

**A super-Tunguska event circa 1447 BC:
a scenario for the Phaethon explosion,
the Indo-Aryan migration and the Exodus events**

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This work is dedicated:

*To Paulus Orosius, whose neglected *Historiae Adversus Paganos*
gave the key to the proposed scenario*

*To Giovanni Barbareschi,
whose lectures inspired this work*

*To Nieves Hayat de Madarriaga,
for her encouragement in these researches*

Abstract

In this paper we consider the passage of the Red Sea by the Hebrew tribes during Exodus, as described in the Bible. Using additional information from the *Antiquities of the Jews* by Josephus Flavius, a crucial passage in *Historiae Adversus Paganos* of Orosius, and other classical sources, we claim that the passage of the Red Sea was made possible by local effects in the Gulf of Aqaba of a catastrophic event in the super-Tunguska class, namely the explosion over southern Denmark of the celestial object known in Greek mythology as Phaethon. The Deucalion Flood and the demise of the Minoan civilization are also explained within this context. The Phaethon explosion may be seen as the final event of the interaction of Earth with a captured external body, lasting possibly a few months, resulting in the disasters known as the Ten Plagues of Egypt and in worldwide migrations, particularly the Indo-Aryan migration from north-western Eurasia to India and Iran.

1. Introduction

The second book of the Bible, named Exodus, contains some of the best known and most extraordinary tales of the whole Bible. The book deals with Moses who, aged 80, returns to Egypt after an absence of 40 years, mainly spent in the Arabian region of Madian. His return is motivated by the proposal to lead the Hebrew away from Egypt, where they were being mistreated, into the land of Canaan, i.e. the *land of honey and milk*. This is the land that God promised to Abraham and his descendants, wherefrom they had left some 200 years before, at the time of a great food shortage, when Joseph, son of the patriarch Jacob, had a high position in Egypt. The task to lead the Hebrew away from Egypt was given to a recalcitrant Moses by God, who had spoken to him on a certain *Mountain of God*, from a *burning bush*. Moses obtains permission to leave Egypt against the initial opposition of the Pharaoh after ten disasters, the famous Ten Plagues of Egypt, strike Egypt, apparently after Moses invoked the power of his God against the refusals by the Pharaoh. Moses takes the Hebrew to the direction of the land of Canaan by a much longer way than the usual one. While the Hebrew are still far away from Canaan, they discover that an Egyptian army is pursuing them, in a point where apparently there is no escape. A windy night descends, and before sunrise they see that the level of the sea has lowered, allowing them to walk on former seabed. Once they have passed the sea, they watch the Egyptian troops pursuing them over the seabed. Then, apparently after Moses lifted the special baton that God had given to him on the Mountain of God, they watch as first the chariots of the Egyptians are destroyed, losing their wheels, then the whole army is drowned by the returning waters.

There have been different explanations in the literature about the extraordinary facts told in the Exodus story, the withdrawal and return of the waters of the Red Sea being particularly of interest for exegesis. Here we recall some:

- the orthodox/fundamentalist claim, where the events are seen as pure miracles, performed by Moses who had the power to modify the laws of nature
- the symbolist explanation, typical of many Fathers of the Church, see e.g. Gregory of Nissa *Life of Moses* [1], and albeit to a lesser extent Philon [5], where the events are considered essentially as allegories related to virtue or sin
- the approach of several modern scholars, like Finkelstein and Silberman [2] or Liverani [3], who deny the Bible the traditionally attributed antiquity, claiming that it was composed after the Jews returned to Jerusalem (following the permission given by Cyrus to return home to all people that had been deported by the Assyrians or the Babylonians). Reason to compose the Bible, where many events are pure inventions according to this approach, was the desire of the Jews to show that they too had an ancient history as the people they had met during the exile
- the approach of scholars who think that the events appearing as miracles may have been special natural events; among such scholars we recall Ricciotti [4], Barbiero [6], Goedicke [7], Velikovsky [8], De Grazia and Milton [9], see de Vaux [10] for an extensive list of such approaches.

The solution that we propose in this paper belongs to the last category. It is based upon the following working hypotheses:

1 – the considered ancient documents are basically faithful descriptions of real events, apart from generally not important corrections to be made for errors in the translation or in the transmission; omissions, more than plain falsities, are more typical features

2 – in ancient times our planet underwent catastrophic events of external origin; the events associated with Exodus, in particular with the passage of the Red Sea, correspond to the last of the three great catastrophes (among many others) that according to Plato affected the Earth, namely the Deucalion catastrophe. Notice that the first catastrophe in Plato is the one associated with the destruction of Atlantis (also ending the last Ice Age, see Spedicato [11]), while it can be argued that the second catastrophe was the Universal Deluge associated with Noah, Ziusudra/Utnapishtim, Manu...

A connection between Exodus, Deucalion, Phaethon and the migration of the Aryans into India was suspected by Velikovsky [12], who apparently had never read Orosius [16], where such a relation is provided, albeit in an implicit form. We use this connection to a fuller extent arriving at a natural explanation of the above events, at the light of the present knowledge about the consequences of the explosion in the atmosphere of a super-Tunguska object. Our solution apparently has never been considered before. It is consistent with the geographical and physical information in the Bible. It gives also a new explanation for the end of the Minoan civilization, removing the eruption of Thera as the main cause of such an event. It confirms the claim of Velikovsky that the Amalekites are the Hyksos who ended the Egyptian Middle Kingdom, to be further identified with the Amu people who often attacked Egypt during the Middle Kingdom. We provide a geographical origin for the Amu and a motivation for their attack to Egypt.

2. Textual information about the passage of the Red Sea and related events

Our solution of the problem of the passage of the Red Sea, namely where and how it happened, is based upon the following ancient documents. It is likely that there are additional significant data that we have not considered, since we have read only part of the *Legends of the Jews* collected by Ginzberg [13], we have not looked at Jewish texts as Midrash or Talmud, we have only skimmed the huge corpus of the Fathers of the Church and have ignored the Islamic scholars; also investigation of Indian, Chinese and Mayan documents may be useful. However it appears that a satisfactory solution can be obtained on the basis of the textual information that we give here.

From the second book of the Pentateuch, Septuaginta Version, our translation from the French version in [14], section 14, lines 15-31:

And the Lord said to Moses: Why do you call me? Tell the sons of Israel to move the camp. And you, lift you baton, direct your hand towards the sea and open it, so that the sons of Israel enter in the middle of the sea walking on dry seabed. And I will harden the heart of the Pharaoh and the Egyptians, who will enter the sea after them. And I will be glorified due to the Pharaoh, his army, his chariots and his horses. The angel of God who moved in front of the camp of the sons of Israel changed position and went behind them. The column of smoke also changed position and passed behind them, stopping between the camp of Israel and of the Egyptians. Darkness descended and the night passed without contact between the two groups. And Moses lifted his hand over the sea, and the Lord pushed away the sea by a strong wind from the south, for the

whole night, which dried the sea and divided the water. The sons of Israel entered the domain of the sea walking on the dry bottom, the water being for them a wall on the right and a wall on the left. The Egyptians started to follow them and entered the domain of the sea after them, all the horsemen and the chariots. Now it happened, at the morning watch, that the Lord looked towards the camp of the Egyptians, within the column of fire and clouds, and put the camp of the Egyptians in disarray, blocked the wheels of their chariots and agitated them with violence. And the Egyptians said: Let us run away from Israel. Because the Lord is fighting against us on their behalf. The Lord said to Moses: Stretch your hand over the sea, so that the water comes back and covers the Egyptians, their chariots and their horsemen. Then Moses stretched forth his hand over the sea and by sunrise the water came back to its former place; the Egyptians were running against the water and the Lord threw them in the middle of the sea. And the returning water covered the chariots, the horsemen and all other part of the army that had entered the sea after these; not a single man survived. But the sons of Israel walked over the dry seabed, the water being for them a wall at the right and a wall at the left.

From the Book of the Psalms, from Edizioni Piemme (1989), based upon the CEI text of 1974, our translation, Psalm 113A/114:

When Israel left Egypt

....

*The sea saw and withdrew
The Jordan inverted his course
The mountains jumped as rams,
The hills as the lambs of the flock.*

From Josephus Flavius, *Antiquities of the Jews*, [14], II, 3:

(Moses)... did not lead his people by the direct route to Palestine, but decided to take a long and difficult way through the desert to invade Canaan. He was also motivated by the order given by God to lead his people to Mount Sinai to make there sacrifices to Him. However the Egyptians caught up with the Hebrew, closing them in a restricted area.....they blocked all roads wherefrom they thought the Hebrew could escape, constraining them between the sea and inaccessible mountains; it was the sea where the mountain ended, a quite steep one; they thought it was impossible to escape by this way. Stopping close to the point where the mountain joined the sea, they blockaded the Hebrew....

From Ginzberg *Legends of the Jews*, volume 4 of Adelphi edition, [15], pp. 140-165:

Joseph had divided into three parts the riches made when selling the grain during the time of food shortage, one part being deposited in the sanctuary of Baal Sefon; from here it was taken away by the Hebrew [led by Moses].

...when he arrived to the sanctuary of Baal Sefon the Pharaoh was happy to notice that the statue of the God had not been destroyed, contrary to what had happened in the other temples; he offered sacrifices thinking that Baal Sefon agreed with his aim to destroy the Hebrew.

.....

Moses addressed God: Lord of the world!... I do not know how to save my flock. Following me is the Pharaoh, north is Migdol, south is Baal Sefon, in front of us is the sea.

.....

The people of Israel left the sea....they moved towards the desert of Sur, full of snakes and scorpions.....they began protesting because of scarcity of water....they found a source but the water was bitter.....[Moses] threw a branch of laurel in the water and it became sweet... this place Mara became famous.... from Mara the Hebrew moved to Elim, where there were seventy palms and twelve springs, a very dry and sandy place.... They stopped there several days.....

The *Legends* contain interesting material, to be used in a forthcoming paper, on the following events occurring on the way to the Land of Canaan, after the episodes described here:

- Moses goes to Horeb where he makes the miracle of the water pouring out of a rock
- Moses defeats Amalek
- Moses meets his father in law Iethru
- Moses gets the laws from God on Mount Sinai.

Now we quote statements from Orosius [16], *Histories against the pagans*, which have been crucial for our understanding of the passage of the Red Sea, the Ten Plagues of Egypt and other events. Orosius was a friend of St Augustin. He wrote this work, once famous but now essentially neglected, on the invitation of Augustin in the peace of his villa in the Balearic islands, when the Roman empire was under attack by German tribes. The quoted passages are from Book 1, 8-10, our translation.

810 years before the foundation of Rome Amphithion was king in Athens. At his times a flood destroyed most of the people of Thessaly. Only a few could save themselves on the mountains, in particular on the Parnassus which was under the jurisdiction of Deucalion.....Plato states that at that time Ethiopia was affected by many terrible diseases, which almost destroyed the whole population.....at that time Father Liberus conquered India shedding lot of blood and killing many people.....against a nation that was never hostile to others and lived peacefully...

Pompeus [Trogus] and Cornelius [Tacitus] state that 805 years before the foundation of Rome, terrible disasters and diseases affected the Egyptians....they expelled Moses....he stole the sacred objects of the Egyptians....Cornelius Tacitus refers that...a pestilence deforming the bodies developed in Egypt at the time of king Boccoris, who after consulting the oracle of Ammon was ordered to deport out of Egypt certain people disliked by the gods...Moses, one among the expelled people, admonished his people to confide only in him, as a leader sent by the celestial power,,,,,

There were extreme heats, long lasting and unbearable; it was unusually hot in Ethiopia and the Scythians were unable to bear the hot weather.

This was also the reason why some people, not willing to recognize God's absolute power, have invented the ridiculous fable of Phaethon, in order to provide an explanation that is however lacking of basis.

On Deucalion:

From Plato's *Critias*, see [19], and notice that from the Greek way of counting inclusively the sentence *the third before that of Deucalion* means three deluges including the one of Deucalion

(the one of Atlantis)...the third terrible deluge before that of Deucalion

In other authors, e.g. Ovid's *Metamorphosi*, see [36], the Deucalion story appears to be mixed with the story of a previous more severe flood, where few people survived in boats, a type of survival not compatible with the events that we associate with Phaethon.

On Phaethon:

From Hesiodus, *Theogony*, 984-989, our translation from [45]

...Aurora...generated a glorious child to Kephalos, the powerful Phaethon, wholly similar to the gods....he was still a young boy...when Aphrodites who loves the smiles stole him and fled with him....

From Plato's *Timaeus*, the Egyptian priest of Sais speaking to Solon, see [19]:

Your own story of how Phaethon, child of the Sun, harnessed his father's chariot but was unable to guide it along his father's course and so burnt up things on the Earth and was himself destroyed by a thunderbolt....

From Ovid's *Metamorphoses*, I, 751 passim:

Phaethon, the son of the Sun...he moves below the Moon...higher parts of Earth burn....towns burn with their walls....the mountains with their forests....rivers boiled....the crust of Earth broke....then the all powerful father sent a thunderbolt against Phaethon, destroying him, and stopping the fire with this fire....the chariot disintegrated... and fell over the great Eridanus....

On the Eridanus river:

From Herodotus, speaking of the extreme tracts of Europe towards the West, Book III, 115, see also Cunliffe on the voyage of Pytheas [17]:

I cannot speak with any certainty; for I do not allow that there is any river, to which the Barbarians give the name of Eridanus, emptying into the northern sea where, as the tale goes, amber is produced....

From Lucianus *Dialogues of the Gods*, 24-25, our translation from [20]:

What have you (Helios) done, most disgraced of the Titans? You destroyed everything on Earth, by giving the chariot to a stupid youngster who burnt parts of the Earth...and ruined others with cold....if I would not have stricken him with my thunderbolt mankind would have been destroyed....let his sisters put him to rest near the Eridanus, exactly where he fell when thrown out of the chariot, let them cry tears of amber and become poplars...

From the above texts we extract the following geographic and physical information leading to our proposed explanation:

- 1 Before the passage of the Red Sea Moses and the Hebrew were located in a place between the sea and impassable mountains, with the Egyptians blocking the escape way (from Josephus *Antiquities*); the place was located between Baal Sefon, at the south, and Migdol, at the north (from Ginzberg *Legends*)
- 2 While the Hebrew were desperate considering the difficulty of their situation, a strange phenomenon was observed in the sky: the *Angel of God* and the *column of smoke* appeared to stop and darkness came. During the night a strong wind flew from the south; close to the end of the night the sea had dried and the Hebrew could walk over the seabed. By morning time the Egyptians too entered the seabed. Then their chariots began shaking; Moses lifted his baton, the waters came back and destroyed all Egyptians who had entered the seabed (*Exodus*)
- 3 Mountains and hills *jumped* (*Psalms 113A*)
- 4 Phaethon crashed on Earth after a period of wild movement in the sky, first burning forests then being destroyed by a strike of Jupiter (Plato, Ovid, Lucianus)
- 5 Phaethon is said by many to have crashed over a northern river named Eridanus, in a place associated with the production of amber (Herodotus, Lucianus)
- 6 Phaethon is considered by many to be responsible of several catastrophic events that appear to have happened at the same time, or at close times, including an invasion of India by people who slaughtered many of its inhabitants, the Flood of Deucalion, extreme heats in Ethiopia and Scythia, and the Exodus events (Orosius).

In the next section we give our explanation of the events related to the passage of the Red Sea, within the context of a special super Tunguska type event that took place at that time. In the following sections we will briefly discuss other important consequences of the event, namely the migration of the Aryans to Iran and of the Hindi to India, the migration of the Amu-Turanians-Amalek to Egypt, the Deucalion event and the destruction of the Minoan civilization. In the Appendices we briefly consider the chronology of the events and the geography of Hebrew route under Moses.

2. Phaethon and the Exodus event: the passage of Red Sea explained

We will provide here a scenario explaining the Exodus events, and the other related events quoted by Orosius, in terms of the interaction of Earth with an external object of significant size, probably a few km diameters, that we propose was the object named *Phaethon* in Greek traditions. The object was captured by our planet, entered an unstable orbit around Earth, was subject to several fragmentation episodes that sent dust to our atmosphere and pieces to explode in the atmosphere or impact on continents and oceans. The core of the object finally exploded as a super Tunguska event over the river Eider in Denmark. The effects of the explosion reached the shores of the Red Sea and appear as the wonderful events that are described in the above quoted Exodus passages. In particular such effects allowed the Hebrew to escape from an impasse while destroying the pursuing Egyptian army. We recognize that the idea of an external body being responsible for the Exodus events was present in Velikovsky [8] albeit in terms a planetary entity (a young Venus being a giant comet) that passed close to Earth. We do not attribute the considered events to a close passage of a planetary size comet, albeit it is quite possible, even likely, that the captured body was a former small satellite of the young Venus in the radical solar system scenario proposed by Velikovsky and later developed by Ackerman [27,28]. We believe that Velikovsky, a scholar of immense erudition and unusual and balanced insight, missed the scenario that we propose because apparently he never read Orosius (one of the few classical authors who escaped his voracious reading). Moreover, he was not aware of the effects of a cometary-asteroidal impact that have been studied only later, when the existence of Apollo-type objects in orbit of collision with Earth became well known, following the important paper of Whetherill [29] in Scientific American in 1979. Our theory validates all main points in the biblical texts, explains the data from Greek and Latin mythology about Phaethon and Deucalion. It identifies the most recent of the three great catastrophes that according to Plato affected our planet (the Atlantis event being the most ancient, to be associated in our opinion, see [11], with the catastrophic end of the last ice age), and provides a motivation for the great migrations that took place in Eurasia at the time of Exodus (Hindi-Aryans, Amu-Amalek-Hyksos, Danai-Achaeans-Trojans). It follows from our scenario that the claims of Finkelstein et al. that the Exodus story is later invention are unfounded. It also rejects the attempts made to explain the Exodus events in terms of a great eruption of the Santorini/Thera volcano, whose explosion may have occurred at the time of the described events.

According to Exodus, Moses obtains from the (unnamed) Pharaoh permission to leave Egypt after the last of the Ten Plagues that affected Egypt during a period of probably several weeks. It is not here the place to discuss the plagues in terms of events related to the action on Earth by a body that was captured in an unstable orbit around Earth, got probably fragmented when entering the Roche limit, so that several fragments hit the Earth, causing earthquakes and leading many volcanoes to erupt, while associated dust obscured the Sun and led to dramatic drop in temperature at the high latitudes. An eruption at Santorini, located some 950 km from Heliopolis, the very ancient sacred Egyptian centre, is possible, but it is unlikely that it was the cause of phenomena like the waters of the Nile becoming red and poisonous or the sky completely darkened. There are indeed a few volcanoes in the Mediterranean, almost all of them in Italy (*Italia* being a word probably derived from the Greek *Aithalia*, meaning the *smoking land*, from volcanic activity, see Vinci [21]), but we must take into account the existence of several volcanoes in the Arabian peninsula and especially in the Dankalian depression between Ethiopia and Erythrea. Here, at a distance of about 2100 km from Heliopolis, there is the highest concentration of volcanoes in the world, about one hundred, many of them of small size indicating a recent origin. Part of this region is called *Afar*, a name also applied to a local tribe, a word that in Akkadian and Hebrew and generally in Semitic languages means *dust*, see Semeraro

[22]. It is quite possible that the word *Africa* originates from *afar*, therefore meaning *the land of (volcanic) dust*, and that the Biblical word *Ophir* indicates the horn of Africa, the place of origin of dust that in ancient times was produced by the volcanic eruptions in the area, probably happening with a higher frequency than now. We could also suggest that the word *Red Sea*, *Erythreum Mare*, now applied to a sea that is remarkable for the deep blue and clarity of its waters, goes back to when frequent eruptions in the Dankalian depressions led to a reddish color of its waters. One hundred volcanoes certainly could obscure the sky more than the few volcanoes in the Mediterranean might do, even if at twice the distance. Moreover since winds in Ethiopia originate from NE and SE, they would push the volcanic dust over the Ethiopian plateau, which is mostly washed by rivers ending up into the Nile. Hence during a period of intense volcanic eruption in Dankalia the waters collected in Ethiopia would be full of volcanic dust, containing poisonous components and deeply coloring them. This would thereby explain the first plague, an explanation virtually impossible if the dust came from Santorini, since such dust would mainly settle in the Egyptian desert and just remain there, no rivers entering the Nile from the Egyptian territory.

At the moment Moses leaves Egypt we assume that the core of the captured body was still orbiting around Earth, moving, as seen by the Goshen area in the Delta where most of the Hebrew were located, on an orbit that let it appear from a SE direction, i.e. from over the Indian Ocean and SW Arabia and moving towards a NW direction, i.e. over Greece and northern Europe. The SE direction is compatible with the identification of the Land of Canaan, the *Land of Honey and Milk*, where Abraham settled and Moses wanted to take back his people, that has been given by the Lebanese historian Salibi in several books [23,24,25] as the region of SW Arabia now called *Asir*. The identification of the land of Canaan by Salibi, based on the geographical analysis of toponima in the Pentateuch, is totally at variance with the standard identification with Palestine. It has been completely ignored by most researchers (perhaps afraid by the political implications), despite the great scholarship of Salibi, professor in the American Lebanese University in Beirut, founder of the Institute for Interfaith Studies in Amman, and widely considered as the best historian of Arabia. Our opinion that Salibi's arguments are sound has been reinforced by our analysis of the Hebrew distribution around 1175 AD according to Binyamin of Tudela, see [26]. Salibi's work is also important in removing many of the objections to the historical validity of the Bible by the quoted Finkelstein et al.

By our assumption on the orbital movement of Phaethon we have a natural explanation of the properties of the *pillar of light and smoke*. The core had to be active, as a normal nucleus of a comet close to the Sun, emitting therefore ionized dust that appeared during the day as smoke, and with plenty of thermal and electrical activity that made it source of light during the night. It is very unlikely that Phaethon was on a stationary orbit over Earth. Hence the direction where to move was given to the Hebrew by the point in the sky where the core would appear, a fact that repeated itself several times during the 24 hours, once the distance from Earth was less than the distance (circa 45.000 km) corresponding to a stationary orbit.

We will discuss in a later section our proposed itinerary for Moses that takes into account both the fact that the *pillar of light and smoke* was followed and that the route was long and difficult. We consider here the crucial day when Moses, faced by destruction from the Egyptian army, was able to cross the Red Sea, while the pursuing Egyptian army was destroyed.

From Josephus we know that Moses found himself in a restricted area between the sea and impassable mountains. This crucial passage in Josephus (a man of great knowledge to whom Titus gave the library of the Jerusalem temple, certainly containing many documents now lost) is important for two reasons:

- Moses was in a place with impassable mountains reaching down to the sea. This geographic information excludes that the event took place along the coasts of the Mediterranean, as suggested for instance by Goedicke [7] or Anati [30], since here the Sinai coast is quite flat and completely lacking of “impassable” mountains. It excludes the area of Suez or the Sinai coast along the Suez gulf, as suggested e.g. by Barbiero [6]. Phillips [31] and Manher [32], where either there are no mountains or they do not reach close to the coast (assuming that the sea level has not changed significantly since the Exodus time). It also excludes most of the coast of Arabia, which is characterized by a long narrow plane, the Tihamah, rising steeply by a series of escarpments to the western Arabian plateau, that reaches over 3000 meters in the Asir (the name of the escarpment, quite difficult to cross, is *Jordan*; a very intriguing name that is an important point in Salibi’s work; quite intriguing is also that most atlases do not show this escarpment, with the exception e.g. of the Times Atlas, 1976 edition). A coast satisfying the requirement of Josephus is however the Sinai coast facing the Aqaba gulf. About half way this coast, moving north from present Ras Muhammad, the mountains, that were rising a few km inland letting a narrow coastal plain now heavily exploited as a resort area, reach down the coast, so that from near Nuweiba the road to Eilat goes inland by an inner valley crossing a pass of modest elevation (I took this way by bus in 1975 and still remember the beauty of the scenery and the pinkish color of the sands). So the passage in Josephus suggests for the crossing of the Red Sea some place about midway of the eastern coast of the Sinai facing the Gulf of Aqaba; see the section on the itinerary for a more detailed geographical proposal.

- Moses most probably had personal knowledge of the road he decided to take when leaving Egypt, which was not the usual and shortest way to Canaan. He had lived many years in Arabia after marrying Sipporah, daughter of Iethru, a man of religious and political power in Madian, possibly present Iathrib/Medina, not too far from the Sinai Peninsula. Notice that Sipporah was not his first wife, since according to the *Legends* he had taken another wife, named Adoniah, in Kush, when he was there for military reasons; we will argue later that Kush is not Ethiopia as usually assumed, but more probably present Badakshan. As shepherds often move their flocks over long distances (Tibetan and Mongolian shepherds even recently used to move thousand km during a year), it is quite likely that Moses had traveled widely in Arabia and surrounding regions. Moreover he certainly had knowledge of regions not visited personally by talking with other shepherds or merchants, and by his previous experience as a military officer. So the fact that he found himself blockaded between the sea and impassable mountains cannot be explained by ignorance of the route he had taken. Our explanation is that since his last visit to that place, a catastrophic event had occurred, blocking the road. The event was very likely a landslide that closed the road in a point where it was passing by a narrow defilé between mountains and sea. Landslides certainly occurred in the Sinai mountain area due to the earthquakes that must have affected the region during the Ten Plagues. In particular earthquakes must have occurred during the ninth plague, when there were three days of darkness, that can be explained either by volcanic dust of catastrophic eruptions (Santorini? The Arabian and Dankalian volcanoes?) or by dust associated with an episode of fragmentation of Phaethon or even by impacts in the area of fragments of Phaethon (several craters of relatively recent origin are known in Irak, Arabia and Oman, not to say of an extensive tektite field in northern Arabia; see for instance S. Master [83] about a recently found crater of a date compatible with our Exodus date). A landslide from

an unstable mountain slope can be produced by a moderate earthquake, so that it is not a problem the lack of reference to an earthquake in the description of the Ninth Plague; the experienced absolute darkness was terrifying by itself. Now a landslide blocking a road requires plenty of work for removal, a feat that cannot be accomplished in a few hours or days. Even if the depth of the sea was only a couple of meters, bypassing a landslide which must have entered the sea for a certain distance would have been virtually impossible.

We have now a scenario where Moses and the Hebrew (whose number will be discussed later) were stranded in a place where they had from one side the pursuing Egyptian army and on the other side impassable mountains and the sea. Now the following sequence of events took place, that will be interpreted within the context of the Phaethon event:

1. *The angel of God who moved in front of the camp of the sons of Israel changed position and went behind them. The column of smoke also changed position and passed behind them, stopping between the camp of Israel and of the Egyptians. Darkness descended.....*
2. *The mountains jumped as rams, the hills as the lambs of the flock...*
3. *And Moses lifted his hand over the sea, and the Lord pushed away the sea by a strong wind from the South, for the whole night, which dried the sea and divided the water. The sons of Israel entered the domain of the sea walking the dry bottom*
4. *The Egyptians started to follow them and entered the domain of the sea after them, all the horsemen and the chariots. Now it happened, at the morning watch, that the Lord looked towards the camp of the Egyptians, within the column of fire and clouds, and put the camp of the Egyptians in disarray, blocked the wheels of their chariots and agitated them with violence.*
5. *The Lord said to Moses: Stretch your hand over the sea, so that the water comes back and covers the Egyptians, their chariots and their horsemen. Then Moses stretched forth his hand over the sea and by sunrise the water came back to its former place; the Egyptians were running against the water and the Lord threw them in the middle of the sea. And the returning water covered the chariots, the horsemen and all other part of the army that had entered the sea after these; not a single man survived.*

The above statements are taken from the Septuaginta version of Exodus, except for statement 2 that is from Psalms and that we have entered here because of the logical temporal sequence in our scenario. We provide the following explanation of the above events.

1. The Angel of God, associated (during the day) with smoke, is the celestial body captured in an unstable orbit around Earth, as assumed above, the Phaethon of Greek mythology. The Exodus passage appears to describe the final stage of the evolution of this body. We think it describes a final fragmentation of the body, one large piece pursuing its north-western movement that will end up in an explosion over Denmark, other pieces appearing to stop or move back over the Egyptian

army, located south of the place where the Hebrew were camped, darkening the sky in the direction of the Egyptians. The event must have taken place in full day.

2. A short time after the fragmentation episode, Phaethon enters the uppermost layers of the atmosphere probably over the Mediterranean, moving however on an almost tangential orbit (a feature that characterized also the Tunguska event in 1908, the fire trail of the body having been observed over western China, hence for thousand of km). The contact with the air sent initially a heat wave to the surface of Earth. Crete was probably on the path of the body, hence fires started in its cities. Continuing on his way, Phaethon passed over Greece, the Balkans and Central Europe, at those times heavily forested. Here the heat wave led to fires in the forests. As the elevation of Phaethon decreased, the effects of air pressure and of the extremely high temperature of the body led finally to its explosion, over Eridanus. It had to be an immense explosion, incomparably more powerful than the Tunguska explosion, one that could be observed at great distance, with a bright tail extending along the temporary tube made by the body in the atmosphere (hence the claim that it had been destroyed by a thunderbolt of Jupiter). The explosion took place on the Eridanus river that can be identified with the present Eider River in Schleswig Holstein, i.e. a river in northern Europe, not the Po river of Italy. The identification with the Eider is based upon the following consideration:

a – from Lucianus, see above quoted passage, and other authors, the sisters of Phaethon cried his death by tears of amber. Now amber is found in the Northern Sea near Denmark and in the Baltic Sea, but not in the Mediterranean. The explosion must have broken the upper sedimentary layers of the sea around Denmark, freeing amber that was embedded at depths that would not be disturbed by normal waves. Hence a good byproduct of the event must have been an increase in the availability of amber. Notice that from Spanuth [33] we know that in the Middle Ages amber was more easily found than now. Even large blocks were found, that were burnt for heating if not of the best quality.

b – until the 14-th century, according again to Spanuth, the Eider river and the Schlei river were essentially connected, providing a direct access to the Baltic sea from the North river that avoided circumnavigating the Jutland peninsula. The passage was difficult in medieval times, but may have existed and been easier in earlier times and so represented one of the most important ways for navigation. Now it has been claimed by Wirth [25] that the constellations in the sky which are named usually according to animals or heroes have these names only as popular names, while their real meaning is not related to animals or heroes. They represent in reality “secret” maps of the coasts of the Atlantic and the Mediterranean or of important passages for navigation. In other terms the stars of a constellation are grouped in order to form a celestial map useful to the navigators. There is a constellation named *Eridanus*. Its shape bears no relation with the Po river but has an uncanny similarity to the profile, zigzagging, of the Eider river.

The above elements support the identification of Eridanus with the Eider river, in Denmark. We do not know at which height Phaethon exploded nor his energy. Detailed discussion of the effects of the explosion requires of course such knowledge. To leave such a memory of disaster, related as we will discuss later to the Deucalion Flood, i.e. to one of the three great catastrophes alluded to by Plato, it must have been an event of enormous

power. While we discuss later some of the local effects that must have taken place in northern Europe, the following consequences are important for the analysis of the Exodus text:

A – the explosion must have compressed the soil in Denmark, originating an enormous earthquake, to be felt over much, if not all, of Eurasia and Africa, hence in Sinai. Seismic waves travel fast, between 2 and 6 km/sec depending on the type of rock they traverse. The Gulf of Aqaba being about 3500 km from the Eider river, the earthquake would have reached there say after about 20 minutes

B – the explosion would lead to the radial propagation of a pressure wave in the atmosphere, generating a hot wind, whose temperature and speed would decrease with the distance from the point of explosion, while the duration would increase. Detailed computation of these effects is a very complex mathematical task, requiring, in addition with the information on the height and the energy of the explosion, detailed knowledge of Earth surface features and sea bottom. Preliminary estimates, but for the case of an object impacting an ocean, are given for instance in Strelitz [35]. For more discussion on this problem see Appendix 3.

From A we have an immediate explanation of the above sentence 2 in Psalms: the earthquake due to the explosion reaches Sinai with great violence shaking the mountains.

From B we have the explanation of the wind that flows during the night, for several hours. The Septuaginta text says that it was a wind from the south (while the Masoretic text refers to a wind from orient). It was neither from south nor orient (the difference in the texts being possibly explained by the strangeness of the wind, that *should* have come from south, but somehow appeared as coming from another direction). Now a wind coming from the south should be a *hot* wind, since in Egypt hot winds come from south, cool winds from north, a truth by default, as we read in a passage of *Pistis Sofia* [34], where Jesus is supposed to speak:

...when the wind comes from the north, you know that it will be cold, when the wind comes from the south you know that it will be hot and dry....

Before proposing our explanation of the crossing of the Red Sea, we have to observe that an inspection of the terrestrial globe shows that the Red Sea, about 2000 km long, 200 km wide, ending in the narrow (about 30 km now, possibly less at time of Exodus) Bad el Mandeb straights, is perfectly aligned with the direction of radial propagation of an atmospheric wave, i.e. of a wind originating from a point say in the area of the Eider river. This means that a strong wind active for many hours over the Red Sea would push consistently the waters in the direction of its narrow exit, with two effects:

- lowering of the water level in the northern part, particularly in the Gulf of Aqaba (and of Suez)
- increase of the water level in the southern part.

In other terms we expect that the Phaethon explosion generated along the Red Sea effects similar to those today generated by the wind in the Adriatic sea (the high waters and low tides that so annoy the people in Venice), but on a much larger scale. We have therefore here a mechanism that provides for the lowering of the waters of the Red Sea, and the explanation to the statement that the sea bottom was dry, an obvious effect of the flowing

of a hot wind. How much the sea lowered is impossible to say without a computation of the explosion effects (where energy and elevation of the explosion should be given as parameters) but it is clear that if the problem of Moses was how to bypass a landslide, even a lowering of the sea level by a few meters might have been enough to allow the passage.

Therefore in our interpretation the passage of the Red Sea is not intended as the Hebrew going from one coast to another, but as them bypassing a landslide by moving over a seabed suddenly become accessible and dry.

We are however unable to fully explain the passage saying that ...*the Lord ... divided the water. The sons of Israel entered the domain of the sea walking on the dry bottom, the water being for them a wall on the right and a wall on the left.*

However we can propose at least a partial explanation, allowing for parts of the passage to be an inaccurate rendering of the event, that was experienced by people certainly bewildered by what they could interpret only as a miracle performed by the Lord on the request of Moses. The Gulf of Aqaba is mostly very deep, with a depth around 1600 meters; however in front of Nuweiba, where the passage most likely happened, the sea bottom rises reaching a level quite close to the sea surface. We cannot certainly be sure now how the Gulf of Aqaba bathymetry was at the time of Moses, this region been tectonically very active, belonging to the northern part of the Great African Rift. However we cannot exclude that the wind reduced the sea level so much as to let at least part of this rise to emerge, hence dividing the Gulf of Aqaba into two separate basins. This fact would explain the “division” of the sea. Our imagination of the event is unable now to explain the formation of the “walls”. Perhaps a different vocalization or translation of the original Exodus text that was used by the 72 senior scholars in Alexandria or by the Masorets one thousand years later might remove the problem, as is certainly the case, discussed in Appendix 2, with the number of people who followed Moses.

Once the landslide was bypassed, Moses could continue some distance on the road on the other side, likely the road to Eilat passing inland by a low pass. There is now a modern road close to the sea, built along a rocky and steep coast. It is unlikely that here a road existed at Moses time, where several thousand people could pass. So it is likely that Moses took the road inland, which moved up from the sea level, allowing safety from the return wave that led to the destruction of the Egyptian army. Also along this road there were probably good points to look at what was happening to the Egyptian army.

We now consider the destruction of the Egyptian army (whether it was a full destruction also involving the death of the Pharaoh is not stated in the Exodus text, which only claims the destruction of those who had entered the seabed). The Egyptian army saw the Hebrew walk on the dry seabed and moved in their direction. Exodus text says that the wind flew during the night, so we may now assume that it had stopped. This means that the waters pushed south towards the Bab ed Mandeb started to return to their normal position. The return of the waters was a catastrophic event itself, whose mathematical modeling would be a fascinating challenge for today’s algorithms and computers. The waters returned as a kind of rebound tsunami, probably with a turbulent high front wave. The following features are expected to characterize the arrival of the waters:

A – a moderate earthquake with peculiar soil vibrations, which would explain the loss of the chariots wheels before the water arrived, terror striking the pursuing Egyptians; note that tsunamis are not necessarily accompanied by sound, which is not recorded in the text

B – the complete washing up of the Egyptian army (save people that might have been standing in high places; among them possibly the Pharaoh) into the Gulf of Aqaba. Hence archaeological support of this scenario should be based upon existence of objects in the sea bottom of the Gulf of Aqaba that may be related to the Egyptian army: weapons, pieces of chariots, gold objects....

The waters came back after Moses lifted his baton, so the event appeared as a miracle performed by the Lord on his call. It was not only a wonderful event but a scaring one. The wave went down the whole Aqaba gulf and certainly rebounded, so that a sequence of waves, albeit of decreasing intensity, must have rocked the coast for several hours if not days. This must have led Moses to the prudent decision to stay for a number of days in a high place until the waters calmed.

In the next section we consider other effects of the Phaethon explosion, i.e. the Deucalion event, the demise of the Minoan civilization, the arrival of the Pelasgians and Minoans in Italy (central Italy and Salento) and the further destruction of the Egyptian delta, leading to the four hundred period of decadence of Egypt, under the power of foreign dynasties, the Hyksos dynasties.

We observed that archaeological support of the given scenario should be provided by findings on the sea bottom in the Gulf of Aqaba. Such findings are reported to have occurred very recently, by a Swedish expedition from the Karolinska Institute in Stockholm, see [72]. On the sandy sea bottom in front of Nuweiba the sub water archaeologists found a large number of coralline structures, in an area lacking of rock, where coral is not expected to grow. Corals to grow need a seed that may be a metal or a wooden object. Once the coral grows, the metal object might slowly decay by rusting and disappear, while leaving intact the coralline structure that has grown on it. Not only unexpected coral structures were found, but some of these have the geometric aspect of spiked wheels, same form and size of wheels of Egyptian chariots, or of other components a chariot. The investigated area is part of a submarine park, where objects cannot be removed, so radiocarbon dating has not yet been made. Metal detectors have shown the presence of metal inside the corals. Further investigation may possibly show therefore that here are the proofs of the violent destruction of the chariots of the Egyptian army.

3. The Phaethon explosion, the Deucalion Flood and other events

The Phaethon explosion over the Eider river in Schleswig Holstein that we have hypothesized allowed Moses to escape the Egyptians but, being an event of probably hemispheric extent, had enormous consequences on other parts of Eurasia and Africa, and even North America. Here we briefly consider some effects it had in Northern Europe and the Mediterranean. It would be very interesting to look at effects in other parts of the world, including China and the Americas, a work we leave for future investigation.

A – Effects in Northern Europe

The Phaethon explosion must have destroyed everything within hundred of km of its epicenter. This means the destruction of most vegetation, animals and men in present Denmark, northern Germany and Poland, southern Scandinavia. Very heavy destructions also in Finland, Baltic states, Holland, Belgium, eastern Britain. At the date of the event given by us, 1447 BC, in these countries the bronze civilization was in full bloom, as attested by the rich findings in many tombs. The extremely strong hot wind in the vicinity of the explosion must have flattened everything, thereby explaining why many great megalithic monuments of the bronze age are found in Ireland and western Britain, more distant from the explosion and moreover to some extent protected by the Pennine hills, while they are lacking in the eastern part of Britain. People may have survived in the Hartz, northern Germany, since mountains afford some protection from high winds and usually have caves where people can hide and temperature changes take place more slowly. The survival of people in the Hartz may explain why this area preserves the greatest richness of ancient traditions and myths of Germany that should be reconsidered at the light of the present scenario. People certainly could survive in the Norwegian fjords, protected by the explosion. The civilization that followed the event must have lost some features that had characterized the previous civilization, which had a significant urban life. Here we should recall the work of Vinci [21], who argued a Baltic origin for the setting of the Iliad and Odyssey, before people left the Baltic area to the south, due to climatic changes. Our scenario is apt to provide the motivation for the migration of the Baltic people (Danai and Achaeans from Denmark and Trojans from southern Finland, in particular). Indeed before the final explosion the object that had been captured into an unstable orbit around Earth had already significantly affected our planet by a sequence of disintegrations that sent pieces to impact on Earth and dust to darken the skies. These events happened during a period of several weeks if not months. While in Egypt they originated the Ten Plagues, with some terrific events, in northern Europe they must have led to no less dramatic effects, and in particular to a much colder weather than usual and possibly very intense snowing. These events terrified people so that those who had courage and strength, i.e. mainly young fit men, decided to leave to southern Europe, following possibly the great rivers of Russia and Ukraine, whose sources reach close to the Baltic (a way suggested by Vinci). Crossing eastern Europe under these unusual conditions must have taken quite a few weeks, and it is likely that these migrating people were still inside the European continent when the explosion occurred. They were therefore saved from the effects of the tsunami that raged in the Mediterranean. The tsunami savaged the Mediterranean coasts, emptying them of their former inhabitants, hence it should have been not a difficult task for these groups to occupy places that formerly belonged to other people.

Another effect that should be considered is that the immense pressure provided by the Phaethon explosion over the Denmark surface led to a significant compression and depression of it. So not only amber was liberated from consolidated sediments to appear in great quantities on the shores of North Sea and the Baltic, but the average elevation of Schleswig Holstein and nearby areas might have decreased. Hence the presently observed positive bradisism, that is usually attributed to a rebound effect originated by the melting of the ices circa 11.500 years ago, might be due, at least in part, to the Phaethon event.

B – Effects in Russia and Western Asia

The climatic effects considered above, leading to the migration from the Baltic to the Mediterranean, were certainly present possibly at a more severe degree in northern Russia and north-western Siberia, considered by many, see for instance Tilak [37] and Godwin [80], to be the original “Arctic” motherland of the Indo-Aryans. These people invaded Iran and India around the mid second millennium BC, at a time that, on the basis of the above quoted passage of Orosius, we identify as the time of the Phaethon explosion and Exodus. We therefore propose the climatic effects of the explosion as the reason why the Indo-Aryans moved south, one group, the Aryans, towards Iran (where they gave name to the province Ariana), another group, the Hindi or Sindhi, towards India. The detailed story of the invasion is yet to be written, a difficult task since the invading people left no history and the invaded people were either destroyed or moved away and did not like to record the story of their defeat. Clues may be found in the Persian Shahnama, in the Indian documents in Sanskrit and Tamil, in the little known Kirghisian epic (6 million verses....hopefully to be fully translated by the Cenacolo di Bergamo...), perhaps even in Nonnus *Dionisiaca*, since from the Orosius passage Dionysius or Liberus appears as the leader of the people invading India.

Reaching Iran and India required the Indo-Aryans to cross the Syr Darya (the river of the Lion), possibly defining the southern border of the area controlled by them (notice the related names *Hindi, Sindhi, Syr, Sindh, Sundh, Singh, Senge, Simba*, all meaning *lion*, which suggests that at least part of the invading people called themselves *the people of the lion*, an obvious reference to their military prowess). Then they had to cross the territory of the Turanians, who lived between the Syr Darya and the Amu Darya, and finally the Amu Darya. Passage into Iran was then rather easy, while passage into India implied crossing the Hindukush, hence defeating the local Afghan tribes who have never liked foreign people in their land.

It is our opinion that the Turanians, who too had been scared by the celestial events, decided not to fight the invading Indo-Aryans, but to move before them to another far away land, Egypt. For their decision we see two reasons:

- while the Turanians were great warriors, as shown in the Shahnama [39], often attacking Iran (that in the Shahnama context probably defines a country whose borders are the Indus River, the Amu Darya with an Aral then joined to the Caspian, and the Tigris....), they probably did not possess the iron technology that had been developed by the Indo-Aryans. Such a technology was probably based upon the exploitation of the iron nodules that are found in the northern Europe marshes and on the bottom of the lakes in Scandinavia (recently the iron ore of the Kiruna mines has ceased to be exploited, being more convenient to use nodules from the Swedish lakes. A technology retrieved after 3500 years!). Iron appears, but as an uncommon metal, also in Homer, suggesting that it was a recently discovered metal whose technology was kept secret. Bronze weapons are no match for iron weapons, so the Turanians did not try to stop the invasion.

- the Turanians were the people living north of the Amu river, a large river, always full of water, not easily crossable, whose sources are found in a very special land, by us identified with the Biblical Eden and the Sumerian Kharsag, see [40,41]. It is very likely that they are the people known in the Egyptian documents as the *Amu* and in Exodus and other Biblical passages as *Amalek* (to be interpreted as *people of Amu /Amol*, *Amol* being a very ancient town quoted in the Shahnama, near the Amu River, whose name has been changed only

recently; *Amu* may be a word obtained by contraction of *Adamu*, see [40]). It is known, see Cimmino [42], that the Amu invaded Egypt several times during the second kingdom. As a protection against their invasions a wall had been built near where is now the Suez canal by Pharaoh Sesostri II, see Manher [32]. So the Turanians/Amu knew their way to Egypt, knew that it was a country with pleasant weather, with many riches to boot, and far away from the lands where the Indo-Aryans were directed. It is also our suspicion that they wanted to take revenge for a defeat suffered not many years before at the hands of the Egyptians, an argument that will now involve Moses. Lapis lazuli were an important item in Egyptian imports since they were used both as talismans and medicines. Lapis lazuli in ancient world (even until not many years ago) were produced in only one place in the world, the so called *blue mountain* in Badakshan, north-eastern Afghanistan. This mine represented an enormous value from the point of view of the income it produced and the sacred meaning attributed to the lapis lazuli. Protecting this mountain had to be a very important task for the local population, and may explain the extreme determination that Afghans have always shown in defending their country. Being located not far from the Amu Darya it is quite plausible that the Amu tried several times to conquer it. So the expedition that, according to the *Legends*, the Egyptians carried on in Kush under the leadership of young general Moses may have been motivated by help to the Kushite against the invading Amu. The Amu were repelled and Moses married the local princess Adoniah. After several years Moses returned to Egypt, not having begotten sons from Adoniah (he later had two sons, Ghersom and Eliezer, from Sifforah). But we cannot exclude that he had daughters and that he kept good relations with the family of Adoniah. When arrival of the Indo-Aryans became known, it is possible his relatives in Kush informed him that the Amu would move towards Egypt. This time it had to be an invasion by most of the Amu people, which required some time to be organized, with the likely prospect of defeat and destruction of Egypt. Moses as the leader who had defeated the Amu some years before was certainly in the list of the persons to be punished, with his own people. So it is possible that the main motivation for Moses to take the unusual long and difficult way through the Sinai was to avoid the arriving Amu. A motivation of course not to be stated in writing since not “honorable”. It is also possible that his relatives realized that they too would be attacked by the Indo-Aryans and this time could not resist. So while a strong resistance was anyway put by the Afghans against the Indo-Aryans, which led *Kush*, the *place of the killing* (of *Abel* we suggested in [40]) to be renamed *Hindukush*, i.e. *the place of the killing of the Hindi*, it is possible that some groups, especially important families, fled to safer places. Such places probably included over-sea regions in Africa (where both a *Kush* and a *Meluhha* are documented), in south eastern Asia (*Moluccas*) and in the mountains of northern India, at those times well protected by jungles, forests and narrow passes, not the type of terrain with which the Indo-Aryans, coming from Russia and Siberia, were familiar. About 150 km north of Srinagar in Kashmir a small village exists, named Hasbal (possibly a variation of *Mosbal*, *Lord Moses*; also possibly the village named as *Heshbon* in Deuteronomy 4-46, where geographic details are given about the place where Moses died, all corresponding to places found in the Hasbal area). Here a dozen Hebrew families live and a so called *tomb of Moses* exists, of which the Wali Rishi family takes care since about 2700 years, see Kersten [43]. Notice that about 2700 corresponds to the years passed since the Ten Tribes of Israel were deported to the region of Halah, Habor and Gozan by Sargon II of Assyria. In a forthcoming paper we will argue that such a region is eastern Afghanistan, i.e. Kabulistan. In the Pentateuch no information is given about the tomb of Moses, whose whereabouts are said to be unknown. We conjecture that at the end of his mission, perhaps due to contrasts with the younger people, including his violent and mentally unstable son

Gherson, he left the Arabian desert to reach the relatives of the first family, and died in the far away Kashmir.

C – Effects in the eastern Mediterranean

Eastern Mediterranean at the time of Exodus, 1447 BC according to our date, was an area dominated in the south by Egypt, in the north by the Minoan civilization and the Pelasgians located on the coasts of Greece and possibly of western Turkey. Egyptians were not particularly apt at navigation, their overseas trade being taken care in the Mediterranean by the Minoans and the Pelasgians (Phoenicia had not yet developed a basis of the Puni/Phoenici, albeit Byblos, whose existence is documented from the time of the First Kingdom, had certainly significant marine activity). The Red Sea was under control by Indian navigators, the Pani, see [70], who had mastered the knowledge of how to exploit the monsoons, hence were able to trade with Africa, Arabia, Iran, Southeast Asia, possibly even China and Australia (Egyptian objects have been found in several places in Australia). Trade in the Mediterranean was in the hands of the Minoans and the Pelasgians (whose basis was Athens), with possible contrasts among them, as suggested by the story of Theseus and the Minotaurus. The Minoan civilization, enriched by the profits of the trade (some of which coming from outside the Mediterranean, as tin from Cornwall, silver from Tartessus, copper even possibly from the Isle Royale in the Superior Lake...) had developed in the northern part of Crete, with several towns rich of splendidly decorated palaces. Less is known about the Pelasgians, see however Pincherle [44], possibly more devoted to piracy than trade. They were considered by classic authors, e.g. Herodotus, Hellanicus, Diodorus, Dionysius of Halicarnassus, as the ancient inhabitants of Greece, who partly moved to Italy. Here we quote a passage in Thucydides, *War of Peloponnesus*, I, 2-4

...before the Flood of Deucalion, Greece was inhabited by the Pelasgians: Then the Hellenes came....

And a passage from Herodotus, *Histories*, I, 3, 57

...the main people of ancient Greece were the Spartans and the Athenians.... If we investigate their origin, we find that the first were Hellenes while the Athenians were Pelasgians....the Pelasgians were local stable populations while the Hellenes were nomads arriving from Thessaly....we do not know the language of the Pelasgians....on the fact that their descendants still live in Crestona (now Cortona) near Tuscany and others...on the Marmara sea, it appears that they spoke a strange language made only of syllables. Therefore Greece changed language after the invasion of the Hellenes....

Anyway Greece had at that time a number of cities that survived into later times, including Athens, which Pausanias [71] associated with the domain of Deucalion, who was also in charge of Thessaly, and where his tomb was located, and most probably several places in Peloponnesus as Argos, Mycenae, Tyrint.

So let us consider the effects of the Phaethon event on eastern Mediterranean. The south-eastern coast of the Mediterranean probably did not experience the heat wave that characterized the first contact of Phaethon with the atmosphere. It was rocked by the earthquake following the explosion and was affected by the surge of the sea due to the wind, that flew with about the same speed and duration experienced by Moses. The waters were moved from the north side towards the south side of the Mediterranean, with a surge

that only mathematical modeling can evaluate, but that might have reached more than ten meters. So the waters would have invaded part of the coast of Sinai, destroying any army or persons that would be found there. More dramatically, the waters would have invaded much of the Delta, which is very low lying, with enormous destruction of life, cattle, fields, villages, towns, temples. Hence Egypt already severely beaten by the Ten Plagues would experience another dramatic disaster. Only the part of Egypt south of Memphis would have escaped the tsunamic surge. Rebound effects after the wind ceased certainly did additional damage. The surviving Egyptians found themselves in a country thoroughly devastated and must have thought to have been abandoned by their gods.

Let us consider now Crete. If Phaethon entered the upper atmosphere over the Mediterranean, it is possible that the signs of fires noticed in the ruins of the buildings in Crete are due to the heat wave produced by the attrition of Phaethon with the atmosphere. Notice that people inside buildings would have escaped the heat effects, as happened in Hiroshima where saving the life depended in many cases of being exposed directly or not to the heat wave from the atomic bomb. It is interesting to note that the Deucalion story makes no mention of fire, albeit Ovid in the *Metamorphoses* quotes the fires due to Phaethon in many places in Greece, including the Parnassus. This can be explained by Phaethon rebounding after his first encounter with the atmosphere, an effect that has been observed in the case of fireballs and that might happen also for bodies of substantial size. Then Phaethon re-entered the atmosphere, burning the forests over the Balkans and Central Europe, before the final explosion over Eridanus.

The earthquake due to the explosion reached Crete in a few minutes, with a strength probably greater than that experienced in Sinai, where hills appeared to jump. This event must have destroyed most of the buildings. It might also have influenced the Santorini volcano, either activating an eruption or being the event that led to the collapse of its caldera, if the eruption had been going on for enough. The problem of dating the Santorini event – actually several eruptions probably took place in the mid second millennium BC – is not yet settled by volcanologists, see [54,55]. It is clear in our scenario that the Santorini eruption has to be viewed only an ancillary catastrophic event on a planet that had been for many weeks subject to an assault from the sky.

A few hours after the earthquakes the wind arrived, hotter and faster than in Sinai, but for a shorter time. So the north coast of Crete was invaded by the surge of the sea due to the wind. When the wind ceased additional rebound waves, also affecting the south coast, must have taken place. At the end of the event Crete had been thoroughly savaged, albeit people certainly were able to survive in the high places that form much of the surface of the island. Anyway it was the end of the Minoan supremacy, to be followed by the emergence of the Mycenaean city states, whose activity on the sea was however for the following centuries more based on piracy than on trade. The Mediterranean returned to be a sea of trade only about four hundred years later, with the birth of the Israel state under the great kings Saul, David and Solomon, the expulsion of the Hyksos (by Saul and Thutmosis in the Velikovsky chronology that we accept) and the great 18th dynasty in Egypt, the development of the marine trade by the Phoenicians, whose entrance in the Mediterranean, from their previous basis in the Red Sea (as stated e.g. by Herodotus I, 1) was, we believe, the result of a wise decision of the great Solomon.

Let us now consider the Deucalion event, that took place about 400 km north of Crete and was so well remembered that at the time of Solon it was considered as the most ancient event that could be dated by *counting generations* (albeit Plato does not give the number of generations). The event was stated by Plato to be the last of three great catastrophes. Deucalion was a man of power controlling Thessaly and probably part of Attica, where his tomb still existed at the time of Pausanias [71], who gives us important information. He survived, with his wife Pyrrha and

other people, on the mount Parnassus. This mountain is about 2400 meters high, has steep walls, is part of the mountain ranges that cover most of Greece. It is specially famous for the presence, on the south side at elevation about 600 meters, of a sanctuary that has been in use from very ancient times, predating the mid millennium time that we are considering now. It is likely that Deucalion was a high priest in Delphi, kingship and high priesthood being often joint in ancient civilization. He might have visited the sanctuary to inquire about the disasters that were affecting Greece as well as Egypt. The Deucalion story, as noted before, makes no reference to fires, which we have tentatively explained as due to Phaethon rebounding after the first contact with atmosphere. Deucalion must have seen the body moving in the sky as a fireball. Similar view was reported by people in western China, over a distance of some thousand km, in relation with the Tunguska explosion in June 1908; similar view may have also appeared to Genghis Khan, in relation with the multiple impacts in the Pacific Ocean that likely happened in 1178 AD, according to the evidence collected by us [46], following a likely major impact on the Moon, well described in Canterbury chronicles.

Then the earthquake came. This is also not related in the surviving description of the event, which can be explained by the fact that Greece is quite prone to earthquakes (possibly in the past more common than now) and that the sanctuary at that time probably had no sizable stone building, being an open place with sacred trees (as in Dodona) and a cave where the responses were given (stimulated, as recently discovered, by the presence of methane).

Then the wind came. Now Delphi is located on the southern side of the Parnassus. So it was shielded by the huge mountain from the unusually strong wind coming from north, hence explaining the lack of reference to the wind in Deucalion stories. Then the Flood came. It was due essentially to the action of the wind on the Adriatic sea, that is aligned quite well, albeit not almost exactly as the Red Sea, with the direction of the wind flowing radially from the explosion point over Eridanus. The Adriatic waters were pushed south, part of them rebounded on the high coast of Abruzzi and Molise and on the 50 km long promontory of Gargano, whose top is about 1000 meters. So there was an eastwards deviation that pushed the waters towards the opposite coast of (present) Montenegro, Albania, northern Greece. Part of them entered the area between Corfu, Kefalonia and the Etolian coast and were pushed inside the Patras-Corinth Gulf, about 150 km long, mainly surrounded by steep mountains. Reaching the end of the Gulf part of the waters, with a front wave possibly a hundred meters high, were able to cross over the low lying Corinth isthmus, invading the Gulf of Salamis and destroying the area of Athens. Another part entered the small Amphissa plain, at the basis of the Parnassus, and ran up the Parnassus to a certain elevation. Delphi must have been too high for the waters to reach. So Deucalion witnessed a wonderful and terrible event that destroyed much of the people in his land and whose memory he was able to transmit due to his special position of priest and king.

Two more observations are interesting about the Phaethon effects in Greece. The Patras Gulf is bounded on the south by mount Erymanthus, 2224 meters high (visible in very special light conditions even from the coast of Salento!). The Erymanthus shielded the interior of Peloponnesus from the wave that entered the gulf. The region just south of the Erymanthus in the central part of Peloponnesus is called Arcadia. The inhabitants were considered to be the original people of Greece, see Pausanias [71], Book 5, 1-2, lending their name to the adjective that describes extremely ancient things. By our arguments, these were the people who escaped the destruction, not being affected by the heat wave and being shielded from the incoming waters by the Erymanthus.

What we have described is the initial wave due to the continuous action of the wind. When the wind stopped, rebound tsunamic waves must have raged for several hours, if not days. Since similar events occurred essentially over the whole Mediterranean, it is fair to conclude that most of the coasts were savaged with full destruction of the local settlements. It is also very difficult that people on boat on open seas survived, due to the very strong wind (generally a tsunamic wave is not dangerous on high seas, since it has a long wavelength and a small surge; the wave swells dramatically only near the coasts, see Bryant [47]). But the following two considerations are of interests:

- according to Herodotus VII, 170, Minos left Crete to get back Daedalus, who had returned to his native Sicily, where king Cocalus reigned. On the return from Sicily the fleet of Minos was destroyed by a storm in front of Iapygia (present Salento), but several of the men survived, founded a number of towns and changed their name to Messapian Iapygians. It is possible that they did not return to Crete having known that the island had been severely ruined by the described events. Cretans were known for the love of bull games. So perhaps the present town of Taurisano, close to Ugento, takes its name from the breeding of bulls (Latin *tauri*) to be used in games originated in Crete
- there is evidence that Pelasgians settled in central and southern Italy, see Pincherle [44]. Since Pelasgians were involved in sea trade a number of them might have been visiting ports in Italy. Now settlements on the Adriatic coast of Italy were probably all destroyed by the tsunamic wave, in addition of being fully subject to the immensely strong wind. Settlements on the Tyrrhenian coast were in many cases shielded by mountains from the wind and, due to the geometry of Italy, they were subject to initial lowering of the water levels, being only after some time (say a few hours) affected by the return of the waters and the rebound waves. Hence it is likely that people living near the coast, who certainly were accustomed to tsunamis albeit of smaller size, understood the danger and escaped to the nearby hills, the Tyrrhenian coast being mostly hilly (here it is interesting to note that the aboriginals in the Andaman islands survived the great tsunami of December 2005 by running uphill when they noticed the lowering of the waters that precedes an earthquake generated tsunami). The survived Pelasgians later knew not only of the destruction of their settlements in Greece, but also that strongly armed people had arrived from the Baltic. So they began a new life in Italy, living in megalithic towns on the top of hills, perhaps to be safer also from another strong wind....
- There is evidence, see Arecchi [47], that a huge lake existed in the second millennium BC in the interior of southern Tunisia. Arecchi has considered this vast inner basin in the context of a scenario for Atlantis located in that area, a hypothesis also considered by other authors. In our scenario the basin was certainly replenished during the Deucalion Flood. No theory of Atlantis can be accepted that sets Atlantis after Deucalion!
The following sentences in Pomponius Mela [64], VI, apply to Numidia, i.e. present Algeria, suggesting that a tsunami, possibly the one of Deucalion, reached over there: *in the interior, and quite far away from the sea, if you accept to believe, there is a wonderful finding: they say that on very dry areas one finds skeletons of fish, broken shells of mussels and oysters, smooth pebbles like those found on beaches, anchors fixed on rocks... all signs that the sea surged up to there.* The reference to anchors seems to exclude that the objects were ancient fossils, which are quite common in the rocks of the Mediterranean and would not be object of mention.

C – Effects in northern Europe

We have already considered some effects of the Phaethon explosion in northern Eurasia:

1. depression of the crust in the area near the explosion, implying that the present positive bradism of the Baltic region may not all due to a rebound effect after the melting of the glaciers
2. breaking of the sediments on the sea bottom, leading to emergence of a large amount of amber from deep sediments, previously covered by later sediments. Amber material is usually extremely old, several million years, and should therefore not been found on the surface, unless this has been subject to disturbance or erosion
3. a shallow crater was possibly formed, but was soon refilled by sediments brought by the rebound waves; this fact should be subject to geological investigation
4. in a radius of possibly 1000 km or more forests were leveled, partly burned. Forest material may have contributed to the formation of the many turf formations in the area. Organic material in fine dust must have reached the upper atmosphere in the billion of tons, where interaction with material lost by Phaethon in the course of its frequent break-ups (if Phaethon was associated to a Venus that was born in the scenario described by Ackerman [27,28], then it was probably partly composed of hydrocarbons) may have led to the formation of the whitish sweet and unstable substance named *manna* in Exodus
5. in a probably large radius, order 1000 km, most people were killed. Pockets of survival were probably in well protected valleys and where people used caves. The high birth rate of man until very recently (even more than 7%) of course allows a population to recover soon. Forests growth covered again the area within half a century. Man returned within probably one or two generations. But the people who had created the great bronze civilization that is described by Homer, following Vinci's scenario, were gone. Their settlements, most of wood, had been destroyed. Stony buildings like menhir or dolmen could survive, larger structures would collapse. Perhaps this is the reason why the big megalithic monuments predating the mid second millennium BC are found in western Britain and Ireland, for instance, but not around the Baltic or even in eastern Britain. Here the wind and the earthquakes were too strong.
6. part of the local Baltic population must have decided to move south, before the final explosion, due to the terrible weather conditions that corresponded to the Ten Plagues of Egypt. As Vinci suggested, most of them probably followed the great rivers of eastern Europe, Dnepr, Dniester, Don, avoiding the thick forests and the dangerous marshes on the way, to the Black Sea and the Mediterranean. The explosion must have taken place when they were still on the move. The above rivers could not be affected by tsunamis and, moreover, they run often in valleys that, while not deep, would protect from the strong wind. It is possible that some of the people decided to return to the original country after the explosion, when no danger was seen any more in the sky, thereby leaving the memory of the event in the many northern texts as the *Edda* or the *Kalevala* (where recollections of even more ancient catastrophes may be present). The people who continued found a Black Sea and an eastern Mediterranean whose coasts had been depopulated. It was therefore easy for them to resettle there, renaming settlements with the names of their original places around the Baltic. It is possible that most of the migrating people were young men. No problem certainly for them to find women among the survived people in the interior.

Again within Vinci's scenario, it is likely that people from southern Finland, particularly the region of present Toja, see also Harris [50], identified with the Troy of Homer, reached northern Italy, possibly by following the Vistula and then crossing over Moravia and Austria. A most important settlement at that time in Italy was Valcamonica, the

valley where the Camunian civilization developed over a span of thousand of years, see Anati [48, 49]. Valcamonica was a centre of trade (iron and copper mines being present there) and certainly a very important religious centre influencing Northern Europe (we will claim in a forthcoming work the identity of the Avestan *Manu* with the German *Mannu* in Tacitus and that such person survived the second of the Platonic catastrophes, i.e. the Biblical Universal Flood, inside caves in Montisola, an island inside Lake Iseo, at the end of the Val Camonica). It is possible that the people from Toja came to this valley, which was well protected from the effects of Phaethon. Then they were given permission to settle in the Po valley, giving to the Po the second name *Eridanus*, from the water passage that allowed direct passage to the Baltic from the North Sea. Notice that the city of Padova according to tradition was founded by Antenor, a Trojan leader.

4. Conclusion

In this paper, taking the hint from a forgotten passage in Paulus Orosius (briefly referred to in Clube and Napier [51], who wrongly date him at the 15th century) we have developed a scenario that identifies the last of the three great catastrophes quoted by Plato with the Deucalion event, contemporary to great migrations and to Exodus. Orosius refers with criticism the pagans' opinion that Phaethon was the cause of these events. Using present knowledge about Tunguska type explosions of large objects in the atmosphere, we deem to have validated at least qualitatively the statements of Orosius. Using textual data in the Bible, in Greek and Latin sources, we have suggested the causes behind the events described in Exodus (especially concerning the passage of the Red Sea), the nature of the Deucalion Flood and the Indo-Aryan invasion of India. As a corollary of this invasion we have explained the migration towards Egypt of the Turanians/Amu/Amalek. As a corollary of the arrival of the Amu, about which we suspect Moses was informed by the family of his previous Kushite wife, we have a natural explanation of why he took his people by a long and unusual way in the Sinai peninsula.

It follows from our scenario that the used ancient texts are fully compatible with expected consequences of a super Tunguska type explosion, an event which can certainly happen again. Therefore we claim, in contrast with many modern scholars, that such texts are a valuable source of hard information, even if they contain, due to their antiquity and transmission problems, some passages that are not correct. Such errors are sometimes recognizable and correctable, sometimes leave us in a deep puzzle. So, as far as the Bible is concerned, we claim that Finkelstein and others are wrong. However in order to fully retrieve the informational content of the Bible, it is necessary to take into account two facts, which are rejected by mainstream researchers, or even simply not taken into consideration, partly for political reasons, partly because their truth means that academia has taught for a couple of centuries scenarios that are wrong:

- that the chronology of Egyptian history, essentially established about two hundred years ago by Lepsius and Champollion who dated a certain Sothic year referred to in Censorinus *De die natali*, is wrong, by several centuries, as claimed by Velikovsky [18], and confirmed by the astronomers Clube and Napier [51], and other scholars, e.g. Bimson [81,82]. Perhaps everyone should read the *opus magnum*, in his own judgment, of Isaac Newton, which is not the *Principia*, but the *Chronology of ancient people amended*, whose dates are close to those of Velikovsky. It says much that Westfall, the greatest biographer of Newton, wrote that reading this work is *the worst penance that can be inflicted to a man*. It is with great interest that the present author awaits the publication

- of the monumental work on chronology, a forgotten science, by the Australian scholar Dale Murphie, on the line of the work of Velikovskiy
- that some points in the interpreted geography of the ancient world are not correct. One is which river was initially called Euphrates (we claim this was the original name for the Indus; the name changed after the invasion by the Sindi, to the present form which is Sindh, Sundh, already documented in the *Peryplus Maris Erythraei*; quite incredibly scholars do not yet know how the Indus was named in Sumerian or Akkadian, as this author has learned from the sumerologist Pettinato). This is a fundamental point for the analysis of the story of Eden, see Spedicato [40,41], and for the determination of the borders of the kingdom of Solomon, again a non-existing person according to several present historians. The second point is the location of the *land of honey and milk*, where Abraham settled and where Moses led back his people. We think that the identification given by Salibi [23,24] is correct, even if we are doubtful of his analysis on the existence of several Abrahams and other people. Perhaps scholars, who have forgotten Orosius, should also reread that extraordinary book which is the *History of the Armenians of Moses Koronesis*. This historian visited the immense archives of the royal palace of Edessa where a room contained the list of genealogies of many families in the Middle East. He comments that before the time of Cyrus (about one thousand years before him) important families kept their ancient genealogies, but the fashion disappeared at the time of Cyrus. This suggests that when Ezra wrote the Bible (24 canonical books of the *Tanakh* and 70 secret books, see Manher [32]), genealogies were probably still known by many Judaic families, so that the overlapping of persons would have been a violation of an important tradition. Nowadays very few families know their genealogies (among them: the Ethiopian and Japanese imperial families, the Confucius family, the Mandel family, now represented by the great scholar and artist Jibril Khan Mandel, a Sufi leader: his family list originates with a chief of Bactriana who fought against Alexander the Great).

Finally a comment of interest from the theological point of view. We have treated the Bible and other ancient documents as texts with an authentic historical content, albeit the correct interpretation requires accepting rare events of extraterrestrial origin. Therefore events like the withdraw of the waters, their return after Moses lifted his baton, and other stories not considered here (as the water pouring out of the rock again after he lifted his baton), are seen as natural events, consequence of the special interaction of Earth with an external object. But Moses saved himself and his people because he was at the right place at the right moment, an event of very small probability. The waters returned and the water spilled out after he lifted his baton, again an event whose probability is extremely small. These facts suggest that either he could forecast the future, which is scarcely credible, or that a superior power acted on him, on his decisional processes, so that his actions appeared as actions of supernatural powers. **This approach can be rejected only under the postulate, to all purposes equivalent in our opinion to the postulate that the Earth is at the center of the Universe, that over man no superior powers exist or that they cannot or do not want to influence man. Superior Powers do not necessarily mean the Most Superior Power, God.**

Appendix 1: the chronology of the event

Dating ancient events is a difficult problem, since not all people had written history with a chronology as we intend now. About the events considered in this paper we cite the following chronological information, partly from ancient texts and partly from modern analysis of ancient geological material:

1. Exodus can be dated from Biblical data on the Solomon temple in Jerusalem, whose construction is stated to have begun 480 years after Exodus. That year, from the biblical chronology of the kings up to the deportation first of the Ten Tribes by Sargon II the Assyrian in 722 BC and then the Judah and Benjamin tribes by Nebuchadnezzar in 587 BC, can be determined to be year 967 BC. A difficulty for some time was the apparent incompatibility of dates relating to the kingdoms of Israel and of Judah. However Thiele [52] has been able to remove such problems, stemming to a large extent from the fact that the two kingdoms followed different calendars, one Assyrian, the other Egyptian (the beginning of the year being different, either in autumn or in spring). Therefore we get the date 1447 BC for Exodus, accepted by Velikovsky and a number of other scholars.
2. Dating the Deucalion Flood is not immediate from the classical sources, since Plato states that Solon was going to date it by generation counting, whose number is not given. I remember reading in some classic source that there were 20 generations till the first Olympics, but I am unable to retrieve the specific source (reading about three books per week and no more having the memory of younger years leads to such type of problem). I have by no way made a complete survey of the classical sources about Deucalion. It is however interesting that dating Deucalion at circa 1500 BC was commonly accepted about two hundred years ago, when classical literature was more studied than now, see for instance the *Classical Dictionary* of Lempriere [53]. About dating the end of the great Minoan civilization, and the several eruptions of Santorini, there has been much debate, see [54, 55]; a date around the mid 15th century seems to be acceptable.
3. There is also discussion about the date of the invasion of India by the powerful Hindi or Sindhi, who imposed their dominion in the northern part of India, where, in the valley of the Indus river, had developed the great civilization of Vallindia, see Mandel [65]. A date around the mid 15th century seems acceptable. It is quite possible that there had been invasions before, on a smaller scale, by the way of Kashgaria, Karakol and the passes leading into the Hunza valley (Mintaka and Khunjerab). Entering the low Indus valley by such a way is a hard task but not an impossible one. The most fertile part of the Indus valley lies at the foot of the mountains. It is called Punjab/Penjab, most probably this being the mysterious biblical *land of Punt*, i.e. *of the five rivers*, called in Sumerian documents *Meluhha*, this probably meaning the *land of the Meru*, the mount Meru being associated with the three pyramidal sacred great mountains Kailas, Hunza Kunji, Rakaposhi. The fact that the waters from these mountains all go to the Indus is probably the reason why in the 1439 map of Fra Mauro, now at the Marciana library in Venice, the Indus is called *Ameru*, i.e. *the water (river) from the Meru...* The use of these passes in very ancient times has been shown by the discovery of over ten thousand rock inscriptions between Gilgit and Khunjerab during the construction of the Karakorum Highway, completed around 1980. The inscriptions are as old as the 4th millennium BC; a few dated at the second millennium BC had been found by Aurel Stein [56] at the end of his adventurous career. Remnants of Indo-Europeans who came by this way were

possibly the Kafirs living in the Chitral area visited by Maraini [57] in 1959, whose anthropometric features, cultural and living habits were clearly of north-Eurasian origin. By this way India was briefly invaded by the Chinese in the first century BC and again by this way the great Kushana emperor Kanishka invaded Chinese controlled territory, occupying Kashgar for some time.

The Hindi/Sindhi after a while mixed with the culturally more advanced local population, leading to the present form of Hinduism, where pre-Indo-Aryan elements are present (Shivaism, Tantrism, Yoga...), see Daniélou [66]. They brought Vedism, albeit the Rig Veda may be not only a religious text, but a description of even more dramatic events that affected Earth long before the Indo-Aryan migration to the south (even predating the Biblical Flood, i.e. the second catastrophe in Plato, datable at 3161 or 3172 BC, on the basis of arguments to be developed in a planned monograph). For an interpretation of the Rig Veda, and the very ancient astronomical book Surya Siddhanta, in astronomical terms, see Ackerman [27,28].

4. An event of more than continental effects as the one we have described (Phaethon exploding over Denmark after weeks of destructions due to fragmentation episodes) must have left geological evidence, even if it was certainly many orders weaker than the impact with a meteorite of about 10 km diameter that probably terminated the era of the dinosaurs, see Hsu [58]. We thank geomorphologist Stuart Harris, who is preparing a monograph on such a critical period, for the following information:

A – analysis of the California Bristlecone Pine tree database shows a pronounced minimum at 1445 BC. This year is part of a sequence of dust layers and minimum tree rings every 10, 12 or 18 years. But the dust layer of 1445 BC is quite different from the rest. From an archaeological viewpoint, then, 1445 BC is the date of the Plague of Darkness. This is derived by counting actual years – there is no recourse to radiocarbon estimates, see [59]. Here we notice that not only darkness but also strong cooling would have produced a minimum growth, and that while dendrochronologists are very confident of the accuracy of their counting, errors can never be discounted (e.g. an axis reversal might result in two layers, or a strong cooling episode might result in no layer; also any local disturbance affecting the roots of the tree, that will survive but be impaired for a number of years, may affect the number of layers); anyway Harris noticed a glitch in the database that moved the year to 1446 BC, see [60]

B – I revisited the GRIP2 ice core data and found that it does contain a record of the dust associated with the plague of darkness...A group of scientists measured insoluble particle size from the present to 1800 BC. Their data shows that the largest particles ever recorded, by a factor of 3, occurred in a single sample covering the years 1444-1443 BC.... see [61]. Again taking into account that dating of the layers may not be so precise as scientists claim, and that possibly more than one year might be needed for the dust to reach Greenland (it took a four years for the Tunguska dust to reach Antarctica), the above information is a remarkable evidence that dust, whose origin might have been partly volcanic, partly from the disintegration of initial Phaethon, partly from fragments of Phaethon having impacted other parts of the world (there are reasons to include here the Carolina Bays and the clathrate rich Caribbean basin), affected the atmosphere, leading to darkness, that reduced vegetation growth, and cooling, hence causing large migrations from the middle and high latitudes to south.

C – the earthquake following the considered super Tunguska event, and possibly earlier smaller direct impacts, can result in a number of geological effects in addition to the awakening of volcanoes (we considered Santorini and the many volcanoes in the Dankalian depression). One special effect, that will be amply discussed in the forthcoming monograph by Harris, is the sudden delivery of methane that is contained in sediments in the form of clathrate, an unstable compound of water and methane. Huge amounts of such clathrates are found in the Caribbean sea, especially in front of Texas and Louisiana. The sudden delivery of sizable quantities of methane from these structures probably takes place occasionally even now, and would be the natural explanation of the “mysterious” events described for the Bermudas triangles (disappearance of ships and airplanes). A very large emission of methane would lead inter alia to a great tsunami. Harris claims to have established, from analysis of satellite photographs, that such tsunamis affected the Mississippi basin and the US Atlantic coast around 1450 BC. It was this claim that led me to suggest him to look for a relation with the Exodus event. According to his latest estimate, see [62], there is evidence of tsunami in year 1445 BC. He has another evidence for year 1404 BC. Notice that 40 years after exit of Egypt, the military campaign against Canaan began, the Hebrew being led by Joshua. Among the events of such campaign the phenomena of the falling down of the walls of Jericho and the sun standing in the sky suggest another catastrophic event, related most probably to an axis reversal. See Spedicato and Del Popolo [63] for a mathematical analysis of this phenomenon, which would move Earth to a nearby orbit (with a change of the day length of about 10 minutes and of the distance to Sun of about 150.000 km, a too little change to affect the Earth climate; but the number of days in the year would change by two....).

Another possible effect of the methane explosion in the Caribbeans should be considered, namely that it carried in the upper atmosphere also amounts of oil. So hydrocarbons from the Caribbean might have contributed additional material in the stratosphere to produce manna. If the oil from the Caribbean was the main source for manna, then we have an explanation why it took several days for manna to appear.

The above considerations support the date 1447 BC as the year for Exodus and the other considered events. According to the standard Egyptian chronology, see e.g. Baines and Malek [67], this year would pertain to the New Kingdom 18th dynasty, dated at 1550 to 1307 BC. The Hyksos, terminating the Middle Kingdom, would have arrived circa 1783 BC, to initiate the 13th dynasty, the following dynasties being in power either in the Delta or in the south. Particularly troublesome is the fact that no Egyptian references exist dealing with the departure of the Hebrew, the destruction of the Pharaoh army or even the Ten Plagues (unless, as suggested by Velikovsky [8], the Hermitage and the Ipuwer papyrus, describing catastrophic event, refer to this time; notice also the existence of a stele found near Gaza referring to a Pharaoh who died in a *whirlpool*). This problem has led scholars, who accept at least a core of truth in the book of Exodus, to propose several Pharaohs and theories about who left, all explicitly or implicitly meaning that the biblical tale grossly exaggerated the facts. The chronological change proposed by Velikovsky [18] completely removes this problem. The Hebrew leave just before the Amu/Amalekites come, which are the Hyksos of the Manetho story. Incidentally we have argued, see [68], that the name *Hyksos* means *people of the horses*, the name that also the Chinese gave to the invading Mongolians (horses of the best quality were bred in Turan; some two thousand years ago the horses of Ferghana were immensely prized, one horse worth more than one Chinese princess of imperial blood...). Part of the Egyptian army (not necessarily also the Pharaoh) perished in the Aqaba gulf when the waters returned; another part was probably drowned, with most of the civilians, when the Mediterranean waters pushed inside the Delta; the

remaining troops either survived in the south or were destroyed by the advancing Amu people, who most probably were not significantly affected in their march by the catastrophes described. For the next 400 years Egypt was under control of the Hyksos. They destroyed most of what had been left by the natural disasters, and so they were the real villains, their invasion being immensely more grave in the eyes of the later Egyptian writers than the escape of some thousand of slaves.

Here we can give, with Velikovsky, the name of the Pharaoh who dealt with Moses, namely Dudimose, or, in Josephus *Contra Apionem* quoting Manetho, Tutimaios. About him almost nothing is known from Egyptian sources, his name having been preserved anyway in the badly damaged Turin papyrus that probably had a complete list of the Egyptian pharaohs.

We have not discussed the question of radiocarbon dating, for two reasons:

- radiocarbon dates that fall out of the date established on the basis of archaeological arguments are usually discarded, with the justification that the treated specimen has been contaminated
- it is known, see [57], that radioactive carbon C14 can be created in the atmosphere by an impacting body, thereby modifying the supposed fixed ratio of C12 and C14. Moreover the events considered by Harris to have taken place in the Caribbean would lead to a huge increase of carbon in the atmosphere (not only methane but also CO2 would be liberated from the sediments), further complicating the ratio problem. Therefore radiocarbon dates are certainly less accurate than those provided by dendrochronology, ice cores, palinology (we are not aware now if pollen counts indicate a crisis around 1447 BC) or, best of all, precise year counting as is done in the Bible. Moreover it should be remarked that dates based upon the decay of radio-nuclides assume that the half-time decay constants are fixed. In 2001 the eminent Cambridge physicist John Barrow claimed the recent discovery that the *fine structure constant* increases with the expansion of the universe (if light speed and electron charge remain constant) as the *biggest discovery in 50 years*. Such result had been predicted in writing three years earlier by physicist Robert Bass, with the observation that an immediate consequence was that the so called half-time constants would increase with time, with enormous effects on all the dating so far performed for geological layers !!! See [69], and wait for a new dating of geological layers!

Finally we should discuss the numbers 805 and 810 given for the considered events in Orosius with reference to the foundation of Rome. If Rome was founded in 753 BC, the traditional date, then the events would have happened about 1550 BC, i.e. about a century before our date. It is likely that Orosius, or his sources Tacitus and Trogus, are not accurate, even letting apart the fact that there are doubts about the true date of the foundation of Rome. Unfortunately most of Tacitus and almost all Trogus are lost, so we cannot check how they obtained such numbers. Of course it is also possible that an error was made in copying the Orosius manuscript, or the number was changed by a copier who thought he knew better. This type of problem does not affect biblical codes, since absolute correctness in the new copy was a fundamental requirement, even so that errors could not be corrected but the whole scroll had to be written anew. The perfect concordance of the text of Isaiah found in Qumram with the Leningrad code, the oldest extant code but about 1000 years later, is a confirmation of such accuracy over the centuries. No copier considered a grave sin to change the text of Orosius....

Appendix 2: the route of Moses to the point of the passage

It is not here the place of a full discussion of the route taken by Moses out of Egypt, up to the point of the passage of the Red Sea, then to the Mounts Horeb and Sinai where he received the Laws, finally to Canaan, whose conquest was reserved to Joshua, 40 years after the exit from Egypt. We leave to a future work a more extensive study of this problem via also the analysis of Arabic maps. Here we shall deal briefly only with the route from Egypt to the point of passage.

According to the Bible, the Hebrew entered in Egypt at the time of Joseph, 210 years before Exodus, increased in number faster than the Egyptian population, so that an unnamed Pharaoh, afraid that they would become too powerful, decided that all Hebrew males had to be eliminated. This law probably took place around the time Moses was born, i.e. about the year 1487 BC in our chronology. It is of course unlikely that the law was strictly enforced, but it was certainly applied to a significant degree, as indicated by the following two items of evidence, see Rohl [73]:

- analysis of the bones in a cemetery used by slaves indicates a number of infant bones higher than the usual
- names of slaves were found in the ruins of a private palace near Thebes; they are mainly Semitic names, typical of Hebrew people, but mostly names of females appear.

We may also provide a reason why the Hebrew increased faster than the Egyptians. There is no reason why their birthrate had to be higher than that of the Egyptians, both people having certainly a very high birthrate (of the order 7%, like in medieval Florence...); however we know from Diodorus, who describes conditions of his time that were probably also true at older times, that the Egyptian peasants cared of their children only until they stopped sucking. Then the children had to find the food by themselves. This resulted of course in a high death rate of children, letting the fittest to survive. Hebrew always had the greatest care for their children, hence their children likely had a lower death rate, implying a growth of the percentage of the total population that was of Hebrew blood.

We may also consider another consequence of the law establishing the elimination of the male infants. Only women would survive, not for a life of chastity of course, but to father children to Egyptians or other non Hebrew people. So in order to avoid the disappearance of their people, the seniors must have decided that being Hebrew depended only on the mother being herself Hebrew. A decision that is still fully valid.

The Hebrew in Egypt were apparently concentrated in the eastern part of the Delta, in a settlement called Goshen, where probably later (several centuries later in our chronology) Ramses II build his famous summer palace Pi-Ramses. Goshen has been excavated recently by the Austrian archaeologist Bietak, who has uncovered evidence of a settlement by Semitic people, and even an intriguing room under the soil with a defaced statue of a man covered by a special mantel. According to Rohl [73] this might have been the room containing the bones of Joseph, which were taken away by Moses, and the statue a representation of Joseph, with the special multi-colors mantel he was wearing when his brothers sold him to Madianite traders. In Goshen the Hebrew were involved in slave work, mainly to build bricks for construction of public structures. Here Moses killed an Egyptian officer who mistreated the Hebrew and had to flee from Egypt.

It is unlikely that all Hebrew were in Goshen, many or most of them were distributed around Egypt, down to the borders of Nubia; so it is virtually impossible that all Hebrew left the country

with Moses, the time to collect them would have been very long and Moses had a special urgency to leave, if we are correct in our hypothesis that he knew of the arrival of the Amu.

The usual translations of the Bible, including the Septuaginta, state the Moses left with 600.000 men (not including children). This number would imply a total number of his followers of several millions, taking into account that women had to be the majority and that many slaves (probably non Hebrew husbands of most women...) were with them. This number is impossibly high, would generate tremendous management problems, not to say of the food and water problems in the desert. The number is certainly a wrong translation, possibly due to a desire to show the greatness of the Hebrew tribe, of the word *Eleph*, *Aleph* that, as suggested by several scholars including Ricciotti [4], means not only *thousands* but also *groups*, *clans*, *families*. Six hundred families, led by senior Hebrew who either were born before the law establishing the killing of the male babies or somewhat escaped death as was the case with Moses, represent a reasonable number. Each leader would have been accompanied by a group of persons, mainly women, numbering perhaps between 10 and 100. Assuming for default that such number was 50, this would give a total of 30.000 persons, a very reasonable number for the route that Moses had in mind. Not too many problems however even if the number was around 100.000. Notice also that the Pashtun of Afghanistan, who claim to be descendant of the Ten Tribes deported by Sargon II, are divided in about 400 clans all having clearly Hebrew names, see Kersten [43], names that may preserve the names of a large part of the 600 clans that left Egypt.

We are now going to propose a route that, as far as we are aware, has never been considered till now. Many investigators of the problem, e.g. Goedicke [7] and Anati [30], have considered a route along the Mediterranean, where the main road to Palestine, Phoenicia and Syria was found, called the *Royal Road* or the *way of Horus*, the road that was certainly usually followed by the Amu in their past incursions against Egypt, and that would be later followed by Cambises, Alexander, the Arabs, the Turks.... Under such a scenario the crossing of the Red Sea would correspond to the crossing of the shallow lakes that border the northern Sinai (now and probably also at Moses time), rich in reeds, and noting that the biblical name for the Red Sea, *Yam Suf*, also means *Sea of reeds*. We reject this scenario because from Josephus we know that the road was long and not the usual one, hence it could not be the Royal Road; along this road there are no impassable mountains moreover. This road would put Moses in the risk of meeting the Amu, too strong for him and probably also for the Egyptians. Finally the Hebrew would have been drowned in the tsunami that, following the Phaethon explosion, certainly flooded all northern Sinai peninsula for tens of km in the interior.

A second road proposed by several scholars, e.g. Barbiero [6], Phillips [31] and Manher [32], has the Hebrew passing near present Suez, location in ancient times of another shallow lake, Lacus Serbonis, and then moving towards Palestine by Central Sinai, a higher region with non difficult passes below 1000 meters (near the Mitla pass there was a famous tank battle during a recent conflict between Israel and Egypt). While the tsunami problem here would not arise, still this road would not be safe for Moses against the Amu danger and would not be unusual or particularly longer than the standard road.

Our proposal has the following features:

- it provides a longer road, by a factor at least two, over the Royal Road, but provided with water in many places; it agrees with a statement in Cosmas Indicopleustes [86], V, 14:...*they had the sea on their right, the desert on their left...*
- it would make Moses safe from the Amu, except possibly when he had to cross a stretch of the *desert of Shur* before reaching the safe mountains where he gets the Tablets of the

Law (as proposed by Phillips [31] and other authors before him, with whom we tend to agree, these mountains are in present Jordan, in the region of Petra. They are called *Jebel Haroon (mountain of Haroon)*, and there is a *Wadi Musa* and an *Ain Musa (source of Moses)*. They were inhabited by the Edomites, descendants of Esau, a people who probably had been contacted by Moses when he was in Madian. Esau being the first born of Isaac, it is virtually certain that he got from Isaac since a child knowledge on the past of the family of interest to Moses that had not been given to Jacob; here may lay the source of the material given in *Genesis...*)

- it provides an explanation of what was the mysterious Baal Sefon
- it may exactly pinpoint the place of the passage, albeit presently we are unable to do it with great precision, this requiring better maps than those available to us now and a local exploration, planned for a next future, hopefully with the sub water archaeologist Marco Chioffi...
- it provides a motivation why the Monastery of St Catherine was built in the southern part of Sinai, albeit we agree that this was not the place where the Tables were given
- it provides a new identification of *Elim* and *Migdol*.

We start by observing that Exodus (or Numbers) do not present the stages of Moses day per day. Only the important places are listed, either because the Hebrew spent there a longer time or because they were places with important natural or man made features. The time to the day of the passage should have been about 30 days, Moses reaching the Mountain of God in the third month after the exit from Goshen. The distance from Goshen to our point of passage is about 600 km, implying stages of about 20 km/day, an acceptable value. Note that Laurence of Arabia crossed from Aqaba to Suez, about 300 km, non stop in one day and a half, albeit using a camel. The standard time to reach Palestine from Egypt is given by Philon of Alexandria as only 3 days, see [79], section 163.

The first stopping place after leaving Goshen is named *Succot*, meaning *place of reeds*, that can be safely identified somewhere near present Suez, where brackish water in lagoons (now called the Great and the Little Bitter Lakes) allowed the growth of reeds. A wall, *shur* in Egyptian as noticed by Manher [32], had been built by Sesostri II, and may have given the name to the desert east of it. We disagree with Manher [32] that crossing the wall was a difficulty. The earthquakes taking place during the Ten Plagues had certainly badly damaged it and the thousand of men with Moses were anyway certainly able to open a passage.

After Succot Moses led his people SE, in the direction of the *Glory of God*, i.e. of Phaethon that was moving from the Indian Ocean towards northern Germany. He followed the rather flat and drab coast of the Sinai peninsula, then very sparsely populated by the Ichthyophagoi (living along most of the coasts of the Indian Ocean of seafood, speaking a very strange language, as described by several classic authors, especially in the *Peryplus Maris Erythraei*, see [82]). Ample water was probably available in places that even now bear names as *Springs of Moses*, *Hammam Pharaun*, *Hammam Mussa*, *Hammam* meaning *communal bath*, a term suggesting big pools of clean water. Many rivers descend as wadi from the Sinai massif, which reaches over 2500 meters; they might have had some water at the time of Exodus; even if dry, water can usually be obtained by pushing a reed in the sandy soil, to reach the water below the surface, as Bushmen have done for centuries in the Kalahari desert (from Herodotus we infer that Bushmen, called Troglodytes, lived in parts of the Egyptian desert, and possibly in Sinai, at his time; they were pushed to the south of Africa by the Bantus, who arrived there at the time of the first white immigrant Boers). A technique certainly of immense antiquity and well known to the Ichthyophagoi.

The next important stop is Baal Sefon, where the Hebrew take away gold, one third of the riches that Joseph had amassed by selling food during the great shortage, and where a statue existed and was not touched by them, that had survived the events of the Ten Plagues, contrary to what had happened to statues in Egypt proper, see the *Legends of the Jews* quoted in Section 2. This information indicates that the place had to be a kind of temple-fortress, Baal meaning Lord. The problem is Sefon.

For Sefon in the literature, see e.g. any Biblical Encyclopedia, we find the following “meanings”:

- *Lord of the North*
- *Lord of the flies* (!!)

We now assume the following admissible phonetic changes in Sefon

$$SEFON = SEFO = SIFO = SIFA = SIVA = SHIVA$$

Therefore we propose that Bal Sefon was a temple dedicated to the Indian divinity Shiva or Siva, predating the Indo-Aryan invasion. The name *Baal Sefon* thus would mean *Lord Shiva*. Notice that according to the *Sifat Nama...* [78], Shiva was one of the three main gods of the Kafirs of Kabulistan in the 15th century, with the name *Sharvia*, another divinity being *Lambam*, identified with Lamech, the father of Noah, whose tomb was considered to exist in that region. Our identification is based upon the fact that contacts between Egypt and India were active during the Middle Kingdom. They were managed by the great Indian navigators called *Pani*, see Sahai [74] (who, being himself a Brahmin disregards the existence of such contacts before the Indo-Aryan invasion...), who were able to exploit the monsoons for long distance travel to Middle East, SW Asia, and possibly even around Africa to Europe and Americas. They had important bases on the western coast of India including certainly the now submerged town named Dwarka, see Gaur [75], located on a big island not far from the mouth of the Indus (now joined to main India as Peninsula of Kutch, a name probably indicating contacts with Kush...), probably the island referred to by Aethicus Ister [76] as being in front of the mouth of the river Euphrates/Indus. Another likely port was in the small island of Elephantina, in front of the present peninsula of Bombay/Mumbai, famous for containing an extremely ancient temple of Shiva, represented by a statue with three heads, see Maraini [77]. They would export to Egypt precious material as lapis lazuli from Badakshan, avoiding the overland passage prone to attacks by bandits, gold from the great Tibetan mines near the sources of the Indus on the north slope of the Kailas, ivory, emeralds, possibly asbestos from Bactriana (we are prone to think that asbestos is the mysterious *bdellium* quoted in Genesis as a product of the land of Havilah), slaves. We can even conjecture that Moses, during his years in Madian, was in touch with the Panis, imported precious items from an India he knew well, and was possibly even in contact by letters with his family in Kush. Maybe by this way he was informed of the planned move of the Amu towards Egypt. And by this way he returned to Kashmir...

We can retrieve the meanings of Sefon given above as follows:

A – Shiva had his throne on Mount Kailas, in present Tibet, hence north of India, and precisely north of the first ridge of the Himalayas

B – Indians believed in metempsychosis certainly before the arrival of the Indo-Aryans, hence they would never kill insects like flies, who might have been reincarnations of their ancestors. In India even now there are temples dedicated to snakes or rats. Indians would not care if there were plenty of flies around, attracted by the butter offered to the statues of the gods and melting for the heat; flies were actually needed to clean the temples! The association of Shiva with flies

would have been noted by Egyptian or Middle East mariners voyaging to India and reported back home as something very peculiar.

Another possible association of Baal Sefon is with *Baal Zebub*, a Cananean and Phoenician divinity that has been considered in devilish terms, and considered in later Hebrew thought to be a devil, second only to Satan. By similar acceptable phonetic changes as above we can transform Sefon into Zebub. The association with a devil is possibly due to the fact that many Indian gods were represented with statues having features easily considered in the west as monster-like or devilish, as the three heads quoted for Shiva's statue in Elephantine, or the statues of Shakti, the mystical wife of Shiva that reincarnated 10 times as Kali and other goddesses, all shown in frightening form, with colliers of skulls, or without head, this kept in one hand.....As we noticed above, Phoenicians are probably related to the Pani, and Cananaeans, in Salibi's scenario, were 2000 km closer to India than Egypt, with good ports available in the southern part of the Red Sea (they would export especially incense, myrrha, and their extraordinary honey, even now sold at 100 dollars a litre...), hence they had probably adopted some gods of Indian origin.

Our interpretation of Baal Sefon as Shiva suggests now its location. The Panis, on their way to the northern side of the Red Sea, would meet before reaching the ports near Suez and Eilat, the Sinai peninsula, jutting out in the sea as a triangle having on one side the Gulf of Suez, on the other the Gulf of Aqaba. The vertex of the triangle may be considered now as the small peninsula named *Ras Muhammad*. Now *ras* means *head* in Arabic, geographically hence "promontory". *Muhammad* probably refers to the Prophet of Islam, indicating that a place before named according to a divinity of a non monotheistic religion, was renamed after the prophet of strict monotheism. Now it has been a very common procedure for ancient navigators to build on well visible promontories temples with statues of gods, to protect them from the perils of navigation. Examples in the Mediterranean are the Temple of Poseidon at Cape Sounion in Attica and the Temple of Hera Lacyna in Calabria; several temples on the coasts of the Atlantic and the Channel were quoted by Pytheas, see [17]. So, it is likely that the Pani used to build such religious buildings. It is unlikely that Baal Sefon had an important role for trade, unless the Ichthyophagoi were interested in some trade, being probably able to provide pearls and grey amber. They were anyway in small number, would not constitute a danger, hence the temple could be used as storage of precious objects (as was the case for many temples in antiquity). Thus the fact that Moses took away a large amount of gold is a possibility to be considered. Very likely Moses knew of the gold since his time at the court of the king and as an Egyptian military officer, not to say of his contacts with the Panis when he was in Madian. He may have been in good relations with the people in charge of the temple. So taking the long detour along the whole coast of the Sinai peninsula added the bonus of the gold in Baal Sefon to the security against the expected Amu.

From Baal Sefon Moses now moved along the Sinai coast facing the Aqaba Gulf. The place where he was reached by the Egyptian army (possibly aiming to recover the stolen gold; the horses and the chariots were probably taken there by boat, from the port in Egypt at present Mersa Gawasis, in use since the third millennium BC) is called in Exodus *Pi-Hahiroth*, translated with *epaulis* in the Greek Septuaginta, with *Domaine* in our French translation of the Septuaginta. Pi-Hahiroth may be a translation into Hebrew of an Egyptian word meaning *place of marshes*, thereby possibly indicating a flat area near the sea where some wadi could overflow in the rainy season, so a place with availability of water. This place was set between Bal Sefon, in the south, and *Migdol* in the north. From the considerations that we already gave, it was likely close to present Abu Nuweiba, where the mountains of the Sinai massif reach the sea leaving only a narrow passage. Here the trail had to leave the steep coast over for an inland passage by the Wadi Watir, then reaching the *desert of Shur* by a low pass. Under this identification Pi-Hahiroth would be about 140 km from Baal Sefon as the crow flies, a distance that in the clear

air of the desert allows perfect visibility. North of Pi-Hahiroth was Migdol, a name indicating a tower, or a fortified place. We think that Migdol was located either in the short stretch of coast between present towns of Eilat and Aqaba, or on the *Island of the Pharaoh (Jezirat Faraun)*, where there was most probably the main port used by the Israelites to trade with Egyptians, Arabs and other populations. The island is the most likely location, because at Solomon time, some 500 years after the considered event, it was transformed into the important port of *Ezion Geber*, wherefrom ships went to Punt (Punjab, India) and to Ophir (Africa). Here recently the remains have been recovered of a ship dated at Solomon's time. Within our scenario it is clear that the return sea wave after the wind stopped destroyed everything at the end of the Aqaba Gulf, hence it is extremely unlikely that any archaeological remain may be found of structures dated at Moses time. Distance from Pi-Hahiroth to Migdol in our identification would be less than 100 km as the crow flies, allowing again full visibility.

After the passage of the landslide blockading his way, Moses most probably took the way leading to the desert of Shur by the way of Wadi Watir. This road was the natural choice, since following the coast, where there is a road now, was probably too difficult, if there was a road at that time, and moreover the tsunami that had destroyed the Egyptians certainly had greatly damaged any trail, making a passage probably impossible. We are presently unable to pinpoint the place (possibly *Ain el Furtaga?*) called *Mara* where bitter water was found, changed by Moses into sweet water, a fact whose explanation we leave also aside. After *Mara*, the Hebrew stopped at a place with 12 sources and 70 palms called *Elim*. It is quite natural to identify this place with the area under *Jebel Ghlim*, that is reached by a short deviation to the south from the way to the desert of Shur. Moses needed to stop a number of days in order to ascertain whether the Amu had already arrived and to evaluate the effects of the tsunami on his itinerary. We think that his battle and victory with Amalek once he reached the desert of Shur involved only part of the Amu, possibly the last group. He may also have wanted to visit again the place where the voice from the Burning Bush had spoken to him, that we think was indeed near where St Catherine monastery was built, some 50 km as the crow flies from *Elim*. Here a church was built around 330 AD by Flavia Elena, mother of Constantine, in a place where local monks pointed out what they believed was the remain of the Burning Bush.

Here we stop, since a fuller analysis of the geography of Moses movements until he left for Kashmir before the Hebrew began the attack to Canaan will be made hopefully in another work.

Appendix 3: mathematical problems related to the proposed scenario

The scenario described above needs, in addition to the historical concordances that we have provided, geological and mathematical confirmations. Here we do not deal with the geological problems involved (determination of tsunami evidence in the Baltic, North Sea, Mediterranean, Red Sea...; finding of soot layers of the type associated with the Usselo horizon, see Kloosterman [70]; sediments datable to volcanic dust from the Afar volcanoes in the Red Sea and in front of the Nile Delta...). We only briefly consider how mathematical modeling and computation might validate or disprove the proposed model.

It is certainly impossible to model the whole episode of the capture of a cometary/asteroidal type object as Phaethon was, according to our scenario, and especially of the several fragmentation episodes that must have taken place, with debris and dust perturbing the atmosphere and several pieces impacting oceans and continents. Also we do not know at what elevation, with what energy, from which direction, the object exploded over the Eider. But modeling the effects on

the atmosphere of a large body colliding with Earth is possible. This task has been performed with increasing degree of precision in the last thirty years, some of the best results being due to the physicist Elisabetta Pierazzo, working in Arizona; see also [84] where the authors considered the impact of a 10 km sized object with particular interest to atmospheric effects (they found that a part of the atmosphere in the hole punched by the object gets escape velocity, hence leaves our planet; but not so much as to dangerously deplete the atmosphere). As we wrote before, atmospheric effects at some distance from the explosion point are represented mainly by a hot wind with possible long duration. In our case we are especially concerned not with the general effects but, in order to validate the historical reconstruction, with some specific local effects, namely:

A: duration of the wind in the Aqaba gulf, its temperature, its speed

B: how much the sea level lowered in the Aqaba gulf and how much it increased at the Bab el Mandeb exit of the Red Sea

C: how long did it take to the waters to return to Nuweiba and how tall was the wave front of the returning waters

D: how much the sea surged in front of northern Crete

E: how much the sea surged inside the Patras-Corinth gulf, especially in the area of Amphissa and Corinth

F: how much the sea surged over the coasts of Abruzzo, Molise, Puglia

G: how much the sea surged over the northern Mediterranean coast

H: how much the sea surged over the Baltic and North Sea coasts.

Such problems must be solved using as parameters height and energy of the explosion, which can be set without loss of generality over the mid course of the Eider. The equations (parabolic-hyperbolic partial differential equations with free boundary) are basically known and good albeit expensive solutions methods are available. Present computers are quite fast and possess big memory. A precise calculation requires to input data on the topography of the area around the explosion point for a radius of at least 5000 km, both pertaining to the bottom of the seas and the surface of the continents. A huge task (more than one billion data to be input) but a feasible one, of the greatest interest for the reconstruction of a crucial past event, and useful also to evaluate the effects of another not impossible event happening in our time!

Appendix 4. Who was Phaethon?

According to Greek myth, Phaethon was the Sun of Helios, usually considered to be the sun. From our scenario it was an object captured by Earth in an unstable orbit, subject to fragmentation episodes (which indicate that it had no great strength, otherwise it would have survived entering the Roche limit) and whose core finally entered the atmosphere on an almost tangential orbit, to explode over the Eider river. Size was probably at most a few km, say 2 or 3.

Now it is very unlikely that the object was in orbit around the Sun. It is in our opinion more likely that it was a satellite of another very luminous body, considered by man for a long time as a second Sun. In the light of the work of Velikovsky [8], De Grazia and Milton [9], Ackerman [27,28] and others that we do not quote here, it may have been a satellite of the object, initially extremely shining and called Agni in the Rig Veda, then losing its brilliancy and called Varuna, and finally ending up as our still very hot planet Venus. This suggestion agrees with the text of Hesiod given in section 2, where Phaethon is said to have been stolen by Aphrodites, a goddess to be associated, as a planetary divinity, with Venus. According to myth Athena-Venus was born from the *head of Jupiter*. Ackerman has interpreted this legend as Venus being born from the hot gases escaping from Jupiter in the location where is now the Red Spot. Here a planetary size body impacted in his scenario, delivering energy of the order ten to 40 erg (versus the ten to 30 of the asteroid that formed the Chicxulub crater and killed the dinosaurs), at a time to be set between the end of the Ice Age and the Noachian Flood, the event being described in the Rig Veda. We think that Ackerman's theory is the most important contribution to the understanding of the recent past of our planetary system, after Velikovsky's *Worlds in Collision*. We would date the birth of Agni/Varuna/Venus at circa 7500 BC, the time of the seven catastrophes documented by the geologist and paleontologist Alexander and Edith Tollmann [85] of the University of Vienna. Of course if Velikovsky and Ackerman are correct, so are ancient texts, read with intelligence, but no so are most people in the academia, a very good reason not to consider V & A.

Acknowledgements.

This author thanks for discussion, comments and providing important documentary material: John Ackerman, Antonio Agriesti, Emanuele Anati, Flavio Barbiero, Marco Chioffi, Luce Ciullo, Stuart Harris (particularly), Gabriele Mandel, Michele Manher, S. Schaible, Felice Vinci. But especially we must remember Immanuel Velikovsky and Kamal Salibi: only standing on the shoulders of these giants it was possible to see the forest beyond tree.

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