

THE HIGH WEALD COAST FROM HASTINGS TO PETT

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Magnificent cliffs have developed where the Hastings Beds of the High Weald meet the sea between Hastings and Pett Level (TQ 828100 to TO 888132). Because the sea is cutting back into high ground, which reaches 145m O.D. adjacent to Fairlight Coastguard Station (TO 862113), the cliffs are impressively tall with some vertical faces in excess of 60m in height. The form of the cliffs along this 8km stretch of coast depends upon lithological variations within the Hastings Beds and their degree of exposure to wave attack. None of the rocks is particularly hard and the average rate of cliff retreat is in excess of 1m per year. It is this rapid erosion which maintains the impressive cliffs, not the strength of the geological materials.

The cliffs are developed in the Ashdown Beds and the overlying Wadhurst Clay (Fig. 13). The lower Ashdown Beds are predominantly clays (formerly called the Fairlight Clay) with thin bands of sandstone, whilst the upper beds are predominantly sands and sandstones. The Wadhurst Clay mostly consists of shales but just above the base of the formation contains a band of massive sandstone some 10m thick, known as the Cliff End Sandstone. All these rocks lie in a faulted anticline. The axis of the anticline lies to the east of the Firehills (TO 867114) where the oldest rocks, the clay of the lower Ashdown Beds, outcrop. South-westwards and north-eastwards from this point the cliffs are developed increasingly in the sand and sandstones of the upper Ashdown Beds and the Cliff End Sandstone.

The soft clays of the lower Ashdown Beds are rarely capable of supporting vertical cliffs. Where these beds outcrop, the cliffs tend to consist of a jumbled chaos of unstable ground stretching inland for 2-300m from the landward limit of wave action. Erosion of material from the base of these cliffs triggers successive collapses which eat back into the clay slopes of the high ground behind. The rate of erosion at the base of the cliffs is so rapid that the materials brought down by repeated landslips and persistent mudflow activity are rapidly removed by the sea and instability is maintained.

To the west of Fairlight Coastguard Station the sandstones of the top Ashdown Beds and the Cliff End Sandstone become prominent in the upper parts of the cliffs. The cliffs have a relatively low-angled footslope, developed in the clay beds, surmounted by vertical cliff faces developed in the sandstones above. The clays in the lower part of the cliff become saturated by rainfall, sea spray, and ground water which has passed through the overlying sandstones. Mudflows transport the clays forward to the sea edge where they are eroded by wave action. The loss of clay support brings down the overlying sandstones which collapse in massive rock falls. Large blocks of sandstone litter the clay footslopes and are left behind on the beach when the softer clays are washed away by the waves. Large rotational landslips occasionally occur which affect both the overlying sandstones and the clays beneath.

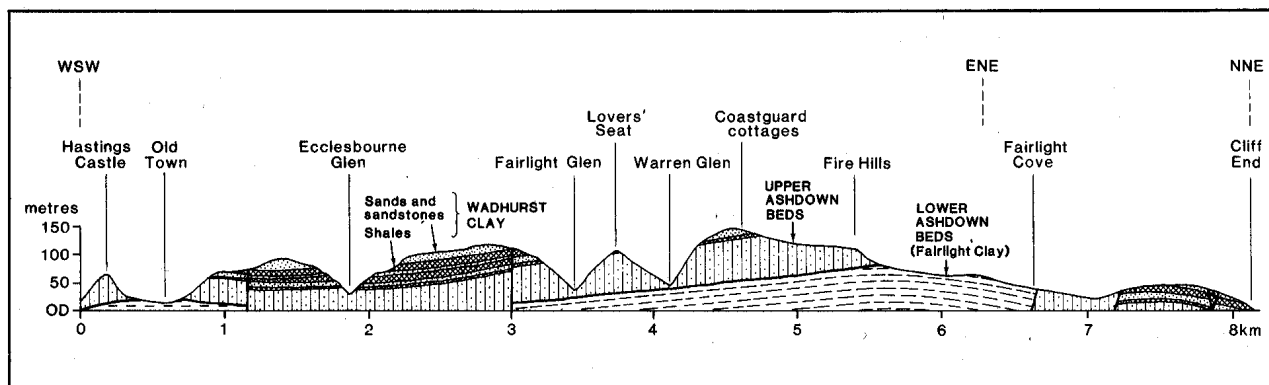


Fig. 13 Geology of the cliffs between Hastings and Pett. (Redrawn, with minor modifications, after Geological Survey of England and Wales, 1:25,000 Sheet, Hastings – Rye, Inst. Geol. Sciences, 1977.)

All these features can be observed in the vicinity of Fairlight Glen (TQ 852105) which is the only point along the cliffs with safe access to the beach (Fig. 14, Plate 5). The active mudflow zone has to be crossed to reach the beach, and this provides excellent opportunities for observing the characteristics of the flows. Their active nature is clearly demonstrated by the dislocated remnants of more than one set of access steps. The edges of individual flows are frequently delimited by sharply defined tears, side-shears, and their surfaces are often broken by transverse crevasses where they descend over convex sections of slope. Sometimes there are rafts of soil and vegetation up to a cubic metre or more in size, which lie on the surface of the flows and which have clearly been carried *en bloc* over the saturated mud below. The flows are most active in wet winter weather and least active during summer droughts. Because a proportion of their water supply comes from ground water in the sandstones above, they very rarely dry out completely, even during droughts, and are quickly reactivated when wet weather returns.

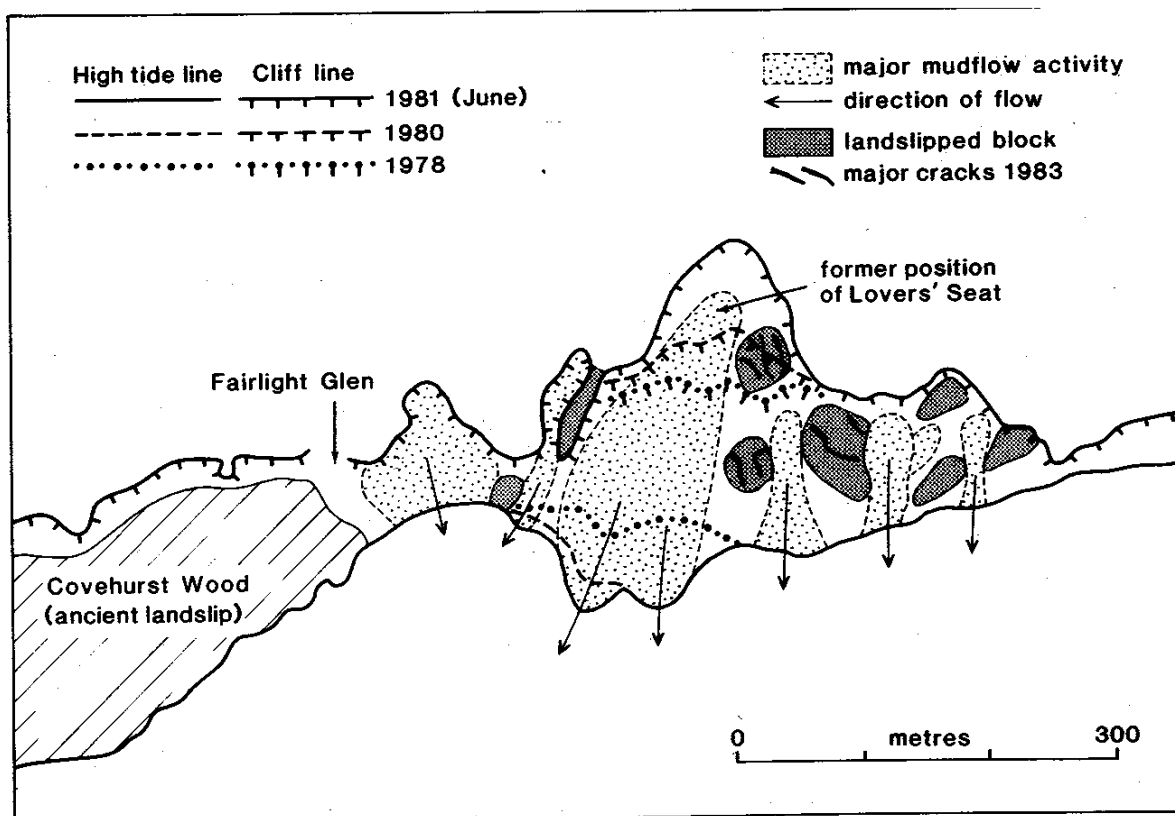
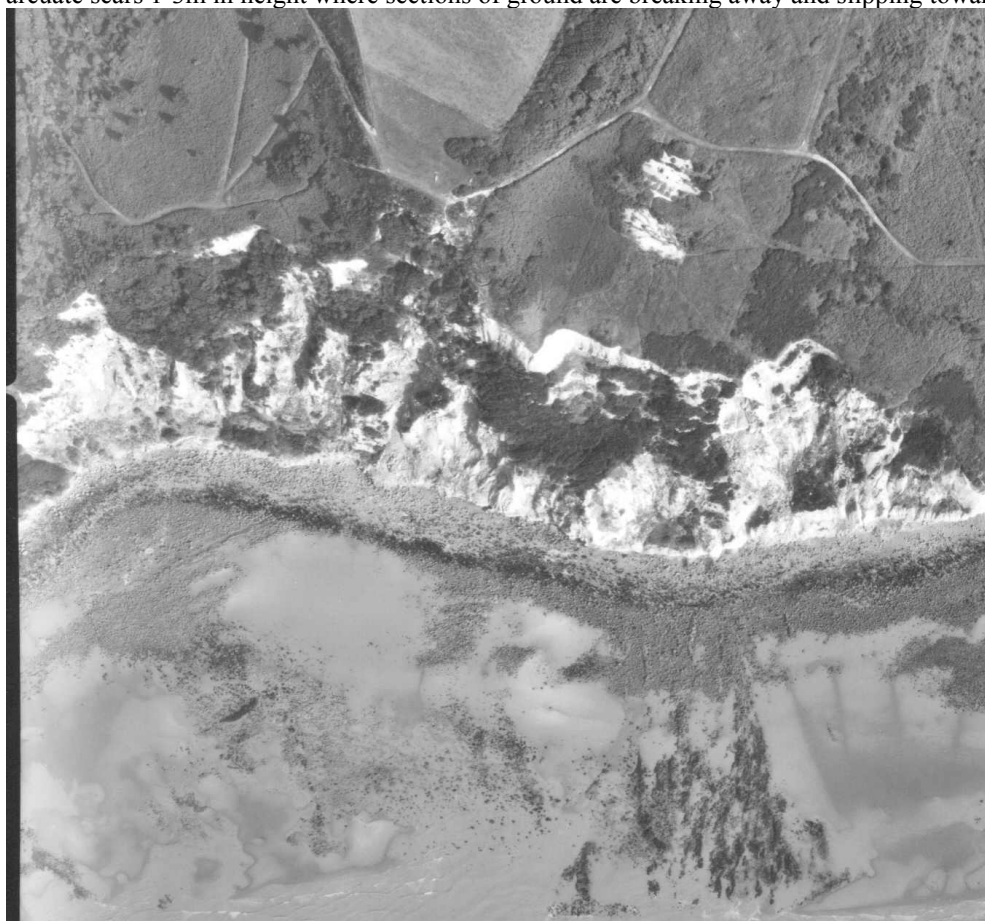


Fig. 14 Coastal landslipping at Lover's Seat, Fairlight Glen, Hastings.

To the east of Fairlight Glen is a fresh vertical scar more than 30m in height which was created by a major landslide and rockfall during the winter of 1980-81. This spectacular cliff collapse was responsible for completely destroying a famous sandstone crag at Lovers' Seat (TO 854108) which formerly stood close to the cliff edge (Plate 6). Mudflows at the toe of the slip project out to sea and are covered with a chaos of massive sandstone boulders. The seaward margins of the whole interfluvium between Fairlight Glen and Warren Glen to the east remain very unstable, and there are many arcuate scars 1-3m in height where sections of ground are breaking away and slipping towards the sea.



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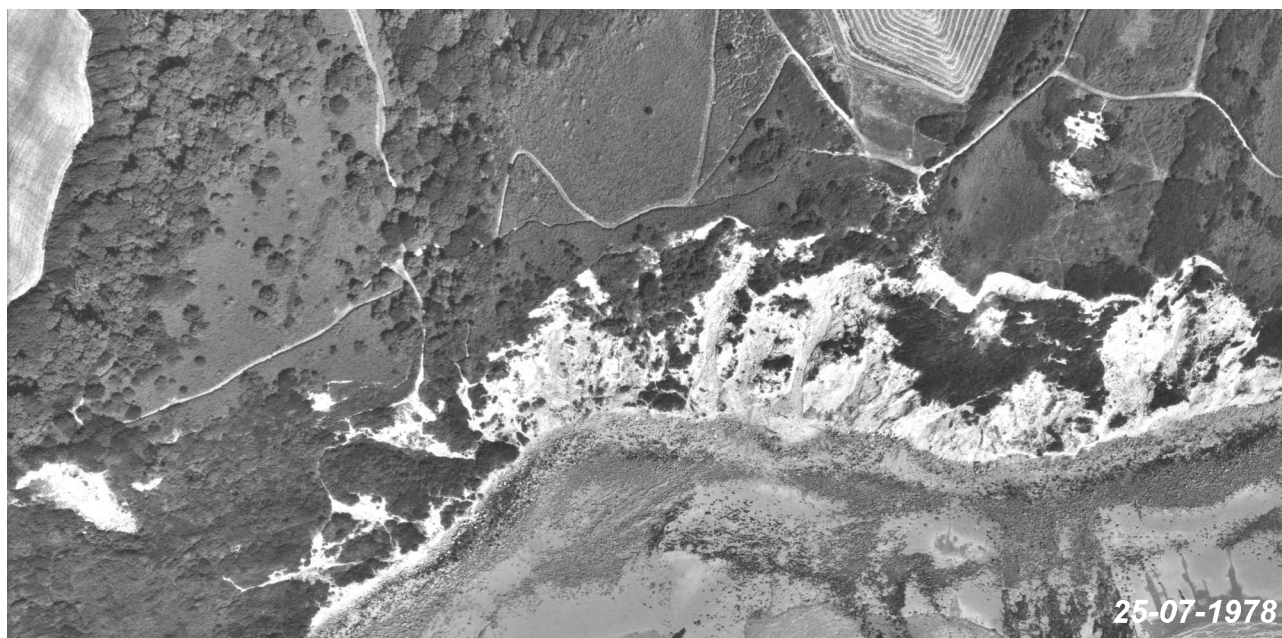


Plate 5 Aerial views of the coast at Lovers' Seat taken in 1974 (above) to 1982 (below). The spectacular extension of the mudflow and landslip which destroyed this local landmark can be clearly seen. (Photographs supplied by Meridian Airmaps, Lancing and reproduced by courtesy of the Southern Water Authority.)

To the west of Fairlight Glen lies the massive rotational landslip of Covehurst Wood which forms an undercliff backed by nearly vertical sandstone cliffs. The landslip affects nearly a kilometre of coast and is 300m wide at its broadest point.



Plate 6

Lovers' Seat, Fairlight, 1849. This picturesque and well-known landmark was destroyed by landslipping during the winter of 1980-81. (Reproduced by courtesy of Worthing Museum.)

The slip is evidently of considerable age. It appears on a number of early nineteenth century prints by Rowe and Nicholson and on a map published by Rowe¹. The prints show that it was clothed in dense woodland so it must date from the eighteenth century or earlier. The first ordnance survey map of 1813 shows what is presumably the slip but it is misplaced eastwards and it is not until 1868 onwards that the ordnance maps show the slip in its correct position. Low cliffs occur around the toe of the landslip where it is being eroded by the sea, and small slumps frequently occur around the seaward edge. When originally formed, the toe of the slip must have extended much further out to sea than it does at the present day.

Between Ecclesbourne Glen (TQ 837099) and Hastings, the westward dipping sandstones of the upper Ashdown Beds descend almost to sea level (Fig. 13). These massive sandstones, and the overlying Cliff End Sandstone, give rise to tall cliffs with vertical or near vertical faces up to 60m in height. Shales of the Wadhurst Clay outcrop at the top of the cliff and slump over the face of the cliffs onto the beach below.

Cliffs of a similar form, consisting of a lower vertical face developed in massive sandstones with an unstable upper zone of clays and shales, occur between Fairlight Cove (TQ 881120) and Cliff End (TQ 888132). Here, however, the vertical face is not as tall and is mostly developed in the Cliff End Sandstone.

An abandoned cliff line continues east of Cliff End behind Pett Level and Romney Marsh. Where this ancient cliff was developed in massive sandstone some vertical faces survive although the lower sections of the cliff are now hidden behind fallen debris. Where it was developed in clays and shales the cliff has been degraded to gentler slope angles by landslips, mud and earthflows (Fig. 8). These processes continue intermittently at the present day on all slopes greater than 10-12°. Although the clay cliffs are now entirely grassed over, except for temporary scars created by the mass movements, they form a marked feature rising above the low alluvial flats of Pett Level. The Toot Rock (TQ 893138) which stands in Pett Level, is a former sandstone islet impressively cliffed on its seaward side.

The Coastal Glens

The coastal upland between Hastings and Pett is dissected by three deeply incised valleys, Ecclesbourne Glen, Fairlight Glen and Warren Glen. Although the streams in these glens are actively lowering the floors of their valleys they have not been able to keep pace with the falling base level caused by the retreat of the cliffs. As a result, the floors of the three valleys hang some 25 to 45m above the sea and the streams issuing from the valleys cascade down the cliffs to the beach below.

¹ Examples can be viewed in the library of the Sussex Archaeological Society, Barbican House, Lewes.

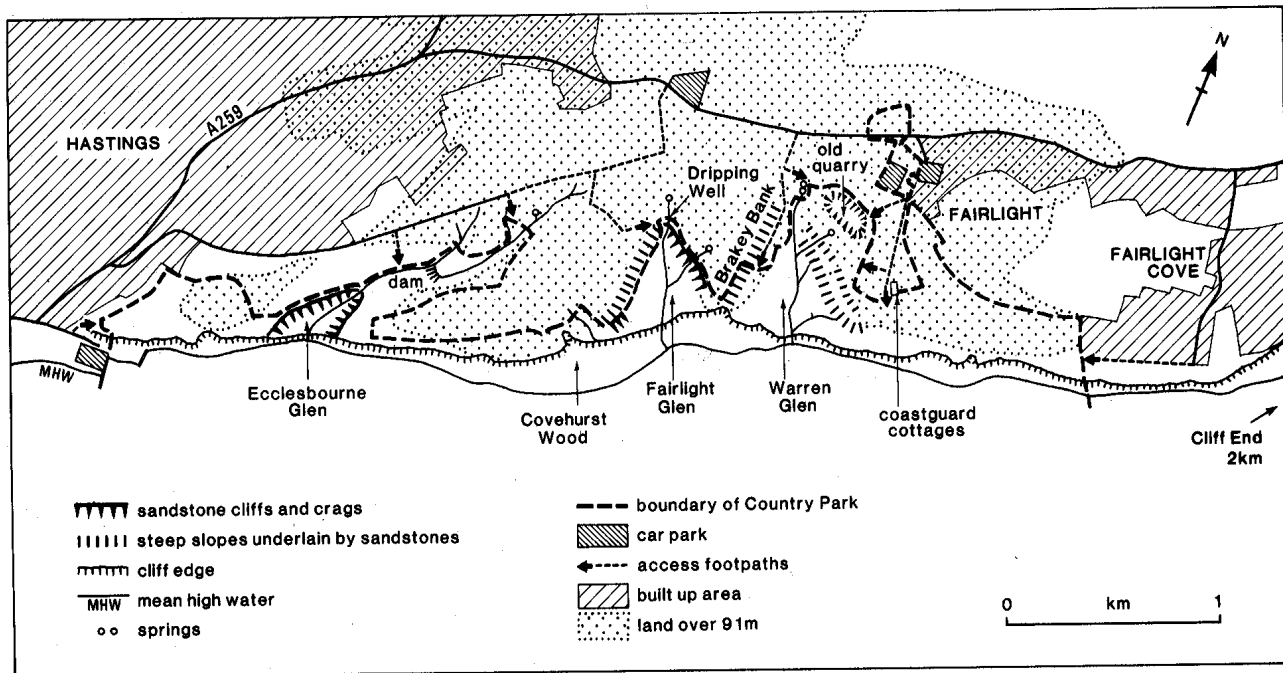


Fig. 15 The landforms of Hastings Country Park, Fairlight.

The cross-sectional profile of each of the valleys is very closely related to the underlying geology. Where the massive sandstone beds outcrop on the valley sides, they form steep slopes or lines of bare crags. Where the softer clays and shales outcrop, the slopes are gentler and often scarred by minor mass movement features.

In Ecclesbourne Glen, for example, the upper valley, excavated in the shales of the Wadhurst Clay, is broad and open with relatively gentle slopes. In contrast, the lower valley, which is largely excavated in the Cliff End and upper Ashdown Sandstones, is narrow and deeply incised with very steep slopes. The Cliff End Sandstone outcrops as a persistent line of crags which are particularly prominent on the western slopes where they reach a height of 4-6m (Fig. 15).

Fairlight Glen is developed almost entirely within the Ashdown Beds. The overlying Cliff End Sandstone forms a rim of very steeply sloping ground and outcrops as crags just below the crest of the eastern slopes. Near the head of the valley two further bands of massive sandstones are exposed beneath the crags and give rise to a double waterfall in the stream bed, often misleadingly known as the Dripping Well. Headward retreat of the waterfalls has left a narrow, gorge-like inner valley cut into the floor of the main valley.

Warren Glen is a broader, more open valley with less woodland. The slopes are developed in the alternating sandstones and clays of the Ashdown Beds, and the slopes developed on the clays frequently exhibit signs of instability. The Cliff End Sandstone forms the steep slope of Brakey Bank high on the western slope and is exposed in old quarries on the north east flank of the valley. Other bands of sandstone within the Ashdown Beds form marked benches on the lower valley sides.

Access

Most of the area lies in the Hastings Country Park and is criss-crossed by a dense network of public paths and trails. Major access points, with good parking facilities, are to be found at Hastings and Fairlight (TO 860118). The beach is accessible from Hastings in the west and Cliff End in the east, but Fairlight Glen is the only safe access or exit along the 8km in between. Walking along the beach from Fairlight to either Hastings or Cliff End is slow and exhausting because of a scatter of large sandstone boulders and is not recommended. Good views of the cliffs can be obtained from the beaches at Hastings, Fairlight Glen and Pett, and from the coastal path along the top of the cliffs. The beach at Fairlight is used by naturists.

Safety

The cliffs are unstable and no attempt should be made to explore seaward of the well marked coastal paths and viewpoints. Rock falls are common and it is unwise to approach close to the base of the cliffs.