GEOLOGY

Section 7. Miocene period. **- Eocene**
(61:0.2) During the Cenozoic, the world's landscape presented an attractive sight: hilly heights, spacious valleys, full-flowing rivers, and vast forests. Twice through this stretch of time the Isthmus of Panama rose and fell; three times this section reached the Bering Strait Bridge. The types of animals were as numerous as they were varied. The forests abounded in birds, and the whole world was a paradise for animals, notwithstanding the continual struggle of evolutionary species for supremacy.

Point I. The Eocene period. New continental droughts. Age of the Early Milk Askers

Point A. 50,000,000 years ago
(61:1.1) 50,000,000 years ago the continents were generally either above the level of the sea or only barely hidden under water. Suddenly, the placental milk-suckers appeared. Milk-suckers have a colossal advantage in the struggle for survival.

Point B. 40,000,000 years ago
(61:1.12) During the closing period of this age, much of Europe was submerged. After a slight elevation of the land, the continent was covered with lakes and bays. The Arctic Ocean continued southward through the Ural Basin, joining the Mediterranean Sea, which at that time was expanding northward, leaving the heights of the Alps, Carpathians, Apennines, and Pyrenees above the water in the form of sea islands. The Isthmus of Panama rose, separating the Atlantic and Pacific oceans. North America was connected to Asia via the Bering Strait, and to Europe via Greenland and Iceland. The circle of continental land in the northern latitudes was broken only by the Ural Strait, connecting the Arctic Sea with the extended Mediterranean Sea.
(61:1.14) Throughout this period, so called the Eocene, the evolution of mammals and other related forms of life continued practically uninterrupted. At this time, North America was joining all the continents except Australia, and the world was gradually filled with a fauna in which various types of primitive mammals were represented.

Point II. Oligocene period. New floods. Era of more developed milk-asking

Point A. 35,000,000 years ago
(61:2.3) 35,000,000 years ago began the age of world domination of the placental milk-suckers. The broad southern land bridge reconnected the then vast Antarctic continent with South America, South Africa and Australia. Despite the concentration of land mainly in high latitudes, the world's climate remained relatively mild due to the colossal increase in the water area of tropical seas. Moreover, the uplift of the lands was insufficient for the formation of glaciers. Extensive lava flows were observed in Greenland and Iceland, and a certain amount of coal was deposited between these layers.
(61:2.13) Towards the close of the Oligocene, covering ten million years, plant life, and also sea and land life, had largely completed their development, and existed on the earth practically in their present form. In subsequent times considerable specialization took place, but by this age the ancient forms of most modern living things had already appeared.

Point III. Miocene period. Formation of modern mountains. Era of the Elephant and the Horse
(61:3.1) The uplift of the land and the parting of the seas brought about a gradual change in the world's climate, which became cooler but still mild. In Greenland, redwoods and magnolias grew, but subtropical plants began to migrate south. By the end of the given period, these heat-loving plants and trees basically disappeared in the northern latitudes, and their place was taken by more cold-resistant plants and deciduous trees.
(61:3.2) A great variety of new grasses appeared, and the gradual modification of the teeth of many mammals led to the establishment of the present grazing type.

Point A. 25,000,000 to 15,000,000 years ago

Point 1. Uplift of continents, warming of land.
(61:3.3) 25,000,000 years ago, after a long period of continental uplift, a slight submergence of land took place. The Rocky Mountain region remained at high elevation, so deposition of erosional materials continued eastward throughout the lowlands. Again the Sierra ranges rose; in fact, they have continued to rise ever since. To this time belongs the huge, six and a half kilometer long vertical fault in California.

Point 2. The Golden Age of Milk Askers.
(61:3.4) 20,000,000 years ago the golden age of the milk-askers began. The land bridge across the Bering Strait allowed many groups of animals to migrate to North America from Asia, including four-tusked mastodons, short-footed rhinoceroses, and many species of the cat family.

Point 3. Elevation of the mountainous regions of Eurasia, closing of the Straits of Gibraltar, sinking of the Iceland Bridge.
(61:3.7) 15,000,000 years ago an uplift was taking place in the mountainous regions of Eurasia, and some volcanic activity was observed over all that space, but not comparable to the lava flows of the western hemisphere. Such instability was characteristic of the whole world.
(61:3.8) The Straits of Gibraltar closed, and Spain was joined to Africa by the narrow strait crossing the territory of France, and the mountain peaks and heights rose above the water in the form of islands in the ancient sea. Later, these European seas began to recede. Still later, the Mediterranean joined the Indian Ocean, and at the end of this period the uplift of the Suez region caused the Mediterranean to become for a time a saline inland body of water.
(61:3.9) The Icelandic land bridge was submerged and the arctic waters mingled with the waters of the Atlantic. The Atlantic coast of North America cooled rapidly, but the Pacific coast remained warmer than at present. Vast ocean currents influenced climate much as they do today.

Point B. Biological development

Point 1. Elephants survived because of a large and perfect brain.
(61:3.10) The evolution of the milk-drinkers continued. In the western valleys of North America huge herds of horses joined the camels; this time was indeed the age of the horse, just as it was the element of the elephant. The horse's brain is second in quality among animals to that of the elephant, but in one respect it is clearly inferior, for the horse has never completely overcome its deep-rooted tendency to run away when frightened. The horse lacks the emotional control inherent in the elephant, and the elephant is extremely limited by its size and poor mobility. During this period the animal, something between an elephant and a horse, appeared, but it was quickly exterminated by the rapidly multiplying cat family.

Point 2. Biological development in this period made a great contribution to the creation of conditions for the subsequent appearance of man.
(61:3.12) In Central Asia there arose true types of both primitive ape and gorilla, which had a common, unpreserved ancestor. But none of these species has anything to do with the line of living beings that were subsequently destined to become the ancestors of humans.

Point C. Conclusion
(61:3.15) Thus ended the most eventful and interesting period in world history. This age of the elephant and the horse is known as the Miocene.

Point IV. Pliocene period. A New Rise of the Continents. Last migration of the milk-beggars.
(61:4.1) In this period the pre-glacial uplift of the land in North America, Europe, and Asia took place. The topography of the land was undergoing enormous changes. New mountain ranges appeared, currents changed their direction, and individual volcanic eruptions occurred all over the world.

Point A. 10,000,000 years ago

Point 1. Geological situation before the ice age.
(61:4.2) 10,000,000 years ago began the period of extensive local deposition in the continental lowlands, but most of these strata were subsequently rapidly swept away. Large areas of Europe were still underwater at the time, including parts of England, Belgium and France, and the Mediterranean Sea covered a significant portion of North Africa. In North America, extensive deposits were formed at the foot of mountains, in lakes, and in the great depressions of the land. These more or less colored deposits average only about sixty meters and fossils are rarely found in them. Two huge freshwater lakes existed in western North America. The Sierras rose; mountains Shasta, Hood and Rainier appeared. But it wasn't until the subsequent ice age that North America began its slow slide toward the Atlantic slope.

Point 2. For a short time all the continents except Australia were reunited.

(61:4.3) In a short time all the continents except Australia were reunited and a worldwide animal migration took place. North America was connected to both South America and Asia, and a huge exchange of animals took place between these continents. Asiatic sloths, armadillos, antelopes and bears appeared in North America, and North American camels moved to China. Rhinos migrated to all continents except Australia and South America, but they died out in the Western Hemisphere towards the end of this period.

Point B. 5,000,000 years ago
(61:4.6) The climate gradually became cooler; land plants slowly moved south. At first it was the increasing cooling that stopped the migration of animals across the northern isthmus; later these North American land bridges hid under the water. Soon there was the final submergence of the corridor connecting Africa with North America, and the Western Hemisphere became practically as isolated as it is today. Beginning at this time, the western and eastern hemispheres began to develop their own, distinctive types of life.

Point C. Conclusion
(61:4.7) Thus came to an end the period of nearly 10,000,000 years, but still the progenitor of man did not appear. This time is usually called the Pliocene.

Point V. The Pleistocene Period. The ice age

Point A. Formation of glaciers

Point 1. The northern parts of America and Europe were high mountains.
(61:5.1) Towards the close of the preceding period vast tracts of northeastern North America and northern Europe were highly elevated; in North America, the vast territories were located at an altitude of 9,000 meters and above. Previously, a mild climate prevailed at these latitudes, and the Arctic waters evaporated freely, remaining ice-free almost until the end of the Ice Age.

Point 2. Snow 6,000 meters thick.
(61:5.2) Simultaneously with these uplifts of the land, the ocean currents shifted, and the seasonal winds changed their direction. As a result, the combination of these conditions resulted in almost continuous precipitation falling in the northern elevations as the moisture-rich air currents moved. In these high-mountainous and therefore cold regions, snowfalls began, which continued until the snow thickness reached 6,000 meters. The centers of subsequent ice pressure-driven ice flows were determined by the greatest snowpack thickness as well as latitude. And the ice age continued until excessive rainfall ceased to cover these northern elevations with a vast mantle of snow, which soon turned into hard but sliding ice.

Point 3. Spread of the ice sheet.
(61:5.3) All the great ice sheets of this period were located on the highlands, not in the highlands where they may be found today. Half of the entire ice mass was concentrated in North America, a quarter - in Eurasia, and another quarter - elsewhere, mainly in Antarctica. Africa was hardly affected by the ice, but Australia was practically completely covered by the Antarctic ice "blanket".

Point 4. Six Ice Invasions.
(61:5.4) The northern regions of the planet experienced six distinct and distinct ice invasions, although there were numerous movements and subsidences associated with the activity of each individual ice sheet. In North America, the ice was concentrated in two and later three centers. Greenland was hidden under the ice, and Iceland was completely buried under the ice flow. In Europe, ice at various times covered the British Isles, with the exception of the coast of southern England, and spread into western Europe as far as France.

Point B. 2,000,000 years ago

Point 1. First North American glacier.
(61:5.5) 2,000,000 years ago the first North American glacier began its southward movement. The ice age was beginning, which lasted almost one million years - from the beginning of the movement of glaciers from the centers of pressure to the return to it. The central ice sheet extended south to Kansas; the eastern and western ice centers at that time were not so extensive.

Point C. 1,500,000 years ago

Point 1. Second Ice Invasion.
(61:5.6) 1,500,000 years ago the first extensive glacier retreated northward. At that time, a huge amount of snow fell in Greenland and northeastern North America, and soon this eastern mass of ice began to move south. This was the second ice invasion.

Point 2. The limiting effect of the first two ice invasions.
(61:5.7) In Eurasia these two ice invasions were not extensive. In the early stages of the Ice Age, North America was filled with mastodons, woolly mammoths, horses, camels, deer, bighorn sheep, bison, ground sloths, giant beavers, saber-toothed tigers, elephant-sized sloths, and numerous groups of the cat family and the dogs. But from that time on, their numbers rapidly decreased due to the increasing cooling. In North America, most of these animals died out towards the end of the Ice Age. Away from the ice, land and water life changed little.

Point D. 1,000,000 years ago

Point 1. An important event during this ice age was the evolution of primitive man.
(61:6.1) A little to the west of India, in the region now under water, among the descendants of the Asiatic migrating ancient North American type of lemur suddenly appeared the milk-suckers who became the early progenitors of man. These small animals walked primarily on their hind legs and possessed large brains relative to their size and compared to the brains of other animals. In the seventieth generation, a new, more developed group suddenly separated from this type of living beings. These new milk-suckers-man's intermediate ancestors, who were almost twice the height of their ancestors and who possessed proportionately enlarged brains-had barely established themselves when suddenly the third most important mutation occurred: the primates appeared. [At this time, as a result of the reverse development of the intermediate ancestors of man, the anthropoid apes appeared; from that time to this day the human branch has progressed at the expense of gradual evolution, while the apes have remained unchanged and even somewhat regressed.]

Point 2. Other processes took place during the Ice Age, but the action of the ice eclipsed all other phenomena in the northern latitudes.
(61:7.1) Other processes also took place during the Ice Age, but the action of the ice obscured all other phenomena in the northern latitudes. No other activity on land leaves such clear topographic traces. Characteristic rock blocks and surface fissures, such as sinkholes, lakes, displaced rock types, and stone flour-occur only in association with this natural phenomenon. Ice is also the cause of these elegant hills or undulating surface which are called narrow glacial drifts. According to its movement, the glacier displaced and changed the entire surface of the earth. Only glaciers leave behind these fabulous deposits-bottom, side, and terminal moraines. In North America, these deposits, especially the bottom moraines, extend from the east coast to the north and west. They are also found in Europe and Siberia.

Point E. 750,000 to 700,000 years ago

Point 1. Fourth Ice Shield.
(61:7.2) 750,000 years ago the fourth ice sheet, the union of the central and eastern North American ice fields, deepened in a southerly direction. At the peak of its advance, it reached the southern parts of Illinois, displacing the Mississippi River eighty kilometers to the west, and to the east its southern edge extended to the Ohio River and central Pennsylvania.
(61:7.3) In Asia the Siberian Ice-Shield made its deepest incursion to the south, while in Europe the advancing glacier stopped beside the upper barrier of the Alps.

Point 2. The Fourth Ice Age forced the Neanderthals and other tribes to retreat south.
(64:4.4) 750,000 years ago the fourth ice sheet descended far to the south. With the help of their sophisticated tools, the Neanderthals cut openings in the ice that froze the northern rivers and caught the fish that approached these openings. These tribes always gave way to the rising ice, which this time made its greatest incursion into Europe.
(64:4.5) At this time the Siberian glacier was making its greatest incursion in a southerly direction, forcing ancient man to retreat still farther south, toward the land of his ancestors. But the human species had already been separated to such an extent that the danger of further mixing with the rest of the ape relatives was greatly reduced.

Point 3. With the retreat of the fourth glacier, the life of milk-drinkers changed.
(64:4.6) 700,000 years ago the retreat of the fourth glacier, the most extensive of all the glaciers in the territory of Europe, was taking place; people and animals began to return to the north. The climate was cool and humid, and primitive man once again thrived in Europe and western Asia. In the northern regions, not long ago covered with ice, forests gradually appeared.

(64:4.7) The extensive invasion of the glacier brought no essential changes in the life of mammals. These animals were preserved in the narrow strip of land between the ice and the Alps, and after the retreat of the glacier they quickly spread again throughout Europe. From Africa, across the Sicilian land bridge, came elephants with straight tusks, rhinoceroses, hyenas and African lions, and these new animals practically destroyed the saber-toothed tigers and hippopotamus.

Point F. 650,000 to 600,000 years ago

Point 1. After the retreat of the glacier, the climate remained mild.
(64:4.8) 650,000 years ago the climate remained mild. By the middle of the interglacial period, it had become so warm that the Alps were almost entirely free of ice and snow.

Point 2. The interglacial period.
(64:4.9) 600,000 years ago the retreating ice reached its then northernmost point, and after an interval of several thousand years the climatic changes remained slight. The people and animals of Europe hardly changed. The notable aridity of the previous period diminished, and the alpine glaciers descended far down the river valleys.

Point G. 550,000 to 500,000 years ago

Point 1. During the fourth and fifth ice ages, the primitive culture of the Neanderthal races spread.
(64:4.10) 550,000 years ago the advancing glacier again pushed men and animals southward. But this time man had plenty of room in the wide belt of land that stretched northeastward into Asia and was situated between the ice sheet and the greatly expanded Black Sea part of the Mediterranean.
(64:4.11) During the fourth and fifth glacial invasions the further spread of the primitive culture of the Neanderthal races took place. But progress was so slight that the attempt to create on Urantia a new, modified type of intelligent life seemed to be actually approaching failure. For nearly a quarter of a million years these primitive tribes wandered, hunting and warring, intermittently succeeding in some directions, but generally gradually degenerating from their more advanced Andonite forebears.

Point 2. During the fifth ice invasion, the six colored races appeared and the Planetary Prince arrived.
(61:7.4) 500,000 years ago, during the fifth ice invasion, a new turn of events accelerated the course of human evolution. Suddenly and in one generation, as a result of a mutation of the original human race, six colored races appeared. This date has a double significance as it marks the arrival of the Planetary Prince.
(61:7.5) In North America the advance of the fifth glacier represented the combined invasion of all ice centers. Indeed, the eastern tongue descended very slightly along the St. Lawrence River valley, and the southward movement of the western ice sheet was also negligible. But the central language reached the southern regions and covered most of the state of Iowa. In Europe, the invasion of this glacier was not as extensive as the previous one.

Point H. 250,000 to 150,000 years ago

Point 1. Sixth and final glaciation.
(61:7.6) 250,000 years ago the sixth and final glaciation began. And despite the fact that the northern elevations began to slowly descend, in this period there was the most extensive deposition of snow on the northern ice fields.
(61:7.7) In the course of this invasion the most extensive deposition of snow took place on the northern ice fields. During this invasion, three huge ice sheets coalesced into one huge mass of ice, and all the western mountains were affected by this glacial activity. This became the most extensive ice insertion on the territory of North America. The glacier moved south and nearly 2,500 kilometers from its centers of contraction, and North American temperatures fell to record lows.

Point 2. Lucifer's Rebellion.
(61:7.8) 200,000 years ago, during the advance of the last glacier, an event occurred that had a tremendous influence on the course of Urantia's historical development-the rebellion of Lucifer.

Point 3. Spread of the sixth glacier.
(61:7.9) 150,000 years ago the sixth and last glacier reached the extreme limits of its southward advance: the western ice sheet passed the Canadian border; the central one descended in the states of Kansas, Missouri and Illinois; the eastern shield shifted south, covering much of the states of Pennsylvania and Ohio.
(61:7.10) It was this glacier that formed the many tongues of ice that cut through the modern lakes, large and small. During the retreat of the glacier, the system of North American lakes - large and small - was formed. During the retreat of the glacier, the North American Great Lakes system was formed. And Urantian geologists have quite

accurately determined the different stages of this process, making the correct conclusion that these bodies of water are of different times; it first emptied into the Mississippi Valley, then eastward into the Hudson River Valley, and finally northward into the St. Lawrence River Valley. Thirty-seven thousand years have passed since the Great Lakes system began to empty itself through the present-day Niagara Falls.

Point I. 100,000 years ago

Point 1. Retreat of the last glacier and formation of the polar shield.
(61:7.11) 100,000 years ago during the retreat of the last glacier, the vast polar ice sheet began to form and the center of ice accumulation moved far to the north. And until then, until the polar regions are covered with ice, a new ice age is hardly possible, regardless of future land uplifts or changes in ocean currents.
(61:7.12) This last glacier had been moving for 100,000 years, and a similar lapse of time was required to complete its northward retreat. The temperate zone has been ice-free for just over fifty thousand years.

Point 2. Impact of glaciers on biological species.
(61:7.13) The harsh Ice Age wiped out many species and radically modified a large number of others. Many suffered severe sifting in the process of migration from place to place caused by the movements and retreats of the ice. Among those animals which in their land migrations repeated the movement of the glaciers were the bear, the bison, the deer, the muskrat, the mammoth, and the mastodon.
(61:7.16) The forced migration of living beings before the invasion of the ice led to an extraordinary intermingling of plants and animals, and with the retreat of the last glacier many arctic species of both plant and animal life found themselves cut off from certain high mountain peaks, where they they managed to save themselves from the ice. Therefore, today these plants and animals torn from their habitat are found high in the European Alps and in the northwestern Appalachians.

Point 3. End of the ice age.
(1:7.17) The Ice Age is the last completed geological period, the so-called Pleistocene, lasting over two million years.

Point VI. Modern era Cenozoic

Point A. End of the Cenozoic
(61:7.19) The present record, from the origin of the mammals to the end of the Ice Age and the beginning of the historical epoch, spans nearly 50,000,000 years. This last, present-day geologic period is known to your explorers as the Cenozoic, or modern era.

Point B. Post-Glacial Period or Holocene

Point 1. The Ice Age ended at the time of Adam and Eve's arrival on Urantia.
(61:7.18) 35,000 years ago the great ice age ended everywhere except the polar regions of the planet. This date is also significant in that shortly before this a Material Son and a Material Daughter arrived on the planet and the Adamic judgment period began. This roughly corresponds to the beginning of the Holocene, or post-glacial period.

Point 2. The retreat of the glacier turned the Sahara into a desert.
(80:2.1) The first spread of the violet race in Europe was terminated by some very sudden climatic and geological changes. As the northern ice fields retreated, moist westerly winds moved north, gradually turning the open grassland regions of the Sahara into bare desert. This drying caused the dispersion of the short brunettes - dark-eyed but long-faced inhabitants of the great Sahara plateau.

Point 3. England separated from the continent and Denmark rose from the waters, the Mediterranean joined the Atlantic.
(80:2.4) About the time these climatic changes were taking place, England separated from the continent and Denmark rose from the water, while the Strait of Gibraltar, protecting the western basin of the Mediterranean, collapsed in consequence of earthquakes, causing a rapid rise in the water in this inland lake to the level of the Atlantic Ocean. Soon the Sicilian Land Bridge sank, turning the Mediterranean basin into one compact sea and connecting it to the Atlantic Ocean. This natural disaster caused the submergence of a large number of settlements and led to the largest number of human casualties in the entire world history of floods.

Conclusion

(58:7.12) All this narrative is vividly set forth on the fossilized pages of the great "book of stone" recounting the events of days gone by. And the pages of this gigantic bio-geological annals will surely reveal the truth to you, if only you learn to interpret them. The bottom of many seas has risen to a great height today, and their centuries-old deposits testify to the struggle for existence in those long-ago days. Literally true are the words of your poet who declared: "And the dust on which we tread was once alive."