The day the earth shook to a heavenly bang

The golf ball-sized meteorite that traumatised Guyra pales beside the gigantic space intruder that exploded above Siberia in 1908. **Gabi Mocatta** reports

FIVE hours flight east of Moscow and two hours north, a wooden settlement of 5000 holds its own against the Siberian forest — the taiga. It is hard to imagine a place more remote. No roads connect it with the outside world, no railway has ever been built. For a few short months each summer, the stony Tunguska River allows access to central Siberia's lifeline, the mighty Yenisey. Then temperatures plummet, at times to -60C, all water is icebound and the weekly flight south is the only way out.

But there is something special about the town of Vanavara. Street names such as Meteorite and Explosion soon give it away. Here, 91 years ago, the earth shook and fire engulfed the sky. Above the forest an errant cosmic body entered Earth's atmosphere and vapourised with a cataclysmic explosion 4km from the ground. With a blast 2000 times more powerful than the Hiroshima bomb, the Tunguska event laid waste to 2150 sq km of trees, released massive radiation and sent shock waves around the globe.

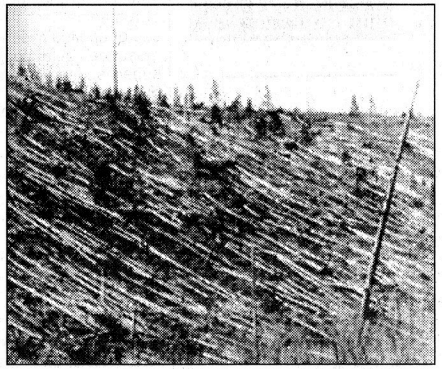
The explosion was heard 1000km away and months of strangely luminous nights were experienced worldwide. Despite the enormous destruction, a handful of Russian fur trappers and nomadic Evenk reindeer herders were the only unfortunate victims.

Eyewitness accounts of that fateful morning in 1908 were at first difficult to come by. As shamanistic believers, Evenk tribesmen were convinced of the metaphysical origin of the explosion and had long observed a strict taboo on the area. The sheer remoteness of the place meant that the initial scientific expedition reached the epicentre only in 1927.

When they eventually agreed to speak, the witnesses told how a bright fireball crossed the heavens and disappeared over the horizon. Then "the sky split apart and a great blaze appeared", it became "searingly hot", and with the force of the deafening explosion, people and livestock were dashed to the ground. News of this soon filtered through to the outside world, spawning countless explanatory theories, both scientific and fantastic.

But only after 1991 and the demise of the Soviet Union were foreign researchers also allowed in. Last year, on the 90th jubilee international expedition, I took an Aeroflot white-knuckle ride, swooping low over the taiga to the site of the biggest explosion in the history of humanity.

It was a grey, brooding day as our massive, old helicopter creaked into action on Vanavara's airstrip. Loaded with expedition equipment and a team of 14, it laboured precariously into the air, skimming treetops that stretched to an endless emerald horizon. This is a territory of transition — taiga broken by boggy tundra patches. It is a land of bears and reindeer, mushrooms and berries. Permafrost begins here and stretches north in a frozen subsoil sheet to the shores of the Arctic Ocean.



Laid waste: flattened taiga in Siberia, 1927

From the air, the century-old destruction is hardly apparent. Only a few of the characteristic "telegraph poles" — stripped, charred trees that mark the blast's centre — have remained standing.

In the undergrowth, though, lie the rotting hulks that the blast felled. In some places their extensive root systems, ripped out by the blast, rear up like grey spectres in the gloom of the forest depths. The trees fell radially, so roots point towards the epicentre. Persistent magnetic anomalies make compasses unreliable and bearings must be taken from the direction of tree fall.

Most experts now agree that the Tunguska cosmic body was a small comet or asteroid. But as there is neither an impact crater nor any substantial fragments, it is hard to prove conclusively. Evidence points to a comet, a "dirty snowball" of rock and frozen gas that in vapourising would have left little trace. But a rival ricochet theory suggests that most of the object, in this scenario a stony asteroid, was catapulted back out into space after the initial explosion. If this is so, the Tunguska Cosmic Body's nature may never be known. In any case, scientists have yet to explain the massive radiation and magnetic anomalies that accompanied the event.

Preserving the explosion site and safeguarding the future of the area's indigenous people were also among the goals of the 90th jubilee expedition. The campaign to list it as a UNESCO World Heritage area has not yet borne fruit — and the oil-rich Evenkia area will certainly be subject to further mining and exploration. After 74 years of Soviet rule, the Evenk nation is beginning to reassert its cultural identity. Once a purely nomadic Mongol people, these hardy reindeer herders suffered the same collectivisation as the rest of the Soviet Union. They are now mostly Russian speakers living sedentary lives, but the past decade has seen a cultural reawakening.

Preserving the site is vital to science too, because by understanding what caused the Tunguska explosion, we may better be able to prepare ourselves for the real threat of earth impact. Thousands of cosmic objects fall earthwards each year — most of them so tiny they burn up as meteors in the upper atmosphere. Only a fraction of these reach the earth's surface, becoming meteorites, and only a handful have ever left the giant craters we associate with earth impact.

But humanity has been lucky, up to now, that cosmic objects have fallen in Earth's remotest places. Some researchers believe two other near impact events — in the Brazilian Amazon in 1930 and in British Guyana in 1935 — were of comparable scale to Tunguska. They say Earth may be subject to three or four such potentially catastrophic events a century.

In the silence of the Siberian taiga noise carries for miles, and it was half an hour from when we first heard the throbbing helicopter to when it appeared at our point of rendezvous. We emerged from the forest with peat samples for laboratories in Moscow and Tomsk, rocks bound for the US, tree resins for Bologna and burn maps for Japan. Two weeks had been spent in international co-operation, each of us removed from our disparate backgrounds and focused on a common goal.

But humanity's ability to protect itself against such impacts is limited. We can only hope that the next time a Tunguska scale invader is on a collision course, it chances upon just such a deserted landscape. Anywhere else and the consequences for mankind will be dire.