

Geological pioneer was a biblical creationist

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One of the pioneers of geology was Nicolaus Steno who believed the Bible recorded an accurate history of the earth. As a consequence he used the biblical worldview as his starting point for his geological investigations, and as the framework for developing the first geological history ever produced for any location on Earth. His geological framework is remarkably similar to biblical models developed by modern creationist geologists.

Nicolaus Steno (1631–1686) has often been called the Father of modern geology. The three principles of stratigraphy he published (horizontality, superposition and lateral continuity) marked the birth of geology as a science and of stratigraphy in particular. They have stood the test of time. He had immense influence on geological thinking in the 17th and 18th centuries. His principles are still taught in first-year geology courses all over the world,¹ and used every day in the field by professional geologists. From them we can unravel the stratigraphy of sedimentary deposits.

Niels Stensen (as he was originally called) is the first person to apply the empirical method to geological investigations,² and he produced ‘one of the earliest directional accounts of both Earth and life history’.³ In other words, he was the first person ever to describe the geological history of any area of the earth. As we will see, he described it within a biblical geological framework. That framework is consistent with the biblical geological model I developed in 1994,⁴ starting with the assumption that the Bible describes real history. Carl Froede developed a similar model at about the same time.⁵

It is unfortunate that geologists today do not realize that Steno was a Bible believing creationist. Geology professors do not mention it when they deal with Steno’s principles. When challenged about this, some suggest that his beliefs about the Bible are irrelevant, like whether he was married or played a violin.

This is not so because our beliefs about the past, including our beliefs about the Bible, are crucial to the way we approach geological history and the interpretation of geological environments. The dominant philosophy of uniformitarianism rests on the assumption that biblical history is not true and that the Bible can be ignored. This is regarded as an axiom, or self evident truth: an assumption that has never been proven.⁶ It’s hardly ever discussed, presumably because a serious attitude toward the Bible and Noah’s Flood would undermine the philosophy on which all of modern geology is built.

To my mind this ignorance of how Steno used the Bible to understand geology is unfortunate. It deprives geologists of their geological heritage and, more importantly, constrains their understanding of the philosophy behind their geological interpretations, and the limitations.

Although it is not discussed seriously, the Bible is usually mentioned early in geological courses. For example, one textbook says:

‘The literal interpretation of this book [Genesis] of the Bible gained increasing adherence by churchmen and persisted in the beginnings of modern times in reaction against the scientific explorations of the Renaissance.’⁷

Such a disparaging attitude is common but it is understandable. It could be threatening for students to discuss why such a giant of geology as Nicholas Steno took the Bible seriously, how he could begin his geological investigations from a biblical foundation, and whether such an approach could be as valid as other approaches used today.

Some have claimed that Steno did not actually believe the Bible but simply gave it lip service so he would not offend his patrons. So it is enlightening to examine Steno’s original writings and discover what he really thought, and whether such claims can be sustained.

In his writings we see how he described the geological history of the area where he lived, Tuscany. Steno’s *Prodromus*⁸ was his pioneering geological work, in which he set out his principles of stratigraphy, along with other geological ideas.

It is instructive to see how Steno interpreted the geological history of this area and to see how his thinking was guided by his belief in the historical reliability of the Bible.

Steno’s geological history of Tuscany

‘Six distinct aspects of Tuscany we therefore recognize, two when it was fluid, two when level and dry, two when it was broken; and as I prove this fact concerning Tuscany by inference from many places examined by me, so do I affirm it with reference to the entire earth, from the descriptions of different places contributed by different writers’ (p. 263 [68–69]).⁹

His two fluid phases correspond to the two occasions recorded in the Bible when the earth was entirely covered with water: the Creation Week and the Flood event. His two level-and-dry phases correspond to the first parts of the pre-Flood era and the post-Flood era. The two phases when the earth was broken correspond to other parts of the pre- and post-Flood eras, to times when Steno envisaged the mountains were pushed up and the valleys were formed. Steno makes general reference to Tuscany and places he had examined as well as to places described by other writers. Unfortunately, we do not know the precise area to which Steno was referring.

‘But in order that no one may be alarmed

by the novelty of my view, in a few words I shall set forth the agreement of Nature with Scripture by reviewing the chief difficulties which can be urged regarding the different aspects of the earth' (p. 263 [69]).

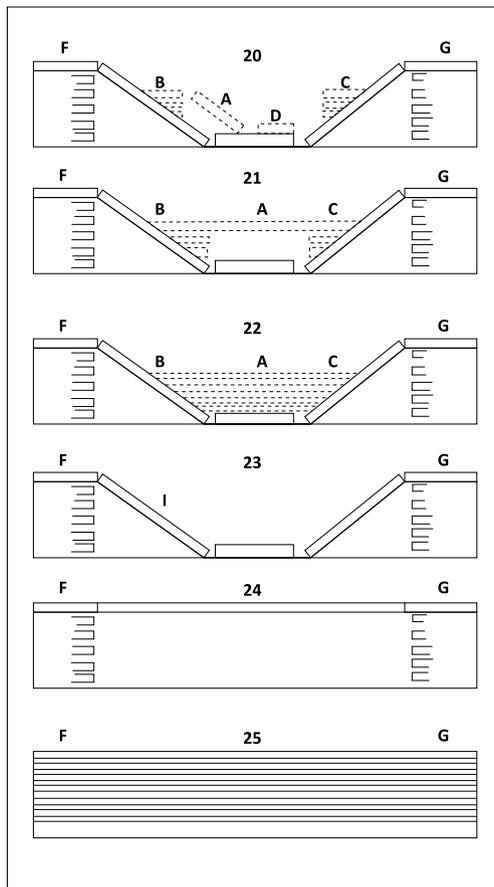
Steno clearly says his ideas agree with the Bible. It is wrong to suggest that Steno discovered geological principles that were at variance with Scripture. Like all scientists, Steno began with an interpretive framework, and sought to explain the geological evidence within that framework. For Steno, as with modern creationists, his interpretive framework was biblical history. Modern uniformitarian scientists have invented a different (evolutionary) interpretive framework, which they try to use to explain the evidence. It is wrong for modern revisionists to claim, as Alan Cutler did in his biography of Steno,¹⁰ that Steno discovered a new history of the earth, one that contradicted biblical history.

Creation Week

'In regard to the first aspect of the earth Scripture and Nature agree in this, that all things were covered with water; how and when this aspect began, and how long it lasted, Nature says not, Scripture relates' (p. 263 [69]).

From the Bible (Genesis 1) Steno knows that the earth was originally covered with water until the third day of the Creation Week when dry land first appeared. Steno acknowledges that, by examining the rocks, he cannot determine how long the earth was covered with water. But he can tell the length of time from the Bible. He acknowledges too that he does not know the processes involved. It needs to be emphasized that the situation concerning the age of rocks is still the same today—the age of a rock cannot be measured independently. The ages that uniformitarians convey are based on philosophical assumptions framed to give an answer that fits within the uniformitarian paradigm.^{11,12}

'That there was a watery fluid, however, at a time when animals and plants were not yet to be found, and that the fluid covered all things, is proved by the strata of the higher mountains, free from all heterogeneous material' (pp. 263–264 [69]).



Steno's geologic history of Tuscany—considered the first geologic history ever developed. During Creation Week the strata were deposited horizontally (diagram 25). Huge cavities were eaten out as the water receded (diagram 24), which collapsed the strata and formed valleys and mountains (diagram 23). Noah's Flood deposited new strata (diagram 22) which were also undermined as the water receded (diagram 21), to collapse and form the present landscape (diagram 20).

Steno recognized that when the earth was first covered by water there were no animals or plants—they had not yet been created. So he concluded that Creation rocks would be devoid of fossils. This same reasoning is used by modern creationists. I discuss these classification criteria in my biblical geological model.¹³ Most modern creationists would not assign the strata in the higher mountains to the Creation Week but to the Flood. However, changing ideas about where rocks fit in the biblical framework are simply examples of the linking problems we routinely encounter when trying to determine a relationship between two different sources of information.¹⁴ They do not mean the model is wrong.

'And the form of these strata bears witness to the presence of a fluid, while the substance bears witness to the absence of heterogeneous bodies. But the similarity of matter and form in the strata of mountains which are different and distant from each other, proves that the fluid was universal' (p. 264) [69]).

Steno is using the scale of the strata to argue that the water covered the whole earth and was not just a local flooding. Scale is one of the classification criteria used in my geological model.¹³ Froede uses a similar criterion that he calls geological energy.¹⁵

'But if one say that the solids of a different kind contained in those strata were destroyed in course of time, he will by no means be able to deny that in that case a marked difference must have been noticed between the matter of the stratum and the matter which percolated through the pores of the stratum, filling up the spaces of the bodies which had been destroyed' (p. 264 [69]).

Steno is addressing the argument that the rocks may have contained fossils which have subsequently been destroyed. He argues that even if the fossils had been destroyed, we should still see the evidence of them with percolating fluids filling the spaces where the fossils once were.

'If, however, other strata which are filled with different bodies are, in certain places found above the strata of the first fluid, from this fact nothing would follow excepting that above the strata of the first fluid new strata were deposited by another fluid, whose

matter could likewise have refilled the wastes of the strata left by the first fluid' (p. 264 [69–70]).

Steno is using his Principle of Superposition here to show that the separate strata speak of two inundations of the globe, and to determine which strata are older.

'Thus we must always come back to the fact that at the time when those strata of matter unmixed, and evident in all mountains, were being formed, the rest of the strata did not yet exist, but that all things were covered by a fluid free from plants and animals and other solids. Now since no one can deny that these strata are of a kind which could have been produced directly by the First Cause, we recognize in them the evident agreement of Scripture with Nature' (p. 264 [70]).

Steno is arguing that there were no plants or animals on the earth when the strata in the mountains were formed by the First Cause. He is arguing that these strata were deposited during Creation Week.

Pre-Flood era

'Concerning the time and manner of the second aspect of the earth, which was a plane and dry, Nature is likewise silent, Scripture speaks. As for the rest Nature, asserting that such an aspect did at one time exist, is confirmed by Scripture, which teaches us that the waters welling from a single source over-flowed the whole earth' (p. 264 [70]).

Steno is referring here to the period part-way through Creation Week and after which the dry land appeared. Again he makes it clear that he cannot determine the time from the rocks, but he can determine the time from Scripture. I assume his waters welling up from a single source refer to the springs in Genesis 2:5–6 or to the rivers Genesis 2:10–14. It is clear from Steno's diagrams that his description of the earth as a plane refers to its shape locally. His 'waters welling' here do not refer to a global inundation. He makes it clear that only two of the six phases he refers to were fluid. He discussed the first phase at the beginning, and discusses the second phase later.

'When the third aspect of the earth, which is determined to have been rough, began, neither Scripture nor Nature makes plain. Nature proves that the unevenness was great, while Scripture makes mention of mountains at the time of the flood. But when those mountains, of which Scripture in this connection makes mention, were formed, whether they were identical with mountains of the present day, whether at the beginning of the deluge there was the same depth of valleys as there is today, or whether new breaks in the strata opened new chasms to lower the surface of the rising waters, neither Scripture nor Nature declares.' (pp. 264–265 [70–71]).

Steno is speaking of the mountains that existed before the Flood. He cannot determine, either from the rocks or from Scripture, when those mountains formed. But he recognizes that the Bible speaks of mountains at that time (Genesis 7:19).

He does not say whether the mountains of today are the same as the mountains that existed before the Flood (but later on he says they are different). Modern creationists would say that the mountains that existed before the Flood were destroyed by the Flood, and that today's mountains were pushed up toward the end of the Flood.¹⁶ Modern geomorphologists recognize that mountain-building is a geologically recent event.¹⁷

The Flood event

'The fourth aspect, when all things were sea, seems to cause more difficulty, although in truth nothing difficult is here presented' (p. 265 [71]).

We will see that Steno recognizes this fourth aspect as the global Flood of Noah. In the next paragraphs he shows that there is much geological evidence that supports the global Flood described in the Bible. In these paragraphs we see that Steno is not able to formulate a physical mechanism for how the Flood could have been caused but he does make some suggestions.

'The formation of hills from the deposit of the sea bears witness to the fact that the sea was higher than it is now, that too not only in Tuscany but in very many places distant enough from the sea, from which the waters flow toward the Mediterranean; nay, even in those places from which the waters flow down into the ocean. Nature does not oppose Scripture in determining how great that height of the sea was, seeing that:

'1. Definite traces of the sea remain in places raised several hundreds of feet above the level of the sea' (p. 265 [71]).

After Steno it was commonly accepted that fossils of sea creatures in the mountains are consistent with the biblical record of the Flood—common until the rise of the uniformitarian philosophy within geological circles.

'2. It cannot be denied that as all the solids of the earth were once, in the beginning of things, covered by a watery fluid, so they could have been covered by a watery fluid a second time, since the changing of the things of Nature is indeed constant, but in Nature there is no reduction of anything to nothing. But who has searched into the formation of the innermost parts of the earth, so that he dare deny that huge caverns may exist there, filled sometimes with a watery fluid, sometimes with a fluid akin to air?' (p. 265 [71]).

Steno's 'in Nature there is no reduction of anything to nothing' is a statement of the conservation of matter. Steno suggests caverns inside the earth filled with fluid as the source of the water for the Flood. Steno is probably referring to the fact that the Bible describes the fountains of the deep breaking up (Genesis 7:11) as the source of the floodwaters. Geologists recognize today that there is much water still stored in the mantle (enough to fill the oceans some 10 to 30 times over) and that water has come out of the mantle (differentiated) in the past.¹⁸

'3. It is wholly uncertain what the depth of

valleys at the beginning of the deluge was; reason, however, may urge that in the first ages of the world smaller cavities had been eaten out by water and fire, and that in consequence not so deep breaks of strata followed from this cause; while the highest mountains of which Scripture speaks were the highest of those mountains which were in existence at that time, not of those which we see to-day' (p. 265 [71–72]).

Steno clearly recognizes that the mountains we see today are not the same as the mountains that existed before the Flood.

'4. If the movement of a living being can bring it to pass that places which have been overwhelmed with waters are arbitrarily made dry, and are again overwhelmed with waters, why should we not voluntarily grant the same freedom and the same powers to the First Cause of all things?' (pp. 265–266 [72]).

Steno is not discounting a supernatural cause for the Flood, and many modern creationists would agree.¹⁹

'In regard to the time of the universal deluge, secular history is not at variance with sacred history, which relates all things in detail. The ancient cities of Tuscany, of which some were built on hills formed by the sea, put back their birthdays beyond three thousand years; in Lydia, moreover, we come nearer to four thousand years: so that it is possible thence to infer that the time at which the earth was left by the sea agrees with the time of which Scripture speaks' (p. 266 [72]).

Steno clearly agrees with the Bible that the Flood was about 4,000 years before his time. Steno shows that his current knowledge of human occupation agrees with the biblical chronology.

'As regards the manner of the rising waters, we could bring forward various agreements with the laws of Nature. But if some one say that in the earth the centre of gravity does not always coincide with the centre of the figure, but recedes now on one side, and now on the other, in proportion as subterranean cavities have formed in different places, it is possible to assign a simple reason why the fluid, which in the beginning covered all things, left certain places dry, and returned again to occupy them' (p. 266 [72]).

Steno is here speculating on a physical mechanism for the Flood. Just because we may not be able to fully explain the mechanism does not mean the Flood did not occur. Interestingly, continental drift was originally rejected by the geological community because there was no plausible mechanism. Now most geologists accept continental drift (plate tectonics) but there is still no consensus on an agreed plausible mechanism for it.

'The universal deluge may be explained with the same ease if a sphere of water, or at least huge reservoirs, be conceived around a fire in the middle of the earth; thence, without the movement of the

centre, the pouring forth of the pent-up water could be derived. But the following method also seems to me to be very simple, whereby both a lesser depth of the valleys and a sufficient amount of water are obtained without taking into account the centre, or figure, or gravity. For if we shall have conceded (1) That by the slipping of fragments of certain strata, the passages were stopped through which the sea penetrating into hollow places of the earth sends forth the water to bubbling springs; (2) That the water undoubtedly enclosed in the bowels of the earth, was, by the force of the known subterranean fire in part driven toward springs, and in part forced up into the air through the pores of the ground which had not yet been covered with water; that, moreover, the water which not only is always present in the air but also was mixed with it in the manner previously described, fell in the form of rain; (3) That the bottom of the sea was raised through the enlarging of subterranean caverns; (4) That the cavities remaining on the surface of the earth were filled with earthy matter washed from the higher places by the constant falling of rains; (5) That the very surface of the earth was less uneven, because nearer to its beginning—if we shall have granted all this, we shall have admitted nothing opposed to Scripture, or reason, or daily experience.' (pp. 266–267 [72–73]).

Steno's speculations about the possible mechanism for the Flood, include internal heat, slipping of strata, water enclosed in subterranean cavities welling up, and the bottom of the sea being raised up, making the surface of the earth less uneven. Creationists recognize today that if the surface of the earth were flattened out, there is enough water to cover the globe to a depth of nearly 3 km.

'What happened on the surface of the earth while it was covered with water, neither Scripture nor Nature makes clear; this only can we assert from Nature, that deep valleys were formed at that time. This is (1) because the cavities, made larger by the force of subterranean fires, furnished room for greater downfalls; (2) because a return passage had to be opened for the waters into the deeper parts of the earth; (3) because to-day, in places far from the sea are seen deep valleys filled with many marine deposits' (p. 267 [73–74]).

Steno postulates underground cavities that collapsed to form valleys at the time of the Flood. Most modern creationists do not use such ideas (although a few still do). Most would agree that the landscapes, including the gorges and valleys, were generally carved by the receding waters of the Flood.

The post-Flood era

'As for the fifth aspect, which revealed huge plains after the earth had again become dry, Nature proves that those plains existed, and Scripture does not gainsay it. For the rest, whether the entire sea presently receded, or whether, indeed, in the course of ages new chasms



Courtesy www.wikipedia.org

Nicolaus Steno was a founder of geology, and he based his reconstruction of the geological history of Tuscany on the Bible.

opening afforded opportunity for disclosing new regions, it is possible to determine nothing with certainty, since Scripture is silent, and the history of nations regarding the first ages after the deluge is doubtful in the view of the nations themselves, and thought to be full of myths. This, indeed, is certain, that a great amount of earth was carried

down every year into the sea (as is easily clear to one who considers the size of rivers, and their long courses through inland regions, and the countless number of mountain streams, in short, all the sloping places of the earth), and that the earth thus carried down by rivers, and added day by day to the shore, left new lands suited for new habitations' (p. 267 [74]).

It seems that Steno is speaking of post-Flood processes such as the erosion of the continents, the carrying of sediment to the ocean, and increasing the area of land. Steno is not clear about how much post-Flood sedimentation occurred. His description of the erosion by rivers is vivid and he clearly understood erosion well before James Hutton extended these processes into an unimaginable abyss of deep time in the past.

'This is in fact confirmed by the belief of the ancients, in accordance with which they called whole regions the gifts of rivers of like name, as also by the traditions of the Greeks, since they relate that men, descending little by little from the mountains, inhabited places bordering on the sea that were sterile by reason of excessive moisture, but in course of time became fertile' (p. 267–268 [74]).

Steno is referring to records of people settling the land after the Flood. His comment about land fertility is an interesting one.

'The sixth aspect of the earth is evident to the senses; herein the plains left by the waters, especially by reason of erosion, and at times through the burning of fires, passed over into various channels, valleys, and steep places. And it is not to be wondered at that in the historians there is no account as to when any given change took place. For the history of the first ages after the deluge is confused and doubtful in secular writers; as the ages passed, moreover, they felt constrained to celebrate the deeds of distinguished

men, not the wonders of Nature. Nevertheless the records, which ancient writers mention, of those who wrote the history of the changes which occurred in various places, we do not possess. But since the authors whose writings have been preserved report as marvels almost every year, earthquakes, fires bursting forth from the earth, overflowings of rivers and seas, it is easily apparent that in four thousand years many and various changes have taken place' (p. 268–269 [74–75]).

Steno again makes it clear that he accepts the biblical chronology of 4,000 years since the deluge. Again he is discussing the amount of geological work that has been done since the Flood. This is an issue among modern creationists. Some say that much geological activity has occurred since the Flood, and others say not much. Most would agree that there was one Ice Age that began immediately after the Flood and continued for some 700 years. However, the geological effects of this were small when compared with the geological effects of the Flood. Many creationists would argue that the basic landforms (valleys, mountains) were formed by receding floodwaters¹³ in the second half of the Flood.²⁰

'Far astray, therefore, do they wander, who criticize the many errors in the writings of the ancients, because they find there various things inconsistent with the geography of to-day. I should be unwilling to put credence in the mythical accounts of the ancients; but there are in them also many things to which I would not gainsay belief. For in those accounts I find many things of which the falsity rather than the truth seems doubtful to me. Such are the separation of the Mediterranean Sea from the western ocean; the passage from the Mediterranean into the Red Sea; and the submersion of the island Atlantis. The description of various places in the journeys of Bacchus, Triptolemus, Ulysses, Æneas, and of others, may be true, although it does not correspond with present day facts. Of the many changes which have taken place over the whole extent of Tuscany embraced between the Arno and Tiber, I shall adduce evident proofs in the Dissertation itself; and although the time, in which the individual changes occurred, cannot be determined, I shall nevertheless adduce those arguments from the history of Italy, in order that no doubt may be left in the mind of anyone' (p. 269 [75–76]).

Steno makes a good point here. We should not arbitrarily dismiss the writings of the ancients because they do not agree with our ideas. Uniformitarians should take note of the father of modern geology: 'Far astray, therefore, do you wander', who do not accept 'the writings of the ancients'. In particular, the writings of Moses regarding Creation and the Flood, which Steno is upholding, because Moses records the true history of the earth.

'And this is the succinct, not to say disordered, account of the principal things which I had decided to set forth in the Dissertation, not only with greater clearness but also with greater fullness, adding a

description of the places where I have observed each thing' (p. 269–270 [76]).

Steno here concludes the first description of the geological history of any portion of the earth, and he presents it within a biblical framework.

Conclusion

This extended quote from Steno shatters the myth that geological discoveries demanded a far longer history for the earth than the roughly six thousand years recorded in the Bible.¹⁰ Steno and many other geological pioneers were Bible believing creationists. They saw no conflict between the field evidence and the history of the world set out by Scripture.

The so-called conflict between geology and the Bible began in the late 1700s and early 1800s when people such as James Hutton and Charles Lyell championed a new philosophy into geology—uniformitarianism. In Lyell's words in the title of his book, it was 'an attempt to explain the former changes of the earth's surface by reference to causes now in operation'. Nowhere did they show the biblical framework was faulty. Rather, they completely ignored the Bible and the deluge (2 Peter 3:3–7). However, in recent decades geologists have been saying that the gradualistic uniformitarianism of Charles Lyell does not match the evidence.²¹

A century of faulty interpretations could have been avoided if it had been remembered that the giants of geology such as Nicholas Steno took the Bible seriously, and why. By considering alternative interpretive frameworks geologists would have appreciated the philosophical underpinnings of geological investigation, and perhaps been more open to seeing the evidence for catastrophe. Ignorance of our geological heritage simply narrows our understanding of the intellectual basis for geological interpretations, their limitations and the risks.

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