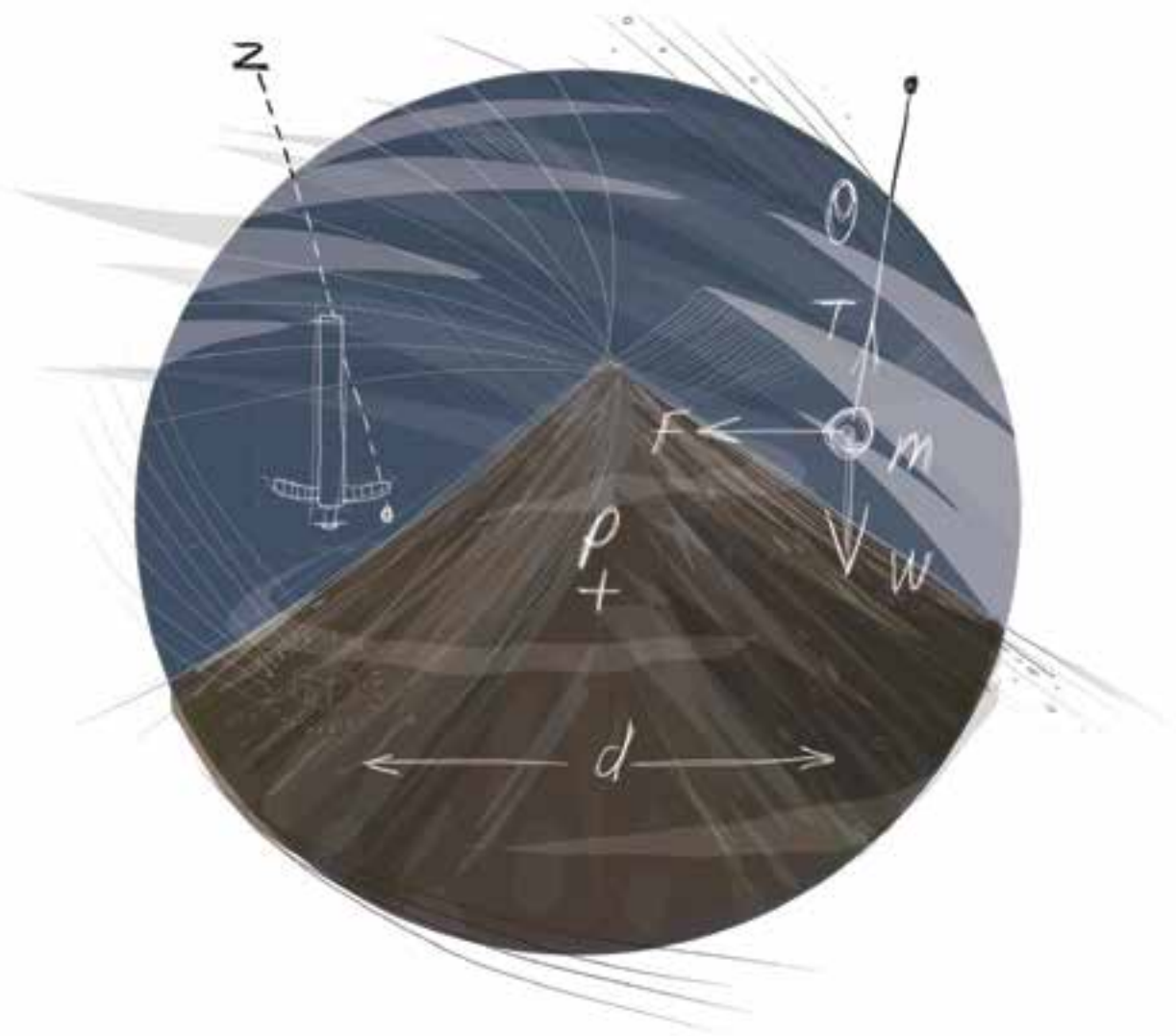




MOUNTAIN OF GRAVITAS

How a wild camp, a Scottish peak and the site of an old experiment formed the foundation of an unlikely adventure two centuries in the making

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Schiehallion is totally fantastical. Seen from Loch Rannoch it is a mirage of a mountain: elegant and scooped, rising a vertical kilometre from Perthshire's knotty Highland to a startlingly sharp point. It stands statuesque and quite separate to its rather dumpy neighbours. You've seen it, even if you don't think you have: perhaps in reality, hooking the corner of your eye from the summit slopes of Ben Nevis, or the road through the East Highlands. Maybe you've seen it depicted on a beer bottle or a painting. You've seen an unwitting impression in every child's paintbrush interpretation of a mountain or poking out of the backdrop of a bedtime story. Its name even means 'fairy hill.' And while Schiehallion is quite real, like most fairytales, not everything about it is quite as it seems.

This vision of Schiehallion from afar has, over many hundreds of years, captured countless imaginations. This particular tale focuses on two. Separated by ambition, motives and the not insignificant gulf of 240 years, one of these imaginations belonged to a scientist, minister and Astronomer Royal by the name of Nevil Maskelyne. Rather less impressively, the other belonged to me. But while my motives for being in this wild place were simple, Maskelyne's were not.

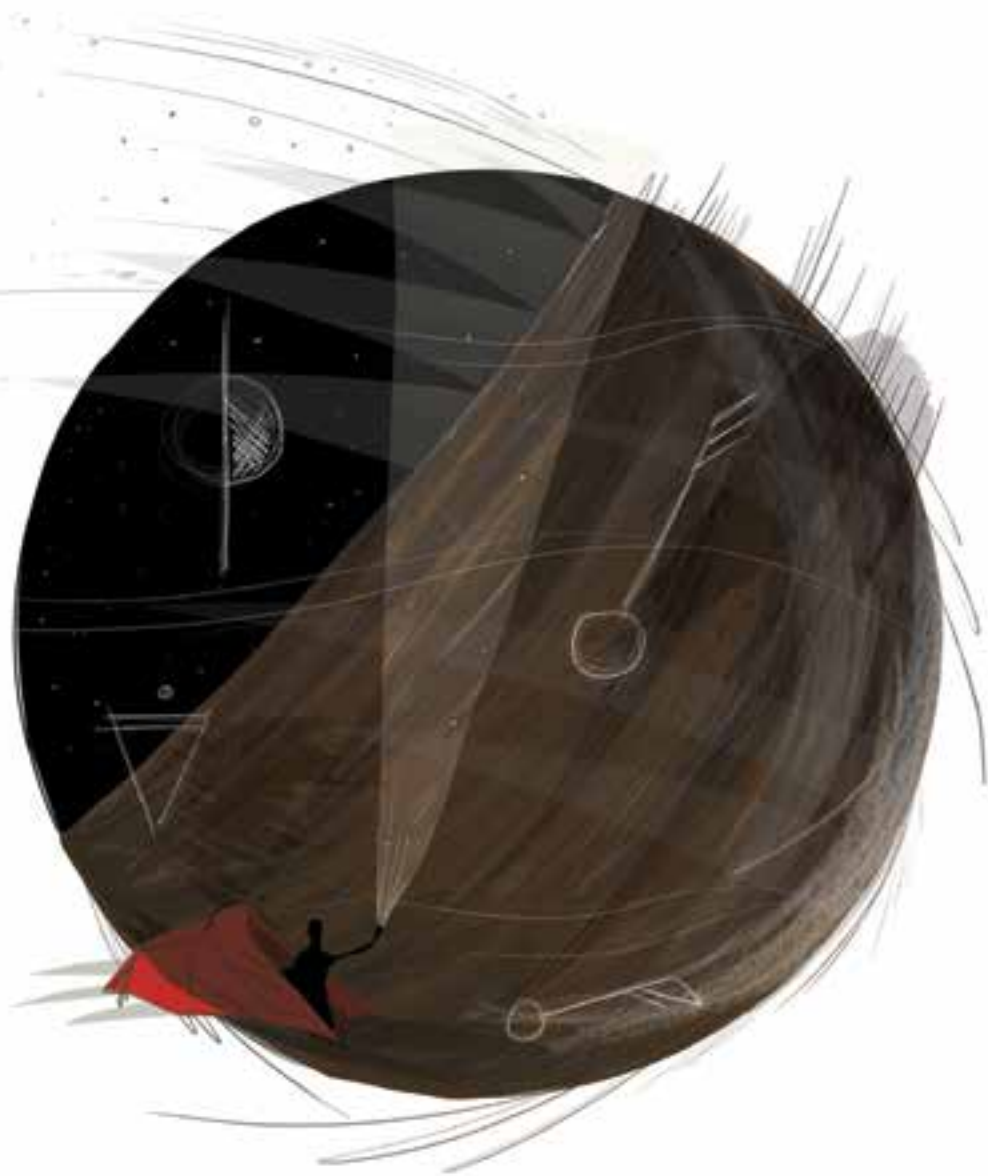
THE EXPERIMENT

You may have heard the headline: the Highland mountain that, a time long ago, was used to ‘weigh the

world'. It sounds grand and unlikely. Then you learn the details, understand the reasoning and grasp the basics of the science involved – and it starts to sound utterly crackpot. The Royal Society plaque at Foss that commemorates the Schiehallion Experiment, as it would come to be known, wisely dodges detail. You do get the sense that Something Rather Important happened here. But you're not sure exactly what.

At the time when Nevil Maskelyne arrived on Schiehallion in May 1774 there were certain things that were known, albeit roughly. It was known that Earth and other planets orbited the Sun. And it was known that a relationship existed between the gravity of an object and its overall mass: the bigger the object, the greater its pull. But while such cosmic concepts could and had been observed and proven given time, clear skies, a telescope and a genius, there was one thing far closer to home such things couldn't do: look down. Nobody knew what lay deep within our own planet. Many still thought it was hollow.

The idea that led Maskelyne to the Perthshire highlands was this: things fall to Earth with such gravitational keenness because Earth is the biggest thing hereabouts. But what if there was an object of considerable mass and abruptness located nearby that was large enough to have its own gravity? This object's gravitas wouldn't be enough to override or even challenge Earth's, it wouldn't make Newton's apple fall sideways out of the tree towards it, for instance. But the



gravity of this object *may* be robust enough to have the tiniest influence upon a falling object – a twitch in its trajectory. If that twitch could be measured, you could theoretically work out the factor by which Earth's pull was greater than that of the competing object's.

The kicker was this: if you knew the dimensions, composition and mass of this object, with a relatively simple bit of ratio mathematics you could figure out the bountiful inverse: the mass of Earth itself.

All that was needed was something big, abrupt and – for ease of measurement – symmetrical. After much searching, the mountain of Schiehallion was selected.

Two small, stone bothies were constructed on opposing sides of the mountain. In each was installed a plumb-line – Newton's Apple suspended mid-fall, if you like – and apparatus to determine by what degree of deflection the mountain's mass was pulling the plumb line away from the vertical.

This may have sounded straightforward enough to a mind geared up for science. But the rigours of a Scottish summer would give the experiment – and Maskelyne himself – a beating. Because the instrument usually used to determine if something was vertical or not was a plumb-line, Maskelyne's measurements had to be made using the stars. The planet moves, the skies are frequently cloudy, and delicate observations and the height of the midge season are uneasy bedfellows. As well as this, the addition of a mathematician named Reuben Burrow to survey the mountain's physical attributes – a blitz-tempered Yorkshireman with whom the genteel Maskeyne could hardly be called compatible – along with a result that may turn out to be too small to be measured, the task was, so to speak, mountainous. It took Maskelyne 17 weeks. Then the real work began.

THE MOUNTAIN

In 1774, climbing mountains without ulterior cause – botany, mining, weighing the world – wasn't the done thing. In those days, civility was sought, not voluntarily shunned. This pursuit of progress and the refinement of the modern world through science was known as the Enlightenment. Today, however, enlightenment means something different. Mountains provide us with a way to reconnect with nature and realign a perspective often lost in the jostle of modern life. That this one in particular had a fine aesthetic and an appropriate scientific footnote for me made it an alluring venue for a wild camp.

It was an evening of transient bluster at which the Highlands are master. One moment filthy clouds hung

heavy on the mountain; the next they were pierced by spears of golden sun, then everything was glistening with fresh rain. It felt wild and vital and muscular. It felt like Scotland should.

My hope was to locate the site of Maskelyne's old observatory somewhere on the northern slope of this 3,553ft mountain. It was a difficult task; no express location seemed to be documented, and so my route plan was the result of hopeful conjecture from a pile of vague clues.

I'd never set foot on Schiehallion before. I'd never even seen its famous profile in the flesh until that afternoon, when I wandered down to the shores of Loch Rannoch and looked at it. I imagined what it would feel like to stand on the apex of that extraordinary summit, and was happy that its aura of the unreal stands firm in reality. Some mountains are intimidating; some are beautiful. Schiehallion bewitches.

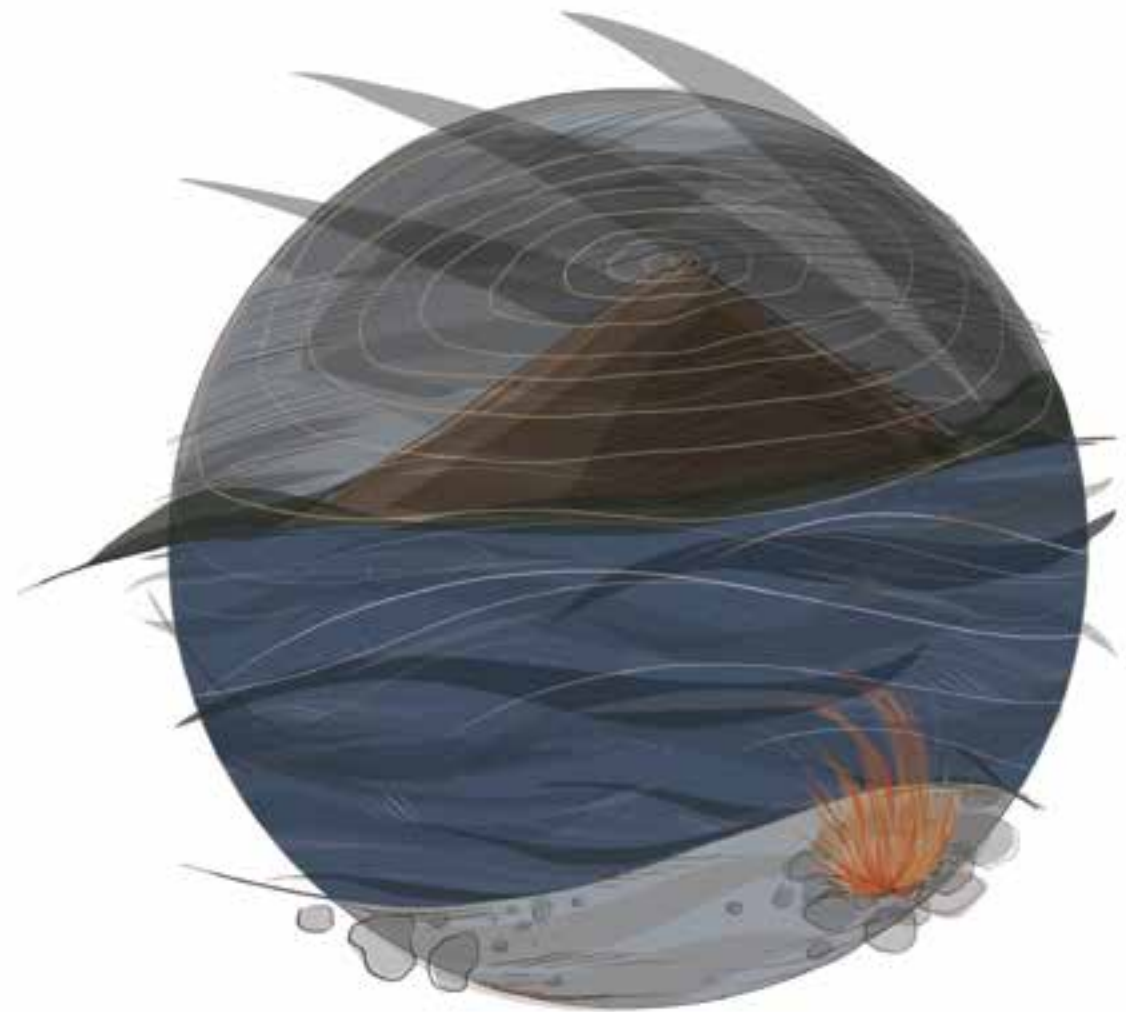
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There is no path on the northern side of the mountain. I followed streams and sheep tracks through tight heather and beneath a glorious Scots Pine, before the ground began to tilt up into that famous concave arc. It's actually an illusion, the symmetry you see from Loch Rannoch; the mountain is in fact long and skinny, with a sharp summit ridge running east-west. It's like the hull of a capsized boat.

The only clue I had been able to turn up as to the site of Maskelyne's northern bothy was that it was at around 2,300ft and close to the course of the stream I had followed from the mountain's base. As the evening began to creep across the sky and wind began to assert itself on the mountain, my hopes of finding it before nightfall began to fade with the thickening dark.

THE CAMP

Night time on a mountain is fierce and thrilling. These are hard places already, and in the dark they lose what little comfort they harbour by day – paths, signs, other



people – and become as they have been throughout history: lightless, uncivilised and wild.

Maskelyne's gravity experiments on Schiehallion were conducted only by night: he needed to see the stars. In the dark and the building wind, I stood outside my tent, pitched on the flattest ground I could find on the slope. I was higher than most of England, and I knew I was close to precisely where the experiment happened. Were it still standing and in use, from my camp I fancied I'd probably be able to see the candlelight of the observatory.

I would have liked to have bunked down within its bricks – it's said there is enough left behind up there to know it when you find it – but somehow, it didn't matter. I got what I'd come for: common ground with the scientists who conducted an extraordinary experiment here 240 years ago.

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I was breathing the same air, drinking water from the same streams, sleeping on the same rock. And save for a few dug-in embers of electric light far down the valley the view I was seeing matched theirs. The mountain drew us together over the centuries into a shared experience regardless of motive: just being there.

I slept fitfully, emerging from my tent twice to re-peg a lively corner of the flysheet in wind that was becoming strong. By the second time, the moon had risen, casting a weird glow onto the landscape through a shroud of cloud.

THE LEGACY

The legacy of the Schiehallion experiment was considerable. Maskelyne and Burrow bickered about each other's behaviour on the mountain for years, but both sit peacefully name-checked on the plaque beneath Schiehallion today. So too sits the quiet hero of the tale, Charles Hutton, who computed the data gathered by the experiment to a conclusion.

Schiehallion's gravitational pull on Maskelyne's plumb-line was less than half of what was expected if Earth had the same average density as the mountain: 2,500kg per cubic metre. To explain this, Earth was estimated at having an average mass – 'weight' – of 4,500kg per cubic metre. The theory Hutton put forward in diagnosis was that the planet was not only *not* hollow, but made up of something denser than rock. Hutton suggested metal. Science still thinks he's right.

Hutton also became an accidental hero to the hillwalker when – while trying to make sense of Burrow's chaotic survey data – he made it more palatable by joining values of equal height on a map with a line: thus inventing contours.

The experiment officially ended with a party at the northern observatory. Things got out of hand, the observatory caught fire, and burned to the ground. The only one not amused by this was the local fiddle player, 'Red' Duncan Robinson, whose violin became inadvertent kindling. Maskelyne honoured his promise to replace the instrument by sending him a package directly from London. The fate of this violin is an intriguing question mark: Maskelyne sent the young lad a 1729 Stradivarius, one of the finest instruments ever made. Had it survived the intervening centuries, it would be worth millions.

So there you have two absorbing ways to utilise a mountain. These muscles of the landscape are often used as metaphors for personal or conceptual challenges. Maskelyne scaled his own mountain of theory and used Schiehallion's gravity to prove Earth wasn't hollow. I climbed the mountain that helped him do so, standing on its tip just after dawn, the morning after my night on its slopes. From it – pleasingly rocky, and minus a trig point – I looked down to the lochside from where I'd first spied Schiehallion the previous afternoon and pictured myself atop the fairytale point.

Be yours an adventure in science or purely an adventure, there are few more beautiful than this – whatever kind of mountain yours happens to be. The Scottish poet Norman MacCaig, who knew the potential of these wild places to bewitch the beholder put it well, and was pleasingly specific, when he wrote:

*There's a Schiehallion anywhere you go;
the thing is, climb it.*

Read Simon Ingram's explorations of mountain landscapes in *Between the Sunset and the Sea: A View of 16 British Mountains*, published by William Collins; £18.99