding a likely niche in New Kingdom history. Velikovsky, however, felt confident that his method of correlation was valid; he resolved to establish the coevality of the Exodus and the Hyksos invasion as a working hypothesis and pursue the inquiry through subsequent centuries. He discovered so much apparent substantiation for the novel synchronization that he was soon compelled to face up to its inherent dilemma: either Hebrew history is too short by more than five centuries, an inconceivable premise - or Egyptian chronology, a proud joint achievement of modern historians, archaeologists, and astronomers, and the standard scale against which all Near Eastern histories are calibrated, is too long by an equal number of centuries. The latter alternative seemed just as inconceivable; all the excess centuries would have to be found and eliminated from post-Middle Kingdom history, that portion of Egyptian history considered by all scholars to be unalterably reconstructed and fixed in time. But soon Velikovsky found the apparent explanation for the discrepancy: certain Egyptian dynasties appear twice in conventionally accepted schemes - first, their stories appear as they have been pieced together from the monuments and other relics of Egypt; then in history gleaned from Greek historians, the same characters and events are given secondary and independent places in the time table. ‘Many figures... are "Ghosts" or "halves" and "doubles". ‘Events are often duplicates; many battle are shadows; many speeches are echoes; many treaties are copies.’

In the fall of 1940 Velikovsky traced events similar to those described in the Pentateuch and the Book of Joshua in the literature of ancient Mexico. This confirmed his growing suspicion that the great natural catastrophes that visited the Near East had been global in scale. Immediately he expanded his research to embrace records of all races. The next five or six years he spent developing parallel themes - reconstructions of ancient political history and recent cosmic history - and as month followed month the intimate details of a new concept of the world emerged. Two manuscripts were the product of his labours: *Ages in Chaos* traced Near Eastern history from -1500 to -300; *Worlds in Collision* documented the evidence and sequence of catastrophes on earth and in the solar system.

The late Robert H. Pfeiffer, then Chairman of the Department of Semitic Languages and Curator of the Semitic Museum at Harvard University, read an early draft of *Ages in Chaos* in 1942 and conceded that the revolutionary version of history might well be correct. He felt the work should receive a fair trial and objective investigation. He also read subsequent drafts of the manuscript and made efforts to help find a publisher for it. To one prospective publisher he wrote: 'I regard this work - provocative as it is - of fundamental importance, whether its conclusions are accepted by competent scholars or whether it forces them to a far-reaching and searching reconstruction of the accepted chronology.' Notwithstanding Pfeiffer's endorsement, eight publishers returned the manuscript.

Before seeking a publisher for *Worlds in Collision*, Velikovsky tried to enlist the help of scientists in arranging for certain experiments that would constitute crucial tests for his thesis, which was essentially three-fold: (1) There were global catastrophes in historical times; (2) these catastrophes were caused by extraterrestrial agents; and (3) these agents, in the most recent of the catastrophes, can be identified as the planets Venus and Mars, Venus playing the dominant role. All three postulates would be largely substantiated if it could be shown that, contrary to all conventional expectations, Venus (1) is still hot - evidence of recent birth, (2) is enveloped in hydrocarbon clouds - remnants of a hydrocarbonaceous comet tail, and (3) has anomalous rotational motion - evidence suggesting that it suffered unusual perturbations before settling in its orbit as a planet. The first two of these points were selected by Velikovsky in 1946 as the most crucial tests for his entire work.

THE EVIDENCE FROM MARINER II

He was confident of ultimate vindication for his conclusion that Venus is hot despite the fact that the outer regions of its envelope were known to have a temperature -25 deg C. Even as recently as 1959 astronomers believed that because of the great reflecting power of its clouds, the ground temperature on Venus could differ little from that on earth. Venus orbits closer to the sun, but more solar radiation is reflected away from Venus than from the earth. Nevertheless, Velikovsky argued that the

seeming contradiction in evidence long available - apparent slow rotation, yet nearly identical temperatures on shadowed and sunlit surfaces of the envelope of Venus - is illusory because the planet is young: it is hot and radiates heat from day and night hemispheres alike [Fifteen years later, in 1961, radio astronomers announced that radiation from Venus indicated that its surface must have a temperature of 600 degrees F. And in February 1963, after analyzing data from Mariner II, scientists raised this temperature estimate by another 200 degrees (Ref. 3). No convincing explanation has yet been advanced to square this evidence with orthodox cosmologies.]

Velikovsky thought his second deduction about Venus - hydrocarbon dust and gases must be present in its atmosphere and envelope - might be investigated spectroscopically. To this end in April 1946 he approached Prof. Harlow Shapley, then director of Harvard College Observatory. Without going into detail, Velikovsky explained that he had developed a hypothesis about recent changes in the order of the solar system and that his conclusions might be checked in part by spectral studies of Venus. Shapely pointed out that sudden changes in the planetary order would be inconsistent with gravitational theory; nevertheless, he agreed to consider performing such experiments if another scholar of known reputation would first read and then recommend Velikovsky's work. At Velikovsky's behest, Prof. Horace M. Kallen, co-founder of the New School of Social Research and at that time dean of its graduate faculty - a scholar already familiar with the work - wrote Shapley to urge that he conduct the search for hydrocarbons on Venus if at all possible. But to Kallen's plea, Shapley, who had refused to read the manuscript, replied that he wasn't interested in Velikovsky's 'sensational claims' because they violated the laws of mechanics; *'if Dr Velikovsky is right, the rest of us are crazy.'* Nevertheless, Shapley recommended that Velikovsky contact either Walter S. Adams, director of Mt. Wilson Observatory, or Rupert Wildt at McCormick Observatory.

In the Summer of 1946 Velikovsky directed identical inquiries to both Wildt and Adams, stating that he had a cosmological theory implying that 'Venus is rich with petroleum gases and hydrocarbon dust.' So strong were these implications that he believed the presence or absence of these materials in the

atmosphere and envelope of Venus would constitute crucial support or refutation for his thesis, and therefore he wished to know if the spectrum of Venus might be interpreted in this sense. Wildt replied that the absorption spectrum of Venus shows no evidence of hydrocarbons. Adams pointed out that the absorption bands of most petroleum molecules are in the far infra-red, below the range of photographic detection, and that hydrocarbons known to absorb in the detectable range are not apparent in the spectrum of Venus.

All this notwithstanding, Velikovsky elected to defer once more to his historical evidence; he left in his manuscript and later in the published book the statement that a positive demonstration that petroleum-like hydrocarbons are or are not present in the envelope of Venus would be a decisive check on his work. [On the basis of an apparent ability to condense and polymerize into heavy molecules at a temperature near 2000 F in the atmosphere, the clouds of Venus must consist of heavy hydrocarbons and more complex organic compounds; thus concluded Mariner II experimenter Lewis D. Kaplan in February 1963.](Ref. 4).

At the end of July 1946 the late John J. O'Neill, science editor of the New York *Herald Tribune*, agreed to read Velikovsky's manuscript. O'Neill was immediately impressed, and he devoted his column for August 14 to the work. In his opinion, 'Dr Velikovsky's work presents a stupendous panorama of terrestrial and human histories which will stand as challenge to scientists to frame a realistic picture of the cosmos.'

Between June and October 1946 Velikovsky submitted his manuscript to one publisher after another, but the consensus was that the heavily annotated text was too scholarly for the book trade. Eventually, however, the trail led to Macmillan Company, where trade-books editor James Putnam saw possibilities in the book. In May of 1947 an optional contract was signed and then, after another year in which various outside readers, among them O'Neill and Gordon Atwater, then Curator of Hayden Planetarium and Chairman of the Department of Astronomy of the American Museum of Natural History - examined the manuscript and recommended publication, a final contract was drawn and signed.

By March 1949 word of the book Macmillan was preparing for publication had spread among people in the trade. Frederick L. Allen, editor-in-chief of *Harper's* Magazine, sought authorization to present a two-article synopsis of *Worlds in Collision* and had Eric Larrabee, then an editor on the *Harper's* staff, prepare a tentative condensation from galley proofs. Allen wished to submit this for approval, but Velikovsky did not respond to the proposal for more than six months. In the fall, however, after more urging, he agreed to see Larrabee to discuss a one-article presentation of his theme; Larrabee then rewrote his piece completely.

Larrabee's article, 'The Day the Sun Stood Still,' appeared in *Harper's* for January 1950. The issue sold out within a few days, and so great was the demand from readers that a number of dailies both here and abroad reprinted Larrabee's text in full.

In February 1950 *Reader's Digest* featured a popularization of Velikovsky's findings prepared by the late Fulton Oursler, who emphasized their corroboration of Old Testament history.

Collier's Magazine, in February and March 1950, published two instalments of an announced three-part series. Velikovsky, who had agreed only to serialization - not adaptation or condensation, was so dismayed by the cavalier treatment being accorded his work in the highly sensationalized manuscripts submitted for his approval that he threatened to make a public disavowal of the Collier's articles unless each was severely revised. After long, stormy sessions, the first two manuscripts were approved; *Collier's* abandoned the third.

Early in February 1950, when *Worlds in Collision* was about to go to press, Putnam called on Velikovsky to show him two letters Macmillan had received from Harlow Shapley. In the first, dated January 18, Shapley expressed gratification over a rumour that Velikovsky's book was not going to appear, and astonishment that Macmillan had even considered a venture into the 'Black Arts.' In his second letter, written on January 25 after Putnam had answered the first, discounting the alleged rumour and assuring him that the book would appear on schedule, Shapley, who had still not seen the manuscript,

remarked: ‘It will be interesting a year from now to hear from you as to whether or not the reputation of the Macmillan Co. is damaged by the publication of, "*Worlds in Collision*".’ At the very least, release of the book would ‘cut off’ all relation between Shapley and Macmillan. He also announced that, at his request, one of his colleagues who was also a classicist was preparing a ‘commentary’ on Larrabee’s article. He concluded with an expression of his hope that Macmillan had thoroughly investigated Velikovsky’s background; however, ‘it is quite possible that only this "*Worlds in Collision*" episode is intellectually fraudulent.’

This second letter apparently struck close to home for Macmillan president George Brett, for he personally answered Shapley to thank him for ‘waving the red flag.’ Brett promised to submit the book to three impartial censors and to abide the majority verdict of the three.

Apparently the majority again voted thumbs up; the book was published on schedule. The identities of the last-minute censors were never officially revealed, but one of them, Prof. C. W. van der Merwe, Chairmen of the Department of Physics at New York University, later disclosed to John O’Neill that he had been enlisted by Macmillan and had been one of the two who voted in favour of publication.

Meanwhile, the February 25, 1950, issue of *Science News Letter*, a publication then headed by Harlow Shapley, printed denunciation of Velikovsky’s ideas by five authorities in as many fields: Nelson Glueck, archaeologist; Carl Kraeling, orientalist; Henry Field, anthropologist; David Delo, geologist; and Shapley himself, speaking for astronomers. This medley of protest came forth just as *Worlds in Collision* went to press - none of the critics had seen the work.

On March 14, the commentary on Larrabee’s article by Shapley’s colleague, astronomer Cecilia Payne-Gaposchkin, appeared in *The Reporter*. (An earlier draft of the article had been mimeographed and circulated widely by direct mail to scientists, science editors, and publishers.) Stringing phrases from three sentences appearing on as many pages of Larrabee’s article into a sentence of her own, Gaposchkin set it in

quotation marks and introduced it as 'Dr Velikovsky's astronomical assertions.' The gist of her thoroughly abusive article was that electromagnetic phenomena are of no importance in space, and in a purely mechanical solar system the events of *Worlds in Collision* are impossible. The March 25 issue of *Science News Letter*, in a 'Retort to Velikovsky,' who had as yet not been heard from, cited Gaposchkin's critique as recommended reading for all scientists - 'a detailed scientific answer to Dr Velikovsky.'

On April 11 *The Reporter* reproduced letters to the editor from Larrabee and Gaposchkin. Larrabee challenged the propriety of her attack on a book she had not yet seen, and Gaposchkin acknowledged that her review had been based on popularized preview articles only; she remarked that she had since read the book (published April 3, 1950) and found it to be 'better written...but just as wrong.'

The last few weeks before *Worlds in Collision* made its appearance were spent in strategic manoeuvring by the leaders of the resistance forces. The late Otto Struve, then director of Yerkes Observatory at the University of Chicago and an ex-president of the American Astronomical Society, penned letters to both John O'Neill and Gordon Atwater, requesting them to abandon their earlier positions with respect to *Worlds in Collision*. Atwater, unaware that he was facing an inquisition, replied that he believed Velikovsky's work had great merit, and although he did not accept all its conclusions in detail he was preparing a favourable review of the book for *This Week* magazine. He was planning - indeed had already publicly announced - a planetarium programme to depict the events of *Worlds in Collision*. O'Neill composed a heated reply, but then destroyed it. He let it be known that his earlier appraisal of the book had not since been altered in any way.

Atwater's planetarium programme was scuttled immediately. During the last week of March he was summarily fired from both his positions with the museum - as Curator of Hayden Planetarium and Chairman of the Department of Astronomy - and requested to vacate his office immediately. Thus, when his review in *This Week* appeared on April 2, an article in which he pleaded for open-mindedness in dealing with the new theory,

the credentials printed alongside Atwater's name were already invalid. Last-minute attempts to influence *This Week* not to publish this cover story failed when the editor sought and followed O'Neill's advice.

THE OPPOSITION TAKES ACTION

O'Neill's prepared review for the *Herald Tribune* had been scheduled to appear on April 2. But instead of O'Neill's article readers of that Sunday's issue found a review written by Struve. No concrete arguments were presented by Struve to justify his rejection of the book; 'It is not a book of science and it cannot be dealt with in scientific terms.' He went on: 'It was necessary for readers to wait until a recent issue of the "Reporter" to learn, through Mrs. Cecilia Payne-Gaposchkin... that the observations of Venus extend back five hundred years before the Exodus, thus refuting the absurd theory of a comet that turned into a planet.' Velikovsky, however, had specified no date for the eruption of Venus from Jupiter, except that it had occurred some time before the Exodus. And, as Velikovsky pointed out in his book, the Babylonian tablets (Venus Tablets of Ammizaduga) cited by Gaposchkin to support her claim ascribe such erratic motions to Venus that translators and commentators have been baffled by them ever since they were discovered in the ruins of Nineveh in the last century; he also pointed out that even if the apparitions and periods of Venus recorded on the tablets date from early in the second millennium, which is disputed among scholars, they prove only that Venus already then moved erratically and quite unlike a planet.

Reviewing *Worlds in Collision* in the *New York Times Book Review*, also on April 2, the late chief science editor of the *Times*, Waldemar Kaempffert, followed Gaposchkin into the same territory and falsely accused Velikovsky of suppressing the Venus Tablets of Ammizaduga. Kaempffert seemingly had not read the book very carefully before condemning it, for not only did Velikovsky describe the tablets and quote the complete texts of observations from five successive years out of twenty-one, but he discussed opinions written by various orientalists and astronomers who had studied the tablets (Rawlinson, Smith, Langdon, Fotheringham, Schiaparelli, Kugler, Hommel).

In the next few months, 'a surprising number of the country's reputable astronomers descended from their telescopes to denounce *Worlds in Collision*,' to quote the *Harvard Crimson* of September 25, 1950. Newspapers around the country were barraged with abusive reviews contributed by big-name scientists; some of these writings were syndicated to ensure better coverage.

Ignoring Velikovsky's alternate explanation that, perhaps in the grip of an alien magnetic field, a 'tilting of the (earth's) axis could produce the visual effect of a retrogressing or arrested sun,' Frank K. Edmondson, director of Goethe Link Observatory, University of Indiana, wrote: [5] 'Velikovsky is not bothered by the elementary fact that if the earth were stopped, inertia would cause Joshua and his companions to fly off into space with a speed of nine hundred miles an hour.' This argument, first formulated by Gaposchkin, is at best disingenuous, for the all-important time factor - the rate of deceleration - is completely ignored.

Paul Herget, Director of the Observatory, University of Cincinnati, derided the ideas expressed in *Worlds in Collision* [6], but advanced no specific counterarguments on scientific grounds. Nevertheless, he concluded that all the book's basic contentions were 'dynamically impossible.' Frank S. Hogg, director of David Dunlop Observatory, University of Toronto, and Oregon astronomer J. Hugh Pruett both reiterated the erroneous Gaposchkin-Struve notion that observations of Venus made before the time of the Exodus refute Velikovsky's theme [7,8]. California physicist H. P. Robertson chose the easy path of invective: 'This incredible book... this jejune essay... [is] too ludicrous to merit serious rebuttal.'[9]

Atomic scientist Harrison Brown disdained to list the 'errors in fact and conclusion' that he estimated would fill a letter 'thirty pages in length.' Instead, in his review of *Worlds in Collision* in the *Saturday Review of Literature* [10], Brown assured his readers that 'the combination of modern astronomy, geophysics, geochemistry, paleontology, geology, and physics can state the following:

'The earth did not stop rotating 3,500 years ago. [Brown, too, disregarded Velikovsky's alternative explanation for the visual effect of an arrested sun.]

'Venus was formed much earlier than 3,500 years ago. Indeed, it is probably about a million times older than Dr Velikovsky suggests.

'Venus was not formed from a comet emanating from Jupiter (or, for that matter, a comet emanating from anything else).'

The balance of Brown's review was devoted to 'book-and magazine-publishing irresponsibility.'

Despite the vigour of the protracted campaign to discredit its author, *Worlds in Collision* was heralded enthusiastically by many science writers and reviewers, and the book topped the best-seller lists of the New York Times and the New York *Herald Tribune* for twenty successive weeks in 1950. [By a strange oversight, however, the *Encyclopedia Britannica Book of the Year* covering 1950 failed to note the existence of Velikovsky's book in its recapitulation of the year's best sellers.]

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On May 25, 1950, when sales of his book were at their peak, Velikovsky was summoned to Brett's office and told that professors in certain large universities were refusing to see Macmillan salesmen, and letters demanding cessation of publication were arriving from a number of scientist. Brett beseeched Velikovsky to save him from disaster by approving an arrangement that had been tentatively worked out with Doubleday & Company, which had no textbook department. Doubleday, with Velikovsky's consent, would take over all rights to *Worlds in Collision*. As evidence of the pressure being brought to bear, Brett showed Velikovsky a letter from Michigan astronomer Dean B. McLaughlin, who insisted Velikovsky's book was nothing but lies. On the same page Mclaughlin averred he had not read and never would read the book.

While Velikovsky pondered his next move - whether to approve the transfer of rights to Doubleday, or to make an independent search for a new publisher - his scientist-critics apparently began to see their problem in a more serious perspective. Inability to dismiss the events of *Worlds in Collision*, gleaned from a multitude of sources, suggested that a substantial assault upon his method and sources was in order.

The June 1950 issue of *Popular Astronomy* carried another attack on Velikovsky by Cecilia Payne-Gaposchkin. Her words were prefaced by a few lines from the magazine editor, who explained, 'We are giving greater prominence to this analysis of "*Worlds in Collision*" than is usually accorded to book reviews... for two reasons. 1. This book has been brought to the attention of a large reading public by having been mentioned favourably in several popular magazines. 2. The analysis here given is by a recognized authority in the field of astronomy, the science with which the book comes into closest contact, or sharpest conflict.'

Gaposchkin's 'analysis' was divided into two parts, first place being devoted to 'the Literary Sources.' By the simple ruse of ignoring both contextual material and corroborative references, she purported to show that Velikovsky had misrepresented his sources. Her 'Scientific Arguments' included restatements of undemonstrable dogmas and a highly sarcastic synopsis of Velikovsky's thesis.

Prof. Otto Neugebauer of Brown University, a specialist in Babylonian and Greek astronomy, in an article for Isis [11] that was mailed far and wide in reprint form, accused Velikovsky of wilfully tailoring quoted source material. To support this charge, Neugebauer specified that Velikovsky had substituted the figure 33°14' for the correct value, 3°14,' in a quotation from the work of another scholar. When Velikovsky protested in a letter to the late George Sarton, then editor of Isis, that the figure given in his book was correct and the 33°14' was in fact Neugebauer's own insertion, not his, Neugebauer dismissed the incident as a 'simple misprint of no concern' that did not invalidate his appraisal of Velikovsky's methods. And the reprint was circulated by an interested group long after its errors had been pointed out.

The fundamental position of Neugebauer is that the voluminous Babylonian astronomical texts from before the seventh century B.C., all of which are inconsistent with celestial motions as we know them, were composed in full disregard of actual observations; Velikovsky regards these records as representing true observations of the heavens before the last catastrophe.

Four Yale University professors collaborated in preparing a rebuttal to Velikovsky for the *American Journal of Science* [12], which was edited by geologist Chester R. Longwell. Sinologist K. S. Latourette acknowledged that Velikovsky 'has combed an amazing range of historical records for evidence to corroborate his thesis,' but apparently Latourette could find no specific arguments to refute that thesis. George Kubler, mexicologist, derided the suggestion set forth in *Worlds in Collision* that the Mesoamerican civilization must be much older that scholars then conceded; 'The Mesoamerican cosmology to which Velikovsky repeatedly appeals for proof did not originate until about the beginning of our era.' [In December 1956 the National Geographic Society announced: 'Atomic science has proved the ancient civilization of Mexico to be some 1,000 years older than had been believed.'] Rupert Wildt took Velikovsky to task for doubting the validity of celestial mechanics based upon gravitation and inertia only, to the exclusion of electromagnetic forces. Longwell scorned the notion that petroleum might have a cosmic origin. [Prof. W. F. Libby, chemist of the University of California, has since suggested that petroleum may be found on the moon. Prof. A. T. Wilson of Victoria University, Wellington, New Zealand, in 1960 produced high molecular weight hydrocarbons by electric discharges in a methane-ammonia (Jupiter-like) atmosphere; in 1962 he, too, suggested that the earth's petroleum may be of cosmic origin and that oil may be found on the moon.]

The article authorized by the four Yale professors and signed by Longwell was given a preview run in the New Haven *Register* on June 25, 1950. A seven-column banner in blue ink above the text proclaimed: '4 Yale Scholars "Expose" Non-Fiction Best-Seller.'

After receiving assurances from Doubleday that it was immune to pressure from textbook writers and buyers, Velikovsky approved the transfer of rights on June 8, 1950. On June 11, columnist Leonard Lyons spread the news, and on June 18 the *New York Times* noted: 'The greatest bombshell dropped on Publishers' Row in many a year exploded the other day... Dr Velikovsky himself would not comment on the changeover. But a publishing official admitted, privately, that a flood of protests from educators and others had hit the company hard in its vulnerable underbelly - the textbook division. Following some stormy sessions by the board of directors, Macmillan reluctantly succumbed, surrendered its rights to the biggest money-maker on its list.'

Leonard Lyons reported that the suppression was engineered by Harlow Shapley. When queried, however, Shapley told *Newsweek*, 'I didn't make any threats and I don't know anyone who did.' The late George Sokolsky also discussed the case in his column, and shortly afterwards received a letter from Paul Herget, who was apparently disappointed that all the credit was going to Shapley. Herget wrote, and Sokolsky quoted: 'I am one of those who participated in this campaign against Macmillan... I do not believe that [Shapley] was in any sense the leader... I was a very vigorous participant myself... ' Dean McLaughlin wrote to Fulton Oursler: '*Worlds in Collision* has just changed hands... I am frank to state that this change was the result of pressure that scientists and scholars brought to bear on the Macmillan Company...'

On June 30, Fred Whipple, Shapley's successor as Director of Harvard College Observatory, informed the Blakiston Company, then owned by Doubleday, that, rather than continue to be a fellow author in the same house with Velikovsky, he would turn over to charity future royalties from his Blakiston-published *Earth, Moon and Planets* and would make no further updating revisions in the text so long as Doubleday controlled Blakiston.

Dumping its offensive best seller, however, was but the first step in the re-establishment of Macmillan's reputation. There remained matters of purgatorial sacrifice and public recantation.

James Putnam, a 25-year veteran with Macmillan, had been entrusted with making the arrangements to contract for and publish Velikovsky's manuscript. His judgement in urging that Macmillan accept *Worlds in Collision* had been confirmed in spectacular fashion when the book became a best seller. Nevertheless, the negotiations to transfer publishing right to Doubleday were carried on without his knowledge, and as soon as the transfer had been consummated, Putnam's good friend, editor-in-chief H. S. Latham, was delegated to inform him that his services were being terminated immediately. [In January 1963 Latham expressed in a letter to Velikovsky the great regret he still feels for Macmillan's capitulation.]

At the annual meeting of the American Association for the Advancement of Science held in Cleveland in December 1950, a Mr. Charles Skelley, representing the Macmillan Company, addressed the members of a committee specially appointed to study means for evaluating new theories before publication. He pointed out that, as a contribution to the advancement of science, his firm had 'voluntarily transferred' its rights to a 'book that the panel regarded as unsound...' His remarks were duly recorded and reported by panel chairman Warren Guthrie [13]. Harvard geologist Kirtley Mather was the main spokesman before the panel, discussing possible methods of censorship.

The British edition of *Worlds in Collision* was rushed into print within two months of a contract between Doubleday and Victor Gollancz, and in September British scientists began to publish reviews. Spencer Jones, quoted in part at the beginning of this account, concluded: 'It is a pity that so much erudition should have been wasted in following so false a trail.' However, he was mistaken in arguing that, if there had been catastrophes such as Velikovsky described, 'we should find that, at a certain epoch in past time, the positions of Mars and Venus were identical.' Velikovsky, in a letter published in *The Spectator* on October 27, 1950 called attention to the Royal Astronomer's error; the last catastrophe took place not between Mars and Venus, but between Mars and earth. He also pointed to the present close approaches of the earth and Mars every 15 years, the similar axial inclinations of these two planets, and the

similar lengths of their days as vestiges of near contact and magnetic interference in the past.

Evolutionist J. B. S. Haldane, author of *Science and Ethics*, reviewed the book in the *New Statesman and Nation* for November 11, 1950. Haldane misquoted Velikovsky, then ridiculed the misquotation; he mismatched dates and the events Velikovsky had associated with them; he concluded that book was 'equally a degradation of science and religion.'

THE ARTICLES IN Harper's

In the fall of 1950 Frederick Allen sought a scientist to participate in a debate with Velikovsky in the pages of *Harper's* Magazine. Shapley and Neugebauer, among others, declined the opportunity, but Princeton astrophysicist John Q. Stewart accepted. The debate appeared in *Harper's* for June 1951, introduced by several background paragraphs prepared by the editors, who noted that 'there has been a remarkable lack of explicit criticism of the book based on careful reading.'

Given the floor first, Velikovsky presented an 'Answer to my Critics.' One by one he described and analyzed fallacies in the principal physical or historical arguments that had been advanced against his book. Among these points were the matters of ancient eclipses, early observations of Venus, the substance of comets, electromagnetic forces and effects in the solar system, and the consequences of stopping the earth's spin or tilting its axis in space.

Stewart's article was titled 'Disciplines in Collision.' He relied heavily on Gaposchkin's earlier writings, quoting in full her synopsis of Velikovsky's theme - a passage filled with parenthetical sneers. Stewart charged that records of ancient solar eclipses contradict Velikovsky's thesis of changes in terrestrial and lunar movements in the second and first millennia B.C. But Velikovsky, in his rejoinder, printed in the same issue of *Harper's*, showed that the alleged eclipses, in the original sources, are accompanied neither by dates nor by locality specifications. Moreover, of the three mentioned records, the text of one (Chinese) referred to a disturbance of celestial motions which had prevented the occurrence of a predicted

eclipse, and commentary about a second (Babylonian) by Kugler, the greatest authority on Babylonian astronomy, called attention to the fact that an eclipse would not be possible at all on the indicated day of a lunar month; Kugler conjectured that the phenomenon reported might have been a darkening of the sky due to passage of the earth through 'an immense train' of dust and meteorites. [In 1959 Prof. André Danjon, director of Paris Observatory, established that there are abrupt changes in the earth's rotational speed following solar flares; this he ascribes to electromagnetic influences. One implication of this discovery is that eclipses cannot be dated by retrospective calculation.]

Stewart also claimed that the geographic position of the terrestrial axis could never change; but since the debate of 1951 the idea of wandering of the axis with respect to the crust of the earth has gained the acceptance of science.

According to Stewart, 'Tombs dated from the fourth millennium B.C. were not destroyed by ocean floods in Ur (of the Chaldees).' But Velikovsky, in his rejoinder, quoted Sir Leonard Wooley, the excavator of Ur: 'Eight feet of sediment imply a very great depth of water and the flood which deposited it must have been of a magnitude unparalleled in local history... a whole civilization which existed before it is lacking above it and seems to have been submerged by the water.'

The August 1951 issue of *Harper's* carried a letter to the editor from Julius S. Miller, professor of physics and mathematics at Dillard University. Miller cited what he called a 'glaring paucity and barren weakness of explicit criticism' on the part of Velikovsky's critics. He concluded: '(1) The Velikovsky notions are not altogether untenable;' and '(2)... not yet refuted.'

Laurence Lafleur, then associate professor of philosophy at Florida State University, brought a new argument to bear against Velikovsky in the November 1951 issue of *Scientific Monthly*: '... the odds favour the assumption that anyone proposing a revolutionary doctrine is a crank rather than a scientist.' Lafleur itemized seven criteria for spotting a crank. Examples:

Test 6. Velikovsky's theory is in no single instance capable of mathematical accuracy. Its predictions, if capable of any, would certainly be so vague as to be scientifically unverifiable.

Test 7. Velikovsky does show a disposition to accept minority opinions, to quote the opinions of individuals opposed to current views, and even to quote such opinions when they have been discredited to the point that they are no longer held even as minority views. For example, we may cite the notion that the earth's axis has changed considerably.

So Lafleur concluded that Velikovsky qualified as a crank 'perhaps by every one' of these test. But having established this 'we must still deal with feeling, first, that scientists should have attempted to refute Velikovsky's position, as a service both to him and to the public...' Thus the professor acknowledged that much of earlier criticism - thousands of words printed in the span of more than a year and a half - was denunciation rather than refutation. But in his own attempt to perform the recommended 'service,' Lafleur, even with the aid of astrophysical theorems contrived for the occasion, fared no better than the scientists. On the assumption that an electroscope would detect it, he denied that the earth carries an electric charge. (No scientist corrected, in print, this mistaken notion or any other wrong statement by any critic during the entire *Worlds in Collision* controversy.) Lafleur also claimed that an approach between two celestial bodies close enough to bring their magnetic fields into conflict must inevitably bring about collision, evaporation, and amalgamation of the bodies.

The American Philosophical Society met in Philadelphia in April 1952, and as part of a symposium on 'Some Unorthodoxies of Modern Science,' a paper, '*Worlds in Collision*,' by Cecilia Payne-Gaposchkin was read. Once again Mrs Gaposchkin repeated most of her earlier arguments, prefacing them with an account of her 'Herculean labour' in ferreting out the alleged fallacies in Worlds in Collision. She chose to disregard the great mass of Velikovsky's evidence and isolate certain quotations from their context, making it appear that Velikovsky had read into them ideas of his own. (See comparison of texts, Appendix 2.) Her audience could conclude

only that Velikovsky had been guilty of the most heinous disregard for the rules of scholarship. Towards the end of her address, which was read in her absence, Gaposchkin professed bewilderment: 'Why is it, if scientists are really the open-minded men they think themselves, that they are under so much criticism of the "Science is a Sacred Cow" variety? I confess I do not understand why the revulsion against science takes this form...'

Velikovsky was in the audience at the same meeting, and he was permitted to come forward to offer a rebuttal to arguments presented earlier by archaeologists astronomers, and geologists. The audience listened attentively and responded warmly. But when he requested that his remarks be reproduced along with Gaposchkin's in the society's *Proceedings* [14], his bid was rejected. Appended to Gaposchkin's paper, however, was a 'quantitative refutation of Velikovsky's wild hypothesis' by Donald H. Menzel, also of Harvard Observatory. '...let us make the assumption with Velikovsky and try to determine what would happen if the sun and the planets suddenly acquired gross electric charges.' Menzel calculated that for electric forces to contribute ten per cent of the gravitational attraction between earth and sun equally charged, but of opposite polarities, each must acquire a voltage of 10^{19} volts (10 raised to the 19th power); the energy necessary to place such charge on the sun would be 5×10^{43} ergs (10 raised to the 43rd power), 'as much energy as the entire sun radiates in 1, 000 years.' Menzel then purported to show that the greatest charge a positive sun could retain was 1800 volts. Now, the specification of suddenly acquired charge, which Menzel apparently sought to ridicule by calculation of the energy required to emplace it, is wholly arbitrary and misleading; nothing in Velikovsky's thesis suggests that solar and planetary charges are acquired suddenly. Furthermore, Menzel's necessary assumptions as to the dielectric properties of the sun, earth, and space were wholly gratuitous and unsupported by observational evidence. (It has been established in space probes since 1960 that interplanetary space, especially close in to the sun, is filled with plasma. Thus Menzel's assumptions are inapplicable to the situation. Furthermore, in 1960, Prof. V. A. Bailey of the University of Sydney, Australia, reported [15]: 'It has been found possible to account for the known orders of magnitude of five different

astronomical phenomena... by the single hypothesis that a star like the sun carries a net negative charge...' Bailey calculated that the necessary charge on the sun would produce an electric field with a potential at the surface of the sun on the order of 10^{19} volts.)

Walter S. Adams, director of Mt. Wilson and Palomar Observatories, was a rare exception among astronomers who participated in discussions of *Worlds in Collision*. In correspondence with Velikovsky, Adams complimented him on the accuracy of his presentation of astronomical material, though he could not accept the premise that electromagnetism participates in celestial mechanics. Whenever Velikovsky requested information or explanations pertaining to astronomical phenomena, Adams answered courteously and in minute detail. In February 1952 the author of *Worlds in Collision* visited the California astronomer at the solar observatory in Pasadena and discussed with him at first hand some of the problems raised by the historical evidence.

Constructive criticism came also from Professor Lloyd Motz, astronomer of Columbia University, with whom Velikovsky on many occasions discussed problems of celestial mechanics. Motz holds conventional views.

S. K. Vsekhsviatsky, director of Kiev observatory, has corresponded with Velikovsky on problems in solar system phenomena and has cited Velikovsky's works on numerous occasions in support of his own positions in theoretical matters.

Volume I of Velikovsky's *Ages in Chaos* appeared in March 1952. Proceeding from the premise that Egyptian and Israelite histories may be synchronized by equating the upheaval described in Exodus with the catastrophe that befell Egypt at the end of the Middle Kingdom, Velikovsky worked down through the centuries from the fifteenth to the middle of the ninth, highlighting contacts between the peoples of the two lands -- Egypt and Palestine. The synchronization is carried almost to the end of the Eighteenth Dynasty in Egypt, to the days of Akhnaton, who thus is revealed as a contemporary of Ahab and Jehoshaphat in the ninth century rather than a precursor of Moses, as in orthodox chronology. Unpublished

portions of *Ages in Chaos* must dispose of six apparently superfluous centuries in conventional Egyptian history, and Velikovsky promises that in doing so, his work will show that no enigmatic half-millennium-long 'dark ages' need to be inserted in Aegean, Mesopotamian, or Anatolian histories.

William F. Albright, Spence Professor of Semitic Language at Johns Hopkins University, reviewed and rejected Velikovsky's second book in the New York *Herald Tribune* for April 20, 1952. Albright's only specific argument was that Velikovsky had mistaken the cuneiform plural sign, mesh, in some of the El Amarna letters for the name of the Moabite King Mesh (a) But in his text Velikovsky twice called attention to the fact that in several instances in these letters the conventional reading cannot apply, since the grammatical construction definitely pertains to an individual - a rebellious vassal of the king of Samaria (Sumur), well known from the Bible.

Professor Harry Orlinsky of Hebrew Union College echoed Albright's remarks [16], thus documenting his unfamiliarity with the book he purported to review.

The scientific press did not devote space to analyses of Velikovsky's reconstruction of history, but as Albright described it eight years later in the *Herald Tribune* [17], there were 'howls of anguish' among the historians.

The Velikovskys moved from New York City to Princeton, N. J., in 1952, and the heretic began to make the acquaintance of scientists in that university community. In October 1953 he was asked to address the Graduate College Forum at Princeton on the subject, 'Worlds in Collision in the Light of Recent Finds in Archaeology, Geology, and Astronomy.' In the course of this address, in which he was able to cite many items in support of his thesis among discoveries made since the appearance of *Worlds in Collision*, Velikovsky suggested that earth's magnetic field reaches sensibly as far as the moon and is responsible for certain unaccounted-for libratory, or rocking, movements of that body. He also suggested that the planet Jupiter radiates in the radio-frequency range of the spectrum. (In April 1955, Drs B. F. Burke and K. L. Franklin of the Carnegie Institution startled their audience at a meeting of the

American Astronomical Society when they announced their accidental discovery of radio noise emitted by Jupiter. However, when a Doubleday editor wrote to call their attention to the fact that Velikovsky had anticipated just such a finding, one of them replied that even Velikovsky is entitled to a 'near miss' once in a while.) The text of the Forum address was published as a supplement to Velikovsky's *Earth in Upheaval* in 1955.

From about the time of the 1953 Forum address, through 1954, and into 1955 up to the time of Einstein's death, he and Velikovsky carried on private debate oral, and written, on the issue of colliding worlds and the merits of an electromagnetic solar system. Einstein remained adamant in his conviction that sun and planets must be electrically neutral and space must be free of magnetic fields and plasma. Yet when he learned only days before his death, that Jupiter emits radio noise, as Velikovsky had so long insisted, he offered to use his influence in arranging for certain other experiments Velikovsky had suggested. It was too late. When Einstein died, *Worlds in Collision* lay open on his desk.

At the same Philadelphia symposium where Gaposchkin's attack on Velikovsky had been read in 1952, I. Bernard Cohen, Harvard historian of science, also spoke. In an abstract of his address released before the meeting Cohen expressed foreboding that the reaction against Velikovsky might signify that his work was of great importance; it appeared that Velikovsky and his book were to be the principal topics of discussion. By speech time, however, Cohen's theme had been altered considerably, and in the printed version of the address in the *Proceedings* [18] Velikovsky was referred to but once, in an off hand conclusion that Gaposchkin had already discredited him.

In July 1955, *Scientific American* published Cohen's tribute to Albert Einstein, whom he had met on just one occasion, for an interview. Cohen took the opportunity to ridicule Velikovsky with isolated adjectives allegedly quoted from Einstein. In an exchange of letters with Otto Nathan, executor of Einstein's estate, in the September 1955 issue of *Scientific American* he conceded that Einstein had compared the reception of

Velikovsky with that accorded Johann Kepler and had noted that contemporaries often have trouble differentiating between a genius and a crank. Cohen ended by saying .'...There is no basis for concluding that Professor Einstein might not have had a friendly feeling for the author in question or that he might not have had some interest in his work... Professor Einstein sympathized with the author when he was attacked and disliked the methods used by some of his attackers.'

'*EARTH IN UPHEAVAL'*

During the same period Velikovsky himself was completing the manuscript of *Earth in Upheaval*, a book presenting the evidence of recent catastrophes on earth. Einstein had read portions of the manuscript and contributed suggestions in marginal notes; before his death, according to Helen Dukas, his secretary, he was intending to write a letter requesting the curator of the Department of Egyptology at the Metropolitan Museum of Art to arrange for carbon-14 tests that might check the thesis of *Ages in Chaos*. Despite her transmission of this appeal, and decade-long efforts directed to the British Museum and other institutions by Velikovsky, the New Kingdom and late periods of Egypt, which span more than 1,200 years in conventional chronology, generally have been left out of testing programmes. In more than one instance, however, relics from this period have been adjudged 'contaminated' because they yielded unexpectedly low ages.

Earth in Upheaval appeared in November 1955. Velikovsky examined the century-old principle of Lyellian uniformity by comparing its tenets with anomalous finds from all quarters of the globe: frozen muck in Alaska that consists almost entirely of myriads of torn and broken animals and trees; whole islands in the Arctic Sea whose soil is packed full of unfossilized bones of mammoths, rhinoceroses, and horses; unglaciated polar lands and glaciated tropical countries; coral and coal deposits near the poles; bones of animals from tundra, prairie, and tropical rainforest intimately associated in jumbled heaps and interred in common graves; the startling youth of the world's great mountain chains; shifted poles; reversed magnetic polarities; sudden changes in sea level all around the world; rifts on land and under the seas.

Then Velikovsky took up the question of evolution, arguing that Darwin had rejected catastrophism in favour of Lyell's uniformity because the catastrophists of his day would not acknowledge the antiquity of the earth. But in reality catastrophes suggest the only plausible mechanisms for the phenomenon of evolution by mutation. Thus Darwin's contribution to the theory of evolution, which dates from Greek times, consisted only in the as-yet undemonstrated hypothesis that competition can give rise to new species. In the controversy that followed the publication of *The Origin of Species*, the issue revolved around whether or not evolution was a natural phenomenon, and it was resolved quite properly in the affirmative. But what was obscured in the uproar, argued Velikovsky, was the inadequacy of Darwin's hypothesis; 'if natural selection... is not the mechanism of the origin of species, Darwin's contribution is reduced to very little - only to the role of natural selection in weeding out the unfit.' Velikovsky proposed in *Earth in Upheaval* that evolution is a cataclysmic process: '... the principle that can cause the origin of species exists in nature. The irony lies in the circumstance that Darwin saw in catastrophism the chief adversary of his theory...'

It appears that at first scientific journals and reviewers, aware of the adverse effect of their earlier agitation against *Worlds in Collision*, chose to ignore *Earth in Upheaval*. But a few months after it appeared a New York radio station presented a 'Conversation Programme' in which Jacques Barzun, then newly appointed to the position of Dean of the Graduate Faculties at Columbia University, and Alfred Goldsmith, president of the Radio Engineers of America and vice president in charges of research for Radio corporation of America, discussed the book, with Clifton Fadiman as moderator. All three participants were enthusiastic and affirmative towards Velikovsky's method, scholarship, and convincing manner of presenting his evidence; they considered that his work may be a beginning towards important new concepts in science and history. All agreed that his work deserved objective treatment from scientists.

From this favourable discussion of *Earth in Upheaval* may have come some pressure to discuss it in other scientific media. In March 1956 *Scientific American* presented a review by Harrison Brown. His words, however, were devoted to an apology for the misbehaviour of scientists who had suppressed *Worlds in Collision* and to a restatement of his own earlier position with respect to that book. In a seven-column article, Brown dismissed *Earth in Upheaval* without challenging one of its points. He dealt with the new book in a single paragraph, then reverted to the old controversy. But he again refrained from producing any of the arguments against *Worlds in Collision* which he had claimed would fill thirty pages. [In 1963, Brown declared in a letter to one of Velikovsky's Canadian readers that his review of *Earth in Upheaval* had been directed against the 'abominable behaviour of scientists and publishers.']

In December 1956, when the International Geophysical Year was in the planning stage, Velikovsky submitted a proposal to the planning committee through the offices of Prof. H. H. Hess of Princeton University: '...It is accepted that the terrestrial magnetic field ... decreases with the distance from the ground; yet the possibility should not be discounted that the magnetic field above the ionosphere is stronger than at the earth's surface.' Also, 'an investigation as to whether the unexplained lunar librations, or rocking movements, in latitude and longitude coincide with the revolutions of the terrestrial magnetic poles around the geographical poles' might well be included in the programme. Hess was notified by E. O. Hulburt of the committee that should the first proposition be proven right by experiments already planned, the second might be investigated later. [As it turned out, the most important single discovery of the IGY was that the earth is surrounded by the Van Allen belts of charged particles trapped in the far reaching geomagnetic field.]

Earth in Upheaval came to the attention of Claude Schaeffer, professor at College de France and excavator of Ras Shamra in Syria. Schaeffer's independently conceived theory that ancient Middle Eastern civilizations had suffered simultaneous natural catastrophes on five occasions in the third and second millennia B.C. had been set forth in a 1948 volume, *Stratigraphie Comparée et Chronologie de l'Asie Occidental*. [Velikovsky

published an abstract of his own thesis in Scripta Academica in 1945.] Schaeffer wrote enthusiastically to Velikovsky and the two began a correspondence that has continued ever since. In 1957 Velikovsky met Schaeffer in Switzerland and again in Athens.

Oedipus and Akhnaton, a book that presents Velikovsky's identification of Akhnaton as the historical prototype of the legendary Oedipus, appeared in 1960. It was an outgrowth of the originally planned work, *Freud and His Heroes*, which had been set aside almost twenty years earlier. ['Dreams Freud Dreamed,' a reinterpretation of the dreams of the founder of psychoanalysis, was published in the *Psychoanalytic Review* for October 1941.] This work also met with silence on the part of most scholars, although Prof. Gertrude E. Smith of the University of Chicago, one of the nation's leading classicists, wrote a favourable review for the Chicago *Tribune* [19]. In the New York *Herald Tribune* [20]. Albright opposed the thesis on the grounds that it was improbable that at such an early time there could have been cultural intercourse between Egypt and Greece; yet Mycenaean ware was found in abundance in the capital city of Akhnaton, and a seal bearing the name of Akhnaton's mother turned up in a Mycenaean grave in Greece. The London *Times* [21] attacked the book anonymously, using a method familiar from the campaign against *Worlds in Collision* in America - discussing the book together with one of doubtful value to establish guilt by association.

Ten years after the abrupt cancellation of Atwater's plans to dramatize *Worlds in Collision* in Hayden Planetarium, U.S. space probe Pioneer V was launched. This experiment was destined to destroy the idea that the earth and other planets are electromagnetically isolated in a near-vacuum space -- the position Einstein could not abandon. After Pioneer had been in solar orbit about six weeks, NASA called a press conference to report its findings. As *Newsweek* relayed the news on May 9, 1960, 'In one exciting week, man has learned more about the near reaches of the space that surrounds earth than the sum of his knowledge over the last 50 years. Gone forever is any earthbound notion of space as a serene thoroughfare for space travellers... a fantastic amount of cosmic traffic (hot gaseous clouds, deadly rays, bands of electricity) rushes by at high

speed, circles, criss-crosses, and collides.' Among the discoveries credited to Pioneer V are space-pervading magnetic fields, electric currents girdling the earth, and high energy charged particles from solar flares.

Between 1954 and 1960 Velikovsky appeared repeatedly before the faculty and students of the geology department at Princeton University at the invitation of Prof. Hess, who recognized the importance of exposing his students to a dissenting view. On April 12, 1961, Velikovsky again addressed the Graduate College Forum, this time on the subject 'How Much of the Great Heresy of 1950 Is Valid Science in 1961?' and offered an extensive list of confirming finds from celestial and terrestrial spheres. Later that same month American radio astronomers announced that the surface temperature of Venus must be 6000 F, and scientists began an energetic search for an 'acceptable' explanation of this new aspect of the solar system.

About the time Mariner II approached Venus, late in 1962, Princeton physicist V. Bargmann and Columbia astronomer Lloyd Motz wrote a joint letter to the editor of *Science* [22] to call attention to Velikovsky's priority in predicting three seemingly unrelated facts about the solar system -- the earth's far-reaching magnetosphere, radio noise from Jupiter, and the extremely high temperature of Venus -- which have been among the most important and surprising discoveries in recent years. They urged that the Velikovsky thesis be objectively re-examined by science.

Also at that time it was announced [23] that ground-based radiometric observations at the U.S. Naval Research Laboratory in Washington and at Goldstone Tracking station in California had shown Venus to have a slow retrograde rotation, a characteristic that puts it in a unique position among the planets.

Feeling vindicated by these developments and encouraged by the publication of the Bargmann-Motz letter in *Science*, Velikovsky sought to publish a paper showing that the points brought out in that letter were but a few among many other ideas set forth in his books that have already been supported by independent research. The attempt was in vain; Philip Abelson,

the editor of *Science*, returned Velikovsky's paper without reading it and published instead a facetious letter from a Poul Anderson, who claimed that 'the accidental presence of one or two good apples does not redeem a spoiled barrelful.'

Mariner II, when its findings were revealed, confirmed Velikovsky's expectations, showing the surface temperature of Venus to be at least 800 deg F and the planet's 15-mile-thick envelope to be composed, not of carbon dioxide or water as previously supposed, but of heavy molecules of hydrocarbons and perhaps more complicated organic compounds as well.

Retrograde rotation, organic molecules in the envelope, and extreme heat on Venus find no convincing explanation, though they have already caused much deliberation; yet in *Worlds in Collision* two of the three phenomena were claimed as crucial tests for the thesis that Venus is a youthful planet with a short and violent history, and the third (anomalous rotation) supports the same conclusions.

In spite of the clamour against the heretic, his books have found an enthusiastic following in every country of the world. Here and there small study groups have sprung up; Velikovsky's books are required reading in the courses of professors in a number of universities. Letters from enthusiastic readers have poured in upon the author through all the years since *Worlds in Collision* appeared. The British edition of that book is now in its fourteenth printing, and the American edition is regularly reprinted. A German edition went through five printings at the hands of its first publisher, then was attacked and suppressed in 1952 by theologians (*Kirchlich-historische Kreise*); after being unavailable for about six years, it is now back in print at the hands of a Swiss publisher.

Seldom in the history of science have so many diverse anticipations - the natural fallout from a single central idea - been so quickly substantiated by independent investigation. One after another of Velikovsky's 'wild hypotheses' have achieved empirical support, but not until December 1962, in the Bargmann-Motz letter to *Science*, was his name ever linked in the pages of scientific journals with any of these 'surprising' discoveries, and never yet by the discoverers themselves. A

platitude, repeated on various occasions, has it that any one who makes as many predictions as Velikovsky is bound to be right now and then. But he has yet to be shown wrong about any of his suggestions. Prof. H. H. Hess, who is now Chairman of the Space Board of the National Academy of Science, recently wrote to Velikovsky: 'Some of these predictions were said to be impossible when you made them; all of them were predicted long before proof that they were correct came to hand. Conversely, I do not know of any specific prediction you made that has since proven to be false.'

This record would appear to justify a long, careful look at *Worlds in Collision* by the guild that not only refused to look before condemning it in the past, but actively campaigned to defame its author.

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2. AFTERMATH TO EXPOSURE

by Ralph E. Juergens

'Minds in Chaos,' reprinted here from the pages of The *American Behavioral Scientist* for September 1963, chronicles more than a decade of controversy over the works of Immanuel Velikovsky. But the story does not end in 1963. Events that have followed - set off in large part by the *Behavioral Scientist* study - shape themselves into additional chapters, and the image of objectivity so cherished by scientists loses even more of its luster as these later events begin to take on perspective. The story has bright facets as well as shadows, but in the glaring light of new knowledge from many fields the shadows cast by acts of repression and vilification seem darker than before.

To place these events in their proper setting, it is necessary to backtrack a bit. In August 1963 - the month before the appearance of the *Behavioral Scientist's* Velikovsky issue - *Harper's* Magazine printed 'Scientists in Collision,' an article by Eric Larrabee, whose 1950 article in the same magazine marked the beginning of the controversy. Now, writing 13 years later, Larrabee chose to point up the case for Velikovsky by citing recent discoveries in astronomy, space science, geology, and geophysics that bring support to the thesis of *Worlds in Collision.*

Like the authors of the articles in the *Behavioral Scientist*, Larrabee called attention to a letter in *Science* (December 21, 1962) in which Valentin Bargmann, physicist of Princeton University, and Lloyd Motz, astronomer of Columbia University, urged their colleagues to recognize Velikovsky's priority in predicting three highly significant discoveries: (1) the high temperature of the planet Venus; (2) the emission of non-thermal radio noise by Jupiter; and (3) the vast reach of the earth's magnetic field in space.

The Bargmann-Motz plea for scientific good sportsmanship won no response in the journals of science [1 and 2], even though almost simultaneously Venus-probe Mariner II eliminated all doubt about the reality of the high temperature of Venus and gave strong support to Velikovsky's further suggestion - offered as early as 1945 - that the envelope of Venus consists largely of hydrocarbon gases and dust. After verifying that the editorial lid on discussion of such matters was as tight as ever, Larrabee sought access once more to *Harper's*.

'Science itself,' wrote Larrabee, 'even while most scientists have considered his case to be closed, has been heading in Velikovsky's direction. Proposals which seemed so shocking when he made them are now commonplace... There is scarcely one of Velikovsky's central ideas - as long as it was taken separately and devoid of its implications - which has not since been propounded in all seriousness by a scientist of repute... His dismissal and suppression by the scientific community require of scientists an act of agonizing reappraisal.'

Almost immediately a reply issued from Donald Menzel, Director of Harvard College observatory. This highly emotional essay turned up as a free-lance manuscript in the editorial offices of *Harper's*. Hardly had it arrived, however, than it was recalled by its author and replaced with a version less abusive to Larrabee and more abusive to Velikovsky. It was so abusive that before printing it (*Harper's* December 1963), the editor of the magazine struck one sentence, which read: 'Velikovsky has been as completely discredited as was Dr. Brinkley of the goat-gland era or the thousands whom the American Medical Association has exposed as quacks, preying on human misery, by purveying nostrums or devices of no beneficial value whatever.'

Menzel was angered by the Bargmann-Motz letter in *Science*, considering it to be 'uncalled for.' He seemed infuriated that Larrabee in one noncommittal passage had called attention to an ironical situation: in 1952, in the *Proceedings of the American Philosophical Society*, Menzel had offered calculations to show that if Velikovsky were right about electromagnetic forces in the solar system, the sun would have

to have a surface electric potential of 10^{19} (10 raised to 19th power, 10 billion billion) volts - an absolute impossibility, according to the astronomer; but in 1960, V. A. Bailey, Emeritus Professor of Physics at the University of Sydney (Professor Bailey died December 7, 1964, in Switzerland - he was en route to the United states, where he hoped to see experiments carried out in space to test his hypotheses), claimed that the sun is electrically charged, and that it has a surface potential of 10^{19} volts -- precisely the value calculated by Menzel. Bailey, at the time his theory was first published, was entirely unaware of Velikovsky's work and of Menzel's repudiation of it.

The idea that his 'quantitative refutation of Velikovsky's wild hypothesis' - Menzel's own description of his contribution to the *Proceedings* in 1952 - should now be brought to Velikovsky's support was intolerable to the Harvard astronomer. So, when he mailed his paper to *Harper's* in 1963, he also sent a copy to Bailey in Sydney and asked him in a covering letter to revoke his theory of electric charge on the sun. That theory was casting doubt on the continuing efforts of Menzel and other American scientists to discredit Velikovsky, and Menzel pointed out what he conceived to be an error in Bailey's work.

Professor Bailey, taking exception to the idea that his own work should be abandoned to accommodate the anti-Velikovsky forces, prepared an article in rebuttal of Menzel's piece and submitted it to *Harper's* for publication in the same issue with Menzel's. Bailey had discovered a simple arithmetical error in Menzel's calculations, which invalidated his argument.

The editors of *Harper's* evidently taken aback by the heat of the controversy generated by Larrabee's article, rejected Bailey's offering, but agreed to print some of his comments if he would submit them in a brief letter. At the same time, however, Menzel was permitted to correct the arithmetical error pointed out by Bailey, and he did so without acknowledging the effect of the correction on his argument. Larrabee objected to such a use of Bailey's rebuttal paper, and at first Menzel was not permitted to extirpate the evidence of his carelessness; but after more pleading the correction was made.

Insight into the frame of mind of the Harvard astronomer at the time he wrote is to be gained by noting his remarks about Velikovsky's score on predictions. In connection with the radio noise of Jupiter, Menzel wrote that, since scientists for the most part do not accept the theory of *Worlds in Collision*, 'any seeming verification of Velikovsky's prediction is pure chance.' In regard to the high temperature of Venus, the astronomer argued that '"hot" is only a relative term. For example, liquid air is hot [196 deg below zero, centigrade], relative to liquid helium [269 deg below zero, centigrade]...' Later in his article Menzel referred to this comparison: 'I have already disposed of the question of the temperature of Venus.'

This is all Menzel had to say about the temperature of Venus, although in 1955 he himself revoked his own estimate of two decades earlier that the ground temperature of Venus would be 50 deg C. The revocation was explained by saying that the temperature must surely be much lower. In 1959 the ground temperature of Venus was still estimated to be 17 deg C. Mariner II found it to be at least 430 deg C, or about 800 deg F.

As for the extent of the earth's magnetic field, Menzel wrote: 'He [Velikovsky] said that it would extend as far as the moon; actually the field suddenly breaks off at a distance of several earth diameters.'

More than a year before Menzel took it upon himself to answer Larrabee, satellite Explorer X had detected the earth's magnetic field at a distance of at least 22 earth radii and gave no indication that this was its limit. Recently the Interplanetary Monitoring Platform satellites - especially IMP I - have found that the tail of the earth's magnetosphere extends 'at least as far as the orbit of the Moon' (*Missiles and Rockets*, January 18, 1965).

Larrabee, limiting his reply to one page in the same issue of *Harper's*, pointed out that 'where Dr Menzel touches on points of fact he is either misleading or misinformed.' The summation that followed stands as a classic example of the demolition of a scientist's arguments by a non-scientist; it is particularly noteworthy in as much as Menzel's main theme was that non-scientists do not understand scientific issues and the scientific

method, and therefore should be rebuked for entering into scientific debate before the general public. Just how successful Larrabee's counterattack proved to be is shown in the examples given below:

Menzel claimed that astronomers recognized the presence of electrified gas and magnetic fields in interplanetary space long before Velikovsky. Larrabee quoted Menzel's own words written in 1953: 'Indeed, the total number of electrons that could escape from the sun would be able to run a one cell flashlight for less that one minute.'

Menzel asserted that the earth's Van Allen belts contain equal numbers of positive and negative particles. Larrabee noted that Dr. James Van Allen, who discovered the belts, admits that this is an assumption for which there is no experimental evidence.

Menzel attempted to calculate the electric field in space near the earth that would result from a charge on the sun of the magnitude suggested by Bailey. Larrabee, in reply, observed that the calculation was based on the erroneous assumption that space is a non-conducting medium.

Menzel claimed that satellite motions are not disturbed by electromagnetic forces. Larrabee cited the publications of a number of space scientists to show that both orbital and rotational motions are affected by the presence of charged particles and magnetic fields.

Menzel argued that the disturbance of the earth's rotation by solar flares is attributable to temporary heating and expansion of the earth and is not an electromagnetic effect. Larrabee pointed out that Professor Andre Danjon, who discovered this phenomenon, evaluated the thermal effect and found it altogether inadequate; Danjon concludes that electromagnetism is the only likely cause.

Menzel insisted on his own earlier position that the envelope of Venus is made up of ice crystals and ridiculed Velikovsky's suggestion of 1950 - actually expressed as early as 1946 in letters to astronomers Harlow Shapley, Rupert Wildt, and Walter S. Adams - that hydrocarbons must predominate in the

envelope. Larrabee referred the Harvard astronomer to a number of publications, including the official report of the Mariner II flight to Venus, in which it is stated that the clouds of Venus consist of condensed hydrocarbons.

Summing up, Larrabee wrote: 'Velikovsky offers evidence from numerous other sciences, in particular geology and archaeology. Breaking the barriers between disciplines, he arrives at conclusions which no discipline had reached independently. This is the real nature of his challenge, and it is fundamental.'

In the limited space allotted his letter (*Harper's* January 1964), Professor Bailey expressed surprise 'that Professor Menzel totally ignores the impressive testimony to the worth of Dr. Velikovsky's predictions contained in the recent letter of that outstanding scientist Professor H. H. Hess of Princeton.' Bailey noted that Menzel's challenge to the theory of electric charge on the sun 'is unconvincing since it involves certain out-of date views about the material contents of interplanetary space as well as the unproved assumption that the earthly laws of the electrodynamic field can be safely extrapolated to bodies such as the sun of unearthly dimensions and temperatures.' In Bailey's view, 'important [new] facts must compel scientists to adopt a cautious attitude towards the astronomical ideas on which they were reared until the powerful new methods of observation developed by space scientists have accumulated more knowledge.'

Earlier, Larrabee's article brought response from astronomer Lloyd Motz, who emphasized that his purpose in writing (*Harper's*, October 1963) was to make clear his own disagreement with Velikovsky's theories. Nevertheless, he stated: 'I do support his right to present his ideas and to have these ideas considered by responsible scholars and scientists as the creation of a serious and dedicated investigator... His writings should be carefully studied and analyzed because they are the product of an extraordinary and brilliant mind, and are based upon some of the most concentrated and penetrating scholarship of our period...'

The debate in *Harper's* went on in the August, October, December 1963, and the January 1964 issues. During the same period another effort failed to break the editorial barrier.

In the spring of 1963, Velikovsky had reason to suppose that confirmation of so many of his once-heretical predictions, and the even more impressive fact that none of his predictions had gone wrong, might have altered his standing among scientists - that finally he might be granted space in their journals. Despite the fact that a paper, 'Some Additional Examples of Correct Prognosis,' had been rejected without being read by Philip Abelson, the editor of *Science*, Velikovsky now prepared an article on 'Venus, a Youthful Planet.' H. H. Hess, who served that year as President of the American Geological Society, offered to transmit the new paper to the American Philosophical Society with his recommendation as a member of the society that it be published in the *Proceedings*.

This simple act of contribution seems to have generated a storm that nearly spilt the society before calm was restored.

The fortunes and misfortunes of Dr Velikovsky's paper during the half-year it was held by the Philosophical Society are revealed, in part, in statements made by two men - George W. Corner and Edwin G. Boring - both of whom played earlier, and thus far unrecounted, roles in the Velikovsky story.

In 1952, Corner was chairman of a symposium on Unorthodoxies in Modern Science at the annual meeting of the Philosophical Society. It was he who permitted Velikovsky to mount the platform and offer comments of his own following the reading of a paper in which Harvard's lady astronomer Cecilia Payne-Gaposchkin attacked *Worlds in Collision* in a most violent and irresponsible manner. This bit of fair play on Corner's part later was repudiated by the society's publications committee; Velikovsky's correction of Gaposchkin's misquotations were rejected for publication in the *Proceedings*. (See page 231 for a comparison of texts - *Worlds in Collision* versus Gaposchkin's alleged quotations from the book). By 1963 Corner had become Executive Officer of the Society and Editor of the *Proceedings.*

Velikovsky's Venus paper therefore came directly to the hand of Corner. For several months following the submission of the paper by Hess there was no word as to its disposition. In the meantime, Larrabee's article in *Harper's* appeared, as did the special issue of the *Behavioral Scientist* devoted to 'The Politics of Science and Dr Velikovsky.' Both documents surely came to the attention of at least some of the members of the Philosophical Society's publications committee.

At last, in a letter dated October 15, 1963, Corner reported to Hess. The publications committee, after several sessions in which Velikovsky's paper was discussed 'at great length,' was stalemated by 'divided opinions.' The committee split into two belligerent camps, each unwilling to yield to the views of the other. Corner informed Hess that he had been 'directed to seek the advice of several responsible scientists and scholars, all members of the society' but not of the publications committee. He promised to keep Hess informed of later developments.

Along with Cecilia Gaposchkin and I. Bernard Cohen, professor of the history of science, Edwin Boring - a professor of psychology - was a scheduled speaker on the programme of the 1952 symposium on unorthodoxies. Thus the panel was dominated by Harvard professors. Boring, in his talk and in the version later published in the *Proceedings*, did not neglect to make sport of Velikovsky. Two years later, in an article published in the *American Scientist* for October 1954, he classed Velikovsky with those who, bolstered by ego alone, hold to ideas long after evidence turns against them.

Now, however, Professor Boring altered his position. On a visit to the campus of George Peabody College in Nashville in the fall of 1963 he made known his new-found feelings about 'the whole sordid mess' retold by the *Behavioral Scientist*. He was particularly critical of the role played by Harlow Shapley.

Boring disclosed at Peabody that in stormy meetings of the publications committee there had been heated discussion whether or not to print Velikovsky's paper. Further, he let it be known that he was to be put in charge of a new Letters column in the *Proceedings*. Such a column would provide what Boring described as an 'appropriate vehicle' for the controversial

paper, which would be the first item to appear in the column. Handling the matter in this way would permit publication without implying approval by the Society.

As it turned out, however, even this face-saving compromise failed. In a letter dated January 20, 1964, Corner reported to Hess that 'the Committee on Publications...completed a long and careful study of the problem raised by the short manuscript of Mr Velikovsky... During the past couple of months, at the direction of the committee, I submitted the paper to an eminent historian of science and an equally eminent sociologist, and an astronomer of very high standing completely outside the circle of Mr Velikovsky's critics.

'After extremely thoughtful discussion, at which every possible way of dealing with this matter was considered, the committee decided that the Society should not publish this paper...'

'The Politics of Science and Dr Velikovsky' appeared in ABS in September 1963 and quickly became a subject of intense discussion and debate on college campuses around the country. For the first time the story of the suppression of *Worlds in Collision* had been documented. The initial printing of the issue, itself larger than usual, quickly became exhausted in the face of a surge of orders for additional copies, and a second printing was made.

Reader reaction was predominantly favourable. A number of scholars and foundation officers wrote letters of commendation to the editor, Alfred de Grazia. Others wrote directly to Velikovsky, expressing hope that recognition for his contributions to human knowledge soon would be forthcoming. One of very few expressions of disapproval appeared in a letter to the present writer from Warren Weaver, a vice president of the Alfred P. Sloan Foundation; Weaver asserted that he was 'amazed, disappointed, and in fact appalled that this serious journal [ABS] would devote so much space and effort to a series of articles of this sort.' This was only the first of several occasions when the Sloan Foundation executives constituted themselves a Committee of Public Safety against Velikovsky's ideas.

Professor Bernard Barber of Barnard College, Columbia University, reported within a few weeks of publication that 'I have already used your Velikovsky issue to very good teaching purpose in my Sociology of Knowledge course in connection with my general article on resistance by scientists to scientific discovery.'

Charles Perrow, Assistant Professor of Sociology at the University of Pittsburgh Graduate School of Public and International Affairs, expressed the conviction that the ABS Velikovsky issue 'should be required reading in social science courses.'

G. A. Lundberg of the University of Washington wrote: 'It seems to me that the A.A.A.S., not to mention individual scientists and groups, must now prepare a detailed answer. What is really at issue are the mores governing the reception of new scientific ideas on the part of established spokesmen for science.'

Indeed, it was tempting for spokesmen of science to take up the charges made by ABS. Even though Professor Menzel, taking it upon himself to reply to Larrabee's article in *Harper's* had, in the opinion of many of his colleagues, fared very badly in the exchange, a more cautious and cleverly calculated reply to the Behavioral Scientist might have a telling effect.

Since the issues raised against the behaviour of the scientific community were essentially questions of ethics, a seemingly natural choice of vehicle in which to pursue these issues was the *Bulletin of the Atomic Scientists*, a journal which prides itself on being a medium of expression for 'the conscience of science.' The *Bulletin* has a readership of more than 25,000, including most of the leading scientists of the world. It has prestige among such people and an obligation to undertake inquiries into the politics of science - to demand objective self-analysis on questions of scientific behaviour. Being a platform both for confession of error and for expression of ideas for improving the image of science, it is ideally suited as an arena in which to come to grips with the issues of the Velikovsky case. Unfortunately, however, the *Bulletin* chose to take up arms against the suggestion of fair play for Velikovsky.

As Eugene Rabinowitch, the editor of the *Bulletin*, later acknowledged in a letter to Professor H. H. Hess (September 8, 1964), a widespread reawakening of interest in Velikovsky's theories, and his being championed as a great savant by the *Behavioral Scientist*, required remedial action. Clearly Rabinowitch took it to be his first duty to close ranks with fellow scientists whose conspiratorial acts in suppression of Velikovsky had been publicly charged against them.

Rabinowitch assigned his Washington reporter, Howard Margolis - no part a scientist - the job of wielding the hatchet against ABS and Velikovsky. Margolis resurrected techniques employed with devastating effect during the earlier outcry against *Worlds in Collision*. His vulgar and thoroughly irresponsible article, 'Velikovsky Rides Again' (*Bulletin*, April 1964) is filled with misrepresentation and misquotations, jeers and sneers, bald statements of unfounded charges, and dogmatic presentations of received theory as fact.

Margolis chose to discuss matters of philology and Egyptology -- fields unfamiliar to him, but having intrinsic appeal in that most *Bulletin* readers could be expected to be little oriented in them and hence dependent upon the integrity of editor and author.

Displaying ignorance even of the elementary French required to read one of Velikovsky's sources, Margolis resorted to bravado - 'Now if you look up the actual inscription...' - and launched into a totally confused discussion of Velikovsky's interpretation of a hieroglyphic text found at El Arish in Egypt. This is an inscription in stone telling of storm and darkness and the death of a Pharaoh in a whirlpool. The place name Pi Kirot appears in this inscription, and the name Pi ha-hiroth is given in Exodus as the place where the tribes of Israel crossed the Red Sea; Velikovsky suggested in *Worlds in Collision* - and amplified the argument in *Ages in Chaos*, unbeknownst to Margolis - that both references are to the same place. The name appears only once in the Egyptian monuments and only once in the Bible. And in context, both sources tell of storm and darkness, and of catastrophe befalling a Pharaoh overwhelmed by water.

From the confused arguments presented by Margolis the only facts to emerge are that he does not understand that Egyptian was written without vowels and that he is not even aware of the use of 'ha' in Hebrew as the definite article. Ironically the *Bulletin's* Washington reporter elected to challenge Velikovsky on a philological conclusion which had won the acceptance of Professor William F. Albright, one of the world's leading orientalists and a harsh critic of *Ages in Chaos*, as early as 1946.

Rabinowitch printed Margolis's vainglorious essay without comment.

At the appearance of this diatribe in the estimable *Bulletin of the Atomic Scientists*, Eric Larrabee - a past contributor to the journal - contacted the managing editor and was promised space for a reply in an early issue. But when he met the assigned deadline, he was informed that the space was not longer available.

The mere vulgarity and unscholarly quality of Margolis's article did not deter its eager reception in quarters dominated by organized science. For example, L. H. Farinholt, another vice president of the Alfred P. Sloan Foundation, sent a facsimile of the article to Moses Hadas, Jay Professor of Greek at Columbia University. Hadas had remarked in a published book review that 'in our time Immanuel Velikovsky... appears to be approaching vindication.' Farinholt thought Hadas should find the Margolis essay 'of interest and perhaps amusing.'

Hadas replied that he had no opinion about the validity of Velikovsky's astronomical theories, 'but I know that he is not dishonest. What bothered me was the violence of the attack on him: if his theories were absurd, would they not have been exposed as such in time without a campaign of vilification? One after another of the reviews misquoted him had then attacked the misquotation. So in the Margolis piece you send me... [Hadas gives several examples of Margolis's misrepresentations of Velikovsky's correct quotations]… It is his critic, not Velikovsky, who is uninformed and rash... The issue is one of ordinary fair play.'

On May 12, 1964, Alfred de Grazia, as publisher of The *American Behavioral Scientist*, wrote to Rabinowitch and demanded that the *Bulletin* editor repudiate the many distortions in Margolis's article. 'Our contributors and our advisors have urged us to take action to remedy the wrong done us. We hesitate to do this since we prefer to rely in the first instance on your scholarly good will.'

Rabinowitch replied to de Grazia on June 23, in a long letter urging him not to go to court; 'the magazine cannot disclaim legal responsibility for any defamatory statements, but I do not see in the article by Mr Margolis any statements of such nature with respect to yourself or to the contributors of your journal.' Thus tacitly admitting that Velikovsky had been defamed, Rabinowitch suggested that 'since Margolis brought up paleographic evidence, fairness requires the *Bulletin* to give space to a letter disputing this evidence (provided this letter is not more abusive than Mr. Margolis's criticisms).' He offered to print an article presenting the views of Velikovsky, should it be written and submitted by a scientist of standing. Rabinowitch concluded: 'It is in this spirit of scientific argumentation that the whole problem should be resolved.'

Velikovsky, informed of Rabinowitch's stand, would not consent to enter into debate with Margolis on matters of Hebrew and Egyptian philology and paleography. The author of the *Bulletin* article had amply demonstrated incompetence in these subject. But since Rabinowitch had written of the 'spirit of scientific argumentation,' Velikovsky thought he might be willing to publish a paper expressing a positive point of view. Professor Hess agreed to submit for publication in the *Bulletin* 'Venus, a Youthful Planet,' the paper by Velikovsky which the American Philosophical Society had returned earlier.

On September 8, 1964 (in the letter already quoted in part, above), Rabinowitch replied to Hess: 'I am afraid I cannot offer publication in the *Bulletin* [for Velikovsky's manuscript] - not because we are "afraid" of publishing it, but because the *Bulletin* is not a magazine for scientific controversies...

'I am not qualified - and have no time - to study Velikovsky's books, or even his article (which I return with this letter), but I

know enough of the absence of dogmatism in modern science and its easy acceptance of revolutionary new ideas - including the relativity of time and absence of exact causality in the world of elementary particles - to trust qualified astrophysicists with an unprejudiced judgment about Mr Velikovsky's theories - and so far as I am aware, not a single qualified scientist has raised his voice in favour of [them] (even if you and one of your colleagues from Princeton have felt in their duty to point out in *Science* the remarkable correctness of some of Velikovsky's specific conclusions).'

It is interesting to compare this expression of complacency with comments made by Robinowitch in his 1963 book, *The Dawn of a New Age*:

'As scientists, we have a common experience - that, in science, free inquiry and untrammeled exploration by individuals are the ultimate sources of the most important progress. The greatest scientific discoveries have come through efforts of non-conformist individuals who have asked heretical questions and boldly doubted the validity of generally accepted conceptions...' (p. 222).

'I believe that the responsibility of scientists in our time is to bring into human affairs a little more of such skeptical rationality, a little less prejudice, a greater respect for facts and figures, a more critical attitude toward theories and dogmas, a greater consciousness of the limitations of our knowledge, and a consequent tolerance for different ideas and a readiness to submit them to the test of the experiment... For scientists, there should be no final truths, no forbidden areas of exploration, no words that are taboo, no prescribed or proscribed ideas...' (p. 223).

'A scientist must always be prepared to submit his beliefs, findings, and generalizations to the never ending test of observation and experiment. Not that he is entirely without resistance to new theories that would overthrow the principles which he has become accustomed to accepting as valid; but of all groups of men, he belongs to the most open-minded one, the one most ready to accept change. He would be a poor scientist who would refuse to consider new facts and to change ideas to

accommodate them. The only thing of which science is intolerant is intolerance itself - claims that certain concepts are sacrosanct, true beyond doubt, and protected from the test of logic and experience.' (p. 323).

In his correspondence with de Grazia and Hess, Rabinowitch admitted that he had not read Velikovsky's books. Furthermore, he displayed an imperfect memory: to de Grazia he expressed a vague recollection that Shapley and Menzel had analyzed Velikovsky's theories, yet Shapley never published any arguments or articles on the subject; in his letter to Hess, Rabinowitch gave evidence of confusion about more recent events, for he mistook Hess for one of the writers of the Bargmann-Motz letter in *Science*. Still, on the basis of no acquaintance with Velikovsky's work, and of hazy memories of what others had said and done, he undertook a campaign against *Worlds in Collision* and put an unqualified journalist in charge of the operation.

Professor de Grazia reproduced the Margolis text in full in the *Behavioral Scientist* for October 1964 and appended an extensive commentary pointing out in detail - 54 examples - its many points of ignorance and misrepresentation. This elicited a letter from Margolis: 'May I merely suggest that before your readers reach a judgment on the matter, they take the trouble to check Velikovsky's assertions, my assertions, and de Grazia's rebuttal against at least one source. I suggest Augustine's *City of God*... Unlike the El-Arish manuscript... the book is available in any library...' In a covering letter, Margolis offered to meet de Grazia to establish harmony.

Margolis, still uninformed - many months after his article appeared in print - that the El-Arish document he purported to interpret is an inscription in stone and not a manuscript, suggested that de Grazia's readers inform themselves of what Velikovsky has to say about 'Minerva, Deucalion, Varro, Ogyges, Venus, and so on' by checking references to those names in St Augustine. Clearly he hoped no one would follow through on his suggestion; otherwise he would not have risked such innuendo.

De Grazia replied:

> 'You claim that Velikovsky misquoted St Augustine's *City of God*, but do not submit any specific reference. In a matter of accuracy in quotations no issue can be settled except by referring to the concrete texts. In the matter of quotations from St Augustine, in your own article, you gave only one example, and on that point your charges were unfounded...If you know of texts of ancient literature that contradict the thesis of Dr Immanuel Velikovsky, you will do a service to knowledge by publishing them. But as long as you do *not* quote them, any debate would be built on air. The solid fact is that the ABS proved that you have misquoted or misrepresented the writers of ABS, the works of Dr Velikovsky, and the two ancient texts mentioned in your article. Please do manifest your professed concern with accuracy in quotations by taking steps to correct this matter.
>
> 'Since you are wrong in fifty-four ways already, it ill behooves you to increase your score.'

The issue of irresponsibility on the part of reviewers was brought into focus again in the summer of 1965. *Book Week*, a Sunday supplement to the New York *Herald Tribune*, the Washington *Post*, and the San Francisco *Examiner*, published (July 11, 1965) a review of *Worlds in Collision* by Willy Ley, author of popular works on rocketry and space travel. The occasion for this review, 15 years after the first publication of the book, was its appearance, along with *Earth in Upheaval*, in paperback form (Delta, 1965).

In his essay, Ley wheels to the firing line almost every device used by the earlier reviewers: he dismisses the arguments of *Worlds in Collision* by summarizing them in a manner calculated to make them appear ridiculous; he categorizes Velikovsky's works with those of Hans Hörbiger, a long-discredited catastrophist whose speculations never led to verifiable predictions; he indulges in the same false generalizations about Velikovsky's handling of source

materials (.'..half the time the Bible does not say what it is supposed to say'), but disdains the opportunity to be specific; he objects to a method of scholarly deduction that he does not even attempt to understand ('...references to old writings...is a peculiar way of establishing proof of physical events'); he flaunts his own ignorance of material Velikovsky assembled in *Earth in Upheaval* (.'..animal life went through the fateful years of 1500 B.C. without any disturbance'); and he outlines his own mathematical proof of 'the complete impossibility' of the eruption of Venus from Jupiter - showing himself unaware that cosmologist R. A. Lyttleton recently demonstrated mathematically that Venus must have originated by eruption from Jupiter or one of the other major planets.

Velikovsky was invited by the editor of Book Week to write a rebuttal to Ley's accusations. Taking the opportunity to answer his uncritical critics in general, he prepared a long article, which appeared in *Book Week* for September 9, 1965.

Professor Horace M. Kallen, after reading the rejoinder, wrote to Velikovsky: 'I think you have put Ley in a position he will find it very difficult to wriggle out of.'

The appearance of *Worlds in Collision* and *Earth in Upheaval* in soft covers occasioned another episode that bears recording.

In March 1965 a modest advertisement announcing the Delta editions was submitted by Dell Publishing Co. for publication in *Science* and *Scientific American*. Both periodicals turned down the ad, but were unwilling to put their refusals in writing. Eventually, however, Robert V. Ormes, managing editor of *Science*, wrote to Franklin Spier, Inc., the ad agency: 'As Mr Scherago [advertising manager of *Science*] told you on the telephone, the advertisement you submitted has not been accepted by *Science*.' As the agency reported in a memo to Dell: 'We insisted on a letter giving some reason for the rejection. So far, just this "answer" from *Science* - which brilliantly avoids mentioning the books that are involved.'

Perhaps inadvertently, *Science* listed the paperback edition of *Worlds in Collision* under 'Reprints' in its occasional department 'New Books' (May 7, 1965).

Throughout the story of Velikovsky's reception by science, one phenomenon occurs over and over again. One prominent scientist after another undertakes to criticize and ridicule the author and his theories; having done this, he states - not without a trace of pride - that he has not read the books.

This trend was established early, when Harlow Shapley, in interviews, and Cecilia Payne-Gaposchkin, in print, spoke out against *Worlds in Collision* before the book appeared. Astronomer Dean McLaughlin of Michigan boasted that he never would read Velikovsky's book, yet he felt no compunction against proclaiming it to be 'nothing but lies.' Philip Abelson rejected Velikovsky's article in 1963 without experiencing any compulsion to read it, and Rabinowitch did likewise with another article, at the same time throwing the weight of his journal's prestige behind a renewal of the campaign to brand Velikovsky as incompetent.

Another phenomenon is the alacrity with which scientist-critics of Velikovsky proclaim their own objectivity by citing their acceptance of Einstein's theories. Again and again the name of Einstein or the theory of relativity has been brought forward in comparisons of Velikovsky and Einstein which are intended to justify the different receptions accorded their works. Einstein's theory, held in highest esteem in spite of the fact that even after half a century there is no indisputable proof of its validity, is held up as a model scientific theory; Velikovsky's theory, on the other hand, although many predictions based upon it have already found vindication, is rejected as unscientific. The logic in this stance - adopted most recently by Rabinowitch - is elusive.

Still another approach to the problem posed by Velikovsky's heresies is to depreciate the evidence or ignore it altogether when it tends to support him. This technique averts discussion and acknowledgment of his successful predictions. *Sky & Telescope,* a journal for amateur astronomers published by Harvard Observatory, reported the findings of Mariner II by reprinting the summary from a book, *Mariner, Mission to Venus*, written by the staff of Jet Propulsion Laboratory - the group which conducted the experiments aboard the spacecraft. Minor ellipses

in the text are noted by dots in the reprinted version, but four major deletions are unacknowledged by any sort of mark.

Restoration of the mutilated text requires reinsertion of the following:

(1) 'The rotation might be retrograde...'

(2) The clouds of Venus 'probably are comprised of condensed hydrocarbons held in oily suspension...'

(3) 'No water could be present at the surface, but there is some possibility of small lakes of molten metal of one type or another.'

(4) 'Some reddish sunlight... may find its way through the 15-mile-thick cloud cover, but the surface is probably very bleak.'

Is it just coincidence that these points - which (1) suggest anomalous behaviour in the past, (2) lend credence to a specific prediction made by Velikovsky, (3) challenge long-held motions of water clouds on Venus, and (4) cast an insurmountable barrier across the path of the theory that Venus is heated by a greenhouse-like trapping of sunlight - fell by the wayside in an editorial office at Harvard? Does Harvard University have any responsibility for inquiring into such matters (the question asked by de Grazia in 1963)?

Influential scientists continue to exert pressure against any sort of favourable mention of Velikovsky in popular journals and magazines. The easiest ploy is to impress upon editors that only scientists - and preferably selected members of the establishment - are competent to judge scientific theories. And since science is an important source of news of interest to the general public, editors are not inclined to reject such advice. An article planned in 1963 by *Newsweek* to call attention to Velikovsky's predictions and their fulfilment by Mariner II was abandoned following a telephone conversation between a *Newsweek* editor and Harlow Shapley - the astronomer to whom Velikovsky wrote in 1946 that a crucial test of his theory would be a search for hydrocarbons in the atmosphere of Venus.

In the Soviet Union, a journal of popular science, *Nauka i Zhizn* (Science and Life), in a series of articles continuing since 1962, has been casually presenting Velikovsky's theories, even the parenthetical speculation that in the legend of the sinking of Atlantis one too many zeroes crept in to the traditional dating of the event. Velikovsky's name, however, has not been mentioned in the series.

The Italian multi-lingual journal *Civiltà delle Macchine*, in its issue for May-June 1964, underlined the need for eternal vigilance to preserve the spirit of the scientific method, which had been discussed at length in an earlier issue commemorating Galileo's fourth centenary. Professor Bruno de Finetti of the Instituto Matematico of the University of Rome contributed the lead article for the May-June issue.

To illustrate a theme presented by the journal's editors - science must continually guard itself against scepticism that tends to limit its perception to a series of unrelated hypotheses just as it must guard against dogmatism - Professor de Finetti expressed the opinion that the refusal of the large majority in the academic community to even discuss Velikovsky's ideas imparts 'one great teaching above all others;' professionalization and departmentalization in science has become a major obstacle to the continuous renewal so necessary to science.

Thus, according to de Finetti, scholars refused to discuss the merits of Velikovsky's studies because their attentions were diverted by a more personal issue - the fact that he challenged 'the right of their fossilized brains to rest in peace' with the skills and problems already established. The defence of such vested interest in the preservation of comfortable interdisciplinary boundaries may transform 'each clan of specialists and the great clan of scientists in general into a sort of despotic and irresponsible mafia.'

Although American scientists and science editors continue to ignore - or rail against - Velikovsky's ideas, impersonal science itself continues to explode its own more conventional theories by turning up new evidence. Much new evidence tends to

support Velikovsky; some of it is simply compatible with his views; up to now none of it has refuted them.

In April 1964 an announcement by radio astronomers of evidence that the planet Jupiter suddenly changed its period of rotation made front-page news. The correspondence between the rotational period of radio sources and the rotational period of the body of the planet is entirely inferential, but the time of sudden change noted for the radio sources coincided with a similar change in the period of rotation of Jupiter's red spot. In this connection, it should be noted that in a memorandum of proposed space researches sent by Velikovsky to Professor H. H. Hess at Hess's request in September 1963 the following suggestion is made: 'Precise calculations should be made as to the effect of the magnetic field permeating the solar system on the motions of [Jupiter] which is surrounded by a magnetosphere of an intensity presumably 10^{14} times that of the terrestrial magnetosphere. This is basic to the impending re-evaluation of electromagnetic effects in celestial mechanics.'

At a meeting of the International Astronomical Union in Hamburg (1964) the planets Mercury and Venus became topics of intense interest. Australian astronomers reported evidence of temperatures near 600F on the dark side of Mercury, where temperatures far below zero were expected. According to *Scientific American* (October 1964), 'The explanation advanced for this surprisingly high temperature provides another surprise: that in spite of Mercury's small mass and its exposure to solar radiation pressure... it has enough of an atmosphere to transfer some of the sunlit side's abundant heat ration to the dark side.' Perhaps a more reasonable explanation will be found some day in the sequel to *Worlds in Collision*, which deals with earlier catastrophes, at least one of which the human record ascribes to Mercury.

New radar studies of Venus have confirmed its retrograde rotation, first detected at about the time of the Mariner II flyby by scientists at the Jet Propulsion Laboratory's Goldstone Tracking Station. Radar Work at Arecibo Ionospheric Observatory in Puerto Rico by scientists from Cornell University and Massachusetts Institute of Technology pinpointed the period of rotation at 247 +/- 5 days. The planet orbits the sun in 225 days.

British and Soviet workers also have verified the retrograde rotation.

The U. S. Interplanetary Monitoring Platform (IMP) Satellite - Explorer 18 - has detected a magnetosphere around the moon -- a teardrop-shaped region reaching at least 68,000 miles into space on the side away from the sun. The same probe has discovered a region of high-energy electrons fanning out and trailing off like a wake on the night side of the earth. K. A. Anderson, who first reported this discovery, believes it likely that the moon encounters this tail on its monthly passages around the earth. Dr N. F. Ness of Goddard Space Flight Center believes the earth's tail may extend well past the orbit of the moon.

The earth's tail is believed to be an elongation of the geomagnetic field in the anti-solar direction. In 1953 Velikovsky suggested that the earth's magnetic field may reach as far as the moon, causing certain unexplained libratory, or rocking, motions of the moon.

In *Book Week* for September 5, 1965, Velikovsky claimed: 'in July, Mariner IV confirmed my picture of Mars as more moon-like than earth-like: "The contacts of Mars with other planets larger than itself and more powerful make it highly improbable that any higher forms of life, if they previously existed there, survive on Mars. It is, rather, a dead planet"(*Worlds in Collision*, page 364)... That Mars has crater-like formations, as the moon does, follows from the way these formations were built. Mars was heated and it bubbled; it was pelted by interplanetary bolts; some large meteorites pelted it, too. These events are described on many pages of *Worlds in Collision* as having taken place mainly in the 8th century before the present era... the sharp outlines of the formations, in the presence of an atmosphere, speak for their recentness.'

Velikovsky's efforts of more than a decade to induce radiocarbon laboratories around the world to test objects from the New Kingdom of Egypt have yielded their first fruits. The test results are compatible with Velikovsky's chronology and quite incompatible with the conventional timetable.

In 1963 three small pieces of wood from the tomb of Tutankhamen were delivered to the radiocarbon laboratory of the University of Pennsylvania Museum. The Director of the laboratory, Dr Elizabeth K. Ralph, performed the test, using all three samples (total 26 grams). In *Radiocarbon* (1965), a Yale University publication, she reports that the date of the material, based on Libby's estimate of the half-life of radiocarbon, is 1030+/-50, B.C.(based on the Washington estimate of the half-life, the date is 1120+/-52, B.C.).

These dates are clearly at odds with accepted chronology, which places Tutankhamen in the fourteenth century. Velikovsky places him in the ninth century. The test results do not confute Velikovsky's chronology because radiocarbon in wooden objects indicates the time when the cells of the wood were actively growing. Only wood from the outer parts of a log yields dates close to the time of cutting, whereas wood from the interior of a log may yield dates hundreds of years earlier. Almost half the wood tested in this case was of Lebanese cedar, a tree famed for its longevity and not usually cut as a sapling. Therefore it is possible that heartwood grown about 1030 (or 1120) B.C. was cut in the ninth century to make objects for Tutankhamen; it is not possible, however, that wood grown centuries after his death furnished objects for a fourteenth-century pharaoh.

No hard and fast conclusions can be drawn on the basis of a single test of this kind. But perhaps now the door has been opened for the further testing that is so urgently needed in the 13 centuries whose chronology Velikovsky has challenged. Up to now this entire period of history had been left out of radiocarbon programmes.

Because of the eminently successful campaign of defamation in the 1950's the name Velikovsky became anathema among editors and science writers of newspapers and mass-circulation magazines. In large degree this situation is still unchanged. But the article by Larrabee in *Harper's* for August 1963 and the special issue of the *American Behavioral Scientist* in September 1963 initiated a fermentation process in scholarly circles and on college campuses which, up to now, has been unreflected in either the general or the scientific press. Students and young

professors are making known their desires to understand the implications Velikovsky's theories and of their non-reception by science.

The October-November 1964 issue of *Quadrant*, published in Sydney by the Australian Association for Cultural Freedom, carried a ten-page article, 'Velikovsky in Collision,' by David Stove, senior lecturer in philosophy at Sydney University.

Stove offers objective criticism of the evidence advanced by Velikovsky in all his books: '...the most striking evidence for Velikovsky's theory remains the historical. The Earth spoke, at least to my ear, very equivocally for him... What, then, of the skies?... it is the Evening Star herself who has responded to two of Velikovsky's antecedently improbable predictions with an audible and astonishing "yes"... [The weight of this evidence] should not be overestimated... but I do not see how it could be denied that these two confirmations substantially raise the probability of...[the entire thesis] above the value it had in the light of all the previous evidence; and this was by no means negligible.'

Stove attributes the violent reaction to *Worlds in Collision* among astronomers to Velikovsky's forceful reminder 'that astronomy is not a theoretical science, but a branch of natural history... The uneventfulness of the history of the solar system is an assumption on which astronomers have placed a tacit reliance it by no means ever deserved. In the house that they knew so well, they had never noticed this door. And Velikovsky did the most infuriating thing in the world: he - a stranger - walked through this open door... We should not withhold the highest possible admiration for the first man to suggest that the earth is not only not the centre, not only not still, but not even safe.'

Notes (References Cited in "Aftermath to Exposure")

1. In a letter to *Science* (Vol. 140, p. 1, 362), Australian radio astronomer Grote Reber charged that Velikovsky's prediction of the earth's far-reaching magnetic field was 'more in the nature of ad hoc guess.' His authority for this is science-fiction writer Poul Anderson (*Science* Vol. 139, p. 671), whose childish and facetious comments on the Bargmann-Motz letter (*Science* Vol. 138, p. 1, 350) caught the fancy of Editor Philip Abelson. On the basis of his own 1955 speculation that the earth's atmosphere has a disc-like equatorial bulge (not yet discovered), Reber claims prior prediction of the magnetosphere. How this follows is not clear.

2. Normal D. Newell, curator of fossils at the American Museum of Natural History and professor of paleontology at Columbia, offered a theory of 'gradual' catastrophism in *Scientific American* for February 1963. Here Velikovsky's name appears - almost as if it were a late editorial insertion - with that of Charles Hapgood (*Earth's Shifting Crust*), and together the two men are exemplified as writers who 'continue to propose imaginary catastrophes on the basis of little or no historical evidence.' The timing of this reference to Velikovsky suggests that the Bargmann-Motz letter in *Science* may have prompted it.

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