**IRELAND'S GEOLOGY**
**Source: John Feehan, The Book of the Irish Countryside; Frank Mitchell and others, The Blackstaff Press, 1987**

**The rocky framework which lies at the heart of every landscape normally only appears at the surface. It is seen on the mountains, in the rivers and along the coasts, where the elements have stripped them bare of their mantle of soil and vegetation, or in quarries where they have been gouged out to provide the raw materials on which our civilisation so depends. For it is rocks which provide us with the stone, metals, oil, gas, coal and chemicals which keep our civilisation afloat.**

**The rock framework of Ireland is a mosaic of the greatest complexity, whose origins go back to the very beginning of time. Ireland as we see it today only began to take on its modern character some tens of millions of years ago, though weathering has wrought profound changes since Ireland first appeared as a discrete geographical entity on the earth's surface.**

**The various pieces in the enormously complex rock jigsaw that is Ireland were fitted into place at different times over the long course of the earth's history. The earliest pieces were laid down as long ago as 2000 million years ago, and the final pieces were slotted in only tens of millions of years ago at most – all a very long time before the first peoples set foot on our little island. Perhaps the best way to appreciate the overall geological picture is to look at the largest and most important elements in the jigsaw, while remembering that there is a multiplicity of other smaller pieces which may be extremely important to an understanding of some particular aspect or corner.**

**We can usefully begin our review of Ireland's geological history by setting ourselves down in the era of earth history called the lower Palaeozoic between 400 and 600 million years ago. For much of lower Palaeozoic time, a great ocean stretched across the part of the earth's surface where Ireland is situated today and, in its waters, sands and muds washed in from the distant land built up over millions of years. The retrospective geologist now gives the name Iapetus - in Greek mythology, Iapetus was the father of Atlas – to this great ocean. This ancient Palaeozoic ocean was in a sense the forerunner of the Atlantic Ocean. This Iapetus Ocean gradually narrowed during the later part of the lower Palaeozoic, as the continental masses which bordered it on the north-west and south-east approached each other and finally collided. The thousands of metres of marine sediments in between were folded and contorted. The pleats of the folds running north-west to south-east were thrust finally upwards as a vast tract**

**of mountainous country, which the forces of weathering and erosion set to work on straight away. This was the Caledonian orogeny (deformation). The great surface disturbances were accompanied by other events deeper down, where granite magma from huge volcanoes was intruded deep in the earth's crust in Galway, east Leinster, Newry, Donegal and around Foxford, Co. mayo; these granite intrusions acted as structural pillars which influenced much that happened later.**

**The sands, gravels and silts produced by this new episode of erosion at the surface were carried by the extensive river network flowing southwards across the surface of this new continent; they were deposited as sandbanks in rivers and lakes, and on the floodplains when the rivers overflowed their banks. By the end of the Devonian period of earth history, the great mountains, which had been there 65 million years earlier, were reduced to sea-level. A new ocean began to creep northwards over the levelled surface of the continent. The continental sediments buried under its advance hardened in time to become a series of rocks to which we give the name 'Old Red Sandstone'.**

**For the next 20 million years, lime-rich muds and other sediments accumulated in the warm waters of these shallow lower Carboniferous seas; in time these too were hardened to rock, producing the lower Carboniferous limestone which is Ireland's commonest rock. The marine sediments of the lower Carboniferous were succeeded by deltaic sediments in the upper Carboniferous period which followed. Forests of tree ferns, horsetails and other strange plants flourished in this environment. Their remains accumulated and were compress in time to become coal. At the end of the Carboniferous period, new continental collisions (Hercynian orogeny) in southern Europe folded the Carboniferous sediments and the Old Red Sandstone, which underlay them, to form new ranges of mountains – this time with east-west fold axes.**

**Much of Ireland's geological framework had already been blocked out by this time; nearly half the country is underlain by rocks of the Carboniferous age, most importantly the Carboniferous limestone which forms to great expanse of the central plain. The Old Red Sandstone dominates the mountains of Munster and the lower Palaeozoic foundation upon which it rests makes up much of the triangle of hummocky upland that lies between Longford, Belfast and Dundalk, as well as much of east Leinster around the granites of Dublin, Wicklow and Carlow. Lower Palaeozoic rocks also lie at the heart of the Old Red Sandstone inliers in the south midlands.**

**Although much of Ireland was once covered by sediments of Mesozoic age, these have long been stripped away to reveal the Carboniferous and older rocks beneath. It is only in the north-east, in the Tertiary basalts and the chalk of Antrim and the mountains of Mourne, Slieve Gullion and**

**Carlingford, whose granites were intruded at about the time the lavas were being poured over the Antrim chalk, that these are of real importance in landscape terms. These great igneous events were accompaniments to the opening of the North Atlantic ocean, which broadly defined where Ireland's western front would one day lie.**

**This interpretation condenses 2000 million years of Ireland's rock history into a few boxes. It is not comprehensive and is intended to open a window onto ancient worlds for every explorer of the Irish landscape to discover. For a more detailed study of the geological calendar look at these interesting websites:**

**http://www.sdnhm.org/exhibits/mystery/index.html**

**http://www.fossilmuseum.net/GeologicalTimeMachine.htm**

**http://paleobiology.si.edu/geotime/main/index.html**