

PAPER 60
URANTIA DURING
THE EARLY LAND-LIFE ERA

THE era of exclusive marine life has ended. Land elevation, cooling crust and cooling oceans, sea restriction and consequent deepening, together with a great increase of land in northern latitudes, all conspired greatly to change the world's climate in all regions far removed from the equatorial zone.

The closing epochs of the preceding era were indeed the age of frogs, but these ancestors of the land vertebrates were no longer dominant, having survived in greatly reduced numbers. Very few types outlived the rigorous trials of the preceding period of biologic tribulation. Even the spore-bearing plants were nearly extinct.

1. THE EARLY REPTILIAN AGE

The erosion deposits of this period were mostly conglomerates, shale, and sandstone. The gypsum and red layers throughout these sedimentations over both America and Europe indicate that the climate of these continents was arid. These arid districts were subjected to great erosion from the violent and periodic cloudbursts on the surrounding highlands.

Few fossils are to be found in these layers, but numerous sandstone footprints of the land reptiles may be observed. In many regions the one thousand feet of red sandstone deposit of this period contains no fossils. The life of land animals was continuous only in certain parts of Africa.

These deposits vary in thickness from 3,000 to 10,000 feet, even being 18,000 on the Pacific coast. Lava was later forced in between many of these layers. The Palisades of the Hudson River were formed by the extrusion of basalt lava between these Triassic strata. Volcanic action was extensive in different parts of the world.

Over Europe, especially Germany and Russia, may be found deposits of this period. In England the New Red Sandstone belongs to this epoch. Limestone was laid down in the southern Alps as the result of a sea invasion and may now be seen as the peculiar

POGLAVLJE 60
URANTIJA TIJEKOM RANE KOPNENE
ERE ŽIVOTA

ZAVRŠENO je doba isključivo morskog života. Povišenje kopna, hlađenje kore i rashlađivanje oceana, formiranje mora i njihovo produbljivanje, zajedno s velikim proširenjem kopna u sjevernim dijelovima, sve je uvjetovalo da se uveliko promijeni svjetska klima u svim regijama daleko udaljenim od ekvatorijalne zone.

Pri okončanju prethodnog epohalnog razdoblja nastupila je dob žaba, ali ovi preci kopnenih kralježnjaka više nisu bili dominantni, kako su preživjeli u znatno smanjenom broju. Vrlo malo vrsta je preživjelo velika iskušenja prethodnog razdoblja bioloških prevrata. Čak su i biljke koje su se razmnožavale sporama gotovo izumrle.

1. RANO DOBA GMAZOVA

Erozijske naslage iz tog razdoblja su uglavnom konglomerati, škriljvac i pješčenjak. Gips i crveni slojevi u ovim sedimentima koji su prisutni preko Sjeverne i Južne Amerike i Europe pokazuju da je klima tih kontinenata bila suha. Ovi sušni predjeli su bili podvrgnuti velikim erozijama usljed nasilnih i periodičnih proloma oblaka na okolnim visoravnima.

Malo fosila se nalazi u tim slojevima, ali se u pješčenjaku mogu naći brojni otisci kopnenih gmazova. U mnogim regijama tri stotine metara naslaga crvenog pješčenjaka iz tog razdoblja ne sadrže fosile. Život kopnenih životinja traje neprekinuto samo u određenim djelovima Afrike.

Ove naslage se razlikuju u debljini od tisuću do tri tisuće metara, čak i do pet i pol tisuća metara na obali Pacifika. Lava je kasnije bila utisnuta između mnogih od tih slojeva. Strmi grebenovi uz rijeku Hudson su formirani istiskivanjem bazaltne lave između tih slojeva koji vuku porijeklo iz trijasa. Vulkanske aktivnosti su bile velike u različitim dijelovima svijeta.

U cijeloj Europi, a posebice Njemačkoj i Rusiji, mogu se naći naslage iz tog razdoblja. U Engleskoj novi crveni pješčenjak pripada tom razdoblju. Vapnenac je prisutan u južnim Alpama kao rezultat invazije mora i danas se može vidjeti kao neobičan

dolomite limestone walls, peaks, and pillars of those regions. This layer is to be found all over Africa and Australia. The Carrara marble comes from such modified limestone. Nothing of this period will be found in the southern regions of South America as that part of the continent remained down and hence presents only a water or marine deposit continuous with the preceding and succeeding epochs.

150,000,000 years ago the early land-life periods of the world's history began. Life, in general, did not fare well but did better than at the strenuous and hostile close of the marine-life era.

As this era opens, the eastern and central parts of North America, the northern half of South America, most of Europe, and all of Asia are well above water. North America for the first time is geographically isolated, but not for long as the Bering Strait land bridge soon again emerges, connecting the continent with Asia.

Great troughs developed in North America, paralleling the Atlantic and Pacific coasts. The great eastern-Connecticut fault appeared, one side eventually sinking two miles. Many of these North American troughs were later filled with erosion deposits, as also were many of the basins of the fresh- and salt-water lakes of the mountain regions. Later on, these filled land depressions were greatly elevated by lava flows which occurred underground. The petrified forests of many regions belong to this epoch.

The Pacific coast, usually above water during the continental submergences, went down excepting the southern part of California and a large island which then existed in what is now the Pacific Ocean. This ancient California sea was rich in marine life and extended eastward to connect with the old sea basin of the midwestern region.

140,000,000 years ago, suddenly and with only the hint of the two pre-reptilian ancestors that developed in Africa during the preceding epoch, the reptiles appeared in full-fledged form. They developed rapidly, soon yielding crocodiles, scaled reptiles, and eventually both sea serpents and flying

dolomit vapnenačkih zidova, vrhova i stupova u tim regijama. Ovaj sloj se može naći diljem Afrike i Australije. Kararski mramor dolazi iz takvog izmijenjenog vapnenca. Ništa od tog razdoblja ne može se naći u južnim dijelovima Južne Amerike, kako je taj dio kontinenta ostao pod vodom i stoga sadrži samo vodene ili morske naslage koje se nadovezuju na naslage prethodnih i budućih epoha.

Prije 150 milijuna godina započelo je razdoblje svjetske povijesti obilježeno kopnenim životnom. Život općenito nije prošao dobro, ali prošao je bolje nego za napornih i teških doba pri završetku ere morskih životinja.

Na početku ovog doba, istočni i središnji dijelovi Sjeverne Amerike, sjeverna polovica Južne Amerike, veći dio Europe i cijela Azija su bili prilično dobro uzdignuti iz vode. Sjeverna Amerika je po prvi put zemljopisno izolirana, ali ne za dugo jer se uskoro ponovo uzdigao Beringov tjesnac, kopneni most koji je povezao ovaj kontinent s Azijom.

Velike koritne uvale su formirane u Sjevernoj Americi, usporedno sa obalama Atlanskog i Tihog oceana. Pojavio se veliki tektonski rascjep u istočnom Konektiktu, s čije je jedne strane kopno s vremenom potonulo preko tri kilometra. Mnoge od tih sjevernoameričkih koritnih uvala kasnije su bile ispunjene naslagama usljed erozije, kao što je bio slučaj sa brojnim jezerima svježje i slane vode u planinskim regijama. Kasnije, te ispunjene kopnene depresije uveliko su povišene protokom lave u podzemlju. Okamenjene šume mnogih regija pripadaju ovom razdoblju.

Potpunule su obale Pacifika koje su obično bile iznad vode tijekom kontinentalnih potapanja, izuzev južnog dijela Kalifornije i velikog otoka koji je postojao u onome što je sada Tihi ocean. Ovo drevno Kalifornijsko more bilo je bogato morskom florom i faunom, prošireno prema istoku i povezano sa starim akvatorijem u regiji Srednjeg zapada.

Prije 140 milijuna godina, *iznenada* i sa samo naznakom od dva predreptilska predka koja su se razvila u Africi tijekom prethodne epohe, gmazovi se pojavljuju u punom obliku. Oni su se razvili vrlo brzo i nije dugo prošlo kad su se među njima javili krokodili, krljuštasti gmazovi, a

reptiles. Their transition ancestors speedily disappeared.

These rapidly evolving reptilian dinosaurs soon became the monarchs of this age. They were egg layers and are distinguished from all animals by their small brains, having brains weighing less than one pound to control bodies later weighing as much as forty tons. But earlier reptiles were smaller, carnivorous, and walked kangaroolike on their hind legs. They had hollow avian bones and subsequently developed only three toes on their hind feet, and many of their fossil footprints have been mistaken for those of giant birds. Later on, the herbivorous dinosaurs evolved. They walked on all fours, and one branch of this group developed a protective armor.

Several million years later the first mammals appeared. They were nonplacental and proved a speedy failure; none survived. This was an experimental effort to improve mammalian types, but it did not succeed on Urantia.

The marine life of this period was meager but improved rapidly with the new invasion of the sea, which again produced extensive coast lines of shallow waters. Since there was more shallow water around Europe and Asia, the richest fossil beds are to be found about these continents. Today, if you would study the life of this age, examine the Himalayan, Siberian, and Mediterranean regions, as well as India and the islands of the southern Pacific basin. A prominent feature of the marine life was the presence of hosts of the beautiful ammonites, whose fossil remains are found all over the world.

130,000,000 years ago the seas had changed very little. Siberia and North America were connected by the Bering Strait land bridge. A rich and unique marine life appeared on the Californian Pacific coast, where over one thousand species of ammonites developed from the higher types of cephalopods. The life changes of this period were indeed revolutionary notwithstanding that they were transitional and gradual.

This period extended over twenty-five million years and is known as the *Triassic*.

na kraju i morske zmije i leteći gmazovi. Njihovi prijelazni preci brzo su nestali.

Ovi brzo razvijajući reptilski dinosauri ubrzo su postali vladari ovoga doba. Oni su se izlijevali iz jajeta i razlikovali su se od svih životinja po svojim malim mozgovima, kako je mozak koji je težio manje od četrsto pedeset grama kontrolirao tijela koja su kasnije dostigla težinu od oko četrdeset tona. No, raniji gmazovi su bili manji, te su bili mesožderi koji su hodali kao kenguri na stražnjim nogama. Imali su šuplje ptičje kosti i s vremenom su razvili samo tri prsta na stražnjim nogama, a mnogi od vaših fosilnih otisaka stopala su zamijenjeni s otiscima divovskih ptica. Kasnije evoluirali su dinosauri koji su bili biljojedi. Hodali su na sve četiri, a jedna grana ove skupine razvila je zaštitni oklop.

Nekoliko milijuna godina kasnije pojavili su se prvi sisavci. Oni su bili neposteljični i brzo su se pokazali neuspjehom; niti jedan nije preživio. Ovaj eksperimentalni pokušaj poboljšanja sisavaca nije uspio na Urantiji.

Morski život tog razdoblja bio je malobrojan, ali se brzo poboljšao s novim proširenjem mora, koje je opet proizvelo duge obalne linije plićaka. Budući da je više plitkih voda bilo diljem Europe i Azije, najbogatija fosilna dna se nalaze na tim kontinentima. Ako danas želite proučavati život tog doba, trebate usmjeriti pažnju na Himalaje, Sibir i Sredozemlje, kao i Indiju i otoke južnog Pacifičkog bazena. Istaknuta značajka morskog života bila je prisutnost prekrasnog mnoštva amonita, čiji se fosilni ostaci nalaze po cijelom svijetu.

Prije 130 milijuna godina mora su se promijenila jako malo. Sibir i Sjeverna Amerika su povezani kopnenim mostom Beringovog tjesnaca. Bogati i jedinstveni morski život se pojavio na Kalifornijskoj obali Pacifika, gdje se više tisuća vrsta amonaka razvilo iz viših vrsta glavonožaca. Promjene u životu tog razdoblja bile su doista revolucionarne bez obzira na to što su bile prijelazne i postupne.

Ovo razdoblje se proteže kroz 25 milijuna godina i poznato je kao *trijas*.

2. THE LATER REPTILIAN AGE

120,000,000 years ago a new phase of the reptilian age began. The great event of this period was the evolution and decline of the dinosaurs. Land-animal life reached its greatest development, in point of size, and had virtually perished from the face of the earth by the end of this age. The dinosaurs evolved in all sizes from a species less than two feet long up to the huge noncarnivorous dinosaurs, seventy-five feet long, that have never since been equaled in bulk by any living creature.

The largest of the dinosaurs originated in western North America. These monstrous reptiles are buried throughout the Rocky Mountain regions, along the whole of the Atlantic coast of North America, over western Europe, South Africa, and India, but not in Australia.

These massive creatures became less active and strong as they grew larger and larger; but they required such an enormous amount of food and the land was so overrun by them that they literally starved to death and became extinct - they lacked the intelligence to cope with the situation.

By this time most of the eastern part of North America, which had long been elevated, had been leveled down and washed into the Atlantic Ocean so that the coast extended several hundred miles farther out than now. The western part of the continent was still up, but even these regions were later invaded by both the northern sea and the Pacific, which extended eastward to the Dakota Black Hills region.

This was a fresh-water age characterized by many inland lakes, as is shown by the abundant fresh-water fossils of the so-called Morrison beds of Colorado, Montana, and Wyoming. The thickness of these combined salt- and fresh-water deposits varies from 2,000 to 5,000 feet; but very little limestone is present in these layers.

The same polar sea that extended so far down over North America likewise covered all of South America except the soon appearing Andes Mountains. Most of China and Russia was inundated, but the water invasion was

2. KASNIJA DOB GMAZOVA

Prije 120 milijuna godina počela je nova faza gmazovske dobi. Veliki događaj tog razdoblja bila je evolucija i propast dinosaura. Kopneno-životinjski svijet je dosegao svoju najveću točku razvoja u pogledu veličine, te je nakon toga gotovo nestao sa lica zemlje do kraja ove dobi. Dinosauri su se razvili u svim veličinama od otprilike pola metra do ogromnih biljoždera dugačkih gotovo dvadeset tri metra, duljine koju nije nadmašilo ni jedno drugo stvorenje poslije toga.

Najveći dinosauri nastali su na zapadu Sjeverne Amerike. Ovi monstruozi gmazovi su pokopani u regiji Stjenjaka, duž cijele Atlantske obale Sjeverne Amerike, širom zapadne Europe, Južne Afrike i Indije, ali ne u Australiji.

Ova masivna stvorenja su postala sve manje aktivna i jaka kako su rasla u veličini, a njima su bile potrebne takve ogromne količine hrane da su krstareći kopnom u potrazi za hranom doslovno izgladnjeli do smrti te izumrli – nisu imali inteligencije da se nose sa situacijom.

U to vrijeme većina istočnog dijela Sjeverne Amerike, koja je dugo bila povišena, srušena je i preplavljena Atlantskim oceanom, tako da se obala nalazila nekoliko stotina kilometara dalje nego sada. Zapadni dio kontinenta je ostao iznad vode, ali čak i ta područja su kasnije preplavljena sjevernim morem i Tihim oceanom, koji se prostirao prema istoku do regije Crnih Brda u Dakoti.

To je bilo slatkovodno doba obilježeno mnogim jezerima u unutrašnjosti, kao što se vidi u izobilju slatkovodnih fosila u takozvanim Morrisonovim ležištima u Koloradu, Montani i Wajomingu. Debljina ovih miješanih slankovodnih i slatkovodnih naslaga varira od šesto do tisuću petsto metara; ali vrlo malo vapnenca je prisutno u tim slojevima.

Ista polarna mora su produžena dolje preko Sjeverne Amerike i također pokrivaju sve od Južne Amerike osim uskoro pojavljujućih planina Anda. Većina Kine i Rusije bila je poplavljena, a širenje vode

greatest in Europe. It was during this submergence that the beautiful lithographic stone of southern Germany was laid down, those strata in which fossils, such as the most delicate wings of olden insects, are preserved as of but yesterday.

The flora of this age was much like that of the preceding. Ferns persisted, while conifers and pines became more and more like the present-day varieties. Some coal was still being formed along the northern Mediterranean shores.

The return of the seas improved the weather. Corals spread to European waters, testifying that the climate was still mild and even, but they never again appeared in the slowly cooling polar seas. The marine life of these times improved and developed greatly, especially in European waters. Both corals and crinoids temporarily appeared in larger numbers than heretofore, but the ammonites dominated the invertebrate life of the oceans, their average size ranging from three to four inches, though one species attained a diameter of eight feet. Sponges were everywhere, and both cuttlefish and oysters continued to evolve.

110,000,000 years ago the potentials of marine life were continuing to unfold. The sea urchin was one of the outstanding mutations of this epoch. Crabs, lobsters, and the modern types of crustaceans matured. Marked changes occurred in the fish family, a sturgeon type first appearing, but the ferocious sea serpents, descended from the land reptiles, still infested all the seas, and they threatened the destruction of the entire fish family.

This continued to be, pre-eminently, the age of the dinosaurs. They so overran the land that two species had taken to the water for sustenance during the preceding period of sea encroachment. These sea serpents represent a backward step in evolution. While some new species are progressing, certain strains remain stationary and others gravitate backward, reverting to a former state. And this is what happened when these two types of reptiles forsook the land.

As time passed, the sea serpents grew to such size that they became very sluggish and

bilo je najveće u Europi. Tijekom ovog potapanja dolazi do pojave lijepog litografskog kamena u južnoj Njemačkoj, onih slojeva u kojima su fosili, kao što su najdelikatnija krila prastarih insekata, sačuvana kao da su od jučer.

Flora ove dobi je mnogo bogatija od prethodne. Paprat je ustrajala, a crnogorice i borovi su postali sve sličniji današnjim sortama. Ugljen je još uvijek u nastajanju duž obale sjevernog Mediterana.

Povratak mora poboljšava klimu. Koralji su se proširili u europske vode, svjedočeći da je klima još uvijek bila blaga, ali se više nisu ponovo pojavili nakon polaganog hlađenja polarnih mora. Morski život tih vremena je unaprijeđen i uveliko se razvio, posebice u europskim vodama. Koralji i crinoidi privremeno se pojavljuju u većem broju nego dotad, ali amonci dominiraju beskičmenjačkim životom oceana, njihova prosječna veličina je u rasponu od sedam do deset centimetara, iako je jedna vrsta postigla promjer od dva i pol metra. Spužve su bile posvuda, a sipe i kamenice se i dalje razvijaju.

Prije 110 milijuna godina potencijal morskog života se nastavlja razvijati. Morski jež bio je jedan od istaknutih mutacija ove epohe. Rakovi, jastozi, moderne vrste rakova su sazrijeli. Dolazi do značajnih promjena u ribljoj obitelji s prvom pojavom tipa kečage, dok ubojite morske zmiје koje potječu od kopnenih gmazova, još uvijek žive u svim morima i one u to vrijeme prijetе uništenju cijele riblje obitelji.

To je i dalje bilo, prije svega, istaknuto doba dinosaura. Oni su u tolikoj mjeri pregazili kopno da su dvije vrste bile primorane preći u vodu kako bi našle hranu tijekom prethodnog razdoblja morskog nadiranja. Te morske zmiје predstavljaju korak unatrag u evoluciji. Iako su neke nove vrste bile progresivne, druge loze ostaju stacionarne ili gravitiraju unatrag, retrogresivno, u prijašnje stanje. A to je ono što se dogodilo kod su ove dvije vrste gmazova naspustile kopno i prešle u more.

Kako je vrijeme prolazilo, morske zmiје su porasle na takve veličine da su postale vrlo tromе i na kraju su

eventually perished because they did not have brains large enough to afford protection for their immense bodies. Their brains weighed less than two ounces notwithstanding the fact that these huge ichthyosaurs sometimes grew to be fifty feet long, the majority being over thirty-five feet in length. The marine crocodilians were also a reversion from the land type of reptile, but unlike the sea serpents, these animals always returned to the land to lay their eggs.

Soon after two species of dinosaurs migrated to the water in a futile attempt at self-preservation, two other types were driven to the air by the bitter competition of life on land. But these flying pterosaurs were not the ancestors of the true birds of subsequent ages. They evolved from the hollow-boned leaping dinosaurs, and their wings were of batlike formation with a spread of twenty to twenty-five feet. These ancient flying reptiles grew to be ten feet long, and they had separable jaws much like those of modern snakes. For a time these flying reptiles appeared to be a success, but they failed to evolve along lines which would enable them to survive as air navigators. They represent the nonsurviving strains of bird ancestry.

Turtles increased during this period, first appearing in North America. Their ancestors came over from Asia by way of the northern land bridge.

One hundred million years ago the reptilian age was drawing to a close. The dinosaurs, for all their enormous mass, were all but brainless animals, lacking the intelligence to provide sufficient food to nourish such enormous bodies. And so did these sluggish land reptiles perish in ever-increasing numbers. Henceforth, evolution will follow the growth of brains, not physical bulk, and the development of brains will characterize each succeeding epoch of animal evolution and planetary progress.

This period, embracing the height and the beginning decline of the reptiles, extended nearly twenty-five million years and is known as the *Jurassic*.

3. THE CRETACEOUS STAGE THE FLOWERING-PLANT PERIOD

propale, jer one nisu imale mozak dovoljno velik da si priušte zaštitu za svoja golema tijela. Njihov mozak težio manje od šezdeset grama, unatoč činjenici da su ti veliki ichtiosaursi ponekad rasli u dužini do petnaest metara, dok je većina bila preko deset metara u dužini. Morski krokodili bili su također bili retrogresija kopnenog tipa reptila, ali za razliku od morskih zmija, ove životinje se uvijek vraćaju na kopno da polažu jaja.

Ubrzo nakon što su dvije vrste dinosaura prešle u vodu u uzaludnom pokušaju samoodržanja, druge dvije vrste su bile primorane na bijeg u zrak u gorkom rivalstvu kopnene faune. No, ti leteći pterosauri nisu bili precizni pravilni ptica naknadnih dobi. Oni su se razvili iz poskakujućih dinosaura koji su imali šuplje kosti, a njihova krila su nalikovala krilima slijepih miševa i imala raspon od šest do sedam metara. Ovi drevni leteći gmazovi su porasli u dužinu do tri metra, i oni su imali odvojive čeljusti poput modernih zmija. Jedno vrijeme, ti leteći gmazovi su djelovali uspješno, ali nisu uspjeli da se razviju duž linija koje bi im omogućile da prežive kao zračni nautičari. Oni predstavljaju izumrle loze ptičjeg podrijetla.

Kornjače su povećane tijekom ovog razdoblja, a prvo se pojavljuju u Sjevernoj Americi. Njihovi preci su došli iz Azije preko sjevernog kopnenog mosta.

Bližio se kraj stomilijunskom razdoblju reptilske dobi. Dinosauri, sa svojim velikim masama, bili su svi glupe životinje, kojima je nedostajala inteligencija da osiguraju dovoljno hrane za tako ogromna tijela. I tako su ti lijeni kopneni gmazovi propadali u sve većem broju. Od ove dobi, evolucija slijedi rast mozga, a ne rast fizičke veličine, i razvoj mozga obilježava svaku sljedeću epohu životinjske evolucije i planetarnog napretka.

To razdoblje, koje obuhvaća kulminaciju razvoja i početak propasti gmazova, trajalo je gotovo 25 milijuna godina i poznato je kao *jura*.

3. RAZDOBLJE KREDA PERIOD CVJETNJAČA

The great Cretaceous period derives its name from the predominance of the prolific chalk-making foraminifers in the seas. This period brings Urantia to near the end of the long reptilian dominance and witnesses the appearance of flowering plants and bird life on land. These are also the times of the termination of the westward and southward drift of the continents, accompanied by tremendous crustal deformations and concomitant widespread lava flows and great volcanic activities.

Near the close of the preceding geologic period much of the continental land was up above water, although as yet there were no mountain peaks. But as the continental land drift continued, it met with the first great obstruction on the deep floor of the Pacific. This contention of geologic forces gave impetus to the formation of the whole vast north and south mountain range extending from Alaska down through Mexico to Cape Horn.

This period thus becomes the *modern mountain-building stage* of geologic history. Prior to this time there were few mountain peaks, merely elevated land ridges of great width. Now the Pacific coast range was beginning to elevate, but it was located seven hundred miles west of the present shore line. The Sierras were beginning to form, their gold-bearing quartz strata being the product of lava flows of this epoch. In the eastern part of North America, Atlantic sea pressure was also working to cause land elevation.

100,000,000 years ago the North American continent and a part of Europe were well above water. The warping of the American continents continued, resulting in the metamorphosing of the South American Andes and in the gradual elevation of the western plains of North America. Most of Mexico sank beneath the sea, and the southern Atlantic encroached on the eastern coast of South America, eventually reaching the present shore line. The Atlantic and Indian Oceans were then about as they are today.

95,000,000 years ago the American and European land masses again began to sink. The southern seas commenced the invasion of North America and gradually extended

Veliko razdoblje krede dobilo je ime zahvaljujući prevlasti rasprostranjenih foraminifera koji luče kredu u ondašnjim morima. Ovo razdoblje privodi Urantiju gotovo do kraja duge reptilske dominacije i svjedoči pojavu cvjetnjača i ptičjeg života na kopnu. To je ujedno vrijeme prestanka zapadnog i južnog pomaka kontinenata praćeno velikim deformacijama kore, kao i popratnim rasprostranjenim protokom lave i velikim vulkanskim aktivnostima.

Pred kraj prethodnog geološkog razdoblja puno kopna je bilo iznad vode, iako još nije bilo planinskih vrhova. No, kopneno pomjeranje se nastavlja i susreće s prvom velikom zaprekom na dubokom dnu Pacifika. Ovaj sukob geoloških sila je dao poticaj za formiranje cijelih ogromnih sjevernih i južnih planinskih lanaca koji se protežu od Aljaske kroz Meksiko do rta Horn.

Ovo razdoblje postaje poznato u geološkoj povijesti kao *faza izgradnje modernih planina*. Prije tog vremena bilo je nekoliko planinskih vrhova, koji su bili uglavnom povišeni zemljišni grebeni velike širine. Sada je došlo do početka podizanja šireg raspona obale Pacifika, ali to je bilo tisuću i sto kilometara zapadno od sadašnje obalne linije. Planine su se počele formirati, a njihovi zlatonosni kvarcni slojevi su proizvod lave ove epohe. U istočnom dijelu Sjeverne Amerike, morski tlak Atlantskog oceana također uzrokuje kopneno uzdizanje.

Prije 100 milijuna godina sjevernoamerički kontinent i dijelovi Europe dobro su iznad vode. Savijanje američkih kontinenata i dalje traje, što vodi metamorfozi južnoameričkih Anda i postupnom podizanju zapadnih ravnica Sjeverne Amerike. Većina Meksika potonula je ispod mora, a jug Atlantika vrši pritisak na istočnu obalu Južne Amerike i na kraju dolazi do formiranja sadašnje obalne linije. Atlantski i Indijski ocean su tada bili uglavom isti kao što su danas.

Prije 95 milijuna godina američke i europske kopnene mase ponovno su počele tonuti. Južna mora su započela invaziju Sjeverne Amerike i postupno su proširena

northward to connect with the Arctic Ocean, constituting the second greatest submergence of the continent. When this sea finally withdrew, it left the continent about as it now is. Before this great submergence began, the eastern Appalachian highlands had been almost completely worn down to the water's level. The many colored layers of pure clay now used for the manufacture of earthenware were laid down over the Atlantic coast regions during this age, their average thickness being about 2,000 feet.

Great volcanic actions occurred south of the Alps and along the line of the present California coast-range mountains. The greatest crustal deformations in millions upon millions of years took place in Mexico. Great changes also occurred in Europe, Russia, Japan, and southern South America. The climate became increasingly diversified.

90,000,000 years ago the angiosperms emerged from these early Cretaceous seas and soon overran the continents. These land plants *suddenly* appeared along with fig trees, magnolias, and tulip trees. Soon after this time fig trees, breadfruit trees, and palms overspread Europe and the western plains of North America. No new land animals appeared.

85,000,000 years ago Bering Strait closed, shutting off the cooling waters of the northern seas. Therefore the marine life of the Atlantic-Gulf waters and that of the Pacific Ocean had differed greatly, owing to the temperature variations of these two bodies of water, which now became uniform.

The deposits of chalk and greensand marl give name to this period. The sedimentations of these times are variegated, consisting of chalk, shale, sandstone, and small amounts of limestone, together with inferior coal or lignite, and in many regions they contain oil. These layers vary in thickness from 200 feet in some places to 10,000 feet in western North America and numerous European localities. Along the eastern borders of the Rocky Mountains these deposits may be observed in the uptilted foothills.

All over the world these strata are permeated with chalk, and these layers of

ka sjeveru povezavši se sa Arktičkim oceanom, što čini drugi po veličini kontinentalni potop. Kada su se ta mora na kraju povukla, kontinent je ostao isti kao što je sada. Prije nego što je ovo veliko potapanje počelo, istočno Apalačko gorje bilo je gotovo u potpunosti srasnjeno do morske razine. Mnogobrojni obojeni slojevi čiste gline koji se danas koriste za proizvodnju grnčarije deponirani su u ovim regijama preko Atlantske obale u ovoj dobi, a njihova prosječna debljina je oko šest stotina metara.

Velika vulkanska akcija dogodila se južno od Alpa i uzduž linije sadašnjeg kalifornijskog obalnog gorja. Najveća deformacija kore u milijunima godina dogodila se je u Meksiku. Velike promjene nastupaju u Europi, Rusiji, Japanu i na jugu u Južnoj Americi. Klima postaje sve raznolikija.

Prije 90 milijuna godina cvjetnjače su izašle iz tih ranih mora krede i ubrzo se proširile kontinentima. Ove kopnene biljke su se *iznenada* pojavile zajedno sa smokvama, magnolijama i stablima tulipa. Ubrzo nakon tog vremena smokave, krušna stabla i palme su razgranate po Europi i zapadnim ravninama Sjeverne Amerike. Nisu se pojavile nove kopnene životinje.

Prije 85 milijuna godina Beringov moreuz je zatvoren, što je spriječilo protok hladnih voda sjevernih mora. Dotad se je morski život u vodama Atlantskog zaljeva i Tihog oceana razlikovao u mnogome, ali zahvaljujući promjenama temperature ova dva vodena tijela su sada postala kao jedno.

Naslage krede i zelenog pješčenjaka lapora su dale ime tom razdoblju. Sedimenti tih vremena su šaroliki, a sastoje se od krede, škriljaca, pješčenjaka i male količine vapnenca, zajedno s lošijim ugljenom ili lignitom, te u mnogim regijama sadrže naftu. Ti se slojevi razlikuju u debljini od šezdeset metara na nekim mjestima do tri tisuće metara u zapadnom dijelu Sjeverne Amerike i brojnim europskim lokalitetima. Uzduž istočne granice Stjenjaka te naslage se mogu promatrati u podnožju okomitih gorja.

U cijelom svijetu ti slojevi su prožeti kredom i ti slojevi poroznih polustijena

porous semirock pick up water at upturned outcrops and convey it downward to furnish the water supply of much of the earth's present arid regions.

80,000,000 years ago great disturbances occurred in the earth's crust. The western advance of the continental drift was coming to a standstill, and the enormous energy of the sluggish momentum of the hinter continental mass upcrumpled the Pacific shore line of both North and South America and initiated profound repercussional changes along the Pacific shores of Asia. This circumpacific land elevation, which culminated in present-day mountain ranges, is more than twenty-five thousand miles long. And the upheavals attendant upon its birth were the greatest surface distortions to take place since life appeared on Urantia. The lava flows, both above and below ground, were extensive and widespread.

75,000,000 years ago marks the end of the continental drift. From Alaska to Cape Horn the long Pacific coast mountain ranges were completed, but there were as yet few peaks.

The backthrust of the halted continental drift continued the elevation of the western plains of North America, while in the east the worn-down Appalachian Mountains of the Atlantic coast region were projected straight up, with little or no tilting.

70,000,000 years ago the crustal distortions connected with the maximum elevation of the Rocky Mountain region took place. A large segment of rock was overthrust fifteen miles at the surface in British Columbia; here the Cambrian rocks are obliquely thrust out over the Cretaceous layers. On the eastern slope of the Rocky Mountains, near the Canadian border, there was another spectacular overthrust; here may be found the prelife stone layers shoved out over the then recent Cretaceous deposits.

This was an age of volcanic activity all over the world, giving rise to numerous small isolated volcanic cones. Submarine volcanoes broke out in the submerged Himalayan region. Much of the rest of Asia, including Siberia, was also still under water.

prikupljaju vodu na površini i prenose je dolje i dostavljaju za vodoopskrbu mnogim zemljama u sadašnjim bezvodnim područjima.

Prije 80 milijuna godina veliki poremećaji su se dogodili u zemljinoj kori. Dolazi do zastoja u zapadnom napredovanju kontinentalnog kretanja i ta ogromna energija tromog zamaha kontinentalne mase izgužvala je liniju Pacifičke obale Sjeverne i Južne Amerike i inicirala duboke posljedične promjene duž pacifičkih obala Azije. Ova kružnopacifička uzvišenja koja su kulminirala u današnjim planinskim lancima, duga su više od četrdeset tisuća kilometara. Prevrati koji su uslijedili nakon njegova rođenja su bile najveće površinske deformacije koje su se desile od pojave života na Urantiji. Protok lave, iznad i ispod zemlje, bio je opsežan i široko rasprostranjen.

Razdoblje prije 75 milijuna godina označava kraj kontinentalnog pomicanja. Od Aljaske do Rta Horna, duga obalna gorja duž Tihog oceana su završena, ali su još uvijek imala mali broj planinskih vrhova.

Potisak unazad koji rezultira iz zapriječenog kontinentalnog pomicanja i dalje podiže zapadne ravnice Sjeverne Amerike, dok je na istoku izbrazdano Apalačko gorje u regiji atlantske obale projicirano ravno nagore, s malo ili bez nagiba.

Prije 70 milijuna godina iskrivljenosti kore povezane su sa najvišim nadmorskim visinama koji se javljaju u regiji Stjenjaka. Veliki dio stijena je bio uzdignut preko dvadeset četiri kilometra iznad površine u Britanskoj Kolumbiji; ovdje su kambrijske stijene koso potisnute preko sloja krede. Na istočnoj padini Stjenjaka, u blizini kanadske granice, nastupio je još jedna spektakularan potisak; ovdje se mogu naći predživotni kameni slojevi gurnuti preko tada nedavnih slojeva krede.

To je doba vulkanskih aktivnosti u cijelom svijetu, čime se uzdižu brojni mali izolirani vulkanski vrhovi. Podmorski vulkani su izbijali u potopljenoj Himalajskoj regiji. Velik dio ostatka Azije, uključujući i Sibir, također je još uvijek bio pod vodom.

65,000,000 years ago there occurred one of the greatest lava flows of all time. The deposition layers of these and preceding lava flows are to be found all over the Americas, North and South Africa, Australia, and parts of Europe.

The land animals were little changed, but because of greater continental emergence, especially in North America, they rapidly multiplied. North America was the great field of the land-animal evolution of these times, most of Europe being under water.

The climate was still warm and uniform. The arctic regions were enjoying weather much like that of the present climate in central and southern North America.

Great plant-life evolution was taking place. Among the land plants the angiosperms predominated, and many present-day trees first appeared, including beech, birch, oak, walnut, sycamore, maple, and modern palms. Fruits, grasses, and cereals were abundant, and these seed-bearing grasses and trees were to the plant world what the ancestors of man were to the animal world -- they were second in evolutionary importance only to the appearance of man himself. *Suddenly* and without previous gradation, the great family of flowering plants mutated. And this new flora soon overspread the entire world.

60,000,000 years ago, though the land reptiles were on the decline, the dinosaurs continued as monarchs of the land, the lead now being taken by the more agile and active types of the smaller leaping kangaroo varieties of the carnivorous dinosaurs. But some time previously there had appeared new types of the herbivorous dinosaurs, whose rapid increase was due to the appearance of the grass family of land plants. One of these new grass-eating dinosaurs was a true quadruped having two horns and a capelike shoulder flange. The land type of turtle, twenty feet across, appeared as did also the modern crocodile and true snakes of the modern type. Great changes were also occurring among the fishes and other forms of marine life.

The wading and swimming prebirds of earlier ages had not been a success in the air, nor had the flying dinosaurs. They were a

Prije 65 milijuna godina pojavio se jedan od najvećih protoka lave koji se ikad javljaju. Taloženja slojeva ovog i prethodnih protoka lave se mogu naći diljem Amerike, Sjeverne i Južne Afrike, Australije i dijelova Europe.

Kopnene životinje su malo promijenjene, ali zbog većeg kontinentalnog iskršavanja, a posebno u Sjevernoj Americi, one se brzo množe. Sjeverna Amerika je veliko područje kopnene evolucije životinja tih vremena, a veći dio Europe je bio pod vodom.

Klima je još uvijek bila topla i ujednačena. Arktičke regije su uživale klimu sličnu današnjoj klimi središnje i južne Sjeverne Amerike.

Sada nastupa velika evolucija biljnog svijeta. Među kopnenim biljkama prevladavaju angiospermi, a mnoga današnja stabla se prvi put pojavljuju, uključujući i bukvu, brezu, hrast, orah, javor i moderne palme. Voća, trava i žitarica ima u izobilju, a te trave i drveće koji se razmnožavaju sjemenom su biljnom svijetu ono što su preci čovjeka u životinjskom svijetu – oni su bili drugi u evolucijskom značaju samo iza pojave samog čovjeka. *Odjednom* i bez prethodne gradacije, velike obitelji cvjetnjača su mutirale. I ovaj novi cvijet uskoro se razgranao u cijelom svijetu.

Prije 60 milijuna godina, iako su kopneni gmazovi bili u propadanju, dinosauri su i dalje bili vladari zemlje, a sada se pojavljuju okretnije i aktivnije vrste manjih skakača klokanovskih sorti dinosaura mesoždera. No, prije nekog vremena tamo su se pojavili novi tipovi dinosaura biljojeda, čiji je nagli porast nastao zbog pojave trava u obitelji kopnenih biljaka. Jednu od tih novih trava jeli su dinosauri koji su pravi četveronožci a imaju dva roga i oklopni ramen prirubnice. Kopnena vrsta kornjača ima šest metara u dužini, a javljaju se također i moderni krokodili i istinske zmije modernog tipa. Velike promjene su događaju među ribama i drugim oblicima morskog života.

Močvarske i plivajuće predptice ranije dobi nisu bile uspješne u zraku, niti su leteći dinosauri. One su bile

short-lived species, soon becoming extinct. They, too, were subject to the dinosaur doom, destruction, because of having too little brain substance in comparison with body size. This second attempt to produce animals that could navigate the atmosphere failed, as did the abortive attempt to produce mammals during this and a preceding age.

55,000,000 years ago the evolutionary march was marked by the *sudden* appearance of the first of the *true birds*, a small pigeonlike creature which was the ancestor of all bird life. This was the third type of flying creature to appear on earth, and it sprang directly from the reptilian group, not from the contemporary flying dinosaurs nor from the earlier types of toothed land birds. And so this becomes known as the *age of birds* as well as the declining age of reptiles.

4. THE END OF THE CHALK PERIOD

The great Cretaceous period was drawing to a close, and its termination marks the end of the great sea invasions of the continents. Particularly is this true of North America, where there had been just twenty-four great inundations. And though there were subsequent minor submergences, none of these can be compared with the extensive and lengthy marine invasions of this and previous ages. These alternate periods of land and sea dominance have occurred in million-year cycles. There has been an agelong rhythm associated with this rise and fall of ocean floor and continental land levels. And these same rhythmical crustal movements will continue from this time on throughout the earth's history but with diminishing frequency and extent.

This period also witnesses the end of the continental drift and the building of the modern mountains of Urantia. But the pressure of the continental masses and the thwarted momentum of their agelong drift are not the exclusive influences in mountain building. The chief and underlying factor in determining the location of a mountain range is the pre-existent lowland, or trough, which has become filled up with the comparatively lighter deposits of the land erosion and marine drifts of the preceding ages. These lighter areas of land are sometimes 15,000 to 20,000 feet thick; therefore, when the crust is subjected to pressure from any

kratkovječna vrsta koja je brzo izumrla. One su, također, poput dinosaura, uništene, jer su imale premalo moždane tvari u usporedbi s veličinom tijela. Ovaj drugi pokušaj za proizvodnju životinja koje bi mogle ploviti atmosferom nije uspio, kao što je bio slučaj s pokušajem proizvodnje sisavaca tijekom ove i prethodne ere.

Prije 55 milijuna godina evolucijski napredak je bio obilježen iznenadnom pojavom prvih pravih ptica, malog stvorenja sličnog golubu koje je predak svih ptica. To je treći tip letećih stvorenja koji se pojavio na zemlji, a potekao je izravno od reptilske skupine, a ne iz suvremenih letećih dinosaura, niti iz ranijih vrsta zubatih kopnenih ptica. I tako to doba postaje poznato kao doba ptica, kao i doba opadanja prevlasti gmazova.

4. KRAJ RAZDOBLJA KREDE

Veliko razdoblje krede je blizu kraja, a taj prestanak označava kraj provala velikog mora na kontinente. Posebno je to bio slučaj u Sjevernoj Americi, gdje su bile samo dvadeset četiri velike poplave. I premda je kasnije bilo slučajeva manjih potapljanja, ni jedno od njih ne može se usporediti s velikim i dugotrajnim morskim invazijama ovog i prethodnih razdoblja. Ova alternativna razdoblja dominacije kopna i mora su se dogodila u ciklusima od milijun godina. Tu postoji višestolječni ritam u ovom ratovanju uspona i padova oceanskog dna i kontinentalnih kopnenih razina. A ti isti ritmički pokreti kore će se nastaviti od ovog vremena u cijeloj povijesti Zemlje, samo sa smanjenom frekvencijom i intenzitetom.

Ovo razdoblje također svjedoči kraju kontinentalnog pomicanja i izgradnji modernih planina Urantije. No, pritisak kontinentalne mase i protivni pritisak u njihovom višestoljećnom ratovanju i pomicanju nisu imali ekskluzivni utjecaj na planinske vrhove. Glavni i osnovni čimbenik u određivanju lokacije planinskih lanaca je bio već postojeće nizinsko korito ili uvala koja je bila ispunjena sa relativno lakšim naslagama erozije zemljišta i morskih nanosa prethodnog razdoblja. Ova svjetlija područja zemlje ponekad imaju debljinu između četiri i pol tisuća i šest tisuća metara; dakle, kada je kora podvrgnuta pritisku iz bilo kojeg uzroka, ta

cause, these lighter areas are the first to crumple up, fold, and rise upward to afford compensatory adjustment for the contending and conflicting forces and pressures at work in the earth's crust or underneath the crust. Sometimes these upthrusts of land occur without folding. But in connection with the rise of the Rocky Mountains, great folding and tilting occurred, coupled with enormous overthrusts of the various layers, both underground and at the surface.

The oldest mountains of the world are located in Asia, Greenland, and northern Europe among those of the older east-west systems. The mid-age mountains are in the circumpacific group and in the second European east-west system, which was born at about the same time. This gigantic uprising is almost ten thousand miles long, extending from Europe over into the West Indies land elevations. The youngest mountains are in the Rocky Mountain system, where, for ages, land elevations had occurred only to be successively covered by the sea, though some of the higher lands remained as islands. Subsequent to the formation of the mid-age mountains, a real mountain highland was elevated which was destined, subsequently, to be carved into the present Rocky Mountains by the combined artistry of nature's elements.

The present North American Rocky Mountain region is not the original elevation of land; that elevation had been long since leveled by erosion and then re-elevated. The present front range of mountains is what is left of the remains of the original range which was re-elevated. Pikes Peak and Longs Peak are outstanding examples of this mountain activity, extending over two or more generations of mountain lives. These two peaks held their heads above water during several of the preceding inundations.

Biologically as well as geologically this was an eventful and active age on land and under water. Sea urchins increased while corals and crinoids decreased. The ammonites, of preponderant influence during a previous age, also rapidly declined. On land the fern forests were largely replaced by pine and other modern trees, including the gigantic redwoods. By the end of this period, while the placental mammal has not yet evolved, the biologic

svjetlija područja se prva gužvaju, a uzdizanje nastupa zbog kompenzacijskih prilagodbi sukobljenih sila i pritisaka koji djeluju u zemljinoj kori ili ispod kore. Ponekad se ovo uzdignuće zemljišta dogodi bez savijanja. No, u vezi s razvojem Stjenjaka, velika uzdizanja i spuštanja su se dogodila, zajedno s ogromnim potisnućima različitih slojeva, kako u podzemlju tako i na površini.

Najstarije planine na svijetu se nalaze u Aziji, Grenlandu i sjevernoj Europi u sastavu onih starijih istočno-zapadnih sustava. Sredinom ove dobi nastale su planinske skupine pacifičkog kruga i drugi europski istočno-zapadni sustav, koji je rođen otprilike u isto vrijeme. Ova gigantska uzdizanja su duga nekih šesnaest tisuća kilometara, a protežu se od Europe do Kariba. Najmlađe planine su u sustavu Stjenjaka, gdje se, od davnina, visoko kopno nije spuštalo i samo dijelom je bilo pokriveno morem, iako su neki od viših dijelova kopna ostali kao otoci. Nakon formiranja planina sredinom ove ere, prave planine su povišene, koje su predodređene da naknadno uđu u sadašnji Stjenjak u kombiniranom umjetničkom djelovanju prirodnih elemenata.

Sadašnja sjevernoamerička regija Stjenjaka nije izvorna nadmorska visina tog kopna; to uzdignuće davno je izravnato erozijom, a zatim ponovno povišeno. Današnji prednji raspon planina je ono što je ostalo od ostataka izvornog niza koji je ponovno povišen. Pikes Peak i Longs Peak su izvrsni primjeri ove planinske aktivnosti, koja se proteže na dvije ili više generacija života planine. Ta dva vrha su održali svoje glave iznad vode tijekom nekoliko prethodnih poplavlivanja.

Biološki kao i geološki to je bila sadržajna i aktivna doba na zemlji i pod vodom. Morski ježevi su povećani, a koralji i crinoidi smanjeni. Amonij-nitrati, koji su imali pretežni utjecaj tijekom prethodne dobi, naglo propadaju. Na kopnu šume paprati uglavnom su zamijenjene borovima i drugim modernim stablima, uključujući i gigantsko crveno drvo. Do kraja tog razdoblja, dok se posteljični sisavac još nije razvio, biološka

stage is fully set for the appearance, in a subsequent age, of the early ancestors of the future mammalian types.

And thus ends a long era of world evolution, extending from the early appearance of land life down to the more recent times of the immediate ancestors of the human species and its collateral branches. This, the *Cretaceous age*, covers fifty million years and brings to a close the premammalian era of land life, which extends over a period of one hundred million years and is known as the *Mesozoic*.

Presented by a Life Carrier of Nebadon assigned to Satania and now functioning on Urantia.

pozornica u potpunosti je postavljena za nastup u kasnijim godinama ranih predaka budućih vrsta sisavaca.

I tako završava dugo razdoblje svjetske evolucije, koje se širi od početka pojave kopnenog života do novijeg vremena neposrednih predaka ljudske vrste i njezinih kolateralnih grana. To doba je, *doba krede*, pokriva 50 milijuna godina i dovodi do zatvaranja dobi predbisavaca kopnenog života, koje se proteže kroz razdoblje od sto milijuna godina i poznato je kao *mezozoik*.

Predstavio Nositelj Života Nebadona dodijeljen Sataniji koji trenutno funkcionira na Urantiji.