



Many solar systems have been formed and passed away before ours was created. The Lord taught us this principle long before it was discovered by scientific investigation.

Was the Earth Formed from the Debris of Other Planets?

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In the past, some members of The Church of Jesus Christ of Latter-day Saints have believed that the earth was made from pieces of other worlds and that the fossil record can be dismissed because those fossils came from worlds that were broken up and reworked into our earth. I understand that sometimes this concept has been taught even in seminary, institute, and Sunday School classrooms. Because I have heard these ideas espoused, even recently, and because I have spent much of my career studying and teaching biology and the fossil record, I decided to initiate a search to discover where such beliefs might have originated.

First, those concepts appear to be loosely based on the statement in Moses 1:38: “And as one earth shall pass away, and the heavens thereof even so shall another come; and there is no end to my works, neither to my words.” This revelation came to the Prophet Joseph Smith in the summer of 1830 as he was translating the Bible.

Then, according to William Clayton's journal notes, the Prophet Joseph Smith made the following statement on 5 January 1841 during what Clayton called "the organization of a school of instruction": "This earth was organized

or formed out of other planets which were broke up and remodelled and made into the one on which we live.”¹

According to the Fair Mormon website, “Some, based on the teachings of Joseph Smith that the earth was organized out of existing material rather than created from nothing, have even concluded that dinosaurs *never* existed on this world, and that the bones we’ve found are actually from the destroyed remains of other planets. This is not a popularly held notion today, and it contradicts the findings of modern paleontology.”²

In an article published in the May 1904 *Improvement Era*, James E. Talmage, who was at the time professor of geology at the University of Utah and later an Apostle of The Church of Jesus Christ of Latter-day Saints, quoted Joseph Smith’s statement as recorded in Clayton’s 1841 journal entry—correcting only the spelling of the word *remodeled*. Of that statement, Talmage observed, “The statement by Joseph Smith, quoted at the beginning of this article, has been amplified and applied by some of our people in a way unwarranted by the prophet’s utterance. . . . Thus, the words of the prophet have been construed as meaning that great masses of material have come together in space to form this planet.”³

John A. Widtsoe, president of Utah State Agricultural College (now Utah State University) and later an Apostle, took up the discussion in the April 1909 issue of the *Improvement Era*:

The Prophet Joseph Smith has been reported as teaching that the earth is made up of fragments of other worlds. . . . Those who hold to the six day theory of creation, claim that in accordance with the above quotation from the Prophet Joseph, these stratified rocks, containing fossils, are fragments of other worlds, and do not represent processes that have taken place on this earth. Why fossils may have been formed on other worlds, but not on the earth, is nearly as difficult to understand as the doctrine that living, intelligent beings are found only on the earth.

Modern science has developed a doctrine like that of Joseph Smith, which teaches that heavenly bodies may be made up of fragments of destroyed worlds, but the parts of destroyed worlds which go to build new heavenly bodies are minute, even microscopic in size. . . .

The more the matter is carefully examined, the firmer grows the belief that the creation of the earth occupied immense time periods, the exact length of which is not yet given to man to know. This view does not in any way discredit the book of books, the Holy Bible. . . . There is no conflict between the story of the rocks and the Bible, except as man has made it.⁴

One might also say the same for all the other scriptures—including the Pearl of Great Price. The 1830 revelation received in Moses 1:38 and the comments made by Joseph Smith in 1841 are in complete agreement with scientific discovery. In fact, the scientific discoveries predating this revelation and Joseph Smith's comments are of considerable interest.

Less than fifty years before Joseph Smith received the revelation recorded in Moses 1:38, the German-born British astronomer William Herschel announced on 13 March 1781 his discovery of Uranus, the seventh planet. Three years earlier, in 1778, Herschel had constructed the world's largest telescope up to that time. His discovery of Uranus sent a shock wave of excitement through the entire scientific world—Uranus was the first new planet discovered in recent human history and the first discovered by telescope.⁵ The first five planets—Mercury, Venus, Mars, Jupiter, and Saturn—had been seen with the unaided eye in the night sky for as long as humans had been looking up.

At least as exciting to eighteenth-century science as the discovery of Uranus was the fact that it had been discovered at exactly the distance from Saturn predicted ten years earlier by the empirical relationships calculated by Titius von Wittenberg and Johann Bode. In addition to the amazing discovery of Uranus, the Titius-Bode law also predicted that another planet should be orbiting the sun between the orbits of Mars and Jupiter.⁶

Once Herschel had found Uranus right where the Titius-Bode law predicted, telescopes around the world were trained on the sky between Mars and Jupiter. Twenty years later, the predicted, missing planet was spotted—but it was really small. On 1 January 1801, Giuseppe Piazzi at the Palermo Observatory discovered the new planet exactly where the Titius-Bode law had predicted, and he named it Ceres. With Ceres essentially satisfying the Titius-Bode law, the search for the missing planet tailed off—at least for a few months. Then, quite unexpectedly, just over one year after the discovery of Ceres, on 28 March 1802 Heinrich Olbers discovered yet *another* new planet in the Mars-Jupiter interspace. He named this second “planet” Pallas. But that discovery created problems: there shouldn't be *two* planets where one had been predicted. Furthermore, they were both very tiny for conventional planets: Ceres is only 587.8 miles in diameter, and Pallas is just 338.6 miles in diameter. Because of the small sizes and star-like appearances of these objects, Herschel proposed that they should be renamed “asteroids” (little stars). The name stuck.⁷

However, most nineteenth-century astronomers initially didn't agree with Herschel and continued to consider Ceres and Pallas to be planets. But the discovery of Juno in 1804 and Vesta in 1807 (bracketing Joseph Smith's birth) in that same interspace between Mars and Jupiter caused the astronomers to rethink the planetary distinction. Nonetheless, even introductory astronomy textbooks of the time, such as *First Steps to Astronomy and Geography* (1828), listed eleven planets: Mercury, Venus, Earth, Mars, Vesta, Juno, Ceres, Pallas, Jupiter, Saturn, and Herschel (later named Uranus).⁸

But by 1830 many astronomers were postulating that those four asteroids were the remnants of some planet in the Mars-Jupiter interspace orbit that had in some way blown apart, leaving four planetary fragments in its place.⁹ According to Talmage (1904), the English astronomer Norman Lockyer first proposed that the asteroids "may be fragments of a larger planet destroyed by contact with some other celestial body."¹⁰ It wasn't until 8 December 1845 that the fifth asteroid, Astaea, was discovered by Karl Ludwig Hencke.¹¹

We can now take the discussion of the earth's construction to the next level and add in the fossil issue. In his 1841 statement Joseph Smith made no reference to fossils being on the fragments of other planets. So how did the fossils become a part of the story? It seems that that concept was introduced by the French zoologist and father of comparative anatomy and paleontology, Georges Cuvier—one of the great scientific luminaries of the late eighteenth and early nineteenth centuries.

In his 4 April 1796 paper, *Mémoires sur les espèces d'éléphants vivants et fossils*, read at the inauguration of the Institut de France, in Paris, Cuvier said the following about the "Ohio animal," which he would later name *mastodon*: "All of these facts, consistent among themselves, and not opposed by any report, seem to me to prove the existence of a world previous to ours, destroyed by some kind of catastrophe." That comment could be interpreted two different ways: First, Cuvier could be simply referring to an ancient time on earth, such as the Pleistocene epoch. Second, in light of Lockyer's later proposal that the asteroids "may be fragments" of some previously existing planet, Cuvier's statement could be taken to refer to an extraterrestrial world.

Cuvier's paper, published in 1800, thirty years before the Moses chapter 1 revelations, if taken in light of that second interpretation, is quite compatible with Joseph Smith's 1841 statement that "this earth was organized . . . out of other planets which were broke up and remodelled," even though Joseph made no mention of fossils on older worlds. Nonetheless, it was not all that

great of a jump for people to conclude that the fossils we discover in the earth are from those other worlds.

As early as 1909 Widsöe had debunked the notion that the earth was made from large chunks of other worlds. He stated, "There are numerous strong evidences against the view that large sections of other worlds were brought together to form this earth."¹² Widsöe also asserted that, in line with the known science of the time, "the parts of destroyed worlds which go to build new heavenly bodies are minute, even microscopic in size."¹³

In 1805 Chamberlin, a geologist, and the astronomer Forest Ray Moulton advanced the Chamberlin-Moulton planetesimal hypothesis to describe the formation of the planets. According to Talmage, the term *planetesimal* was first coined by "Professor Chamberlin of the University of Chicago" and referred to small bodies that were not yet large enough to be called protoplanets. In support of the statement, Talmage cited a scientific hypothesis published in January of that same year.¹⁴ According to the Chamberlin-Moulton hypothesis, the small bodies formed from spiral arms extending from the sun, part of which would break away and condense into planetesimals and larger protoplanets. By collisions, over time, these planetesimals and protoplanets would coalesce into planets. The leftover debris were asteroids.¹⁵

Since 1841 millions of asteroids have been discovered in the asteroid belt between the orbits of Mars and Jupiter. They are currently thought to be the fragmented remnants of planetesimals, which were shattered and reformed many times over in the process of planet formation. These remnants (asteroids) were the collisional debris of larger bodies smashing into each other, but they never coalesced into large enough bodies to become planets.¹⁶ The Chamberlin-Moulton hypothesis of the mechanism of planetesimal formation was disproven in 1840, but the name stayed around, and the conditions under which planetesimals actually form were first described around 1983–89.¹⁷

The most widely accepted interpretation of current data indicates that the solar system was created approximately 4.567 billion years ago when a solar nebula formed from a molecular cloud.¹⁸ Talmage called the stuff of the molecular cloud "world-dust."¹⁹ It is also referred to as "unorganized matter."²⁰ The scriptures say of this time that "the earth was without form, and void" (Genesis 1:2; Moses 2:2). The Lord told Abraham, "And there stood one among them that was like unto God, and he said unto those who were with him: We will go down, for there is space there, and we will take of these

materials, and we will make an earth whereon these may dwell” (Abraham 3:24).

That cloud, by gravitational collapse and spin, formed the sun, with about the same amount of the original cloud being blown out into space by early solar winds. A tiny fraction of the original cloud flattened into a “circumstellar disc” surrounding the early sun. This material formed everything else in the solar system.²¹ The oldest rocks on the earth have been dated to about 3.9 billion years ago, suggesting that for the first half billion years or more of the earth’s life, it was a ball of molten magma. Using current radiometric dating methods, a given rock can only be dated from the time it became solid, which explains why there is no record of rocks dating to the time before the earth was a ball of molten magma. Some of the earth is still molten, though we live on a very thin outer crust, which is only 5–10 km (3–6 mi) thick under the oceans and 30–50 km (20–30 mi) thick under the continents. The entire early molten earth probably had a temperature about as hot as the sun—around 6,000° C (nearly 11,000° F). The boundary between the inner and outer core of the earth is still about that hot today.²²

The molecular cloud from which the solar system formed was made almost entirely from stardust. For example, when a massive star, at least five times the mass of the sun, has burned through all its nuclear fuel, it collapses in on itself, resulting in a gigantic explosion called a supernova.²³ This cataclysmic stellar explosion would instantly vaporize all planets orbiting that spent star, spewing tiny particles of matter, the vast majority of which came from the star itself, millions of miles out into space. In this annihilative event, in addition to the formation of new elements by nuclear fusion, small amounts of *seed nuclei* are produced that eventually capture free neutrons (which are also released by the power of the explosion), forming radioactive elements such as uranium-235 and uranium-238. Those radioactive atoms are mixed in minute quantities with the other elements dispersed by the explosion of the supernova, along with matter from perhaps other supernovas, to form a nebula. Our solar system is the product of several generations of supernova explosions and nebula formation. In other words, many solar systems have been formed and passed away before ours was created.²⁴ The Lord taught us this principle (in Moses 1:38, as quoted above) long before it was discovered by scientific investigation. However, even though the “earths” in past solar systems have passed away, it is from the stars of those solar systems that the

new solar systems and new earths are made—essentially, our earth is made of stardust, not planet dust.

During the first several million years of our solar system's existence, the gas and dust in the circumstellar disc condensed, first into tiny fragments of matter, much like pebbles, and eventually into larger fragments called planetesimals—ranging in size from around five to a few hundred miles in diameter.²⁵ This is essentially the “nebular theory” described by Talmage in his 1904 *Improvement Era* paper²⁶—the main difference now being that instead of “world-dust” condensing directly into the earth and other planets, stardust—along with minute amounts of world (planet) dust—condenses through a series of stages, including the formation of planetesimals. Inside even those small planetary fragments flying through space, radioactive atoms like some aluminum isotopes decayed and gave off enough heat to melt the metallic core of those fragments, which were surrounded by solid crusts made of rock. After only a few million years of the early solar system's existence, there were so many planetesimals in the young solar system that they were constantly colliding with one another over the next three million years.²⁷ Many of these collisions resulted in planetesimals becoming stuck together—creating even larger planetesimals. Some of those masses remained relatively small, such as Vesta, Juno, Ceres, Pallas, and Astaea—the minor planets or planetoids in the asteroid belt. Other masses in specific solar system zones grew larger and larger, some reaching thousands of miles in diameter, becoming what are now called “planetary embryos”—about the size of Mercury. With additional collisions, the larger planets emerged. This growing and coalescing together of smaller bodies into larger bodies is called accretion. Not all collisions, however, resulted in accretion. In some cases, the collisions were sufficiently violent to blow the planetesimal or planetary embryo apart—and the process of collision and accretion started all over again. After about three billion years, most of the dust in the solar system had been accreted into planetesimals, planetoids, planetary embryos, and planets; sucked up by the growing star; or lost to space.²⁸

Today, the heat of the earth's core is largely derived from two sources: about half comes from the heat caused by the formation of the solar system and the other half comes from the radioactive decay of elements such as uranium-235 and uranium-238. Within the core, radioactive uranium decays through several steps to eventually form helium and lead as end products. As magma reaches the surface of the earth and cools to form rocks, the uranium,

lead, and helium are trapped inside the solid rock. The ratio of those elements gives a very precise date of when that rock solidified.²⁹

In a letter to Elder Adam S. Bennion of the Quorum of Twelve Apostles, dated 16 December 1954, the renowned chemist Henry Eyring, who was at the time dean of the Graduate School at the University of Utah and a member of the Sunday School general board, described the radioactive clock by which those rocks are dated:

Here I will briefly sketch a few of the more or less familiar lines of evidence on the age of the earth. The world is filled with radioactive clocks which can be read with varying accuracy but usually within ten percent or so and often considerably better. The principle involved is essentially simple. The heaviest elements such as uranium are unstable and fly apart sending out particles which can be counted in a Geiger Counter. From the number of counts one can tell how much of the radio-active substance one has. As the substance continues to decompose, the counts decrease, always remaining proportional to the number of particles not yet decomposed. Now the particles that are shot out are helium so that if the decomposing uranium is enclosed in a rock this helium will also be entrapped. Thus by determining how much helium is entrapped and how much uranium is present in the rocks one can tell exactly how long it has been since the rocks were laid down in their present form, since it always takes exactly the same amount of time for a given fraction of the uranium to decompose. There is another check on this. Each time a uranium atom decomposes it leaves a lead atom behind as well as ejecting the helium atom. Thus the ratio of these residual lead atoms to uranium is another wonderful clock. Four and one half billion years must elapse in order that half of the uranium present will be gone. Half of what remains will decompose in another four and a half billion years and so on. Thosium, another radioactive clock, has a half-life of fourteen billion years and there are a variety of other long time clocks as well as some short time ones like carbon fourteen with a half-life of five and one half thousand years. The radioactive clocks, together with the orderly way many sediments containing fossils are laid down, prove that the earth is billions of years old. In my judgement anyone who denies this orderly decomposition of sediments with their built in radioactive clocks places himself in a scientifically untenable position.³⁰

As the molten earth began to cool, water vapor arose from the cooling rocks and liquid water began to accumulate on the surface of the earth. In addition, comets from deep space, referred to by some astrophysicists as “dirty snowballs,” as well as meteors from the asteroid belt pummeled the earth, bringing water from outer space. By 2.5 billion years ago, the entire earth was covered in water.³¹ “And the Gods ordered, saying: Let the waters under the heaven be gathered together unto one place, and let the earth come up dry;

and it was so as they ordered; and the Gods pronounced the dry land, Earth; and the gathering together of the waters, pronounced they, Great Waters; and the Gods saw that they were obeyed" (Abraham 4:9–10). Thus, as the earth's crust continued to cool, land masses began to emerge from that shallow sea, eventually forming the continents.

In conclusion, modern scientific data are in complete agreement with the account of multiple world creations and destructions across time and the universe as revealed to the Prophet Joseph Smith in Moses 1:38. They are also somewhat in agreement with Joseph's statement in 1841 that the earth is the product (at least in a tiny part—recognizing the immense size of a star compared to its surrounding planets) of destroyed past planets. They are not, however, in agreement with a notion that any planetary fragments were large enough, let alone anything more than a minute fraction of the total, to carry with them the beautiful fossil formations we see on earth today, as explained by Talmage and Widtsoe more than one hundred years ago, in 1904 and 1909. Thus, the incredible fossil remains that are constantly being discovered every day, all over the earth, are the remains of plants and animals that have lived and died for eons on this beautiful earth, upon which we dwell. For God said unto Moses, "But only an account of this earth, and the inhabitants thereof, give I unto you" (Moses 1:35). **RE**

Notes

1. William Clayton's notes are cited at <https://www.josephsmithpapers.org/paper-summary/account-of-meeting-and-discourse-5-january-1841-as-reported-by-william-clayton/2>; see also George D. Smith, *An Intimate Chronicle: The Journals of William Clayton*, 2nd ed. (Salt Lake City: Signature Books, 1995), 513–15.
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3. James E. Talmage, "Prophecy as the Forerunner of Science—An Instance," *Improvement Era*, May 1904, 485, archive.org/details/improvementera0707unse/page/484/mode/2up.
4. John A. Widtsoe, "The Time-Length of Creation," *Improvement Era*, April 1909, 491–94, archive.org/details/improvementera1206unse/page/492/mode/2up.
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7. Cunningham, "First Four Asteroids," 25.

8. John Hatchard, *First Steps to Astronomy and Geography* (London: J. Hatchard and Son, 1828), plate 4, 72.
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10. Talmage, "Prophecy," 483.
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13. Widtsoe, "Time-Length," 493.
14. Talmage, "Prophecy," 482, the referenced hypothesis is found in Herman Le Roy Fairchild, "Geology under the Planetesimal Hypothesis of Earth-Origin," *GSA Bulletin* 15, no. 1 (January 1904): 243–66, <https://doi.org/10.1130/GSAB-15-243>.
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20. LeRoi C. Snow, quoting Lorenzo Snow, "Devotion to a Divine Inspiration," *Improvement Era*, June 1919, 658–59, <https://archive.org/details/improvementera2208unse/page/658/mode/2up>.
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27. Elkins-Tanton, "Solar System Smashup," 42–49.
28. Elkins-Tanton, "Solar System Smashup," 42–49.
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30. Eyring to Bennion, 16 December 1954.

31. Woolfson, "Origin," 12–19.