

The Big 5 Locations – Following in the footsteps of James Hutton finding evidence to support his “*Theory of the Earth*”.

James Hutton, after many years of studying and research, was about 60 years old when he started to prepare his theoretical views on the geological processes pertaining to the Earth. In 1785, he set off on a series of journeys around Scotland with the aim of testing his ideas particularly regarding the origin of granite, aiming to publish accounts of these field trips in volume 3 of **Theory of the Earth**. In this short feature, we have presented a snapshot of 4 of the key places that are synonymous with the “Founder of Modern Geology” and have supported the pictures with words taken from volume 3 of “***THEORY of the EARTH with proofs and illustrations***” in four parts by **James Hutton M.D. & F.R.S.E.** It was discovered 100 years later and an edited version by Sir Archibald Geike was published in 1899 by the Geological Society of London. The first version of “Theory of the Earth – an investigation in the Composition, Dissolution and Restoration of Land upon the Globe” had appeared in 1788 in transactions of the Royal Society of Edinburgh. The lost drawings by Hutton’s good friend, John Clerk of Eldin only came to light in 1968.

Glen Tilt (1785 & 2023)



James Hutton and John Clerk of Eldin visited Glen Tilt in 1785. It lay between the Rivers Dee and Tay; he appreciated that the Dee carried boulders of granite and the Tay was full of Dalradian rock which he called “Alpine Schistus”.

Hutton wrote:

It is particularly in Glen tilt that this most interesting point of natural history is to be seen. This glen is a long narrow valley, running in a straight line between two mountains, the sides of which are as steep as is possible for earth and stones to lie. The River Tilt that runs in this valley, discovers in many places the solid rock, which being cut or polished by the stream, presents here and there the most interesting picture or section of the strata.....

.....the granite is here found breaking and displacing the strata in every conceivable manner, including the fragments of the broken strata and interjected in every possible direction among the strata which appears. This is to be seen, not in one place only of the valley but in many places, where the rocks appear or where the river has laid bare the strata.

In this picture, some 238 years later, we see some of the members of AGS examining the granite intrusions into the Dalradian schists which Hutton noted in the river by the site of a former bridge, close to the lodge on the Blair Athol estate. This evidence supported his theory that granite must have been molten and younger to have been intruded into the older bedrock schists.

Arran (1787 & 2026)



In yet more pursuit of granite, Hutton set out to explore Arran in 1787, but this time with Clerk's son, John Clerk jnr. Again, he was determined to establish that granite veins invading surrounding *Alpine Schistus* proved that granite must be younger than the bedrock that enclosed them. The pair created an extraordinary diagram showing a cross section of the Northern Mountain Complex showing granite displacing sedimentary layers and rising up from the depths as it ascended through the earth's crust, depicting geological processes many decades ahead of current understanding.

They also discovered this location, near the Cock of Arran, where there was a clear junction between the much older Dalradian metamorphic rocks (dipping steeply to the left in the foreground of the photo) and younger sedimentary layers (dipping gently to the right behind and on which people are standing).

Hutton wrote: *Loch Ranza at the north end of the island, is properly within the alpine schistus; but, in tracing the shore, upon the east side of the loch or bay, we come to the extremity of this schistus district. Here the first thing that occurs is the immediate junction of the inclined strata where here appears to be a composition of sandstone and limestone; these strata are equally inclined with the schistus but in the opposite direction. Those two different kinds of bodies rise to meet each other; they are somewhat confused at the immediate junction; but some of the sandstone or calcareous strata overlap the ends of the schistus.*

Hutton's original drawing of this formation within the text of his magnum opus, *Theory of the Earth* here has been lost and replaced by a fairly crude drawing made long after Hutton's passing by Sir Archibald Geike. Hutton continues: *This I think is the only immediate junction, that I have seen, of the alpine schistus and what are commonly reckoned the strata of the Globe, and acknowledged upon all hands to have been formed of matter deposited in the bottom of the sea.*

The overlying sedimentary rocks are late Devonian / early Carboniferous (~360mya) and sit on top of Dalradian metasedimentary rocks deposited about 600mya and metamorphosed in the Caledonian Orogeny about 470mya.

Allar's Mill, Jedburgh (1787)

After visiting Arran, later that same year, Hutton and Clerk of Eldin visited Jedburgh during their exploration of the Southern Uplands. There they found that the River Jed had excavated a gorge and cut through the Old Red Sandstone into grey Silurian rocks. Interestingly, not only were the rock colours contrasting but they also observed that the topmost sandstones were lying horizontally while the lower facies were displaced vertically. They also noted that the 2 distinct layers were separated by a thin layer of what Hutton called "*puddingstone composed of the wreck of the schistus*". The draughtsmanship of this special feature by Clerk is impressive but regrettably, it is no longer possible to see the overall rock face as it is completely hidden by vegetation. Sadly, we have had to omit visiting this location.

Siccar Point, (1787 & 2026)



Also in 1787, Hutton set out by boat from Dunglass to observe the rock formations at Siccar Point. He was accompanied by Sir James Hall and John Playfair. He wrote:

At Siccar Point, we found a beautiful picture of this junction washed bare by the sea. The sandstone strata are partially washed away by the sea and partially remaining upon the ends of the vertical schistus, in many places, points of schistus are seen standing up through amongst the sandstone, the greatest part of which is worn away. Behind this again we have a natural section of this sandstone strata, containing fragments of schistus. Most of the fragments of schistus have their angles sharp, consequently they have not travelled far or been worn away by attrition.

Hutton deduced that the *schistus* had been at the bottom of the ocean prior to the sandstone's deposition and these sedimentary layers had subsequently been disturbed by the immeasurable forces of tectonic movements into a vertical orientation prior to the sandstone deposition over an immensely long period. With this radical theory, Hutton had changed the science of Geology - the process of erosion, deposition and uplift "*formed new lands on a timescale where we find no vestige of a beginning and no prospect of an end.*"

We are fortunate that in 2026, Edinburgh Geological Society, Scottish Geology Trust and The James Hutton Institute collaborated to raise funding and develop the site for improved public access. The new Deep Time Trail celebrates the tercentenary of Hutton's birth.

Hutton’s section, Salisbury Crags, Edinburgh (1780’s & 2023)



It is not recorded when Hutton visited Salisbury Crags but he lived very close to here at St John’s Hill. Nor do we know who accompanied him. Perhaps it was either or both of his good friends, John Clerk of Eldin who did many of his drawings or perhaps it was John Playfair. The latter was a Professor of Natural Philosophy, a Church of Scotland minister, a scientist, mathematician and a co-founding member of the Edinburgh Royal Society. Like Hutton, he is famous as a member of the Scottish Enlightenment.

Hutton (and perhaps friends) had come to visit a dolerite quarry being used to supply paving stones for London but noted a dolerite sill intrusion in the sandstone just to the west with a very significant feature.

Nor can we find Hutton’s description of this famous rock feature but Clerk’s drawing (only found in 1968) illustrates it perfectly, except that it is a mirror image and the 2 figures and dog depicted in the drawing are made 1/6th actual size so that the feature appears much enlarged.

In reality, here is a section of sandstone some 500mm x 800mm which has been split away from the layers to the left and raised by about 200mm. Basalt intruded into a crack and the resulting wedge-shaped toggle raised the block upwards.

Unfortunately, the basalt is somewhat hidden behind the leafy growth in this photo.

Note that this part of the Crags is currently fenced off so that special permission must be sought from the Holyrood Park authorities to access this particular feature.

Picture Credits:		References:		Acknowledgements:
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Cock of Arran -	Kenneth London	Landscapes in Stone series –	Alan McKirdy	
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