

# The Geology of the Northern Kingdom and its implications for its people

by Neil Holford

Glimpses of the geology of Arnor can be seen in Tolkien's descriptions of the landscape. These glimpses together with observations from the maps of Middle-earth can, with a little guesswork and many assumptions, be fitted together to produce a broad overview of the region's 'bones'.

The hills in the area provide the bulk of the information about the regional geology. The various downs seen are perhaps the best described. Downs are produced by the erosion of fairly gently dipping layers of rock with contrasting resistances to erosion, perhaps chalk and shale. The more resistant of the two rock types defines a steep scarp and a more shallow lee-slope<sup>1</sup>. A clue to the composition of Arnor's downs is given in Pippin's account of the roof of the Town Hole collapsing on Will Whitfoot - he emerged covered in *chalk* dust<sup>2</sup>. Now Will, as Mayor, lived in Michel Delving on the White Downs, so it seems fair to assume that they were composed of chalk, and this is supported by the name of the downs. Vegetation on the downs would be sparse, with grass being the only significant component<sup>3</sup>. Due to the permeable nature of chalk, water would seep down through it and the extensive root system of the grasses would be far more effective at absorbing water than, say, the roots of trees.

Looking at the downs, it becomes apparent that the North and South Downs and the Barrow-downs are related<sup>4</sup>. Although the Barrow-downs are the only downs described in any great detail, some of this information is contradictory on the matter of the orientation of the scarps. Sometimes it suggests that they run east-west - for instance, when Frodo and Company were travelling *north* through the downs, they went 'over the shoulders of further hills and down their long limbs and up their smooth sides again, up onto new hilltops and down into new valleys'<sup>5</sup>, *i.e.*, they were crossing the ridges. Alternatively a north-south

orientation is implied in some places: 'Eastward the Barrow-downs rose, ridge behind ridge'<sup>6</sup>. Most points can be satisfied by scarps running northwest-southeast (a compromise, admittedly), and facing southwest. This would mean the rocks would be dipping northeast.

The North and South Downs are probably similar to the Barrow-downs, in that they consist of chalk with interlayers of shale or clay. The ridges of the North Downs would run southwest-northeast while those of the South Downs would run east-west. This would mean the rocks would all be dipping down towards the Midgewater Marshes and this could be a contributing factor to the lowlands found there<sup>7</sup>. If an impermeable rock base such as shale or an impermeable covering such as boulder clay is situated there then this would explain the presence of the marshes.

The Far Downs are obviously related to the White Downs, and the two sets of hills are probably two scarps running north-south. It is most likely that these downs dip in the same direction as those to the east, and it is perhaps fair to assume that the outcrop of chalk is arcuate in form as in the east. If this is so then it would pass through the hills to the south of Nenuial and that would suggest that they are downs as well. This would make the caves at Iargond fairly easily excavated<sup>8</sup>.

On the map of Middle-earth<sup>9</sup>, the Hills of Evendim appear to be more rugged than the downs so I suggest that they are composed of basement gneisses and schists together with folded sediments related to the deformation in the Blue Mountains to the west. This too may be the case for the Tower Hills which, even though they are adjacent to the Far and White Downs, are notably called hills and not downs. The Ered Luin themselves are a compressional tectonic feature composed of a complex thrust mass of metamorphic rocks and

sedimentary cover intruded by numerous igneous bodies. These bodies were responsible for the deposition of the hydrothermal veins containing the ores that the dwarves mined at Belegost and Nogrod and similar mansions.

This setting of a mountain chain to the west and another ridge of basement rocks to the east leads me to believe that the Lhûn Valley in between is a foreland basin, that is, an area where the underlying continental crust has been down-warped in the mountain-building process and the basin formed has been filled with sediments eroded from the highlands to the east and west. This situation is analogous to that in present day Europe where the Swiss Plain (the Lhûn Valley) lies between the Alps (the Ered Luin) and the Jura Mountains (the Tower Hills and the Hills of Evendim)<sup>10</sup>. The narrowness of Middle-earth's mountain chains can perhaps be explained by a phenomenon seen in some ancient primary world belts. This process involves the "drowning" of the marginal parts by sediment, thus reducing the apparent width of the chain.<sup>11</sup>

Another analogy can be drawn between Middle-earth and the primary world landscape. This is between the Weather Hills and the Malvern Hills (in Worcestershire, England). The Weather Hills 'made an undulating ridge, often rising to a thousand feet and here and there falling again to low clefts and passes.'<sup>12</sup> 'The highest of them was at the right [south] of the line and a little separated from the others.'<sup>13</sup> This ridge of hills seems to be similar to the Malverns<sup>14</sup>, which is a block of basement rocks upfaulted to lie between younger, relatively flat-lying sediments<sup>15</sup>. An explanation for the 'clefts' and the separation of Amon Sûl can also be found in the Malverns. The basement block is cut by faults<sup>16</sup> and it may be that in the Weather Hills the faults have been more susceptible to erosion than the rest of the block and so the clefts have been produced. The separation of Weathertop could be due to more extensive fracturing and mylonitisation along a fault, making it even more susceptible to weathering. An alternative to this is that running across the basement block are dykes, that is, sub-vertical sheets of rock that were more vulnerable to weathering and erosion than the rocks around them.<sup>17</sup> The separation of

Weathertop would then be due to a dyke wider than its counterparts.

The east-west orientation of the hills of the Shire is inconsistent with that of the downs, so it is probable that, like the Weather Hills, they are not of sedimentary origin. The northernmost of these heights are the unforested Hills of Scary. The Brockenbores (Badger Tunnellings)<sup>18</sup> are located on their southern limits, and I propose that they are disused (?) dwarf (?) mine workings into hydrothermal mineral deposits associated with an igneous intrusion, most probably composed of granite<sup>19</sup>, lying under the hills.

The last group of hills to be considered are those of the Green Hill Country. The fact that the hills are only partially forested<sup>20</sup> suggests two different origins for them to me:

1) That they are the expression of metamorphic basement rocks with patchy sedimentary cover, the trees being concentrated on the sediments.

2) That the hills are near the roof zone of an intrusion and the uneven nature of the roof leads to part of the area being composed of granite and the rest of sedimentary country rocks, which are more welcoming to trees because of their better drainage.

The presence of another intrusion to the north, I think, makes the latter hypothesis more likely, the two groups of hills being outcrops of one larger intrusion. The moors to the north of the Shire may also be related to this body.

There are few other glimpses of the Northern Kingdom's geology save for the brown colour of the Brandywine<sup>21</sup>. This is most likely due to it carrying suspended clay from the lowlands upstream. The lowlands across the region are no doubt composed of a wide variety of sedimentary rocks such as clays, shales, marls, sandstones and limestones.

*But what does all this mean for the Northern Kingdom?*

Agriculture would have played an important role in the life of the Dúnedain; crop growing, livestock and woodland management all had their part. The lowlands had rich soils and areas such as the Shire and

the shores of Nenuial would have provided fertile land. The major hill ranges would have, on the whole, been grassy rather than forested due to either a lack of surface water on the highly permeable chalk downs or an excess of water on the rather boggy hills of impermeable basement rocks. These large grassy areas would have provided ideal grazing for livestock, leaving the lowlands free for crops. Large forests and woods were more the exception than the rule, so coppicing played a large part in providing wood for the people of Arnor.

Iron would have been an important resource both in peacetime and war. Where did it come from? Some undoubtedly would have come from the dwarves in the mountains but some could be found within the Kingdom. There were three primary sources:

- 1) Oolitic ironstones;<sup>22</sup>
- 2) Precipitated iron nodules in lakes, bogs and marshes;<sup>23</sup>
- 3) Ores deposited in hydrothermal veins on fault planes.<sup>24</sup>

Hydrothermal veins would also yield useful ores of tin, copper and lead, among others<sup>25</sup>, and perhaps more valuable metals such as silver and gold.<sup>26</sup>

The blocks of basement rocks in the land would certainly yield semi-precious stones such as garnet, rock crystal and amethyst, and perhaps more precious gems such as emerald, sapphire or ruby. If these gems were traded, who would take them? The elves of the Grey Havens certainly would, perhaps in return for salt. The jewel-loving dwarves would not be at the back of the queue for the precious gems, but as for the semi-precious stones - that is debatable. The Blue Mountains would be rich in them, especially in garnets, so if they were to be interested then the stones would have to be special in some way: size or colour, for instance.

What else could the land provide for Arnor's people? The streams, rivers and lakes would, apart from being rich in fish, contain freshwater mussels which might yield up pearls, and if the Dúnedain did not keep them for themselves then no doubt the dwarves would have traded for them, perhaps in return for metals.

To conclude, it should be said that the land of Arnor was a rich country that was able to support its people, even through the hard times they suffered in periods of war, famine and sickness.

#### NOTES

1. Sparks, B.W. *Geomorphology* (2nd ed.) Longman, 1972; p.182 and pp.206-207.
2. *Fellowship of the Ring* (2nd ed.); p.168.
3. 'There was no tree nor any visible water; it was a country of grass and short springy turf ...'. *Ibid*, p.147.
4. Map of 'The West of Middle-earth at the End of the Third Age' at end of *The Fellowship of the Ring and The Two Towers*.
5. *Fellowship* p.147.
6. *Ibid*.
7. 'The land had been falling steadily, ever since they turned aside from the Road ...'. *Ibid* p.194.
8. Scribes of Annúminas *The History of the Northern Kingdom* Edinburgh, The Scribes, 1991; p.13.
9. Map of 'The West of Middle-earth at the End of the Third Age'.
10. Holmes, Arthur *Principles of Physical Geology* (3rd ed.) Oxford: V.N.R., 1978; p.675.
11. Watts, A.B. *Basin Analysis Lecture Course Notes* Oxford University Dept. of Earth Sciences, 1991; pt.6, p.6.
12. *Fellowship* p.197.
13. *Ibid* p.195.
14. Sparks, *op. cit.* p.167.
15. Anderson, J.G.C. *Field Geology in the British Isles* Oxford: Pergamon, 1983; pp.194-196.
16. *Ibid*.
17. Sparks, *op.cit.* pp.187-188.
18. Lobdell, J.(ed.) *A Tolkien Compass* New York: Ballantine, 1975; p.193.
19. Granites are commonly fluid rich, and the escape of these fluids from the intrusions through fractures leads to the deposition of mineral veins as they cool.
20. *Fellowship* 'Map of Part of the Shire'.
21. *Return of the King* p.416.
22. Tucker, M.E. *Sedimentary Petrology* Oxford: Blackwell, 1981; p.186-187.
23. *Ibid* p.187-188.
24. Evans A.M. *An Introduction to Ore Geology* Oxford: Blackwell, 1980; p.59.
25. *Ibid*.
26. *Ibid* p.145.

For some contrasting ideas and theories, see also:

Fonstad, K.W. *The Atlas of Middle-earth* Boston: Houghton Mifflin, 1981.



# More Celtic Influences:

## Númenor and the Second Age

by Marie Barnfield

### The genesis of the legend

In my article on Celtic influences on the First Age (in *Mallorn* 28) I claimed that the Second Age was "worthy of separate study in its own right", despite the fact that it is dominated not by the encouragingly Arthurian-sounding Beleriand but by the island of Númenor, which owes its story to the Greek legend of Atlantis, its culture to ancient Egypt and its religion to the Hebrews<sup>1</sup>. I shall start by stressing that Tolkien's purpose in beginning his island tales was not to invent a new Celtic mythology. The work that he planned was an Anglo-Saxon English mythology, needed, he felt, because England lacked "stories of its own (bound up with its tongue and soil) ... of the quality that I sought (and found) ... in legends of other lands. There was Greek, and Celtic, and Romance, Germanic, Scandinavian, and Finnish (which greatly affected me); but nothing English, save impoverished chap-book stuff."<sup>2</sup> The Numenor story as it finally appeared in *The Silmarillion* incorporates elements of *The Book of Lost Tales* originally connected either with Tol Eressëa, or with that remnant of Beleriand known in the Second Age as Leithian, Lúthien or Luthany. The island of Leithian itself was viewed as a fairy isle comprising what are now the separate islands of Britain and Ireland, which at that time, we are told, formed a single mass. Of the sundering of the two parts Tolkien wrote:

"Ossë is wroth at the breaking of the roots of the isle he set so long ago ... that he tries to wrench it back; and the western half breaks off, and is now the isle of Iverin."<sup>3</sup>

Quenya *Iverin* is clearly cognate with "real" names for Ireland derived from the tribal name *Iverni*, (such as Ireland, Erin, Hibernia). Elsewhere we learn that:

"... that part that was broken was called

Ireland and many names besides, and its dwellers come not into these tales."<sup>4</sup>

(I should stress that the concept of Britain and Ireland having once formed a single island has no historical validity; both were originally joined to the continental mass, and Ireland broke away much earlier than Britain.<sup>5</sup>)

The pre-Akallabêth legends all centre around the coming of a Saxon elf-friend, Eriol or Alfwine, to an Elvish island; in the earliest versions the story was to end with the Elves conveniently annihilated by other agencies and, in due course, the Saxons inheriting the land. So far we have a very anglocentric tale, with the *Brithonin* and *Guddin* dismissed as hostile mortal invaders who preceded the Saxons and had insufficient reverence for the fairies.<sup>6</sup> However, the theme of mortals coming to reside in a land hallowed by earlier divine inhabitants is one that we find in Celtic myth; it is the same motive that lies at the heart of the Irish conquest of the Tuatha Dé Danann<sup>7</sup>, and as I demonstrated in my previous article it was very largely on the Tuatha Dé Danann that Tolkien's Elves were based.

And immediately we find a second Celtic link. In order to turn Tol Eressëa into England, Tolkien apparently planned a scenario under which it would be drawn by a great whale from its position far out in the ocean, coming to rest close to the Great Lands "nigh to the promontory of Ros"<sup>8</sup>, which Christopher Tolkien tentatively identifies as Brittany<sup>9</sup> (*ros* is, incidentally, the Irish word for "promontory"). The great battle of Ros at which the Elves were to be attacked and defeated by the forces of evil may be a reference to the cosmic conflict upon Mont Dol christianised as a battle between St. Michael and the Devil.<sup>10</sup>

Perhaps Tolkien himself felt uneasy at