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## The Elder Ages and the Later Glaciations of the Pleistocene Epoch

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## The Elder Ages and the Later Glaciations of the Pleistocene Epoch



## THE ELDER AGES AND THE LATER GLACIATIONS OF THE PLEISTOCENE EPOCH

by Margaret M. Howes

Until quite recently, it has been almost impossible to place the Second and Third Ages of Middle-earth with reference to the geological evolution of the Earth as a whole, and to the chronology of recent times. Within the past decade, however, the marine studies of Drs Ewing, Ericson, and Wollin of the Lamont Geological Observatory of Columbia University, combined with the remarkable work of Tolkien in translating the ancient records, have enabled us to establish the dating of these periods beyond any reasonable doubt.

Beginning in 1947, Drs Maurice Ewing, David B. Ericson, and Goesta Wollin, with other scientists of the Lamont Geological Observatory, have examined three thousand deep-sea sedimentation cores from various sites on the floor of the Atlantic Ocean. The cores they selected for their interpretation of the climatic history of the Pleistocene contained undisturbed foraminiferal records of the entire Pleistocene era. Here we have, for the first time, a genuinely reliable method of gauging the lengths of the various glacial and interglacial periods; and Ericson and Wollin have been able to develop an accurate chronological chart of these climatic variations. (See Figure 1.)

Notice that the alternating periods of warm and cold appear to follow a fairly regular pattern--with one exception. This one exception appears at the very beginning of the most recent, or Wurm, glacial period. It is a relatively short, "Little Ice Age", lasting some 20,000 years, and followed by a similarly short warm period, called by European glaciologists the Gottweig Interstadial. After this brief interstadial came the main Wurm Ice Age, from which we have just recently emerged. The Ice Ages in general undoubtedly took place, and will take place again, as a result of natural causes. As yet, however, no theory of natural causes can account for the sudden onset and equally sudden recession of ice before the main Wurm glaciation.

Of course, no natural cause will ever be discovered for this period, because no such natural cause existed. This early, or pre-Wurm, glaciation can be explained in one word: Morgoth. Obviously, a more-than-natural power was required to bring about both the tremendous climatic swings and the equally great changes in the contours of the land that took place in what amounted to a very short time, geologically speaking. The record of the continental rocks for this period is faint and difficult to read, the signs of one cataclysm having been almost completely obliterated by another several times in succession. Nevertheless, by correlating the physical evidence carefully with the early age records translated by Tolkien, and with the sedimentation core system to give us our time scale, we can work out an outline of the historical and geological development of that distant time.

On the basis of our time scale, the Ice Age of Morgoth began about 115,000 years before present, and lasted until 95,000 years before present. The Gottweig Interstadial, in which we place the Second, Third, and beginning of the Fourth Ages of Middle-earth, lasted from 95,000 to 65,000 years before present. The Wurm Glaciation lasted from 65,000 to 11,000 years before the present time.

Figure 3 shows the contours of Middle-earth as they existed during the glaciation of Morgoth, as well as the maximum extent of the ice sheet at this time. Also shown are the water bodies formed by glacial melt-water at the time. The glacial sea of Rhûn filled the entire shallow

# GLACIAL AND INTERGLACIAL PERIODS

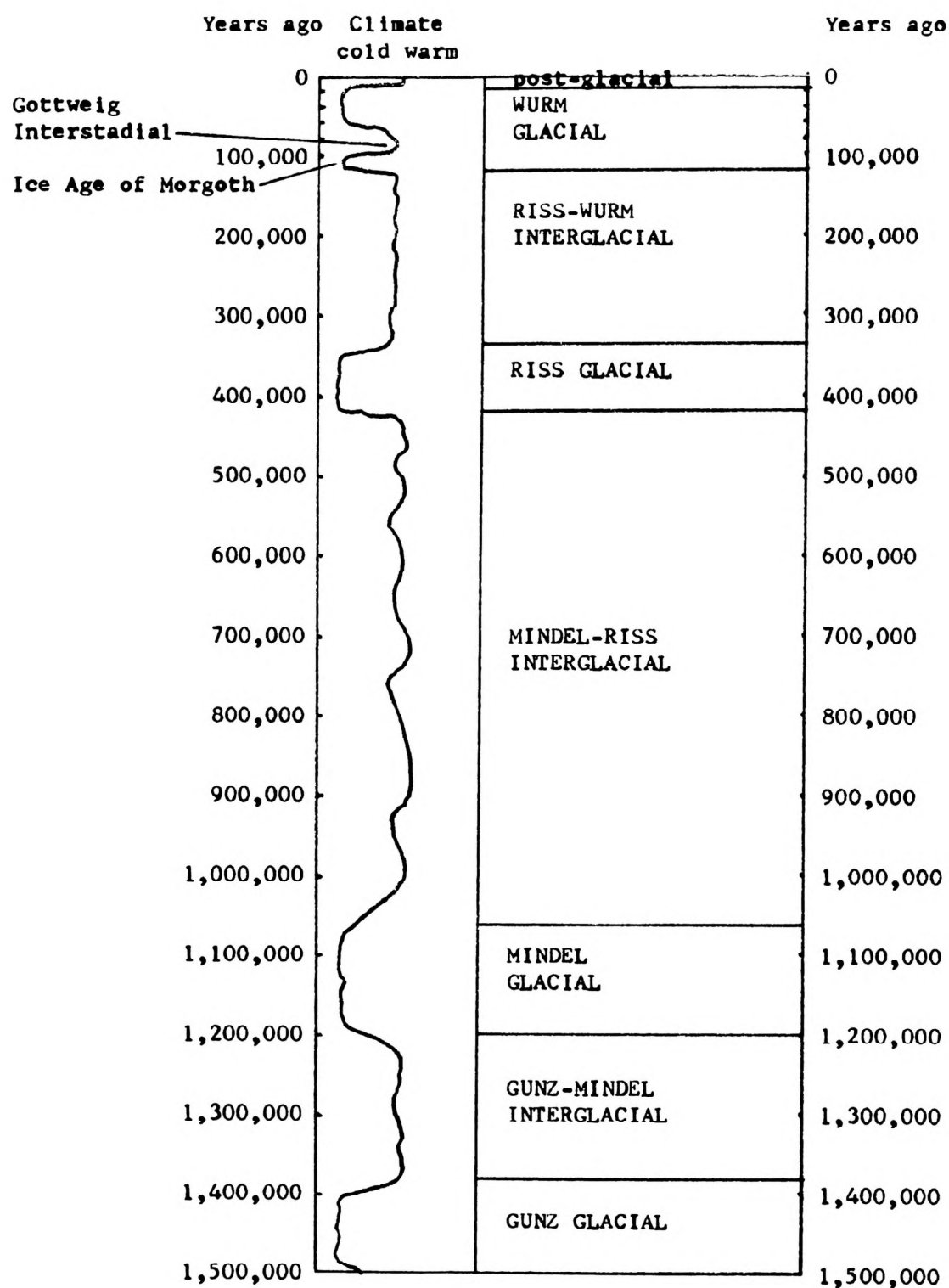


Figure 1. Chart of Pleistocene glacial and interglacial periods; from Ericson and Wellin, The Deep and the Past, page 207.

valley beyond the later channel of the Carnen and below the Iron Hills. Glacial Lake Anduin filled the basin between the Anduin and Entwash channels.

The location of the Wood of Laurelindórinan during this period is still something of a mystery. However, fossilized trees have been discovered in the area that would have been, at that time, between the northern and southern ice caps, the Misty Mountains on the east, and the probable area of Greenwood the Great on the west. The age of these fossils has been determined by the potassium-argon method to be at least 100,000, but not more than 200,000 years. They are of a species unknown to modern science, and discovered nowhere else in the world in any deposits; and they are associated with other plant fossils known to require a mild, equable climate. Thus it is probable that Laurelindórinan extended throughout that area between the ice caps, as no other explanation seems possible for the maintenance of a mild, equable climate between two heavily glaciated areas.

The exact outlines of the Beleriand extension of Middle-earth, and of the Western land that was later to be called Númenor, are still uncertain; the boundaries shown here must be considered approximations.

Because of glacial abstraction of water from the sea much of what is now the continental shelf was exposed, forming much of Eriador. After the overthrow of Morgoth and the accompanying destruction of Beleriand, the ice caps disappeared rapidly, and the general climate warmed up quickly. The core studies show that the major retreat of the ice was probably almost complete by the years 500-600 of the Second Age, although a lesser ice cap persisted in the far north and northeast. The coastal outlines remained approximately the same during this period, except, perhaps, for the land mass now called the Iberian Peninsula, which may have been already partly submerged. The rapid melting of the glacier, as well as the subsidence of Beleriand, of course caused a rise in sea level; but this was offset by the eustatic rise of the land as glacial loading was removed. Figure 4 shows Middle-earth, with Númenor, and the sunken plateau which was all that remained of Beleriand, during the Second Age.

Figure 2 is a chart of the Gottweig Interstadial, showing major dates in the Second and Third Ages, and the probable final date of the Fourth Age kingdom founded by the King Elessar.

Figure 5 shows Middle-earth in the now-familiar contours which it wore throughout the Third, and much of the Fourth, Ages. Since eustatic equilibrium had been reached by the end of the Second Age, the subsidence of Númenor at this time caused a rise of sea level along the coasts of Middle-earth, drowning that part of the Harad which is present Northwest Africa, as well as much of the Iberian Peninsula. As we have noted above, this peninsula may have been partially submerged during the Second Age as well. Less research has been done in this area than in any other part of modern Europe, and much more will have to be done, or additional historical records discovered, before the question can be settled.

The Fourth Age kingdom under the descendants of Elessar was ended, and for a long time human civilization was ended, by a third, and greatest, cataclysm. The problem of tracing the geological record of that period is tremendous, and will probably not be completed for some time to come. The cause of that convulsion of the continent is known, however.

It seems that not only Mordor and the Misty Mountains, but also large parts of the rest of Middle-earth, had been honeycombed with huge caverns during the Third Age. Outside of those two major areas, these had been far below the surface, but all were filled with the machines and weapons of Sauron and the various races of orcs. Late in the Fourth Age, Men began to penetrate these caves, and to study--and try out--what

YEARS BEFORE PRESENT		ELDER AGE YEARS
95,000	Overthrow of Morgoth; end of First Age	S.A. 1
94,500	Final retreat of glaciation of Morgoth; Sauron begins to stir	S.A. 500
94,000	Sauron begins building the Barad-dûr in Mordor	S.A. 1000
93,000	About this time the Shadow falls on Númenor	S.A. 2000
92,000	Ar-Adunakhor King in Númenor	S.A. 3000
91,559	Sauron overthrown by Elendil and Gil-galad; end of the Second Age	S.A. 3441
91,000	Turambar King in Gondor; Tarondor King in Arnor	T.A. 559
90,000	Hyarmendacil II King in Gondor; Araphor King in Arthedain	T.A. 1559
89,000	Boromir I High Steward of Gondor; Aragost chieftain of the Dúnedain	T.A. 2559
88,538-40	The Great Years. War of the Ring. End of Third Age.	T.A. 3021
88,000	"THE	
87,000	GOLDEN	
86,000	AGE"	
85,600	Beginning of dissension in Gondor	
85,000	Destruction of Mordor and Gondor. Collapse of the Misty Mountains. End of the first civilization of Men.	
.		
.	THE BLANK YEARS	
.		
75,000	Crustal revolution caused by the Fourth Age disaster was by approximately this time stabilized into the present contours of Europe. Continental shelf submerged.	
.		
.	THE BLANK YEARS	
.		
65,000	Beginning of Wurm Glacial Age in this millennium. Continental shelf exposed again.	

Figure 2. Chart of Gottweig Interstadial.

they found there. Eventually they managed to set off what can only be called a chain reaction, involving the entire substratum of the continent. Mordor itself, and most of Gondor, simply disappeared under the intruding sea. Western Iberia and Northwest Harad were thrust up again in the crustal recoil of the earth. The Misty Mountains, undermined as they were, collapsed in a series of earthquakes. The entire surface of the land was eventually reshaped, the process requiring millennia. It is believed to have stabilized, the continents assuming the contours they have retained until the present, after some eight to ten thousand years.

Figure 6 shows the comparison between the coastal outlines of Middle-earth during the Third Age and at present. In a relief map showing the contours of the ocean floor as well as the land, the remnants of Beleriand can still be seen west of the British Isles as the Faeroe Plateau; what remains of the sunken land of Numenor is now that portion of the Mid-Atlantic Ridge south of Latitude 45, and centered on the mountain peaks now called the Azores. During the Third and Fourth Ages, these islands, too, were below sea level.

\* \* \* \* \*

So far, few written records have been found on the history of the Kingdom of Men after the death of the King Elessar. In spite of their scanty detail, however, they indicate that the Men of Middle-earth enjoyed a surprisingly long period of peace, prosperity, and growth under the descendants of Elessar. A minimum of 1500, and a more probable maximum of 3000, years have been estimated for the length of this "Golden Age". Even if one accepts the minimum figure, this represents an era of stability and general well-being without equal in all of human history, and is undoubtedly the original "Golden Age" recalled so persistently, in so many legends, by so many of the peoples of Middle-earth.

Regarding the disaster that finally brought an end to this fortunate time, we have a little more detail. Long before, at the conclusion of the War of the Ring, the King Elessar himself had given many of the former slaves of Mordor the lands about Lake Nurnen, in Mordor, to be their own.<sup>(8)</sup> In the centuries that passed, apparently the rest of Mordor was also gradually rehabilitated. A manuscript, reliably dated in the year 1232 of the Fourth Age, speaks of the "grassy plains of Gorgoroth, where cattle thrive," and of the "endless pinv forests of the Ered Lithui." It also states that the easiest route to the new settlements in Mordor is by way of the Great Road through Minas Ithil.

For a long time, these immigrants into Mordor seem to have been content to stay on the now-pleasant surface of the land. The caverns and passages far below, where the creatures of Sauron had once labored, were still places of legendary horror to be avoided at all costs. But in time it became no doubt a simple matter of familiarity breeding contempt. Centuries passed, while Men lived comfortably above these dark and secret places, and no harm ever came to them; they seem to have become convinced that no harm from this source ever could come to them.

Following is an excerpt from the most complete account we have so far discovered, describing these last events in the history of the Fourth Age Kingdom. As far as we have been able to determine, it was written a generation or two after the destruction. The style is stilted and uneven, obviously an attempt to imitate the polished writing of a previous age; but whatever it may lack in literary quality, there is no doubt of its historical accuracy.



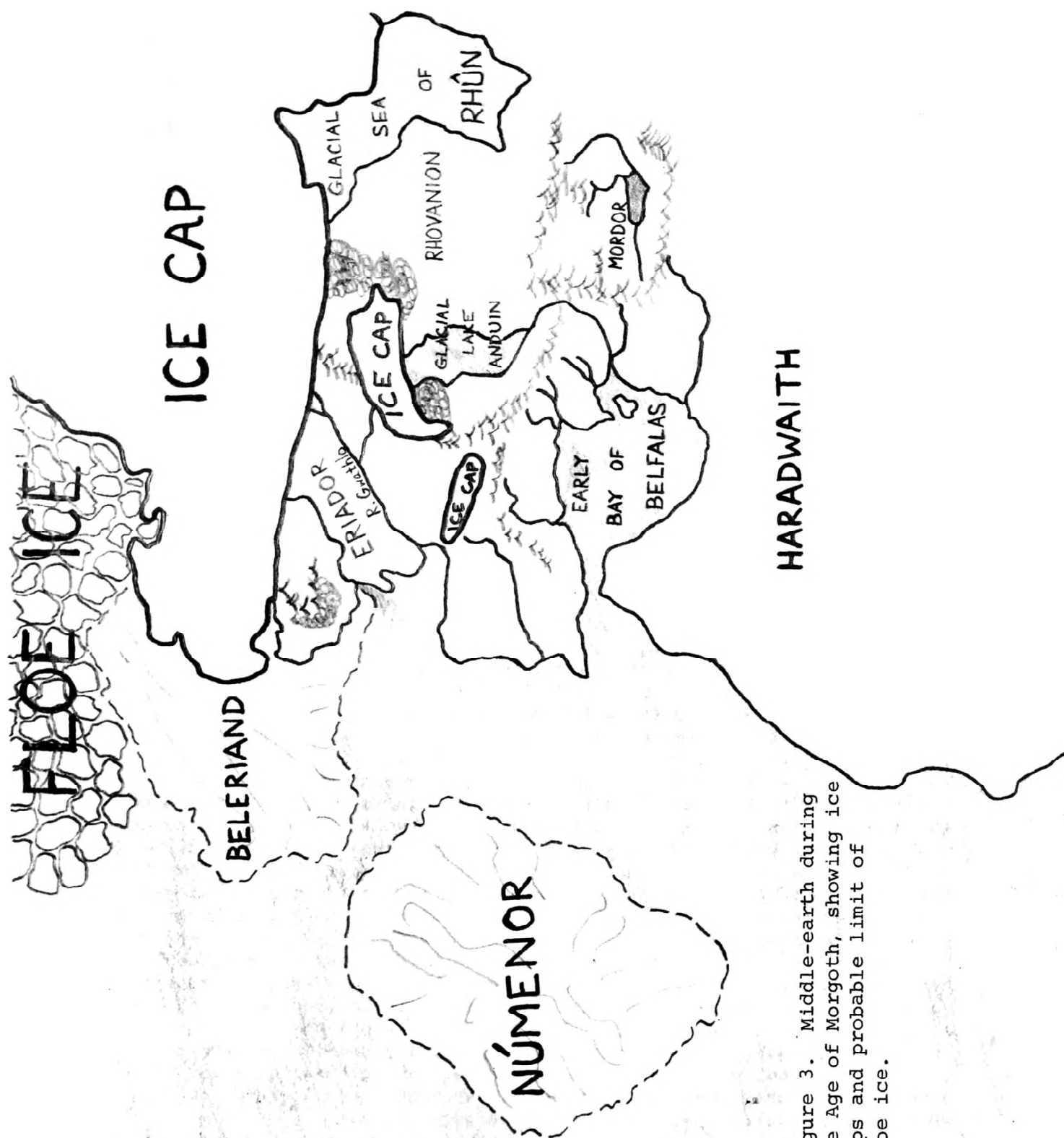


Figure 3. Middle-earth during Ice Age of Morgoth, showing ice caps and probable limit of floe ice.

In their confidence they even began to explore the vast caverns, the work of Sauron, that penetrated the very foundations of the earth below Mordor. At first they still went fearfully, with swords drawn and every sense alert, as men do who enter a dangerous and forbidden ground. But the mighty machines of the Dark Lord stood rusting in the silence, and those of his creatures who still survived had grown witless and feeble; there was no longer any great danger for Men--at least not for their bodies--and they grew easy and lighthearted as they traveled ever deeper to satisfy their lustful curiosity. This was the beginning of dissension, and finally of disaster, for Gondor. For two factions grew up, as they had in Númenor of old. One, supported by the King and his counsellors, urged that the caverns be sealed up, both in Mordor and in the Misty Mountains. Study of these caves, and of the half-ruined devices remaining in them, could only bring ruin, they said, as ruin had come before. Better to seal off both caves and contents, so completely that no power could ever reopen them, and in time even the knowledge of their existence might be forgotten. The other faction denounced this as the advice of cowards. There was no harm in any knowledge, they said, and Men should never turn away from knowledge of any kind; the harm came only when the knowledge was used for harmful ends; and whatever they learned, they said, would be used for good. And this faction won, and gained permission from the King to continue their study of everything left by Sauron and the fell race of orcs.

At first perhaps they were sincere, and some benefit came to Men from their labors; water was brought to waterless places, and rocky hills were leveled, and other great works accomplished. But in time they came to seek only the increase in their own power, and in the end, in their arrogance, they let loose forces they could not control. The whole of Middle-earth was shaken by catastrophe; Mordor itself, and the very land of the King, sank as the waters of the Sea rushed in; the long range of the Misty Mountains collapsed in terrible thunders; everywhere there was terror, and destruction, and death.

Nothing is left now but decay, and a few who try to preserve something of the old learning; but lesser Men multiply in the ravaged lands, Men who have come to distrust all learning. No man knows where the heirs of the line of the King Elessar are sheltered, nor indeed if any of that line survive. The Elven-kind are estranged from us, and hide themselves from us, and there is no help for us from them. The race of dwarves...

The rest of this manuscript is lost. It does not give the name of the king who allowed the dangerous research, or indeed the names of any participants in this final episode. The phrase "Men who have come to distrust all learning" is a clue to why no subsequent civilization ever developed. The actual reshaping of the continent after the disaster took millennia, as we have seen; the survivors and their descendants would have been constantly reminded of the results of ill-applied learning, and reinforced in their belief that all learning, of any kind, was dangerous. In addition, as new hills rose, and gradually built up into mountains, and new rivers flowed, and so on, all the old landmarks were obliterated--cities, roads, everything. In time, knowledge of the old days would have been forgotten, or simply told as stories that had nothing to do with the everyday life of Men.

The men who managed to preserve the written records of the earlier

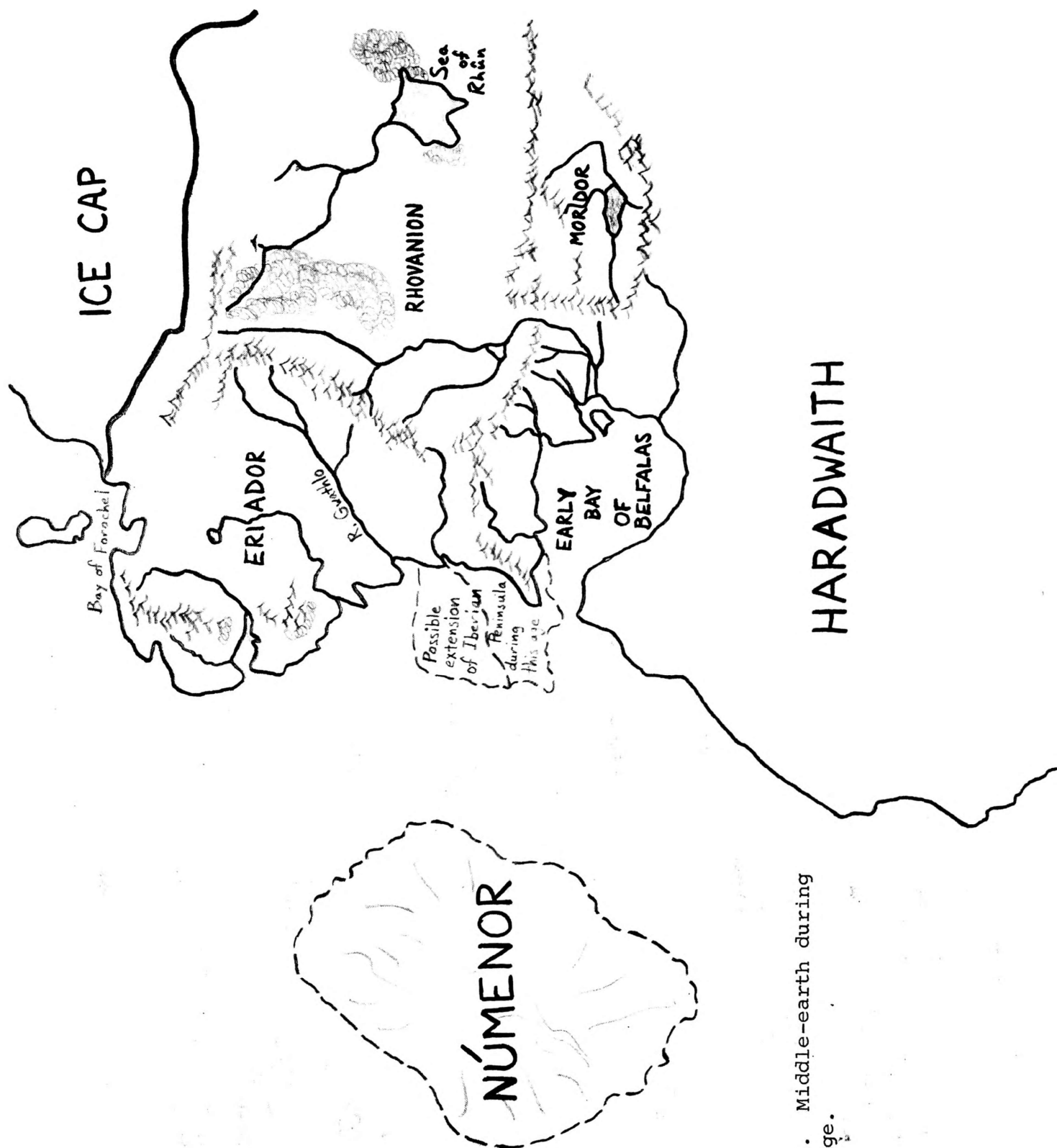


Figure 4. Middle-earth during Second Age.



ages were apparently too few in number and too lacking in influence to begin the building of another civilization. They must have spent most of that long stretch of blank years in hiding, handing down whatever they had retained of their ancient knowledge from father to son, copying and recopying the ancient volumes, often using crudely tanned skins for paper; throughout the Wurm Ice Age that followed at the end of this interstadial, in fact, that was the only material available to them.

It was also some time during those blank years that Eressëa, like the Undying Lands before it, was removed from the circles of the world. The legend of a wonderful land or island, far to the west, persisted of course, even to the beginnings of the present civilization of Men.

\* \* \* \* \*

Physical evidence of Men and their works at this early age is scanty. Such evidence as exists is also misleading, and has been liberally misinterpreted, not only in popular articles and fiction, but also in the works of many presumably reputable anthropologists. We are given a picture of a brutish, low-browed, subhuman race supposedly existing at this time, shambling about in cave-bear skins. The gross inaccuracy of this picture has been made clear by the recent, monumental work of Carleton S. Coon.

His researches show that true *Homo Sapiens* appeared in the central part of Middle-earth during the last, or Riss-Wurm (see Figure 1) interglacial period (2), between about 350,000 and 115,000 years ago, according to our time scale. The most significant paleontological find for this period was the discovery near Fontchevade, in Charente, of two skulls, dated by fluorine testing at early in the glaciation of Morgoth. The left parietal of skull no. 1 contains a hole with depressed edges, suggesting death by violence; the age is estimated at forty to fifty years. According to Vallois, "The essential fact of skull no. 1 is the absolute absence of a supraorbital torus; the glabella and the brow ridge are less developed than in the Upper Paleolithic Europeans, or even the majority of Europeans today. They recall, in their configuration, skulls of female Europeans; there is no nasion depression, and the brow ridge does not extend down to the upper border of the orbit." In skull no. 2, also, enough of the frontal bone is present to indicate that the skull lacked the massive brow ridges of the more primitive types of Men. (2)

In fact, these were some of the Edain, the Fathers of Men. From the location where their bones were discovered, it seems apparent that these individuals were among those making their way west, towards Beleriand, because of the glaciation of Morgoth.

Few of their remains have been found. The bodies of those who died in the war against Morgoth were lost when Beleriand itself was drowned and broken; the bodies of most of their descendants were lost with the destruction of Numenor; but here we have the unmistakable testimony of their existence.

The lesser Men who inhabited Middle-earth at this time have suffered most from anthropological misconceptions. The first remains of these Men to be unearthed in modern times were located in the Neanderthal valley of Germany, and their race has since become famous as Neanderthal Man. They have been described as crouching, stooping, squat, brutal creatures, with huge jaws, little or no forehead, and a low grade of intelligence. As Coon has demonstrated, this popular image is wrong, and was largely the result of unskillful attempts at restoration and articulation of the skeletal and skull fragments.

These people appeared in Middle-earth sometime during the Ice Age of Morgoth and settled in the western and southern portions of the land.

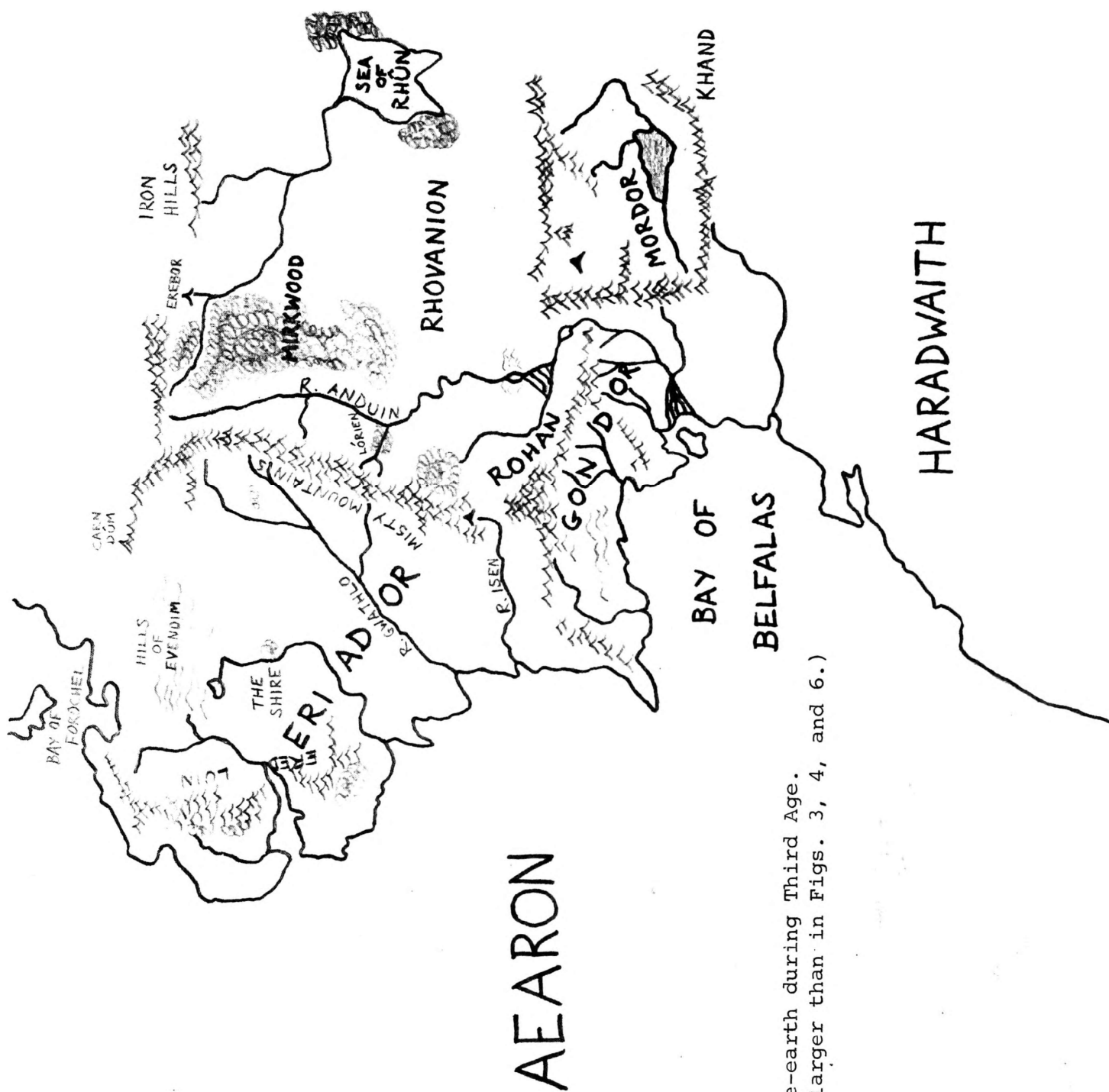


Figure 5. Middle-earth during Third Age.  
(Scale slightly larger than in Figs. 3, 4, and 6.)

They had, in fact, large brains, with capacities ranging from 1300 to 1640 cc., well within the modern range of approximately 1200 to 1800 cc. "It is commonly stated that Neanderthal Man could not have stood or walked erect because his foramen magnum, the hole in the base of the skull through which the spinal cord passes into the cervical vertebrae, was slanted backward. But this anatomical observation is not true; and even if it were true, the position of the foramen magnum would not have affected his posture." They had rather prominent noses, which can be seen to this day in people of that area. The average height of the men was about five feet five, the women being considerably shorter. They had large heads, deep chests, heavy bones, and large feet, and were rather heavy for their stature, probably a good 160 pounds or more. "People built more or less like these 'Neanderthals' may be seen today in the Abruzzi mountains, in the Alps, and in Bavaria." (2) This agrees with the brief description of the Men of Bree given in the old records: "...brown-haired, broad, and rather short..." (7)

Coon also confirms the old records which state that few of these people survived the turmoil of the Elder Days: "Without doubt the 'Neanderthal' population of Western Europe was greatly reduced by the end of the Wurm I glaciation"--that is, the glaciation of Mergoth.

From this stock came the Dunlendings and the Dead Men of Dunharrow, as well as the Men of Bree; these Men were also the original inhabitants of Gondor and Calenardhon, before the kings came back from over the seas at the end of the Second Age. It is paradoxical that of all the great works of these early ages, nothing has survived; only the most primitive and humble tools and artifacts of the lesser Men have come through the Fourth Age disaster and the later Wurm glaciation. Thus it is understandable that this period has been referred to as the Stone Age, with the assumption being made that nothing else, of any kind, was being produced during this time.

The stone culture of this time is called the Mousterian; it began among the so-called 'Neanderthals'--the non-Edain people--at about the beginning of the last inter-glacial, some 350,000 years ago. The tools of this type represent a flake culture of highly developed technique, and they continued to be made throughout the Ice Age of Mergoth. The Edain, learning from the Elves during this time, developed metal working to a very fine art; but little or nothing of this seems to have been passed on to the other Men of Middle-earth. These continued to work in stone throughout the Second Age as well, and even in the Third Age there were still groups of Men making and using stone tools: the Dunlendings, the Pukel-men of the Drúadan Forest, and the poorer classes of Men in several areas. After the Disaster, the higher culture was lost, and Men went back entirely to the working of stone; in that turbulent period it may have become impossible for them to do anything else. This same Mousterian type of stone-work continued until some 60,000 years ago, during the Wurm glaciation, when the long cultural paralysis was somehow broken, and new techniques and materials began to come into use again.

\* \* \* \* \*

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Front cover: Last Homely House  
at Rivendell

Back cover: The Passage of the  
Dead Marshes

both by Tim Kirk

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Thain--Dick Plotz  
Mayer--Banazir Galpsi  
Historian--Bob Foster  
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Maps in geological article  
by Mrs Howes.

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At 8 PM in the First Unitarian Church of  
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### Addendum to Mrs Howes's article.

"...I want you to make it clear to readers that when I speak of the  
machines of Mordor and of the orcs, and of a kind of chain-reaction caus-  
ing the collapse of the Fourth Age Kingdom, I don't mean to imply any-  
thing on the order of atomic power or anything resembling it. The power  
involved was the same type of thing that was involved in a collapse of  
all the works of the Dark Lord when the Ring was destroyed; power of a  
kind that we in this age cannot possibly fully understand, let alone du-  
plicate, and that even the men of that age were using without fully com-  
prehending it. I might point out, too, that even though I have attempted  
to explain how Elessar's kingdom may have come to its end, I have no desire  
to see the story worked out in any greater detail, in a full-length novel,  
for instance. We knew that it did come to an end, of course, and human  
history eventually developed into what we have today; but as Dainis Bisen-  
ieks has said, having the full story would simply be too sad. The more  
realistic it was, the more heartbreaking it would seem."

--Margaret M. Howes