Lytham

[SD 335 274]

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Introduction

South-west Lancashire has provided much evidence for sea-level change during the Flandrian, and regressive and transgressive sea-level index points have been used to construct a detailed sea-level curve for north-west England. Evidence for all but one of the marine transgressions comes from sites in the south Fylde around Lytham and this location has been used as the type locality for these sea-level changes. The tidal flat and lagoonal deposits have been ^{14}C dated and span a time period from 9270 to 805 years BP, during which ten marine transgressions affected the Lancashire coast (Tooley, 1969, 1974, 1977, 1978a, 1982; Middleton *et al.,* 1995). These data, and the method used to obtain them, has been used to compare sea-level change in northern England (e.g. Tooley, 1974, 1982, 1985; Huddart *et al.,* 1977; Plater and Sherman, 1992; Zong, 1993; Bedlington, 1995; Zong and Tooley, 1996), in the rest of Britain (Sherman, 1982, 1986a, b, 1989; Shennan *et al.,* 1983; Long, 1992), north-west Europe (Tooley, 1978a) and in a review of world sea-level change by Jelgersma and Tooley (1993).

Description

The south-western part of Lytham Common and Lytham Moss and the sampling locations are illustrated in (Figure 8.88). The seaward limit of the moss follows the +7.5 m contour northwards from Heyhouses Lane; this moss margin has been overblown by sand. To the east the moss is limited by a broken, rising till ridge, and to the north Lytham Moss runs into Great Marton Moss. Most of Lytham Moss has been burnt or used for fuel and only peat veneers survive at the margins (Wray and Cope, 1948). The moss is underlain by blue-grey, silty clays, which are exposed on the surface east of Queensway and occur at altitudes across the moss from +2.6 to +3.6 m (Figure 8.89). These silty clays are 9.45 m thick at LM15 (Figure 8.89) and to the east of Kite Hall Wood a shelly, silty clay, with *Cerastoderma edule* and *Tellina tenuis,* is 7.16 m thick. Most of the surface of Lytham Common comprises blown sand above +7.0 m, but the land grades northwards towards Lytham Moss, into which it was formerly drained by the South Hey watercourse.

The stratigraphy is illustrated in (Figure 8.89); there is an undulating till surface, the deepest transition from till to a peaty sand occurring at the Starr Hills at –11.2 m OD. On this till surface a thick succession of Flandrian pears, silts, clays and sands has been deposited, with the greatest thickness recorded at LC2A, with over 17 m. A lower peat has been recorded at LC2 and LC14, overlain by marine clays and silts, locally rich in *Scrobicularia plana.* These marine sediments are replaced either by peat, from LC11 landward, or blown sand from LC12 seaward. In every location peat is overlain by varying thicknesses of blown sand. Where the sand exceeds 1.0 m, it is differentiated into a lower and upper stage, separated by a palaeosol, or an accumulation of sandy peat. At LC6, for example, there is a soil horizon at 55–56 cm and peaty horizons at 75–77 cm and 185–200 cm before woody, detrital peat is reached at 220 cm.

The pollen diagrams from the Starr Hills (LC14A) and Heyhouses Lane, St Annes (LC2A) are illustrated in (Figure 8.90) and the pollen diagram from Thomas Gillat's Colley Hey (LC1) is given in (Figure 8.91). Two sampling sites occur in the south-eastern corner of Lytham Common at Ansdell (Al and A2, (Figure 8.88)) and the pollen diagram is shown in (Figure 8.92).

At Lytham Hall Park the stratigraphy is illustrated in (Figure 8.93), which shows a basin in the till, the lowest part of which is at –5.46 m at BH24. This basin is infilled with clays, silts, peats and sands. Again the upper blown sand can be subdivided as at Lytham Common. An example of a pollen diagram is illustrated from LHP5 in (Figure 8.94). The detailed stratigraphy and pollen diagrams from Nancy's Bay and the Lytham–Skippool valley can be found in Tooley (1978a).

Interpretation

The south Fylde has provided direct evidence of nine marine transgressions between 8570 and 1370 years BP and indirect evidence of a tenth transgression from the sand-dune area (Figure 8.95). The evidence for these transgressions is from four locations, the three described above and Nancy's Bay (Tooley, 1978a). The marine sequences that bear the Lytham name (Tooley, 1978a) serve as the type succession for Flandrian marine sequences in north-west England and as a basis for inter-regional correlation (Figure 8.96).

The final stages of Lytham I are recorded from Lytham Common, where a grey clay with sandy partings gives way to a gyttja in which the pollen of open habitat, coastal taxa are recorded at an altitude of –9.75 m, although the dominant freshwater environment is indicated by high frequencies of aquatic taxa. This occurred at 8575 years BP. Lytham II is recorded from the Starr Hills as a grey fine clay and transgressed the present coast ending biogenic sedimentation in basins in the till at an altitude –11.13 m OD, shortly after 8390 years BE The transgressive phase is recorded well landwards at Heyhouses Lane (Figure 8.88), but at a higher altitude (–9.82 m OD). The end of Lytham II is located in Nancy's Bay (Tooley, 1978a) at a mean altitude of –2.58 m OD shortly before 7800 years BP However, there is no evidence of the culminating stages of this transgression from the sequences on Lytham Moss and Lytham Common, although in Nancy's Bay there is evidence of five marine transgressions between 7800 and 5700 years BP Lytham II includes the very rapid sea-level rise recorded from elsewhere in the world, and in the Fylde the relative sea-level rose from –9.6 m to 2.5 m OD and records the final disintegration of the Laurentide ice sheet and the attenuation of Antarctic shelf ice. Lytham III is recorded exclusively from Nancy's Bay as a blue-grey silt, with altitudinal limits of –2.51 m to –1.35 m OD. Lytham IV comprises a complex of short-lived transgressions with slight altitudinal variation recorded in Nancy's Bay and its northern extension in the Lytham–Skippool valley (Tooley, 1978a). The early stages of the transgression are characterized by grey sand and silt, whereas the later stages are fine silt and clay with sheets of *Phragmites* peat containing pollen both of coastal taxa, such as *Plantago maritima* and *Armeria maritima,* and freshwater taxa, such as *Cladium, Typha angustifolia* and *Nuphar.* Lytham V is recorded simultaneously across Nancy's Bay from 5950 to 5775 years BP, where the mean altitude of the transgressive phase is +1.3 m OD and of the regressive phase +1.59 m OD. Lytham VI is recorded from Nancy's Bay, with the transgression having a mean altitude of +2.88 m OD and comprising a blue-grey clay between 30 and 80 cm thick, with rounded pebbles. The end of this transgression is recorded throughout Lytham at the Flandrian chronozone boundary, that is about 5000 years BP, at a mean altitude of +3.03 m OD. Lytham VII is recorded at the northern end of the Lytham–Skippool valley (Tooley, 1978a) as a layer of blue clay with iron partings, and in Lytham Hall Park, where its culminating phase occurred 3150 ± 150 radiocarbon years ago at an altitude of +3.15 m OD. In Lytham Hall Park Lytham VII is close to the marine limit and a short period separates it from Lytham VIII. The latter is recorded in Lytham Hall Park and is a silty clay, although farther seaward there is a transition to a silty sand. The mean altitude of this transgression is +3.68 m OD and +4.34 m OD for the regressive phase, and marine sedimentation lasted from 3090 ± 135 to 2270 ± 65 years BP. The end of Lytham IX is recorded from the south-west corner of Lytham Hall Park and between the park and the present coast. The mean altitude of the regressive phase is +4.46 m OD, although it reaches a maximum altitude of + 5.39 m OD. However, marine sedimentation was occurring nearer the coast at a lower altitude about 1370 years BP. A final transgression is inferred from Lytham, where dates from biogenic strata intercalated with the coastal dune sand ranged from 805 to 830 years BE On the basis that marine transgression episodes are closely related to periods of dune stability, increased precipitation and biogenic sedimentation (Jelgersma *et al.,* 1970), then the dates recorded from the biogenic strata do indicate that a marine transgression of limited extent was underway. Documentary evidence from the accounts and chartulary of Lytham Monastery from the mid-15th to early 16th century (Fishwick, 1907) indicates a period of dune instability, from which can be inferred a period of relatively low sea level. A summary of the relative sea-level curves can be seen in (Figure 8.97), and the time limits of the transgressions are summarized in (Table 8.17). A much fuller discussion of the importance of the Lytham sequences and their correlation throughout north-west England can be found in Tooley (1978a).

(Table 8.17) Marine transgressions in the Fylde (after Tooley 1978a).

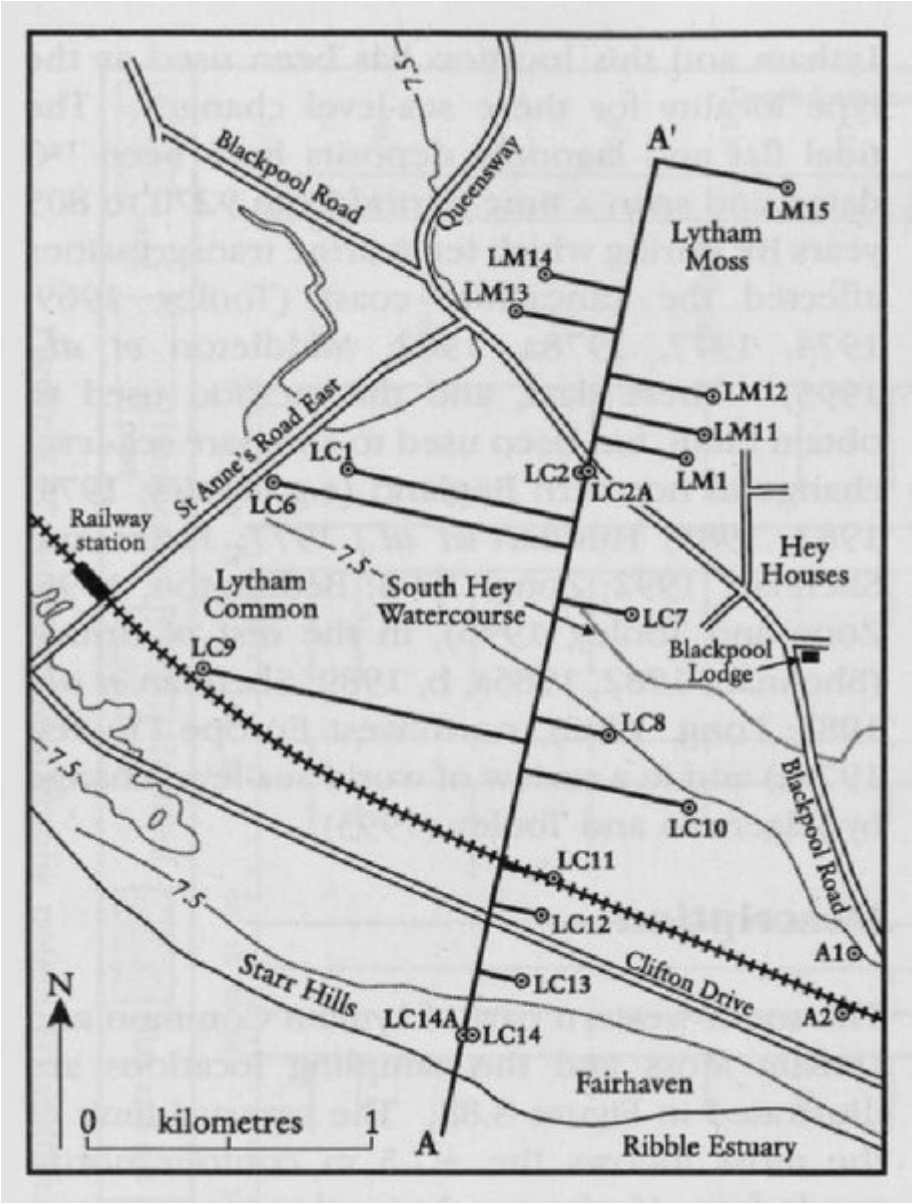
Transgression	**Time limits (radiocarbon years BP)**
Lytham I	9270–8575
Lytham II	8390–7800
Lytham III	7605–7200
Lytham IV	6710–6157

Lytham V	5947–5775
Lytham VI	5570–4897
Lytham VII	3700–3150
Lytham VIII	3090–2270
Lytham IX	1795–1370
Lytham X	*c.* 817

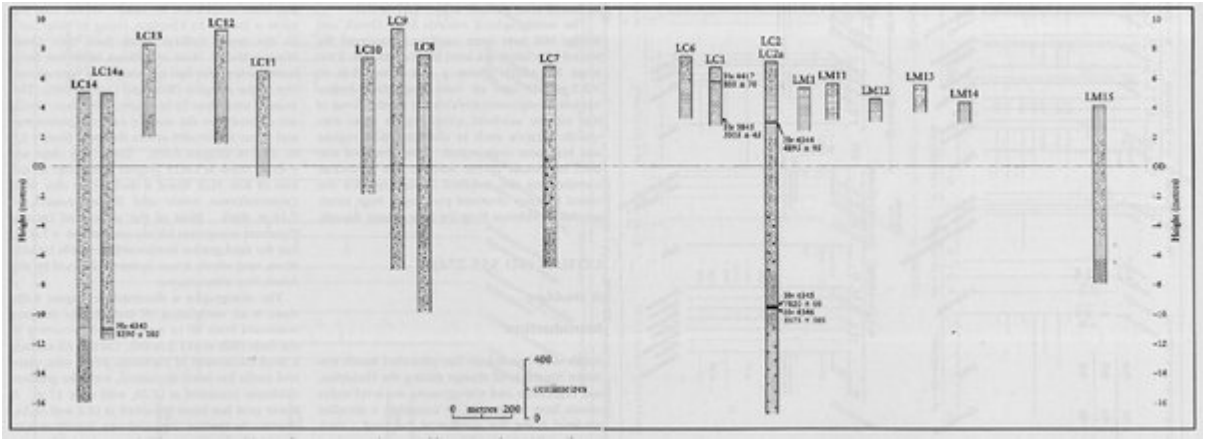
Conclusions

The sites that make up Lytham (Starr Hills, Lytham Moss, Lytham Common and Nancy's Bay) have been most important in establishing the method for the study of relative sea-level change in Britain and they are the type locality for the Flandrian marine transgressions and regressions in north-west England. The dated stratigraphical sequences and sea-level curves that have arisen have been used as the basis for comparison with Flandrian sea-level changes elsewhere in northern England and the rest of Britain.

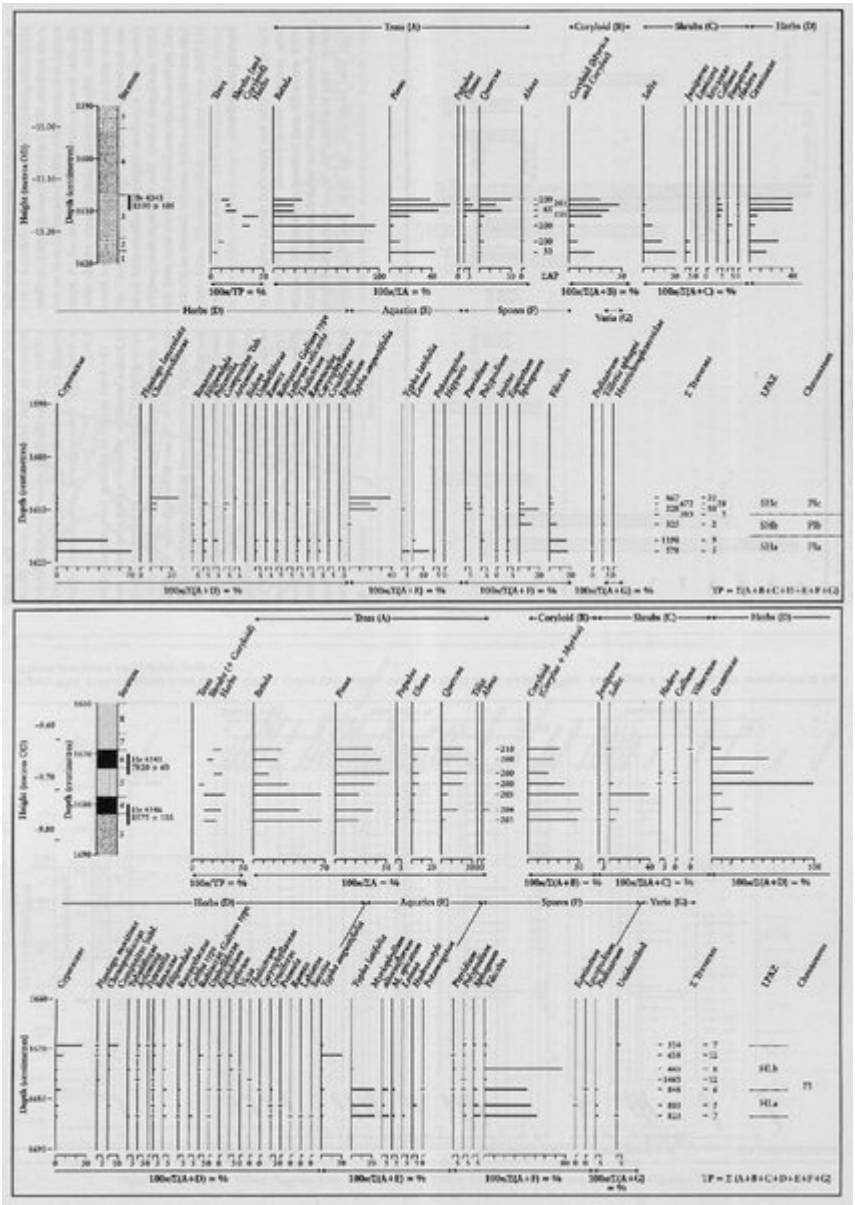
References



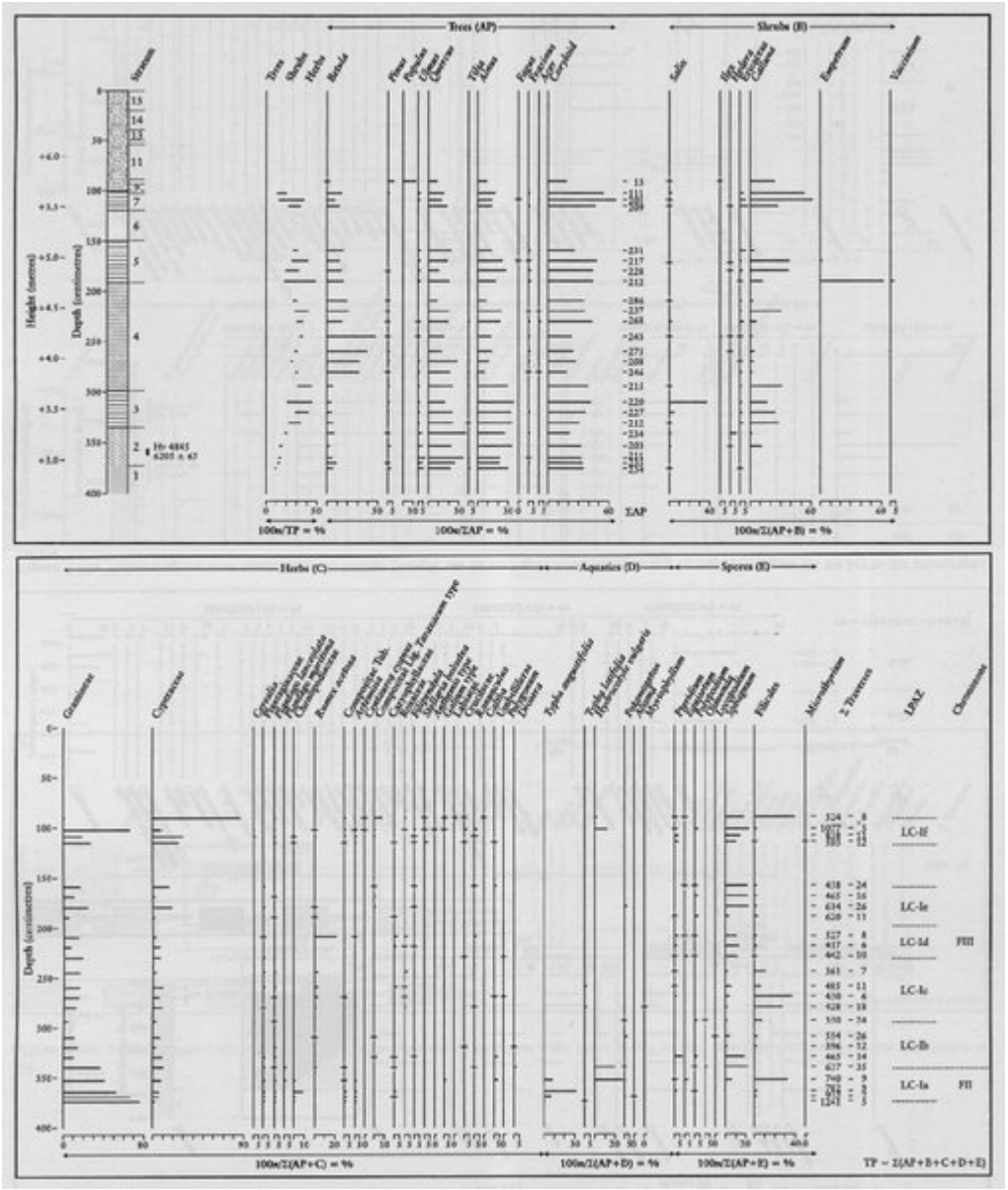
(Figure 8.88) Sampling sites across south-west Fylde (Lytham Common and Lytham Moss), projected on to an artificial line A—A'. The area today is more or less built up as part of Lytham St Annes. The sampling codes are: LM, Lytham Moss series; LC, Lytham Common series; A, Ansdell series (after Tooley, 1969, 1978a).



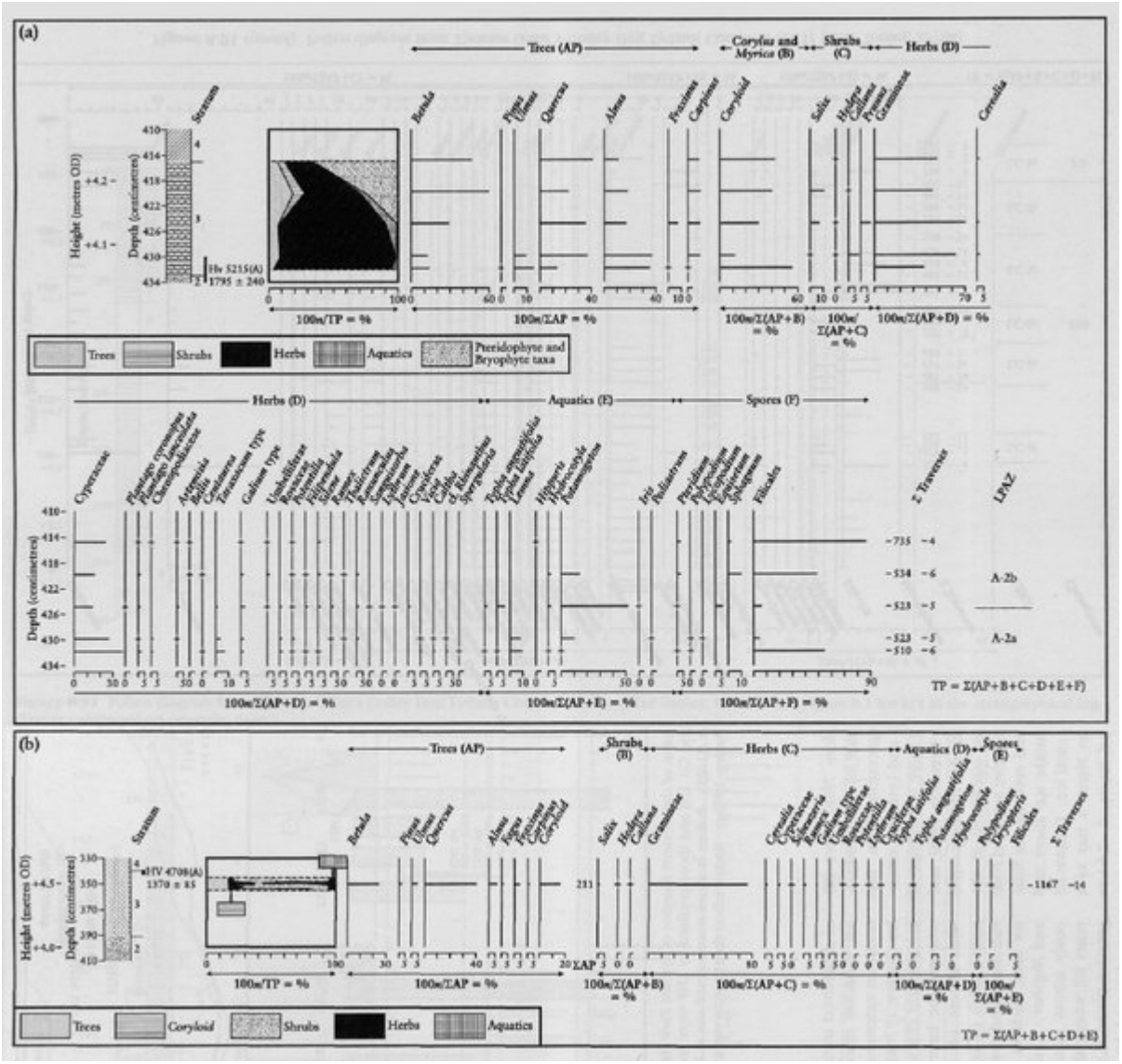
(Figure 8.89) Stratigraphical successions at 18 sampling sites in south-west Fylde, projected on to a single artificial line A–A' shown in (Figure 8.88) (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log.



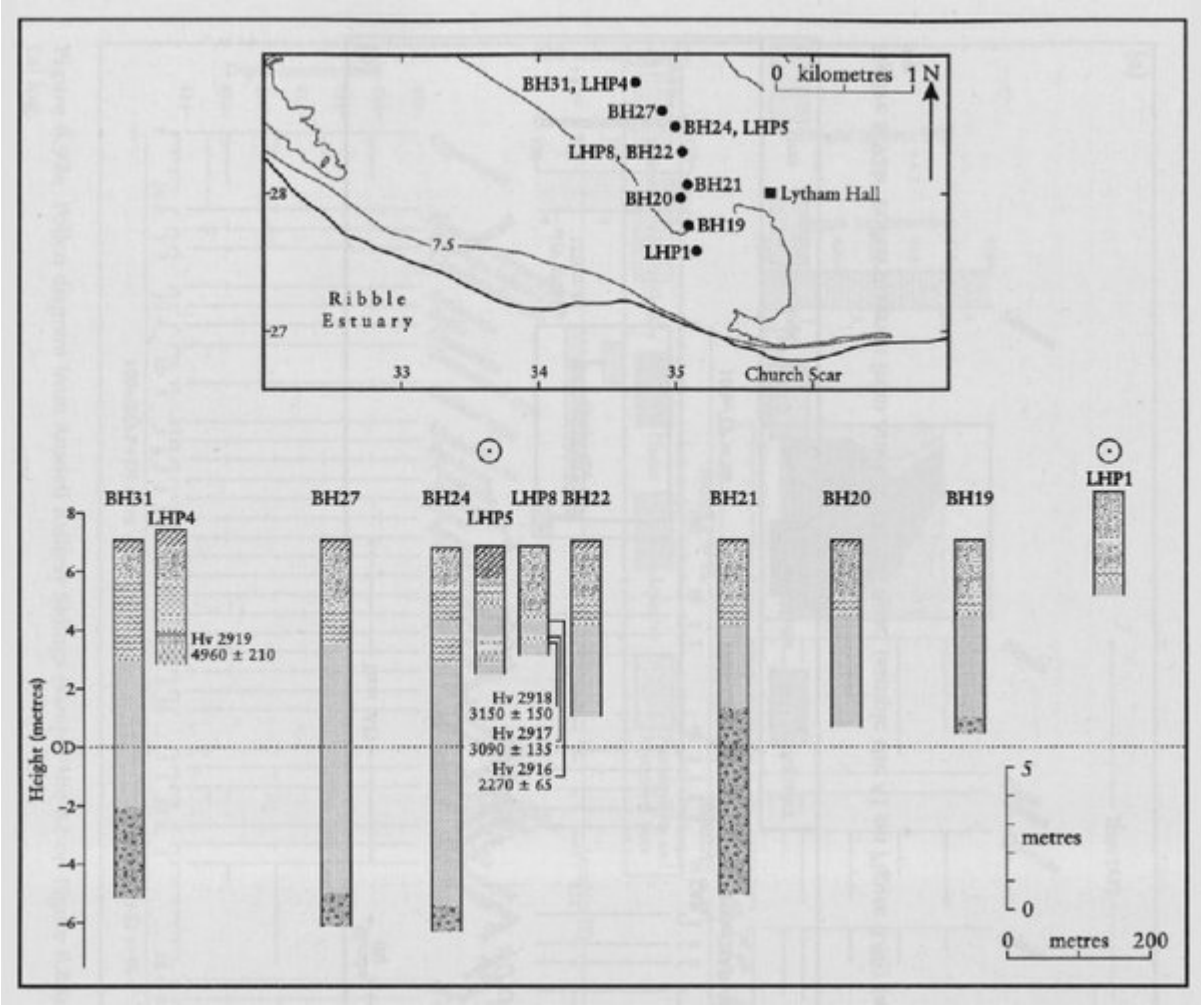
(Figure 8.90)a Pollen diagram from The Starr Hills, Lytham (LC14A). The frequency of each taxon at successive levels through the biogenic deposit is based on the calculation formula shown for each group (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log. b. Pollen diagram from Heyhouses Lane, St Annes (LC2A). The frequency of each taxon at successive levels through the biogenic deposit is based on the calculation formula shown for each group (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log.



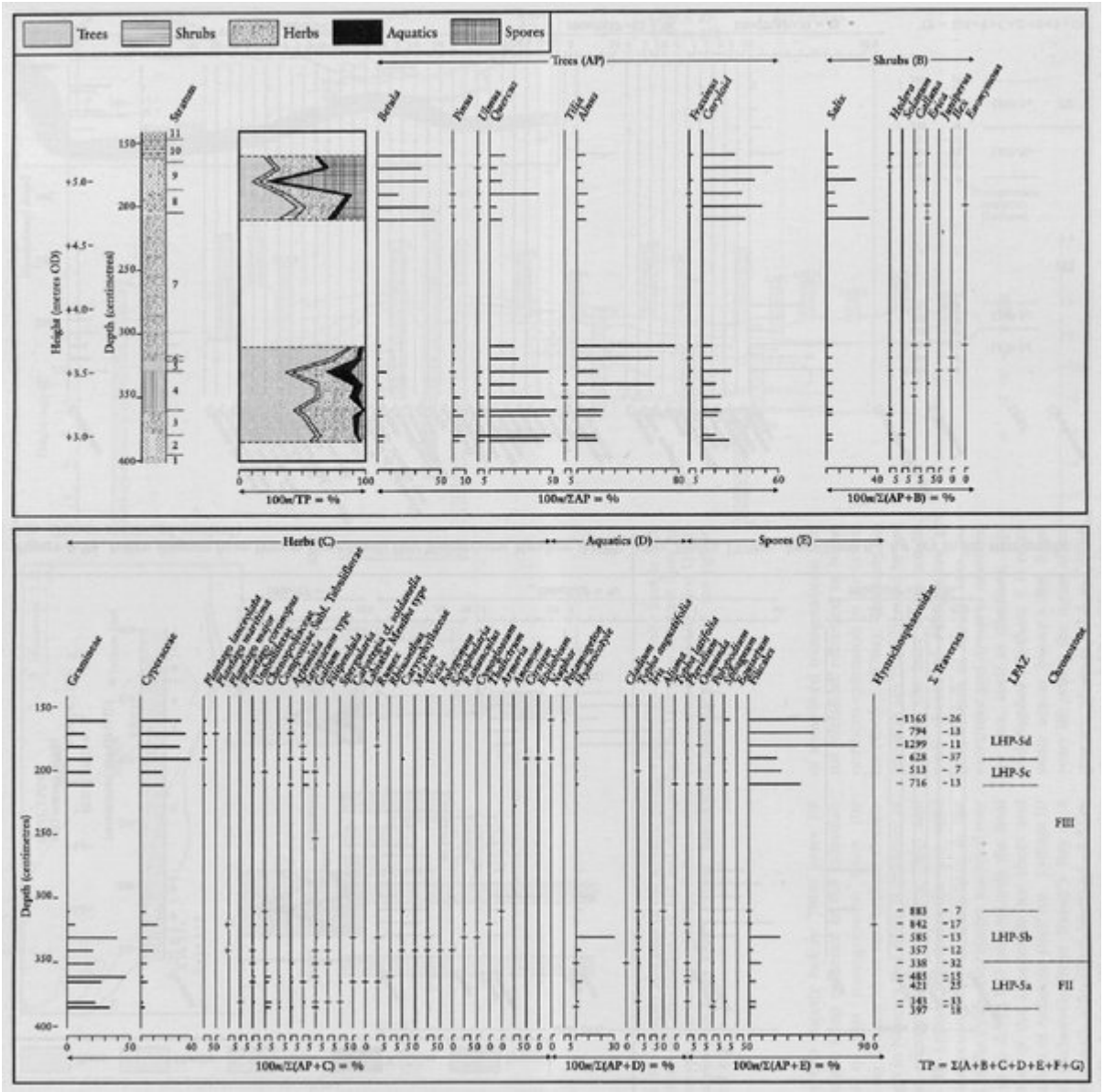
(Figure 8.91) Pollen diagram from Thomas Gillat's Colley Hey, Lytham Common (LC1) (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log.



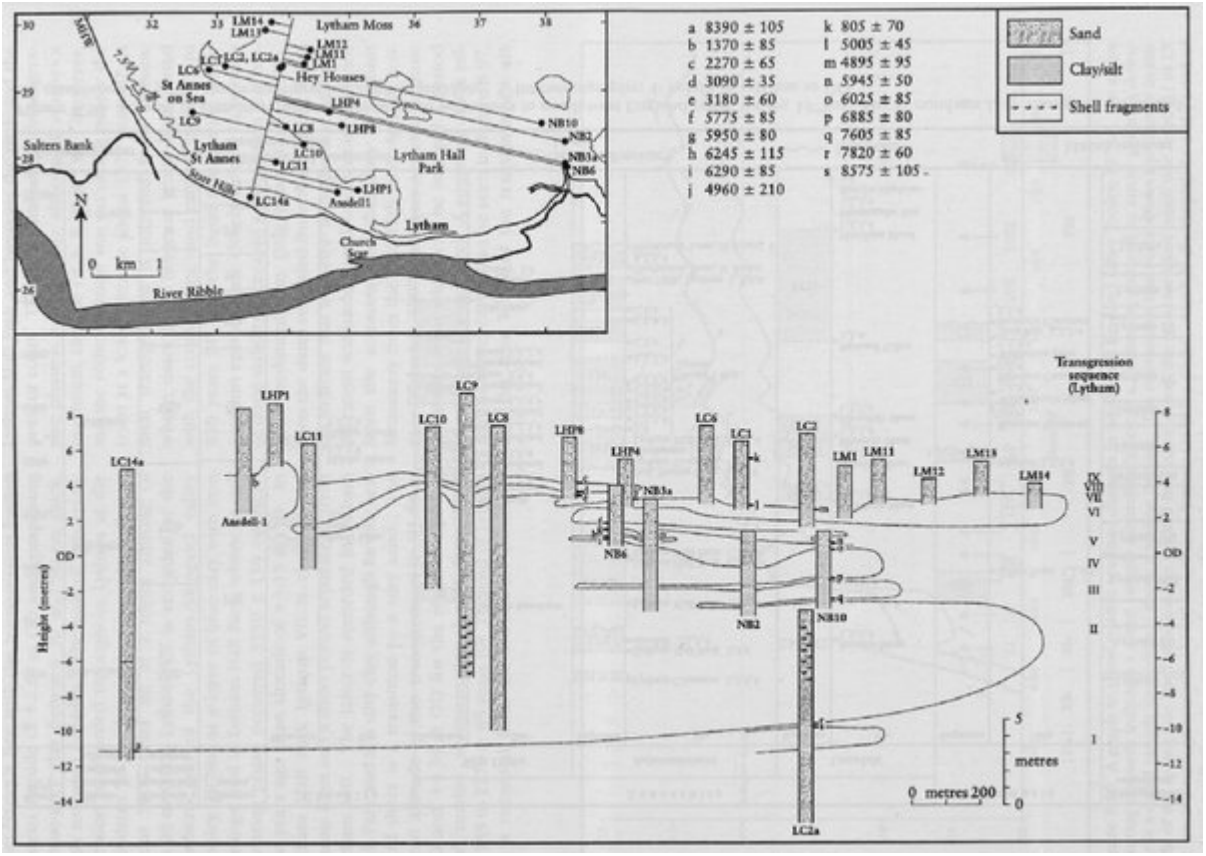
(Figure 8.92)a Pollen diagram from Ansdell Railway Sidings (sample site A2 on (Figure 8.88)) (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log. b. Pollen diagram from Ansdell, Rossall Road (sample site A1 on (Figure 8.88)) (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log.



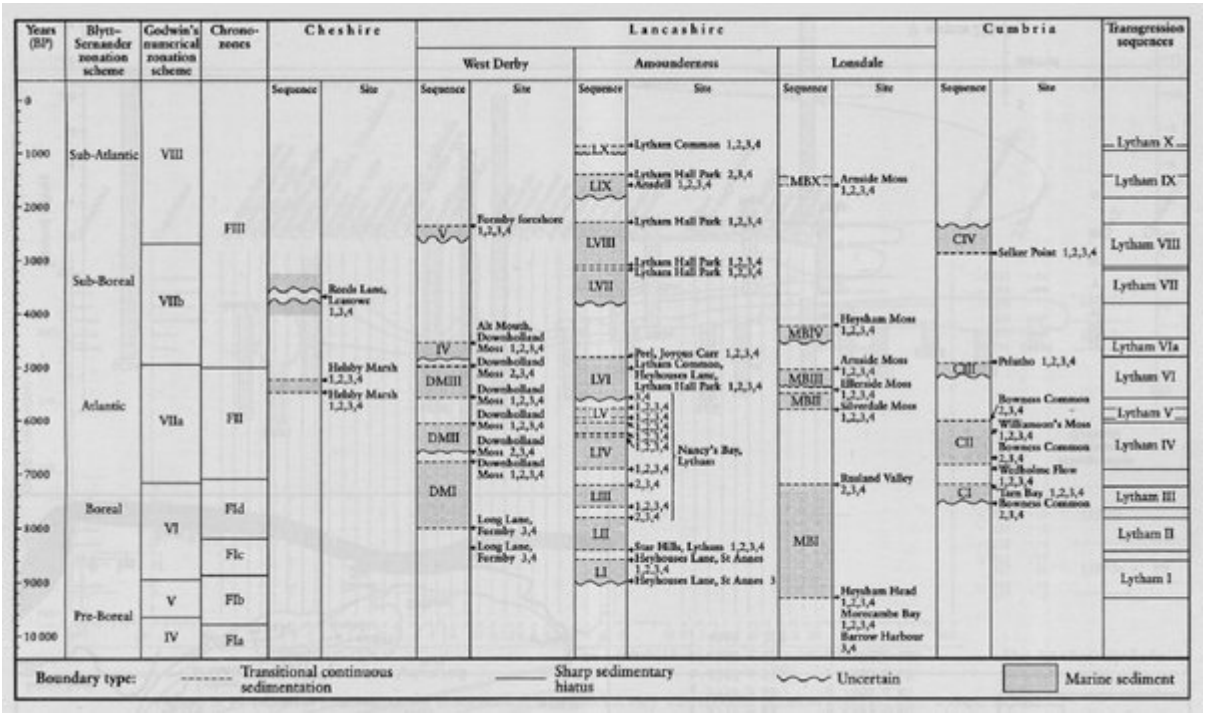
(Figure 8.93) Stratigraphy and plan of the western margins of Lytham Park Hall. Sample codes prefixed by BH were carried out by Cementation Co. Ltd and those prefixed by LHP were recorded from open excavations or from a Hiller-type peat sampler (LHP5). Pollen analyses were carried out at LHP1 and LHP5 and are indicated by a circumscribed dot (after Tooley, 1978a). Radiocarbon dates are in years BE See (Figure 8.1) for key to the stratigraphical log.



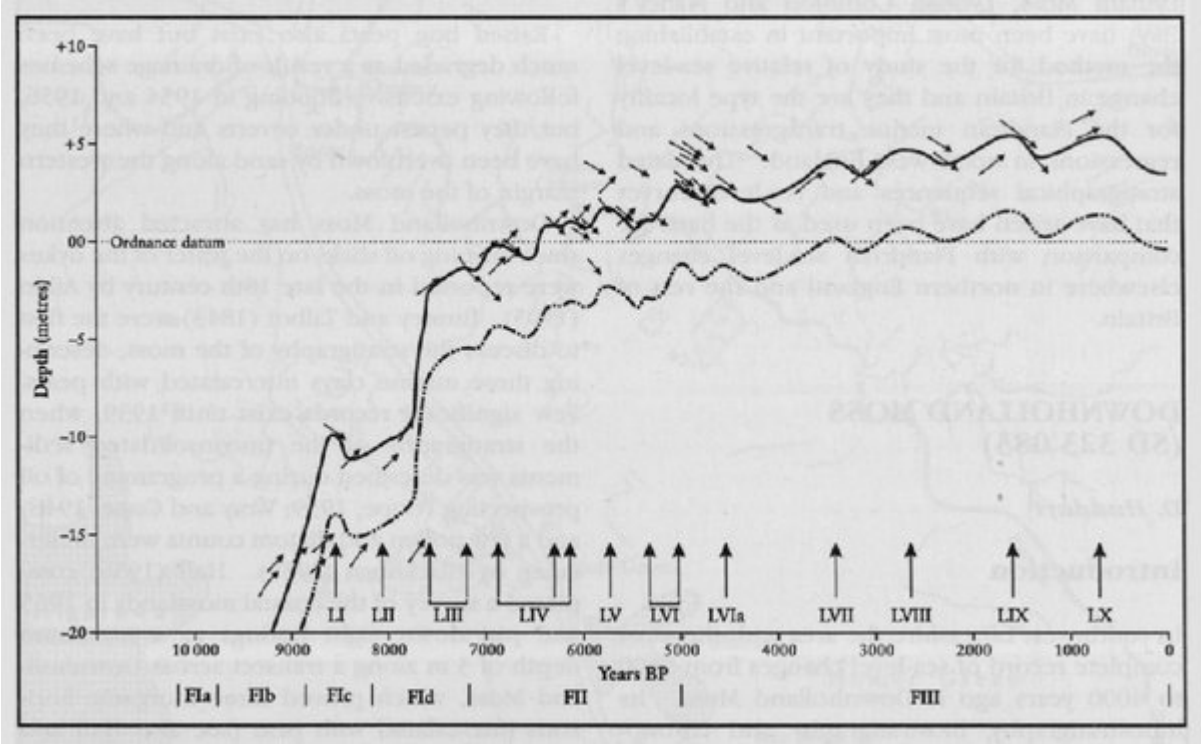
(Figure 8.94) Pollen diagram from Francis Fox's South Hey Watercourse Meadow (LHP5) (after Tooley, 1978a). See (Figure 8.1) for key to the stratigraphical log.



(Figure 8.95) Marine transgressions in the Lytham area based on 21 cores (after Tooley, 1978a). The shading in each stratigraphical column is confined to those of a marine or brackish-water origin. Differences in height of the transgression surfaces derive in part from the projection of each sampling site on to a line A–A' shown on (Figure 8.88) and in part on a vertical exaggeration of x 50. Radiocarbon dates are in years BP



(Figure 8.96) Scheme of Flandrian marine transgression sequences in north-west England (after Tooley, 1978a). Key to numbers 1–4: transgression boundary established by 1: ^{14}C chronostratigraphy; 2: biostratigraphy; 3: lithostratigraphy; 4: height in relation to OD.



(Figure 8.97) A graph to show relative sea-level changes in north-west England (after Tooley, 1978a). An arrow pointing upwards indicates a dated sample immediately below a marine deposit and an arrow pointing downwards a dated sample immediately above a marine deposit. The continuous line curve shows the change in altitude of the spring tide level, whereas the pecked line curve shows the movements of mean tide level. LI to LX are marine transgressions recorded at Lytham. Twenty-six index points establish the amplitude and period of sea-level oscillations in a restricted area of west Lancashire.

Transgression	Time limits (radiocarbon years BP)
Lytham I	9270–8575
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