

Feature

Geology, 'far from the madding crowd', along the northern border of Vietnam

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To the north of Hanoi, about a day's drive by car, lies Ha Giang Province, the northernmost region of Vietnam. Ha Giang is remote from the hustle and bustle of daily life, and beyond its eponymous provincial capital towards the border with China, mountains rise quickly to Quan Ba, 'Heaven's Gate'. The mountains form an uneven landscape of steep-sided karst rising from deep river-cut gorges and form a formidable barrier on the northern frontier of Vietnam. Beyond 'Heaven's Gate' lies the little travelled region of Dong Van, with its majestic mountains of Palaeozoic strata rising precipitously to the sky. Here, a century ago, the French geologists Henri Mansuy and Jacques Deprat documented early finds of fossils from lower Palaeozoic strata on the border with China.

At the back of Phong Nguyen Duc's office, on the 6th floor of the Vietnam Institute of Geosciences and Mineral Resources, in the Ha Dong district of Hanoi, lies a pile of moth-eared books tied-up in a neat pile at the end of a narrow desk (Fig. 1). The books might look undistinguished now, but a brief scan of their spines quickly reveals two names of great historical importance in the geological surveying of Southeast Asia, Henri Mansuy and Jacques Deprat. More than a century ago these two men were making ground-breaking discoveries along the border between northern Vietnam and southern China, documenting fossil faunas from newly discovered lower Palaeozoic rocks. Deprat was later to be embroiled in a scandal, that he had been 'planting' Ordovician trilobites from Bohemia in Yunnan Province, south China and near Vinh, Vietnam. He was forced to leave Vietnam and expelled from the Geological Society of France. In time, Deprat used his great intellect to remake himself as an author, writing under the name Herbert Wild, and biographing his time in Vietnam. Thumbing through the pile of blue-covered books in Phong's office there is no hint of the 'Deprat affair' and it quickly becomes evident that the lower Palaeozoic rocks of northern Vietnam provide a cornucopia of fossils, even if the resident silverfish of the books are gradually gnawing their way through the illustrations of the trilobites. A short car journey later, past the neon signs and teeming motorbikes of Hanoi's

lively streets, and we are in the Geological Museum, where some of Mansuy's and Deprat's collections of fossils reside. Some of these fossils are from the very far north of Vietnam, in a region little travelled to, and beyond the mountains of 'heaven's gate'.



Figure 1 In Phong Nguyen Duc's office in Hanoi lie a pile of dusty books. Inside there is evidence of a cornucopia of fossils from northern Vietnam.

Beyond 'heaven's gate'

About a day's travel north of Hanoi lies the small provincial capital of Ha Giang, which bears the same name of this northernmost Province of Vietnam. The city

has a little fewer than 80,000 inhabitants, and it is dissected by the Song Lo ('clear river'), which rises in the Chinese province of Yunnan. To the north of Ha Giang, mountains rise steeply to form an almost impenetrable barrier on the northern frontier of Vietnam. The small road that carries travelers across these highlands clings precariously to the sides of the mountains and it is in a state of perpetual repair (Fig. 2). About 140 km along the road lies the small town of Dong Van (Figs 3, 4), and the lower Palaeozoic rocks that straddle the border with China. The distance between Ha Giang and Dong Van would be travelled in little more than an hour on the motorways and freeways of Europe and North America, but the mountains of northern Vietnam hold the road within their shadow and progress is slow. After about 8 hours the road finally drops through a series of sharp bends into a beautiful valley encapsulating the town of Dong Van.



Figure 2 The road from Ha Giang to Dong Van clings precariously to the mountainside and is in a state of dynamical repair. Here motorcyclists wait as a small digger effects repairs from damaging overnight rains.



Figure 3 On the road to Dong Van.....just another 46 km to travel.

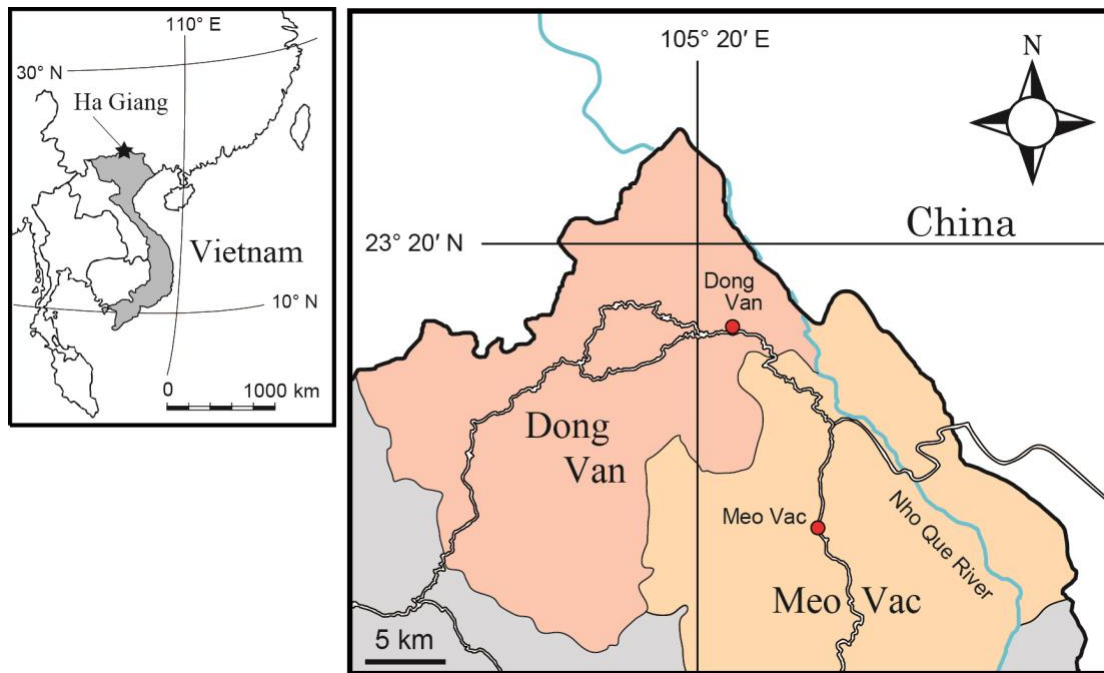


Figure 4 Ha Giang Province lies in the far north of Vietnam. In the Dong Van and Meo Vac areas there are historically important areas of Cambrian strata.

A decade ago Dong Van was a mostly sleepy place, notable for its Sunday market. Nowadays its skyline is peppered with the neon signs of low-rise hotels, as tourists arrive on motorbike journeys across the mountains from Ha Giang. Nevertheless, the town retains its provincial feel, and is dotted with the elaborate costumes of the many minority peoples whose cultures straddle the border with China. All of this life animates Dong Van in its bustling Sunday Market (Fig. 5).



Figure 5 Gentlemen pass the time of day at the weekly Sunday market in Dong Van.

Far from the madding crowd

A few kilometres beyond Dong Van are the lower Palaeozoic rock successions at the border with China, first studied by the French geologists at the turn of the 20th century. The road eastwards out of Dong Van travels onwards towards the town of Meo Vac, and after crossing the magnificent karst mountains of the Ma Pi Len Pass (Fig. 6), a small mountain road diverges from the main road towards Chang Pung. At first, this small sideroad descends gently into the valley of the

Song Nho Que (river) below, before bumpily crossing the river bridge. On the eastern side of the valley the road rises quickly in altitude and almost as suddenly loses its metaled surface, before snaking wildly around the mountain landscape for several kilometres. Its steady rise is measurable in the ever-increasing sheer drops of several hundred metres as the vehicle we are travelling in hurtles upwards. We hold on to our seats and hopefully our nerves, reassured by the passing motorbikes that we are travelling somewhere. As the mountains rise further, the villages become smaller and more remote in their appearance, and Dong Van drifts into memory behind the spectral jaws of a distant mountain chain. We have a sense of being at the edge of something, far from the madding crowd. Near the summit of the mountains the pass opens out again into a majestic landscape that hangs in the distance as it passes seamlessly across the national boundary into China.

We have reached the Chang Pung section. It is a little over three days since we left Hanoi, and we are filled with admiration for how the French geologists Henri Mansuy and Jacques Deprat navigated this unwieldly landscape a century ago. They must have travelled for many weeks to reach here. We stand within a stone's throw of the old French fort and literally within touching distance of China (Fig. 7). Those dusty books in Phong's office remain faithful to our cause, and within a few minutes we have found trilobites. On this visit to Vietnam we will find many more fossils of trilobites, brachiopods, graptolites, ostracods, vertebrates and plants from lower and middle Palaeozoic rocks.



Figure 6 The dramatic Ma Pi Len mountain pass lies on the road between Dong Van and Meo Vac.



Figure 7 The Cambrian succession of the Chang Pung section lies right on the border with China.

Geology in northern Vietnam

After the work of the French Indochinese Geological Survey in the first decades of the 20th century had discovered many new Palaeozoic fossils in northern Vietnam and southern China, mapping geologists again worked through this northern region in the 1970s. These surveys and subsequent work helped identify a fundamental geological divide in Vietnam, between those lower Palaeozoic rocks north of the Red River Fault, and those to the south. Northeast of Hanoi then, the early Palaeozoic history of Vietnam is intimately linked with that of southern China, as both regions once formed part of the ancient South China palaeocontinent. Across the border in China, the celebrated discovery of exceptionally preserved Cambrian fossils of the Chengjiang Biota in the 1980s led to a renaissance in the study of the lower Palaeozoic geology of Yunnan Province. But until recently, similar work in Vietnam has lagged behind. Yet even after more than a century of study – and relative neglect, the fossils of the lower Palaeozoic rocks of northern Vietnam are beginning to yield new information about this stunning land. There are many graptolite collections for example, some of which may enable the Ordovician and Silurian rock successions of northern Vietnam to be correlated with those hundreds of kilometres away in central Vietnam (Fig. 8).

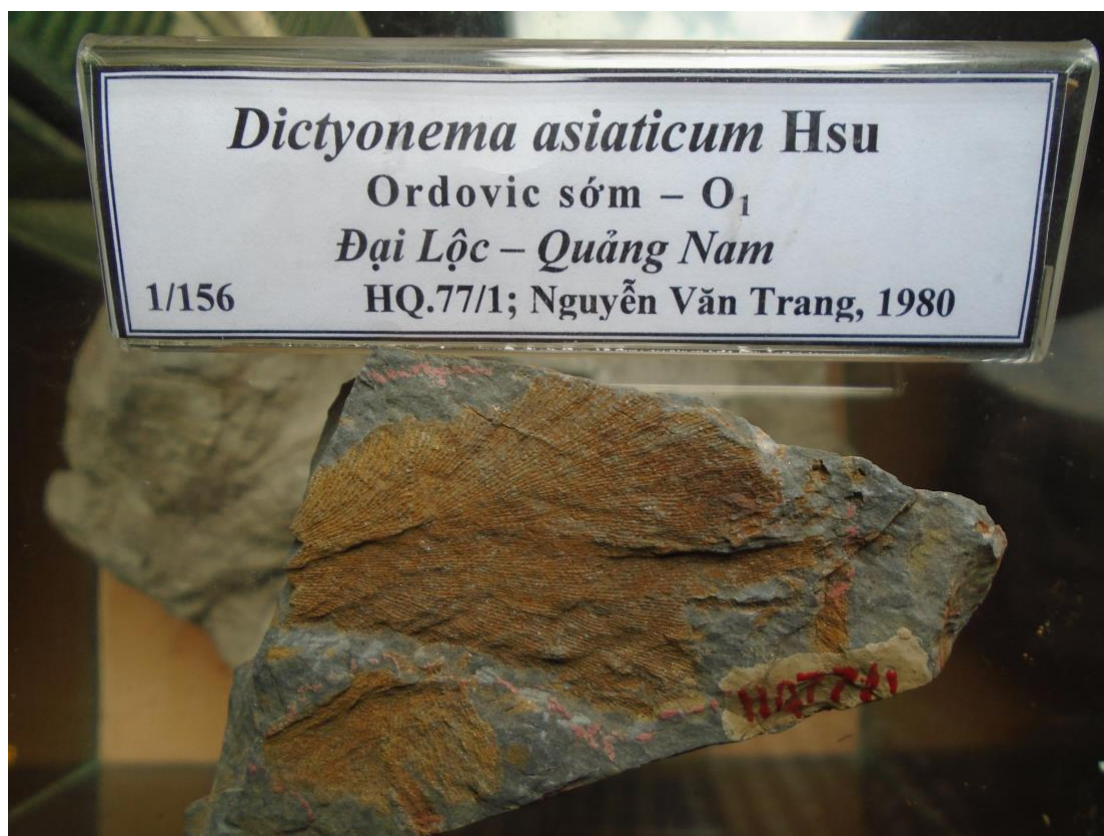


Figure 8 Dendroid graptolites from central Vietnam on display in the Geological Museum in Hanoi (the plastic name tag is about 11 cm long).

Phong Nguyen Duc and his colleagues are beginning a long journey, to try and revisit, recollect, and re-evaluate key fossil sites in Vietnam. To do this one must sometimes travel far from the madding crowd, along the ancient valleys of Vietnam. There we keep the noiseless tenor of our way and work within a landscape rarely travelled to. The geology and the landscape moved us, and so we will be back.

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Further reading

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Gray's Elegy written in a country churchyard ['far from the madding crowd'] at Poetry Foundation: <https://www.poetryfoundation.org/poems/44299/elegy-written-in-a-country-churchyard>