THE GEOGRAPHY OF THE COUNTRY AROUND FLATFORD MILL, SUFFOLK

by

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THE English landscapes owe their description not only to the field scientist and historian, but to the artists who have recreated them in their work. If, amongst the latter group, there are some who gain in appeal at the expense of accuracy, there are many whose work has real virtue in its objectivity. Such were Thomas Hardy, Gilbert White of Selborne, and such was John Constable whose paintings will remain among the most inspired interpretations of the East Anglian scene. Of this scene, Flatford Mill and its surrounding country are essentially a part, and it is fitting that the home of one who took such pains to make his landscape live should be devoted to the scientific use, analysis and description of its regional setting. The brief essay which follows is an attempt to characterize and depict the essential features of this area, and to indicate at least some of the factors at work in the creation of a distinctive environment.

Structure and Geology

In no geographical account may the basic structure and geology be neglected and, in this part of East Anglia, the structure is relatively simple. The area is part of the northward extension of the London Basin synclinal, and the Chalk exposed in the Chilterns and East Anglian Heights, though flexured, dips uniformly to the east and south-east. Conversely, the Chalk, which is just below sea-level at Flatford, appears from beneath its mantle of Tertiary rocks and Drift in Cambridgeshire at about 400 ft. O.D. and is there between 800 and 900 ft. thick.

The Tertiary mantle, in its lower division, consists of Thanet Sands, Woolwich and Reading Beds, and London Clay. The first two have no great thickness, rarely 100 ft. in all, and consist of sands and clays, the latter often having a greenish tinge. The London Clay, a stiff blue clay

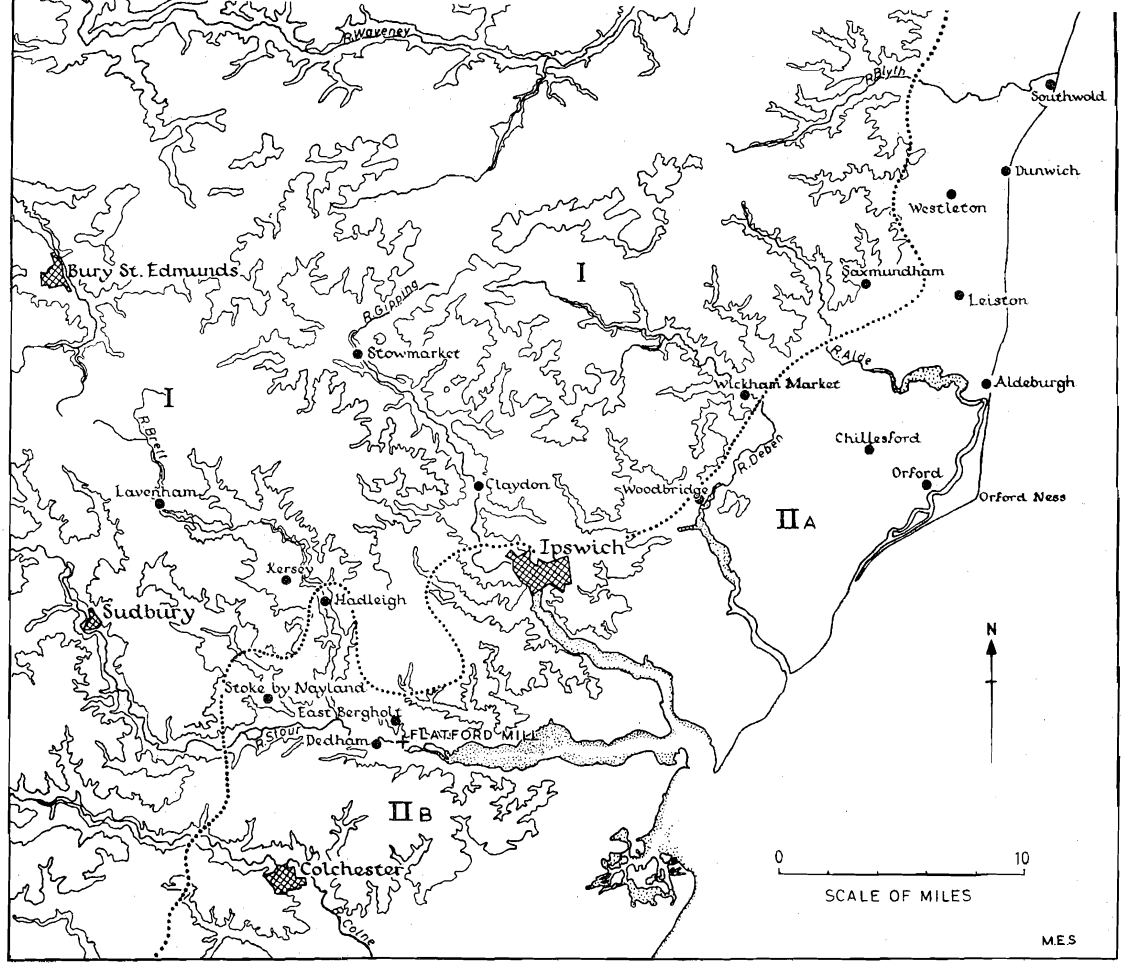


FIG. 1. Flatford Mill in its regional setting. I. The Chalky Boulder Clay Plateau; IIA. The East Suffolk Sandlings; IIB. The Tendring Hundred. The 100 and 200-foot contours are shown.

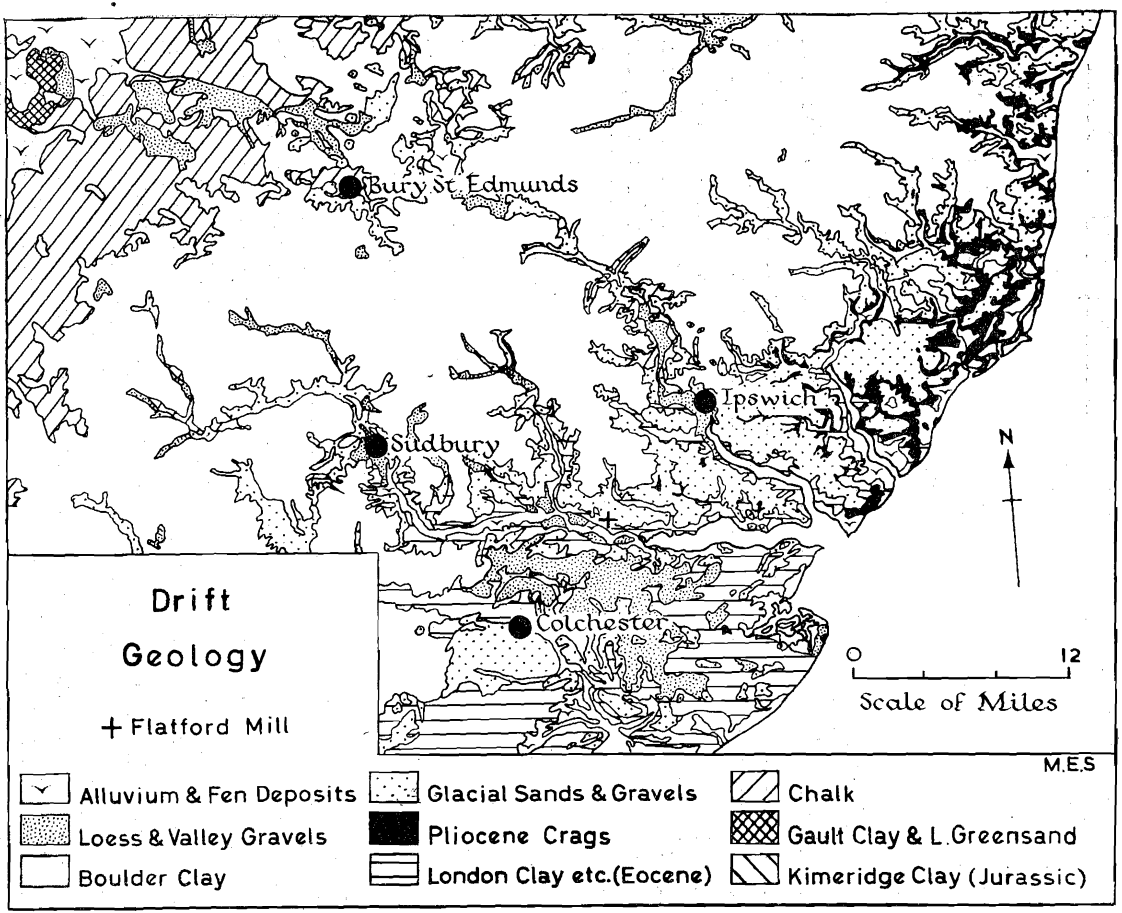


FIG. 2. The Drift Geology of the country around Flatford Mill.

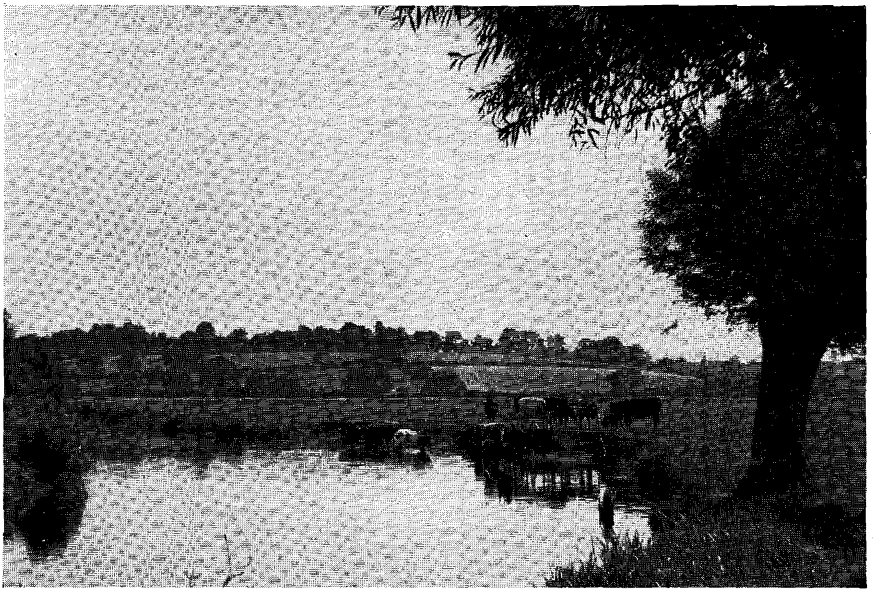


Photo: MIEKE BRAAKSMA

View of the River Stour between Flatford Mill and Dedham, showing meadows on the flood plane (right foreground) and arable land on the valley slope in the background

Photo: A. A. OLADIJI

Arable farming in the Tendring Hundred, near Ardleigh, Suffolk

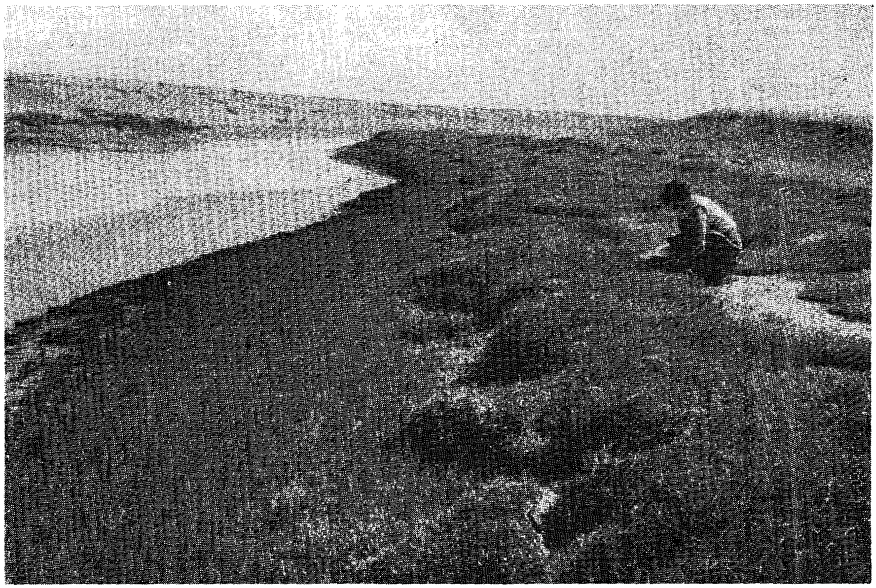


Photo: F. J. BINGLEY

A tidal channel at Shingle Street, Suffolk, showing zoning of vegetation, *Salicornia stricta* and *Halimione portulacoides* above it. This stretch of coast is frequently visited by students from Flatford Mill

Photo: JOHN A. VIDEAN

Students working in one of the laboratories at Flatford Mill

weathering yellow, is more considerable and reaches as much as 400 ft. in thickness. These Lower Tertiaries rest unconformably upon the Chalk, but have the same general direction of dip. No such concordance is shown by the Upper Tertiaries, the Pliocene Crags, which rest in turn upon the series just described. When the Crags were laid down, the earth movements which completed the London Basin synclinal and the Wealden anticline had died away. These new series, therefore, were deposited by a sea which fitfully retreated northward, and in relation to the North Sea basin of subsidence.

The oldest of the Crags is the Coralline Crag. In facies, like the majority of the Crags, it is a shelly sand, and its fossils indicate the presence of a warm fauna. It has, however, a restricted outcrop since it was, in part, eroded by the sea which deposited the succeeding Red Crag. The latter frequently rests directly upon the Lower Tertiaries. Because of the sporadic retreat of the Red Crag sea, this rock shows horizontal rather than vertical changes, with the oldest deposits in the south and the youngest in the north. This character is continued by the Icenian Crag which succeeds the Red Crag to the north of Aldeburgh. The Red Crag is also a shelly sand, rarely reaching 30 ft. in thickness, but the basement beds were a source of "coprolites", the phosphatic nodules so important to the early fertilizer industry in East Anglia. The oldest member of the Icenian Crag, viz. the Norwich Crag, reaches the thickness of 200 ft., with the result that, from Aldeburgh for a considerable distance northwards, cliff sections tend to be completely in the Crag. In southern East Anglia they are normally of London Clay with only an occasional capping of Crag. Succeeding the Norwich Crag are the Chillesford Beds which form the middle division of the Icenian Crag. They are of interest in that they contain bands of micaceous clay. The source of the mica is thought to have been the Ardennes, and the distribution of the Chillesford Beds has been interpreted as showing the course of one of the distributaries of the Rhine. The fauna of these later Crags shows an increasing percentage of cold-water species, the warmer-living types steadily diminishing. The Weybourne Crag which is the youngest member of the Icenian Crag is not found south of Norwich. Like the youngest of all the Pliocene deposits, the Forest Bed series, it is rather too far from Flatford Mill to be studied from that centre.

The rocks so far described constitute the solid geology of the region but, over much of its extent, the underlying structure is obscured by Pleistocene deposits. Only in the drift-free areas of Cambridgeshire and in the coastal areas of the east does the solid geology assume a direct relationship with the detailed pattern and finer textures of the landscape. Elsewhere, if the concealed structures need to be shown, e.g. in relation to the regional relief or to explain the rectangularity of the drainage pattern, the evidence is available from exposures in the valley-sides. According to their situation, these exposures show either Chalk or Chalk plus an overlying sequence of Tertiary rocks. Save for this consideration, where the drift cover is present it is of paramount importance in any study of relief, soils and land-use, and of the progress and distribution of settlement. The extent to which the variable deposits of this cover have been leached, weathered and de-calcified is a matter of importance not merely to the geologist or geomorphologist who wishes, by detailed examination, to relate their history to that of the landscapes they compose. Everywhere, the process and stages of its physical history are closely bound to the aspect and agricultural characteristics of the land.

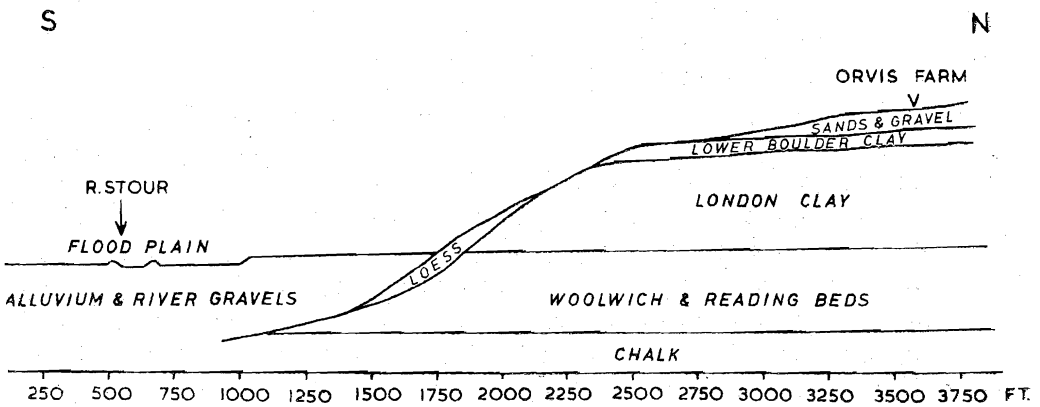
The Pleistocene Deposits

The dominant episodes of the Pleistocene period were its successive glaciations, the relics of which are spread over most of East Anglia. These are now to be seen as a pall of sands, clays, gravels and brickearths, left in mounds or in continuous sheets. Some of the material was left as Boulder Clay, a heterogeneous and mostly structureless mass. But the resorting of ice-borne material by glacial melt-water resulted in the deposition of sands and gravels, and the finest material of all was laid down in the still-water basins beyond the ice-front.

The oldest of the drifts are the Westleton Beds. They consist of rounded pebbles, mostly of flint but with some far-travelled material. These beds, which bear extensive heaths around Westleton village to the south-east of Dunwich, were probably deposited in relatively fresh water ponded back by an ice-sheet advancing from Scandinavia across the site of the North Sea. Laterally, the Westleton Beds pass beneath till which, to the north and west of Flatford, is not associated with the Scandinavian ice-sheet (the North Sea Drift) but with a subsequent major ice advance,

that of the Great Eastern Glacier. The till or ground-moraine from this glacier is the Chalky Boulder Clay which covers some 10,000 square miles of Eastern England, forming a wide belt around the Fenlands and extending from Lincolnshire in the north to Middlesex and southern Essex in the south. Sands and gravels appear from beneath the boulder clay in the south and east, forming a peripheral and contrasting belt of country. The belt varies in width but, near Flatford, it is some two miles wide and separates the Stour valley from the nearest lobe of the Chalky Boulder Clay. A lower boulder clay is occasionally to be found in the valley-sides, outcropping beneath the sands and gravels and resting on the London Clay. This is the case in the vicinity of Flatford where, above the London Clay and alluvium, a lower boulder clay and the sands and gravels follow in upward sequence. Loess flanks the edge of the alluvium and extends into the valleys of those minor streams which dissect the northern slopes of the Stour Valley. The precise age of the lower boulder clay is disputed but, since the Great Eastern glaciation was probably complex, it may mark an earlier advance of the Great Eastern Glacier. Zeuner has correlated this glaciation with the Riss glaciation in the Alps and with the Saale of the North German Plain.

The loess is peripheral to, or overlaps, the sands and gravels, thus resting upon them or on the London Clay. It is found both in the valleys



3. Sketch section from S/N of the geology of the N. bank of the Stour Valley near Flatford Mill.

and on the low plateaux and, presumably, once formed a continuous mantle laid down by the winds which blew from the ice-sheet across the debris left by the retreating ice. Occasionally it has been re-worked by streams. The loess covers a wide area south of Flatford in the Tendring Hundred, between the estuaries of the Stour and the Colne-Blackwater rivers. As will be seen later, its presence here is a critical factor in the human geography of this tract. In the east of the Hundred the deposit is very patchy, and there are wide expanses of London Clay, capped occasionally by outcrops of Red Crag. In the west, however, the cover is far more complete, especially in the environs of Colchester. The European parallels are worthy of comment. On the continent, the loess lies to the south of the great moraines of the North German Plain and flanks the Hercynian Uplands of Central Europe. It is this belt of loess, extending across Europe from Russia to the Low Countries, which is resumed across the North Sea in the Tendring Hundred.

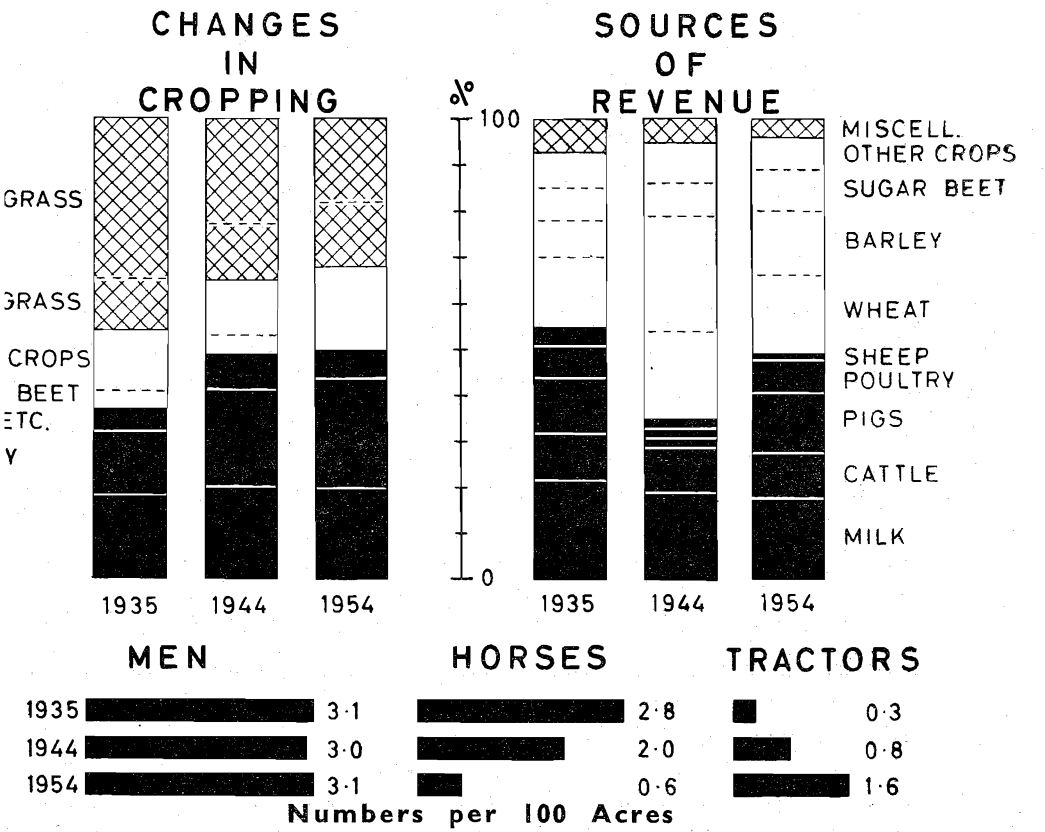
On the basis of the relationships described above, in the physical geography of the country around Flatford Mill it is possible to distinguish three distinctive elements or sub-regions. They are:

1. The Chalky Boulder Clay Plateau with its peripheral sands and gravels.
2. The Tertiary outcrops and their discontinuous drift cover. These lie between (1) and the sea and may be sub-divided into:
   (*a*) The Suffolk "Sandlings" in the north.
   (*b*) The Tendring Hundred in the south.
3. The Coastal features.

The human geography of the area is not solely dependent upon those facts of physical geography which make possible the foregoing sub-division. For example, the farming of this area, which is its most important and widespread activity, is largely determined by two groups of factors, the first physical and biological, and the second economic. To the first group belong questions of soil-type, relief, drainage, local climate, and the prevalence of pests or disease. In some measure these have been discussed above, and the resulting sub-division will be used later as a basis for further description. Meanwhile, it is proposed to discuss the agriculture of the area as a whole, showing the interplay of the second group of factors.

Agricultural Economy

The war-time plough-up campaign in this area reduced the acreage of permanent grass by approximately one-third. All of the arable land gained thereby was devoted to cereal crops. From 1944 to 1954, despite the removal of certain restrictions, the arable acreage continued to increase. Permanent pasture further diminished as a whole, and the land released for tillage has permitted a further growth in the acreage under barley, together with a slight increase in temporary leys and sugar beet. Such changes play their part in the continuing evolution of the landscape and are generally illustrated in the following graph. Price policy is largely



(after Report No. 43 of the Farm Economics Branch, Cambridge University Dept. of ;ulture). Changes in the structure of Farming in East Anglia between 1935 and 1954.

responsible for the emphasis on cereal production. Such crops give a better return on working capital than any other farm enterprise and, in a good corn-growing area, there is little incentive to diversify production. Whereas the average farmer formerly obtained just over half his receipts from livestock, during the war only one-third of farm income was derived from this source. This change, however, is not associated with a decline in the number of grazing animals, but is largely due to reduced numbers of pigs and poultry. Since then, pigs and poultry have resumed their former importance. Crop sales increased markedly during the war, the most conspicuous change being the higher receipts from barley.

Recently the sale of crops has declined relatively, although production has not fallen. The situation merely reflects the recovery in livestock production and the increased amount of home-grown grain fed to animals. In the last ten years there has been a striking increase in farm mechanization. Tractors and combines have greatly increased during this period while the number of horses has declined rapidly. The heavier stocking of cattle has probably been assisted by this reduction in the number of horses; for a working horse requires as much grazing and other foods as a cow, or two or three young stock.

In spite of the large increase in mechanization, the numbers of farm labourers employed in the region remains relatively unchanged. In crop-production, man-hours per acre have shown a marked decrease. In livestock production, progress may have been less rapid, but the number of grazing animals has been maintained in spite of the reduced acreage of grassland. In 1935, 1·5 acres of pasture were used for each grazing animal unit; this was reduced to 1·4 in 1944 and 1·0 in 1954. On the whole, therefore, the evidence shows a high and steadily rising level of output and efficiency. The increase in crop yields is particularly creditable for it has been obtained on a larger area of arable land and to obtain this larger area, much inferior marginal land must have been brought into arable production. As a result of this inclusion, the rise in crop incomes common to all districts shows important variations from district to district and from year to year. The areas least susceptible to drastic change are those of fertile and easily-worked soils, e.g. the loess tracts of the Tendring Hundred. These changes may be studied under the following regional headings.

Sub-Region I. The Chalky Boulder Clay Plateau

This plateau in its general altitudes reflects the dip of the underlying Chalk and falls in height from 400 ft. on the Cambridgeshire border to 150 ft. near Flatford. The level surface tends to extend on to the sands and gravels and it is not easy to distinguish the junction in terms of morphology. The contrasts in soil, however, are sharp and this is reflected in differences in the farming practice. The streams, which in their rectilinear pattern show some measure of control by the underlying structure, are sharply incised and the valley sides steeper than might be anticipated in view of the limited total relief. The valley bottoms have been much aggraded and the steep valley sides are cut off by the alluvial sheet of the valley floors. Such features are clearly to be seen in the valley of the river Stour and in that of the river Brett north-west of Flatford. But, though these valleys show predominantly the effects of a positive change in sea level, there are terraces flanking the streams which give contrasts in land use with the meadow-lands of the alluvium. Both morphological facets are frequently included in the lands of individual farms.

In the area as a whole the valleys must have afforded a means of entrance for the Anglo-Saxon settlers and in the lower valleys, where the floodplain is wide, many of the larger villages are situated on such terraces. Dedham (though strictly beyond the confines of the plateau) is an excellent example across the river from Flatford. Such villages differ from the more dispersed forms of settlement on the boulder clay and suggest a twofold phase of occupancy, beginning with the terrace sites and followed by a slow intake of the heavily forested boulder clays. A large proportion of the farmsteads retain their ancient sites within the village. Their fields, though not contiguous, form fairly convenient holdings, which, in some cases, lie at a considerable distance from the homestead. The layout of such units at the present day may be closely identified with their enclosure award. On the other hand, new farmsteads were erected after enclosure, particularly for land on the outskirts of parishes. This development also created isolated but more compact holdings. Thus, some isolated farmsteads are of comparatively recent appearance. The study of settlement in the field, therefore, is not alone sufficient to establish its age.

In this sense, it is important to recall that the area was formerly important for its woollen industry. The former prosperity, which has left as a legacy many beautiful churches, undoubtedly affected the size, shape and possibly the site of many of the villages. East Bergholt, the nearest village to Flatford, probably owes its size to this influence, whilst in the upper valleys there are valley-bottom sites, e.g. at Kersey and Hadleigh, the adoption of which may partially reflect the requirements of the industry.

In general, however, the influence of manufacturing industry is no longer an important factor and, at the present day, the sub-region is predominantly agricultural. Farming is based here on long rotations (up to six years), and the amount of arable land has gradually increased to over 90 per cent. of the area of some farms. This emphasis on arable agriculture is clearly evident from the aspect of the countryside. In recent years there has been a notable increase in dairy production and the presence of many fine herds of dairy cattle has also influenced the ploughing-up of land for fodder crops. "Arable hays" such as clover, lucerne, oats and sainfoin play a much larger part than hay from meadow pastures. These "arable hays", along with the practice of stall-feeding, mean that the landscape has none of the pastoral aspect associated with some areas of high milk-production. Fodder crops as a whole occupy some 40 per cent. of the arable land. The remaining percentage is devoted to wheat, barley, sugar beet and potatoes. On the heavier loams of the Chalky Boulder Clay, wheat is the most important cereal. In areas of lighter soil, developed on the peripheral spreads of sand and gravel, the emphasis is on barley and there has also been a notable growth of orchards and market gardens.

Sub-Region II. The Tertiary Outcrops

As previously noted, a sub-division between north and south is necessary in this area as a result both of changes in the Tertiary deposits and in the nature of the drift cover.

(a) (North) The Suffolk Sandlings

This tract is essentially a low, undulating and gently dissected coastal plateau, in places rising to approximately 100 ft. above sea level. Its

streams, the Blyth, Alde and Deben, cut through in shallow courses to the sea and their valley-bottoms contain alluvial deposits. Alongside the water-courses are low-lying water meadows, usually with a high water-table and often liable to flood. The glacial cover is much more discontinuous than in sub-region I. Furthermore, it is frequently of light sands or, as in the north, of pebbles from the Westleton Beds. The Crags are likewise sandy and, in general, the soils are too free-draining. The lightest soils are often very infertile and some bear wide stretches of uncultivated heath. Most of the soils are of low base status and acidity is a recurrent problem. Nitrogen, potash and organic matter are also deficient and all the soils, especially those of a gravelly nature, are subject to seasonal drought and "burning".

There are many farms of about 100 acres, but larger holdings of 300-400 acres are more characteristic of the area. The light land is commonly farmed in association with riverside meadows or coastal marsh grazings or with better loam soils where available. These provide grazing during the dry months of summer when the sandy and gravelly tracts are liable to burn out.

Historically, the "sandlings" are essentially sheep and barley land. The sheep were folded on the arable land but much of the heath and the poorer adjacent land was used to provide "sheep-walks". However, as in other parts of England, the decline of this farming system has gone on apace, and dairying is now the principal enterprise. The chief cereal crops are barley and oats, with rye on the poorest fields. Wheat is less important but may be grown on the better soils. In the past, much of the area was kept in cultivation by marling, and old marl-pits may be found on many farms. Crag containing shelly material was also applied, but both of these practices have become out-dated and uneconomic. Much of the land is essentially marginal and, during the present century, has been in and out of cultivation. Some of the poorer soils which were brought into use under the impetus of war have now reverted to heath, rough grazing or dereliction. A more permanent form of utilization has been introduced by the Forestry Commission which has afforested a large proportion of land and it may be that this is the way in which most of these poor tracts are best employed.

This sub-region was not entirely devoid of mineral resources. Many

small pits were dug at the base of the Red Crag to obtain the coprolites, and the beaches were combed for the same material. This, plus the chalk obtained in the Gipping Valley, supplied the basic materials of the early fertilizer industry. The industry remains but the digging of coprolites has ceased and the only extractive industry is in scattered ballast-pits. A malting industry has long been established and the considerable local supplies of barley are now supplemented by imports, giving a big advantage to Ipswich on a still navigable estuary. The presence of the fertilizer and malting industries has assisted Ipswich to maintain its growth but the Sandling area as a whole is one where rural depopulation is in progress.

(*b*) (*South*) *The Tendring Hundred*

South of the Stour the Tendring Hundred offers a marked contrast in soil conditions to those of the Sandlings. The loess or brickearth gives a soil which is inherently fine in both texture and quality. The heavier soils of the London Clay, though more difficult to manage, are worked to a fine tilth and have a higher nutrient status than the sandy soils to the north in II(*a*). There is very little heathland and no great coniferous plantation. To the west, where the loess cover is more continuous, Colchester marks the centre of what must be one of the oldest areas of lowland cultivation in the country, for immediately to the west of present day (and Roman) Colchester lies the Belgic capital. The town presents a most interesting study in siting factors and urban growth. The "ingas" names of Frating and Tendring suggest that the combination of good soils and ease of access by the estuaries was exploited by the Anglo-Saxons. The small enclave of Scandinavian names in the south-east of the Hundred point to a repetition of this exploitation during the Danish invasions.

Throughout the Hundred, farming is carried on at a high level of efficiency. Towards Colchester, accessibility to urban markets has stimulated horticulture and intensive modes of farming. There are many orchards which add to the large amounts of market produce coming from the district. In the east, more large-scale, extensive methods are used, with the emphasis on the production of cereals, especially wheat. As in sub-region (I), dairy herds are associated with arable cultivation, but hay from meadows sited on the heavier soils here plays a larger part.