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V. On the superficial deposits under Cambridge, and their influence upon the distribution of the Colleges.

The foundations of demolished dwelling-houses are hardly ever found within the walls of our colleges, a fact which shows that neither the colleges nor the monastic institutions, to which so many of them succeeded, were built on sites cleared of houses for the purpose, as the Castle for instance is said to have been. There are of course often traces of earlier buildings which had been adapted for scholastic work, and of older parts of colleges which had been rearranged, extended, or repaired.

On the other hand, wherever excavations are carried on over the area now occupied by college buildings, a large quantity of household rubbish is generally found. We cannot conceive it possible that bones, pottery, old shoes, and such things were thrown out into the college courts and allowed to accumulate as on a midden.

The probable explanation of this is that the monastic fraternities and the colleges were given sites outside the area already occupied by the town and on ground which was swampy or liable to be flooded, and had therefore to be artificially raised and levelled. All the higher parts had been already built over, because they were the only sites on which ordinary dwelling-houses could be erected without the prohibitive expense of filling up inequalities and raising the level above the reach of floods. This would not be so much felt in the case of large and important buildings, in which the initial expense incurred in preparing the ground was not such a serious proportion of the whole cost.

A recent example of the manner in which the ground along the river has been raised may be seen in the Trinity Paddocks, where earth from foundations, and refuse of every kind and age were carted from various parts of the town and laid upon the area. There was once an idea of erecting new

buildings in extension of the College on this ground, in which case we should have had a repetition of the conditions which have produced that sequence of artificial deposits within our college walls, which we are endeavouring to explain.

There must have been rubbish pits belonging to any large establishment, whether monastic or scholastic, but a study of the arrangement and uses of various parts of the buildings will often limit the possibilities in respect of the areas assigned to such purposes, and, except by the accident of old relics being dug up during alterations and again thrown in, we may in this case take the stratigraphical order of the objects as indicating their chronological succession. Not so in the case of the oldest deposits on the early alluvial waste land, nor of the transported material carried in to raise the ground, in both of which objects of any age or association may occur together. The large area finally occupied by a monastic or scholastic establishment was not necessarily all levelled up at once, but during every addition or adaptation the level of the first buildings would be as far as possible maintained.

The river silt did not run right up to the town, but the gravel terrace sloped down to the alluvium and passed under it, especially towards the north, and the lower part of this gravel not only allowed the free passage of water down valley from the higher ground, but was also filled by the river water when backed up in floods—so that the more the river was held up by fords, bridges, locks, etc., the more necessary was it to raise the ground artificially along the margin of the higher ground first occupied by the town. The monastic and collegiate buildings for which sites were given outside of the town west of the High Street, crept gradually down over the gravel slope, but even to this day they have not extended far over the alluvium. St John's College has boldly thrown out its new buildings across the river, and proved to its cost the difficulties of building on the alluvium, and Trinity has spread from the gravel slope over the bed of the stream, but the unsuitable character of these river deposits for building upon has checked the extension of the colleges over the "Backs." The low ground sloping down from the west side of the town to the

river was not suitable for ordinary dwelling-houses, and was consequently assigned to monastic fraternities and colleges, and the buildings connected with them; and the waste land which seems to have extended in many places along the King's Ditch, both on the inside and on the outside, was but slowly encroached upon.

Let us now consider what was the condition of this ground before it was raised and reclaimed. It was not necessarily all, nor indeed any of it, always a swamp. Any one who has ever been familiar with an extensive village common in some far off district, previous to sanitation being enforced, will realise the condition of waste land like this, close to a town such as Cambridge then was. Wherever a hole had been dug to procure earth or stone it was immediately utilised to receive any rubbish which it might be thought desirable to remove to a little distance from the front door. If a donkey or a cow died the carcase was left till its whitened bones got scattered over the surface. Thus natural and artificial hollows got filled with the accumulations of ages over ground where anything could be got rid of and where many things were lost. Over such an area as that we are dealing with, holes dug for *any* purpose, or natural depressions into which all the odds and ends which are scattered over waste land sooner or later gravitate, would be filled with water at times, and the bottom would be full of black sludge containing much organic matter.

Such was the low alluvial land through which the river meandered by Cambridge, and the objects found in the black silt at the bottom of the holes and depressions in that old waste land are of course relics of the time when the town did not extend beyond the natural gravelly ridges that, without being artificially raised, offered suitable sites for houses. Many traces of the old conditions still remain. Loops representing old river courses and ditches, some natural and some artificial, traverse it, but they generally fall into an arrangement having a definite relation to the direction of the underground waters. If we could sweep the valley clean of all the recent river deposits, we should find that old channels groove the surface of the underlying clay, often trending down valley in approxi-

mately parallel courses. Cases where this has been observed in excavations will be referred to later. On each side of this recent river deposit gravel of much older date than the alluvial silt rises gently into terraces which slope down towards the north so that they disappear under the alluvium of Midsummer Common. When the stream deserted the channel which it once followed along the margin of the alluvium and therefore no longer kept removing the talus from the base of the steep gravel bank, that bank was soon smoothed down, and is now represented by a slope so gradual that almost all the features of the original terrace are obliterated, and it is difficult to trace it. The margin of the gravel on either side of the river at Cambridge is thus chamfered off by the crumbling down of the river cliffs, so that the alluvium overlaps the gravel, and the surface of the gravel everywhere falls gently towards the river. The steep slope in the Fellows' Gardens of Clare College is artificial and exceptional.

If we could sweep all the gravel away we should find that the surface of the clay which underlies it also, like that under the alluvium, is grooved by old river courses also trending down valley, and separated from one another by banks of impervious clay, so that when the water has got into one of these channels it has to follow it, and if lower down any obstruction, natural or artificial, is set up, the water rises as in a basin till it can find its way out over the rim. These channels formed a conspicuous and troublesome feature during recent drainage operations along the west side of the river near Newnham, and also during the recent digging for foundations of University buildings in Downing Grounds.

When, therefore, we are trying to explain the growth of Ancient Cambridge we have to bear in mind that the early settlers must have avoided such wet sites and crept along the dry places furnished by the ends of the spurs and bosses of gravel which sloped northward from the higher ground near Barnwell and the Botanic Garden to the alluvium near St John's College and Midsummer Common; that these spurs died away under the more recent alluvium on their western margin also; that the base of the gravel was irregular; and

that old channels ran along it and under it, throwing out water in wet seasons, or where obstructions occurred; and, further, that all these natural features have been interfered with by man during his 2000 years settlement upon the area.

In the diagram (fig. 6) the relation of these various deposits to one another is indicated: (*a*) represents the middens and rubbish of the existing state of things; (*c*) the rubbish carted on to level up the ground; and (*b*) the pits and hollows on the old alluvial waste land. Now it is clear that the growth of each of these extends over a very long period. The intramural deposit of refuse (*a*) has become smaller as time went on; (*c*) also took a long time in the making, and was only gradually carried outward towards the river, so that the earlier part of (*c*) might be contemporaneous with (b^2) and a later part of (*c*) with (b^3), and, although a sharp line everywhere divides (*c*) from (*b*), this does not indicate a long interval between (*c*) considered as a whole, and (*b*) considered as a whole.

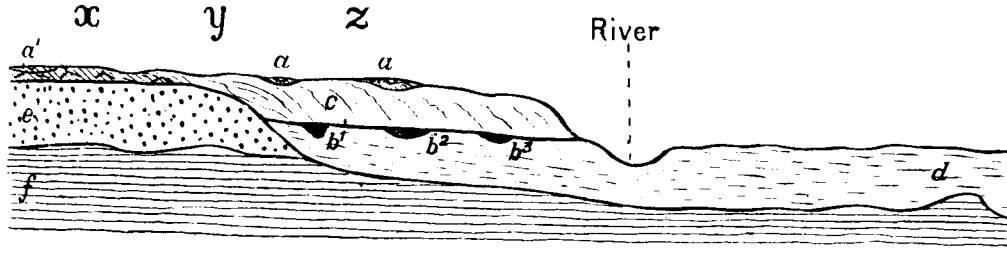


Fig. 6.

a. Laystalls of comparatively recent date.

a^1. Rubbish of every age which has accumulated about the houses of the town.

b^1, b^2, b^3. Depressions and rubbish pits in surface of old alluvial waste land.

c. Material carted on to ground to raise level above floods.

d. Alluvial deposits along river.

e. Gravel of Market Hill etc. (disturbed on top).

f. Gault.

In the same diagram (*x*) represents the terrace of gravel (*e*) or the spur over which the original town spread; (*y*) represents the margin of the dry area; and (*z*) the levelled up marsh land on which the colleges were built.

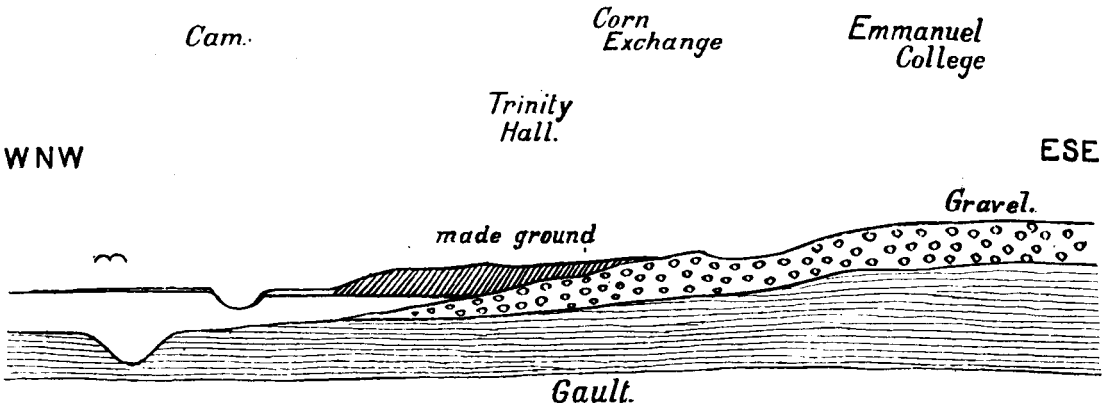


Fig. 7. Section drawn E.S.E. and W.N.W. from Emmanuel to the river.

The relation between these deposits is further illustrated by the section (fig. 7) drawn from Emmanuel College through the Corn Exchange to the river near Trinity Hall. Emmanuel College stands on the margin of the higher terrace of gravel which spreads from Barnwell by Parker's Piece and slopes down St Andrew's Street to Christ's College. There are of course places over this wide area where rubbish has been shot and old gravel pits filled up, but there has been no deliberate raising of the ground by carting waste material on to it. The line of the section crosses a low place in the gravel near the Post Office which, as we shall see, is probably in the outfall from the Downing springy ground, and has been taken advantage of to carry the King's Ditch along, from the New Museums to Sidney Sussex College. West of this comes the once relatively higher ground of Peas Hill and Market Hill, over which there is some made earth derived from middens, ruins, and all the natural growth of soil in the centre of a town, where improvements, rebuilding, levelling, etc., have long been in progress. In the next place the section crosses King's Parade near Great St Mary's Church. The foundations of houses were exposed during draining operations at a depth of 12 feet below the existing street, and dwelling houses are known to have stood until quite recent times along the west side of King's Parade. At the back of these however the natural surface of the ground fell rapidly to the river and the

gravel thinned off and passed under the margin of the alluvium, the denudation of this old gravel furnishing material for the newer black gravel which generally underlies the river silt, and forms a very permeable stratum of which account must be taken in all proposals to build over the alluvium or recent river deposits.

There were of course footpaths, roadways, and, later on, lanes leading from the High Street (King's Parade, etc.) down to the river with its pastures and its hythes, and along these lanes, where the levelling up had rendered it possible, some houses and outhouses were built. The road to the King's Mill, for instance, of which two fragments remain, called respectively Queens' Lane and Trinity Hall Lane, was very early a principal thoroughfare; but there do not appear to have been streets, or any considerable number of town houses west of High Street, except those forming the west side of High Street itself. If we turn to the *Architectural History* (Willis and Clark) we shall find in that most complete and accurate record a confirmation of this view. Take for example the description of the site of King's College. Here we find that the area of the Old Court was acquired (1440–1441) not in many small parcels but by one deed of conveyance; and the small areas do not often appear to be private property but rather excrescences upon the colleges, or small bits of land belonging to the University or colleges or churches. Many of these properties were called Hostels, e.g. Cat Hostel, Tyled Hostel, St Giles Hostel, or Crouched Hostel, which was "an open space in 1441." They may have been lodgings for students. We find a bakehouse and other offices in School Street, ground belonging to the University, land belonging to St Mary's Church, a house belonging to a Chantry in Great St Mary's, a horse-shed belonging to Corpus Christi College, a tenement belonging to the Hospital of St John, and a tenement called God's House. All these may well have crept over the ground after many of the colleges had been founded, and certainly after great reclamation of waste land along the river side of the town had taken place.

My friend Mr J. W. Clark has urged me to draw a plan

showing the distribution of the soils, subsoils, and underlying beds referred to in the explanation offered.

This might have been done with much greater accuracy had a record been kept of what has been exposed to view even in the last twenty-five years, or were there any possibility of comparing the groups of remains found in the different areas, but, with the data available, it is not so easy.

However, I have endeavoured to sketch in what I have observed myself, and hope that it may be of help to others who will follow up the work.

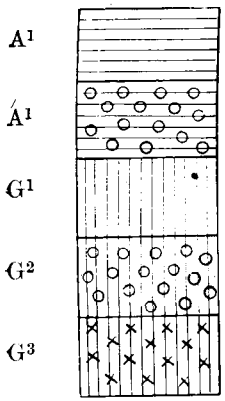
I have traced the various deposits on the plan of Cambridge by Braunius (Plate XXVIII), notwithstanding its inaccuracy, as it shows the area over which the houses of the town extended in 1575, and the distribution of the colleges outside that area.

The description of this plan furnishes an opportunity of discussing in greater detail certain features, many of which can still be observed, and of placing on record some of the sections which have been sunk through the natural and artificial accumulations over the area, and thus offering proofs of the generalised statements made above in explanation of the views put forward as to the growth of the Town and University.

I have traced the margin of the alluvium (A1), and shown the part (A2) over which the level has been raised by carrying rubbish on to it. I have indicated (G2) the margin of gravel which sloped down to the level of the alluvium and passed under it. As this was the portion immediately adjoining the higher ground on which the town was built, it was of course the part first levelled up, and it was only by degrees that the made ground extended over the edge of the alluvium also.

The old river-courses (G3), with terraces which were formed during the deposition of the gravel, or subsequently to the deposition of the main mass, but which do not cut through the gravel, do affect the water-levels, and the suitability of the area for houses. G, is gravel at or near the surface.

The modern town has extended over the higher part of the gravel, which runs from Barnwell by Parker's Piece to the



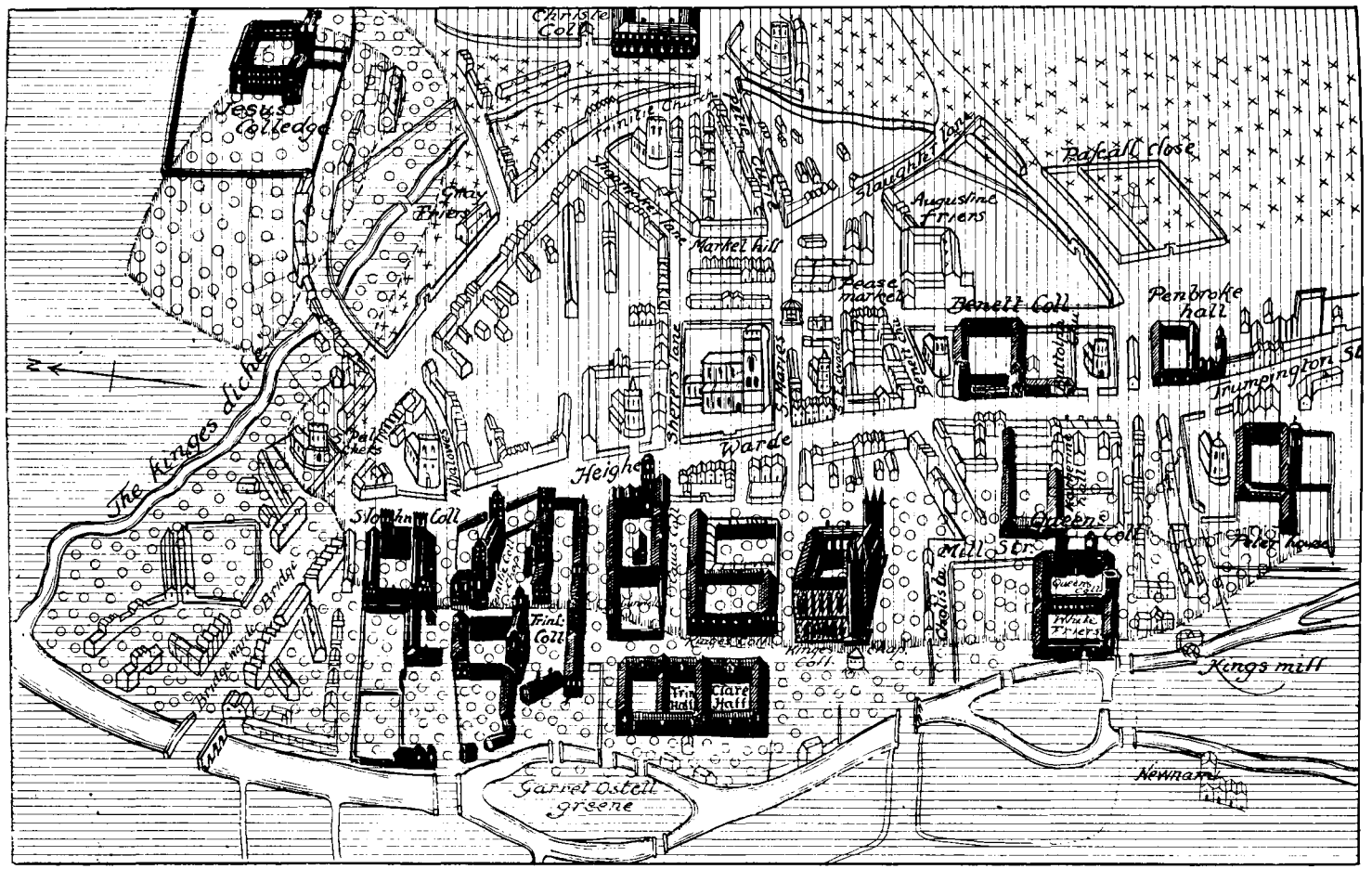
A1 Alluvium

A2 Made ground on Alluvium

G1 Gravel

G2 Made ground on Gravel

G3 Lower Gravel



Plan of Cambridge based on that of Braunius, A.D. 1575.

Botanic Garden. From it run the lower spurs which furnished the dry area along which streets and houses have crept into the great bend of the river, which, subject to the above mentioned limitations, strategically and commercially determined the position of the ancient town.

The Recent Subsidence of the Valley of the Cam.

In all such enquiries as that which is now engaging our attention we are accustomed to regard the level of the land in this country as fixed and permanent for all historic time, and at a little distance above sea level small earth movements of elevation or depression would have very little practical effect, and would be very difficult to prove. But, when we are examining deposits near sea level, in an area where the conflict between the sea and the upland waters is still going on, a rise or fall of a few feet makes a great deal of difference in the issue. For our present purpose it is unnecessary to enquire whether any of this change in the relative position of the land and water is due to actual movement of the land or to the heaping up of the waters by wind or ocean currents to which differences of many feet may in some cases be referred.

We have evidence in the valley of the Cam of a depression in pre-glacial times which went on continuously or intermittently through the period of the deposition of the gravel in which the remains of the Mammoth occur, was continued after the formation of the recent river-silt, and, for aught we know, is going on still.

Under ordinary conditions, such as we have here, a river cannot scoop out its bed below sea level. If then we find a river channel extending downwards below Ordnance Datum, i.e. mean sea level, we may safely infer that there has been a subsidence of the area since that channel was formed.

The date of the erosion is approximately indicated by the deposits which fill the trough. Now when trial-holes were made in the Trinity College Paddocks, with a view to the extension of College buildings over the area, old river courses

were found running to a depth of 40 feet 6 inches from the surface of the Paddocks as they then were, that is before they were raised. The Bench Mark on the stone at the south-west corner of the iron bridge between Trinity College and St John's College indicates 22 feet 9 inches above O.D. The deepest of the old channels then determined is therefore 20 feet 9 inches below O.D., allowing 3 feet for the height of the Bench Mark above the original level of the Paddock. In all of these borings alluvial deposits belonging to the present river system extended down to and rested upon the gault (fig. 8).

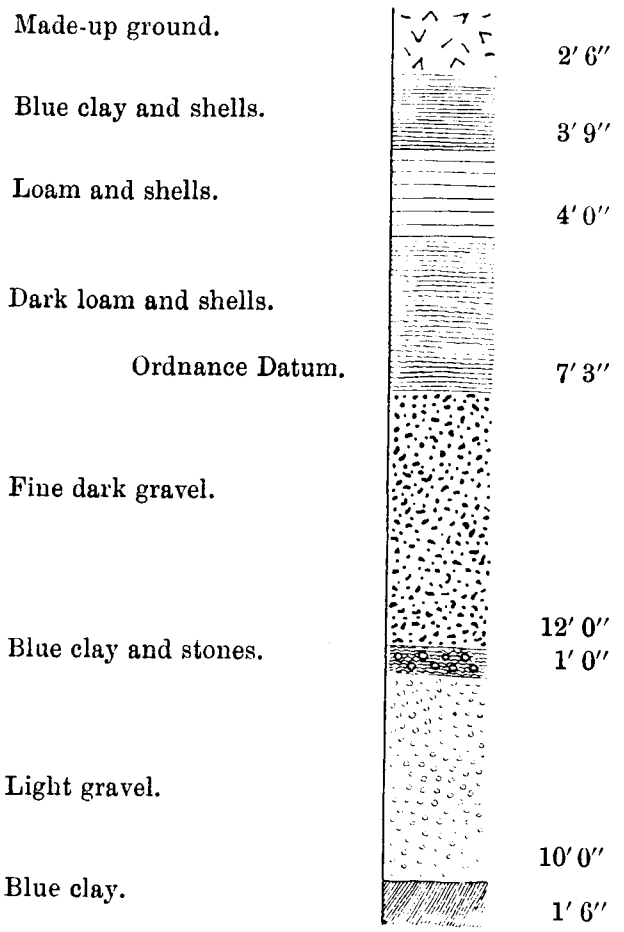


Fig. 8. Section of bore at south-east corner of south paddock, Trinity College, Cambridge. February, 1893.

When Mr Bullock dug the hole in which he proposed at one time to construct a swimming bath between the end of

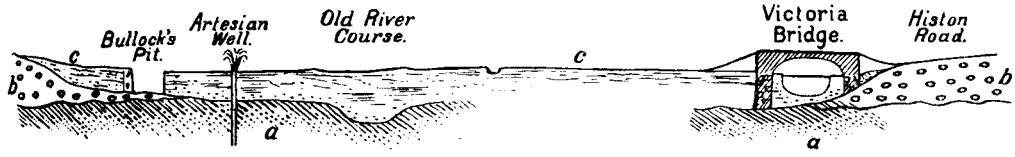


Fig. 9. Diagram Section from Park Street to Victoria Bridge.
a. Gault. *b*. Gravel. *c*. Alluvium.

Jesus Ditch and the girls' school at the bottom of Park Street (fig. 9), the following section was seen:

Surface soil. Peaty silt. Grey clay. Layers of gravel.	Alluvium 17 feet.

The layers of gravel in *c* appeared to be a wash-down from the adjoining terrace of more ancient gravel *b*, and were full of water. In the silt I found a few fragments of black pottery, the exact age of which it was difficult to determine[1]. A little nearer the river Mr Bullock sunk an artesian well into the Lower Greensand which threw up water to a height of 4 feet above the level of the ground.

In the course of further excavations along the line of Park Parade he found an old river channel running to a depth of 27 feet below the surface of the common. The level of the river below the lock is only 20 feet above O.D.

The section exposed in digging the foundations of the new Racquet Courts in Thompson's Lane in 1892 is shown in fig. 10.

I saw a large limb bone of *Bos* and specimens of *Planorbis corneus* at a depth of 22 feet in the gravel and silt, and was informed that bones, pottery, and oyster shells had been found in large quantities in the upper part of the section.

I was told also that the deepest part of the trough was about the middle of the east room, and that the old channel seemed to bend round to a more southerly course towards the south-west corner. It is not improbable that this may be part of the same ancient channel which is shown in the section fig. 9.

[1] See *Proc. Camb. Ant. Soc.* Vol. VIII. 1892, pp. 44, 45, Pl. 3.

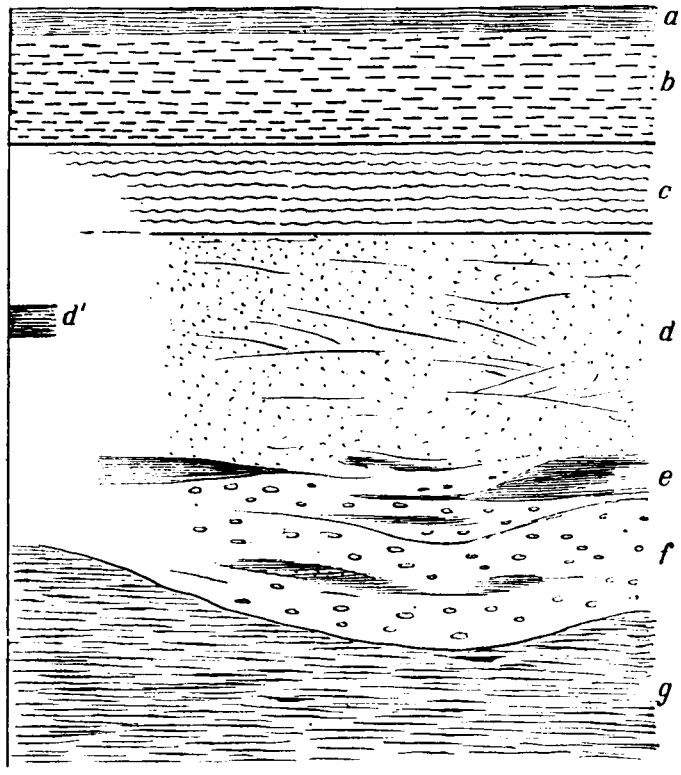


Fig. 10. Section under Racquet Courts in Thompson's Lane.

		Feet.	Inches.
a.	Surface soil.	1	0
b.	Clayey alluvium.	5	0
c.	Impure peat.	4	0
d.	Running sand.	10—15	0
d'.	A band of stiff clay occurred at this horizon at 15 ft. in adjoining pit.		
e.	Black silt with subordinate gravel.	2	5
f.	Silt with subordinate black silt.	2	3
g.	Gault.		

In digging the foundations for the new Electric Works opposite Magdalene College, a similar section through deep alluvium was exposed.

In sinking for the southern pier of the Victoria Bridge at Chesterton, which is near the margin of the recent valley of the Cam, the gault was reached at 16 feet. The section showed surface soil and made ground on sandy black silt with bones, shells and wood; the shells were especially numerous at the base where it rested upon the gault. The river water was

cut off by timber and puddle and did not affect the water in the hole sunk for the foundation. But the water in the hole rose above the level of the water in the river, proving that there is a passage of water down valley through the gravel in ancient channels, independent of the water in the existing bed of the stream, and confirming the generalisations arrived at above.

This subsidence was not sudden, but part of a continuous or intermittently repeated depression, which we can trace back to pre-glacial times at any rate.

When the deep drain was cut in 1895 along the road in front of Jesus College the following section was seen (fig. 11):

Fig. 11. Section seen in roadway in front of Gate of Jesus College during excavations for new drainage, Oct. 7, 1895. Scale 8 feet to 1 inch.

The Bench Mark at Jesus Gate is 31·2 feet above O.D., and the ground falls to 26·3 feet on the path along the edge of Butt Green east of East House. But at the bottom of the drain running sand was proved with a jumper to 31 feet and the gault not touched. On the higher ground at Barnwell the base of the

gravel is found at a much higher level, and indeed is finally cut out altogether by a boss of gault capped by chalk marl between the Abbey and the Junction Station.

If we extend our enquiries we find further evidence of the subsidence of the area in (geologically speaking) recent times. When sinking for water at Impington Park Mr Macfarlane Grieve found in one place Boulder Clay, with a gravelly bed at its base, to a depth of 88 feet 6 inches, and at Sutton Bridge, north of Wisbech, marine alluvium was proved to a depth of 65 feet resting upon Boulder Clay. Widespread depressions since glacial times are shown, according to the observations of Prestwich, Whitaker, and others, by deep troughs of Boulder Clay in many parts of East Anglia. It is clear, therefore, that there has been a subsidence affecting the level of the river at Cambridge which has been going on since the glacial age, has been continued to the time of the deposition of the river-silt at the "Backs" of the colleges, and may be going on still.

For various reasons, therefore, the actual height of the ground above O.D. is not of great importance in our present enquiry, but the relative height of different portions of it and the fall towards the river, does help us to detect what were in old times the waterlogged areas, and the districts unsuitable for houses.

The height about the railway station is over 50 feet above O.D. This drops to 45 feet at the south-east end of Parker's Piece, and to 42 feet on the opposite side by Park Terrace. From 47 feet in Brooklands Avenue it falls to 41 feet near Brookside, a level maintained on either side of Downing Grounds to near Downing Street, where it has fallen to 37 feet.

Now if we examine the natural features along this line of country we can trace first of all a marked terrace projecting from the east side of the valley down which Vicar's Brook runs. This terrace is lost sight of near Brookside. A good deal of water is obviously delivered, where the gault rises underneath it, from the higher terraces along St Andrew's Street to the lower part of the gravel which forms the sub-

stratum in Downing Grounds. This terrace is lost sight of behind the east wing of Downing College, but the slope which represents the eastern margin of it is clearly seen in the yard of the Old Castle Hotel, and although it is not obvious along Downing Street as it now is, when the area on which the Bird Bolt Hotel stood was cleared and excavated for the foundations of the new buildings recently erected at the corner opposite Emmanuel, the old level of Downing Street was seen to have been 6 or 7 feet below the existing road in front of the College. On the other side of Downing Grounds along Tennis Court Road a slight rise may be observed, and thus Downing Grounds lie in a depression which had always a tendency to be swampy. I have frequently seen water standing in winter over a considerable area near the north-west end of the grounds; and I have heard it said that in old times there was good snipe shooting here. This area was not built upon until quite recently.

Before drainage operations were carried out the water that accumulated in the above depression, which narrows between Downing Place and Tennis Court Road, probably ran into the King's Ditch, which is within fifty yards of the north-west corner of Downing Grounds, but in still more ancient times it found its way along the low ground which runs near where Christ's College and Jesus College now stand.

We need not discuss the question whether the lower terrace of gravel is a newer gravel, laid on at a lower level, or whether it represents an ancient river course which cut a terrace in the widespread gravel of the higher level. This question is obscured by the uneven surface of the underlying Cretaceous beds. The terrace of gravel now becomes more conspicuous as we trace it across St Andrew's Street by Christ's College, diagonally over Christ's Piece and Butt Green, and it is sharply defined along the edge of the alluvium to Barnwell Abbey Fish Ponds.

Christ's College was outside the King's Ditch on the margin of the main mass of gravel that sloped down from Barnwell. Other buildings carried the town out along Preachers' Street (St Andrew's Street), so that there were middens and various artificial accumulations over the area, but there was no need to

raise the ground by carrying material in to it. When excavations were made for the foundations of the library extension at

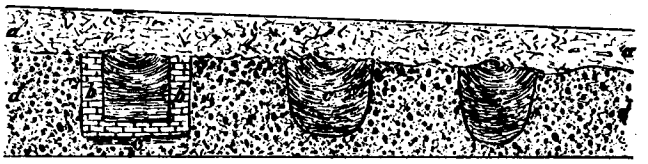


Fig. 12. Section seen along St Andrew's Street in digging foundations of new Library etc. at Christ's College, 1895.

a. Made ground of recent date.
b. Bricked chamber filled with rubbish.
c. Black silt with early mediæval remains.
d. Gravel and sand.

Christ's College in 1895, there was only about 2 feet of soil and made ground resting on the gravel (fig. 12). There were pits, extending down into the gravel to a depth of 7 feet from the surface, which were full of household rubbish. Among the objects found were:

A. Dark grey ware, many of the forms of which have persisted from Roman times, while in many the rim is flatter and more strongly recurved[1]. The ornamentation occasionally, and the association always, connects them with mediæval remains.

B. A brown coarse ware with white specks of calcined flint such as are commonly seen in ancient British pottery. Some of the fragments resemble portions of mortaria such as are found in this district with Roman remains, and many of the larger vessels are ornamented by impressed finger marks. Compare for A and B the Horningsea pottery[2] and that from the older deposits in the King's Ditch[3].

C. Red ware of the 15th and 16th centuries.

D. Green glazed ware probably 16th and 17th centuries.

E. Cullen (Cologne) ware 16th and 17th centuries. The specimens found here were of late date.

F. Red ware 17th and 18th centuries.

G. Brown glazed ware 17th century.

H. Tobacco pipes early 17th century. do. William III.

I. Horse shoe with low calkin. Old English.

K. Perforated pieces of bone and pottery.

L. Large glass flagons and pieces of window glass much decomposed and iridescent.

[1] *Archæological Journal*, Vol. LIX. No. 235, p. 219, Pl. 1.

[2] *Proc. Camb. Ant. Soc. R.* XLV. XXXIII. May 4, 1885.

[3] *Ib.* Vol. VIII. Jan. 25, 1892, p. 32, Pl. 3.

There was also a large quantity of bones of animals, most of which seem to have been used for food. There were bones of horse, ox, sheep, goat, pig, dog, fox, and birds. The remains of the horse were, as usual, in the same condition as the others. Here we had evidently local household rubbish pits. There was no material carted on to raise the ground, for which there was here no necessity.

On the lower ground, near the King's Ditch, between St Tibb's Row and Petty Cury, there was more levelling up by the accumulation of local refuse, but the ground does not appear to have been raised by carting mixed rubbish on to it (fig. 13).

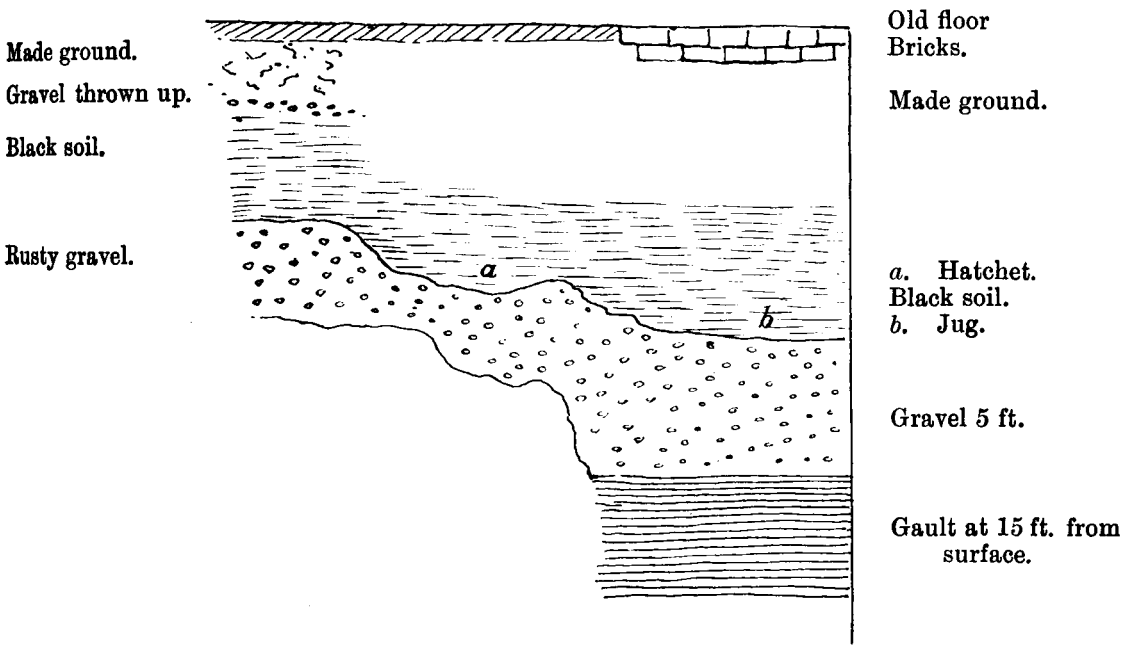


Fig. 13. Section seen in the Falcon Yard, June 10, 1906. Scale 8 feet to 1 inch.

This does not look like rubbish carted on to an even surface of gravel, but is merely household refuse shot into a hole, from which perhaps a little gravel had been obtained.

The interesting jug found here, which probably belongs to the early 15th century, is in the possession of Mr Jas. V. Pryor, to whom I am indebted for much courtesy and assistance.

It follows, therefore, that the Grounds of Downing College were of the nature of a "bourne," that is an area along which

water usually passes underground in the gravel, but where, in wet weather, when the gravel is saturated, the water shows at the surface, at different places according to the level to which the underground water has risen. It must have had originally an overflow channel to the north somewhere near Sidney Sussex College, and this waterway determined the course of the King's Ditch from Downing Street to beyond Christ's College. Between the east bank of this intermittently wet ground and the alluvium of the Cam on the west of the town, there extended the spur of gravel on which ancient Cambridge was built. It ran by Peas Hill and Market Hill, to the church of St Sepulchre.

Along either side of this area, including Downing Grounds on the western boundary, there ran two principal streets; on the east the High Street (Trinity Street and King's Parade), and on the west Bridge Street leading to Preachers' Street (St Andrew's Street). These two streets were carried along the outer margin of the town, but not beyond the dry ground, and, as the spurs of gravel tapered off to the north, so they converged and met opposite to the church of St Sepulchre. It is an interesting point that, although a Roman drinking vessel was found in digging the foundations of Whewell's Court belonging to Trinity College, and a few Roman remains on the waste ground on which the Tutor's House of Trinity Hall was built, this area round the Union, St Sepulchre's Church, and the junction of the two main roads above described, is the only place where we have evidence of Roman occupation of any importance within the limits of the ancient town. When the foundations for the extension of the Union were being dug, I saw and collected a large quantity of Roman pottery, bones, etc., and, in the refuse in one place, a number of oysters with the valves adherent as if they had never been opened. A quern and other objects were found under the road in front of St Sepulchre's Church during the draining operations of 1895. Now this area forms the end of the spur of gravel, and from it the ground may still be seen to slope rapidly along Park Street down to the level of the alluvium, which was exposed in Bullock's Pit (fig. 9).

It is probable that the spur of gravel on which the ancient town was built was not quite continuous at the same level but that there was lower ground between the churches of St Peter (now St Mary the Less) and St Bene't, along which the King's Ditch was taken without the necessity of making any considerable excavation except close to St Peter's. So also the end of the spur was cut off by a depression running across from St John's College to somewhere near Jesus Lane. There was a deep ditch through here which was exposed when the foundations for the Divinity Schools were dug. This ditch seems to have formed the northern boundary of All Saints' Church-yard, and was full of human bones, probably thrown in from time to time as new interments in that crowded church-yard necessitated the disturbance of ancient graves. The ditch crossed the street and passed away under St John's College. St John's College stands partly on the low western margin of the end of the gravel spur, as seen in all excavations in or near the First Court. The College extends over the alluvium as was seen in digging the foundations for the new buildings by the Master's Lodge. The ground here, both over the alluvium and the gravel slope, has been raised artificially.

St John's College represents the ancient Hospital of St John, which had been founded by a burgess of Cambridge "*on a piece of waste land,*" and had long been affiliated to the University. It was dissolved by competent authority, and a new charter given to constitute an exclusively academic body in its place[1].

The King's Ditch.

We must not assume that what is called the King's Ditch was dug by the order of Henry III or King John, any more than that there never was any road or track in ancient times along what was afterwards called the King's High Way. Nor does it much matter for our present purpose whether the ditch of the time of Henry III coincided exactly with that of King John, or whether there was a fosse round the town in

[1] Babington, *History of the Infirmary and Chapel of the Hospital and College of St John the Evangelist at Cambridge* (1874), p. 2.

still earlier times. As a matter of fact we know that there are several ditches along the general line of what is called the King's Ditch. There were some natural channels carrying off the water which ran out of the gravel, or collected on the more clayey portions of the surface, and produced hollow places in various parts of the town. As the ditches were taken through the lowest ground that could be found along the line which convenience in other respects pointed to, they are apt to coincide with these natural depressions. It will be noticed that the line of the ditches has the straight course which we should expect in an artificial cut as we trace it from the King's Mill across the gravel spur to the low ground by St Tibb's Row, where it must have received the water from what we now call Downing College Grounds. Beyond this it has a slightly sinuous course, such as we might expect if it followed the ancient line of drainage from the swampy area by Downing College to the alluvium of Butt Green. It had to be used as a drain, to be periodically flushed from the river above the town, and to have an outfall below. The ancient leet that served the King's Mills provided abundant fall for the purpose, but the depth of the Ditch is such that even before the water was carried in that high channel, the Ditch could have been flushed from Newnham Pool. We must remember that although the system of locks may not be ancient, some holding up of the water was provided by the "hards" and fords.

Even if building along the King's Ditch had not been prohibited, it is obvious that this was not at first a desirable site for residential purposes, and it is interesting to note how few dwelling-houses there are along it even at the present day. Streets have been carried along it and modern public buildings mark its course—the Pitt Press; the corner of Pembroke College; the Chemical Laboratory; the Old Physic Garden; St Tibb's Row; the Post Office; Hobson Street; Sidney Sussex Grounds are on one part or another of it.

I have already placed on record[1] the results of some recent excavations along the line of these ditches, which, for our

[1] *C.A.S. Proc. and Comm.* Vol. VIII. (1895), pp. 32, 255; Vol. XI. (1904), p. 173.

present purpose, we may continue to refer to as the King's Ditch.

It is probable that in Jesus College Ditch we have an ancient river bed maintained as a boundary. It has the winding course of a river channel, and its general trend coincides with that of the valley; while on the common, to the north of it, there is another ditch, now almost obliterated, running parallel to it and probably marking another ancient river course. Many of the existing boundary ditches in "the Backs" represent, as I have already suggested (p. 395), old river courses. These are joined to the existing river by straight artificial cuts dividing the college grounds. But the deep troughs I have described above (p. 401) belong to much earlier conditions, when the river bed was cut down to what is now below sea level, and alluvial deposits belonging to recent conditions filled the hollows.

The streets in the town are raised above the level of the surrounding houses and gardens, but the areas within the monastic and collegiate buildings were raised above the streets. Examples of this may be seen near the Colleges of Jesus and Sidney Sussex, where we have the best opportunity of studying the original topographical features.

In Sidney Sussex College, which, by the courtesy of the Master, I had recently a good opportunity of examining, the ground within the College is raised about 3 feet above Jesus Lane and Bridge Street, and the excavations for the new buildings showed made ground and disturbed gravel to a depth of from 9 to 11 feet.

The grounds of Jesus College are raised well above the alluvium, and the made ground encroaches over it, while the street face is kept up to the raised level of Jesus Lane which is on the gravel. The nunnery of St Rhadegund was built on lower ground, as seen by the depth of the base of the recently discovered arches of the Chapter House, below the level of the existing cloisters. But when we examine the adjoining streets, we find that they are raised above the level of the dwelling-houses and gardens. On the north side of King Street, where excavations show gravel on gault, the

ground falls rapidly to the north. Towards Christ's Piece on the south the ground rises with slight indications of terraces. Malcolm Street is raised several feet above the original base of the houses, the gardens of which on either side are much lower than the street. Behind the Clergy School the ground falls away from Jesus Lane.

Along the street (Bridge Street) which leads to St Clement's Church, the drainage operations exposed alluvial deposits, and what looked like a rough wooden roadway on them. About 140 yards west of this point, in digging the foundations of the new buildings of St John's College near the Master's Lodge a great depth of alluvium was passed through.

It is difficult to trace the margin of the alluvium from this to Queens' College and the King's Mill, but we know that the loop of the river which bounded "Garret Ostell Greene" on the west has been filled up, and that the Library of Trinity College stands upon made ground.

In some excavations between Trinity Hall and the river the alluvial silt was found passing under the made ground between the College and the river. In this that queer discovery was made of a human skeleton apparently secured between stakes and fastened down into the bed of the stream.

Close to King's College Bridge a great depth of made ground was passed through, with much late mediæval pottery and bones, but I did not see any alluvium thrown out. When the foundations of the new buildings of King's College by the river were being dug I saw a great depth of made ground with bones of domestic animals and pottery (mediæval). At the bottom there was some dark unctuous clay, probably alluvial.

When a trial hole was sunk by the Corporation close to Queens' College Bridge, in the attempt to prove that the gault was unsound in places, and that Bullock's scheme was therefore impracticable, the upper part of the section was through gravel.

Up the valley beyond this the boundary between the alluvium and the gravel is obvious, but the great mass of made ground obscures it along the outskirts of the ancient town, where from 7 feet to 15 feet of transported earth covers all the

lower slope to the river. Near the King's Mill the river bends westward and the gravel spur extends eastward, so that the higher ground approaches more closely to the river by King's Mill Pool.

Along the lanes or thoroughfares, transverse to the main streets, which are now more or less represented by Silver Street, Mill Lane, and Little St Mary's Lane, on either side of the King's Ditch, houses thickly clustered. The ancient Colleges of Peterhouse, Pembroke, St Benet's, St Catharine's, and Queens' curve round and enclose it in unbroken sequence. In fact there seems to have been here a small outlier of the town. It grew up around the ancient mill, and probable facilities which existed for crossing the river near the mill. But the principal reason was that this site was on a patch of gravel cut off by the King's Ditch from the end of the spur which runs down from the end of the Fitzwilliam Museum to Queens' College.

The following section has recently been exposed in the course of excavations for the alteration and extension of Mr Foster's house in Mill Lane.

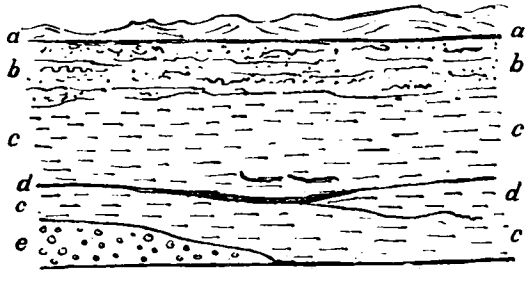


Fig. 14. Section in Mill Lane. Scale 8′ to 1″.

The section was as follows (fig. 14). The artificial floor (*a*) sloped towards the river. A surface deposit (*b*) of gravel, old mortar, and earth, indicated a recent raising of the ground on which the floor was laid, by about 1 ft. 6 in. Below this came (*c*) 4 ft. 6 in. of brown gravelly earth such as generally forms the cultivated surface soil over the district. In this, at 5 ft. from the surface, was (*d*) a layer of black earth full of organic matter and apparently representing a stationary period in the

filling up of the hollow. The made ground, in the lower part of which there was a considerable quantity of potsherds and bones, rested upon an irregular surface of gravel (*e*). The pottery was generally a red earthen ware with an irregular dark glaze. Some pieces were ornamented with bands of yellow produced by brushing on a very liquid clay as colouring matter previous to final firing. There were also a few pieces of a bright green glazed ware, with rose-like moulded ornament, produced by pressing out the clay when the handle was added. One pipkin in red ware was nearly perfect except the handle. These pieces of pottery had a considerable range in time, but taking them altogether I should be inclined to refer them to the early part of the 17th century. There was also a tobacco pipe with a small bulging bowl which I should refer to the same period. Hardly any metal was found. There was one key of a not uncommon type in which the head is made of three cylinders, the lower two of which are cut in half. The pipe of the key is ornamented in stages like a telescope, but the handle seems rather weak for so large a key. This also may well belong to the 17th century.

It is important to record all discoveries over this area, seeing that it lies close to the ditches which mark the ancient boundary of Cambridge on the south. In this particular section there was a rapid deepening of the made earth on the south, but the distinctive soil and remains usually found in the ditches were not anywhere seen.

If the river were taken straight from King's Mill to St John's College it would run through the Colleges of Queens', King's, Clare, Trinity Hall and Trinity, and the eastern part at any rate of all these Colleges, as well as St John's College, are on reclaimed and raised ground. In this connection it is interesting to notice that what is now called Queens' Lane, namely the street which runs between Queens' College and St Catharine's, is on Braunius' map called Mill Street, and was the direct route to the King's Mill where all the mill leets converge, where the river's natural course is most interfered with, and whence the King's Ditch started.

Turning north we look along the belt of land between Mill

Street (Queens' Lane) and High Street (King's Parade), which represents the low sloping edge of the gravel spur on which the old town was built. This area is entirely overspread by colleges, except the strip along the east side of the High Street, which is, or was till recently, occupied by town houses. That is to say, as shown above, the principal street was carried along the margin of the high ground but not so low down the slope as to be unsuitable for the erection of houses on either side of it. In St Catharine's College a quantity of rubbish was turned out, with mediæval pottery and bones in made ground on gravel; and similar made ground was proved during the extension of Queens' College to the north. In King's College the more easterly part of the site consists of made ground on alluvium, but the Chapel is on made ground on the gravel. This was seen at the west end of the Chapel during some excavations for repairs. I found here an interesting figure of a lion carved in stone, which was no part of the Chapel decorations, but must have been carried in from still more ancient buildings with other rubbish, which was used to level up the ground. I placed it in the Provost's Lodge. Further on, during the last extensive alterations in the Arts School, made ground on gravel was exposed. Much of the pottery found here was of the older mediæval type; black ware with the strongly turned back flat rim.

For some reason the corner on which the Tutor's house at Trinity Hall[1] was erected had been always waste land. The date of the enclosure of this portion of land is fortunately recorded in Warren's Book[2]:

The ffellows ffruit Garden.

The ffellows ffruit Garden next Garret Hostle Lane is in Length ffeet.

[1] *Camb. Ant. Soc. Proc. and Comm.* 1880, *R.* XL. XXI.

[2] A collection of documents relating to Trinity Hall, interspersed with anecdotes and descriptions, by William Warren, LL.D. He was admitted Sizar 3 May, 1700; elected Fellow, 3 Sept. 1712; died 1745—46. The work is styled: "Collectanea ad Collegium sive Aulam sanctæ Trinitatis in Universitate Cantabrigiensi precipuè spectantia"; and is signed at the bottom of the title-page: "W. Warren, LL.D. Aul. Trin. Soc. Ap. 27, 1730." See *Arch. Hist.* I. 237—240.

In Breadth ffeet. The Mulberry Tree in it was planted about y^e^ year 1690 by M^r^ Allen then ffellow.

There was another Mulberry Tree planted at the West end of the same Garden about Lady Day 1726 By D^r^ Tenison ffellow.

On the inside of this Garden Wall wch is next Caius College are these letters T.G. held together by a sash workid on a stone. I know not who they stand for.

It appears from Deeds that were made in Stephen Gardiner's time, y^t^ y^e^ ground between our College Building and Gerrard (or Garret) Hostle Lane was granted to our College by y^e^ Mayor and Corporation of Cambridge and by S^t^ Michaels (Mychell) House by several pieces and at several times in exchange for some pieces of Land from Trinity Hall. What is now called y^e^ ffellowes ffruit Garden on y^e^ North side of y^e^ College was granted by Mychell House 16 Apr. 36 Hen. 8. for a Red Rose acknowledgm^t^ (see Arch. Coll. S^t^ Edward's drawer). On a spare leaf at the end of the old Vellum Book with green strings[1] (in which book I have transcribed the College Statutes) are these following Memoranda entred (as I take it) in Dr Harvey's[2] own Handwriting, viz.:

Anno Dni 1545, y^e^ ground on y^e^ north side of y^e^ buildyng of o^r^ College was taken y^n^ and y^e^ wall builded wch befor was a laystowe.

Anno Dni 1569 y^e^ old wall on y^e^ northe side of o^r^ back syde was taken down, and y^e^ grownd wch was w^t^ out o^r^ wall taken yn unto y^e^ water syde all y^e^ lengethe from y^e^ stable w^t^ y^e^ retorn to y^e^ prive and y^e^ new wall sett up and a new crosse wall sevarying y^e^ stableyard also made y^e^ same yere.

The forementioned Date viz. 1569 appears still on y^e^ outside of y^e^ Corner of y^e^ Wall at y^e^ watergate next Garret Hostle Bridge, cut in stone thus 

and over y^e^ Date a Crescent for y^e^ Founder's Arms[3].

A *laystall,* or, as it seems to be written in Warren's book, a *laystowe,* was a place where rubbish was deposited; and in Spenser's *Faerie Queene* (Book I. Canto 6) we read:

> "Scarce could he footing find in that fouleway
> "For many corses, like a great *lay-stall,*
> "Of murd'red men."

The word is spelt *loistal* in Bacon and *leystall* in Ben Jonson[4]. It is probable that when the piece of ground in

[1] This book is now bound in calf and lettered: "Old Vellum Book."

[2] Henry Harvey, LL.D., Master 1560—1584. See Cooper's *Athenæ,* I. 505.

[3] Warren, p. 18.

[4] See Richardson's *Dictionary,* s.v. LAY.

question was taken in by the College, it was levelled, for we learn from Warren's book that it was converted into a fruit-garden and mulberry trees planted in it. This would lead us to expect that there must be a recent surface layer, but containing many odds and ends of earlier date, turned over when levelling the ground, or dug up when planting the trees; and this we found to be the case, as may be seen in the accompanying section (fig. 15). We took out a sufficient number of objects ourselves and watched the workmen enough to justify the general conclusions we have arrived at; but, as it was term-time, and we had little assistance, we were obliged to trust the information received from them as to the exact position of many of the things found, some of which we should have been glad

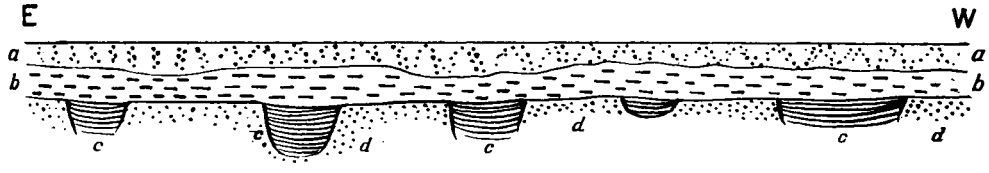


Fig. 15. Diagrammatic Section in illustration of the layers containing Roman, mediæval, and later remains in the Garden of Trinity Hall.

a. Garden soil and recent debris. 1 to 2½ feet.

b. Earth containing bones, pottery etc. from 17th century back to an unknown mediæval date. 2½ to 3½ feet.

c. Pits with black earth, bones, pottery etc. of Roman date. Those bottomed ran to a depth of about 10 feet.

d. Low terrace gravel.

to have seen *in situ*. We can, however, lay some interesting facts before our readers. In the surface layer (*a*) were many recent things, such as an egg-spoon, the top of an inkstand, and some small ornaments. In the older layer (*b*) were bones of domestic animals, ox, sheep, pig, dog, fowls. The fragments of pottery showed a great variety of ware, mostly glazed either wholly or in part; some of known Cromwellian type; some of Elizabethan; and some of probably much earlier date.

In the Roman pits (*c*) the usual layers of oysters, mussels, and bones of animals that had been used for food occurred, with legs of the common cock with the spur-core. Were these kept as relics by a cock-fighting people, as racing men and

others sometimes keep the hoof of a favourite horse? There were many fragments of pottery, some of it differing considerably in the outline of the vessels from that found at Chesterford. A few bits of Samian occurred; one a small saucer with the leaf on the margin which we have found so common, another with a Mercury and part of a hunting-scene; one nearly complete mortarium, and many pieces of black urns, two of which have been partially restored. These I deposited in the Archæological Museum until the College can provide for their safe keeping.

Within the walls of Trinity College an immense quantity of relics of various ages have from time to time been unearthed; of which many fortunately fell under the observation and care of that excellent antiquary Mr William White, sub-librarian of the College, who has given an account of some of them[1].

Several objects have recently been brought to me, respecting some of which I have only the statements of the workmen that they were found when cutting drains in Trinity in 1905. I feel sure from the variety and character of the things themselves that I have rescued only a very small part of the collection. Respecting their position and mode of occurrence I have no evidence. Among them were fragments of earthen cooking vessels, a bellarmine or greybeard, and the teeth of horse and pig. There were also some objects which point rather to later College times, for instance the lower half of an Egyptian turquoise-coloured pottery image, and a stout plain ivory knife handle some 4 inches long and 1 inch in diameter at the thicker end.

Another very interesting series of remains was found in digging the foundations of the new buildings at the corner of Trinity Street near the Great Gate of Trinity. This section I had opportunities of observing during the progress of the excavations. It is on the margin of the gravel spur and the made ground on which Trinity is built.

A large number of the objects were brought to the Bursar, H. McLeod Innes, M.A., who kindly allowed me to examine

[1] *Proc. Camb. Ant. Soc.* Nov. 8, 1893, Vol. II. N.S. p. 292.

them; others were scattered, and some were brought to me and handed over by me to the Bursar. Among these, besides pottery of no special interest, were remains of shoes, some of which were exactly like those I procured from the King's Ditch, and figured in the *Proceedings of the Society*[1]. What strikes one about them is that some are so small that, even allowing for the youth of the students in former times, we can hardly suppose that they belonged to the inmates of the College, and, to explain them, we fall back upon the generalisation arrived at from a consideration of all the circumstances and from an examination of adjoining areas, namely, that these small shoes were probably brought with the rubbish carried here to raise the level of the ground.

The objects found here range over the whole of the mediæval times represented by the deposits in the Cambridge ditches which I have already described[2], viz. the dark grey earthenware cooking vessel (Pl. II., fig. 1) and the pipkin (fig. 5). The dark grey earthenware vessels varying in the form of the rim from the rounded recurved rim, undistinguishable from many found with Roman remains, to the strongly bent back flat rim, as shown in Pl. III., are the oldest type found, and are most abundant near the base in the black silt. There are many varieties of common earthen jug or crock with round or flat fluted handles, on which sometimes a more detailed impressed ornament occurs; and also vessels with a rough ornament brushed on in a lighter coloured clay, and several varieties of green or brown and yellow glaze. Bellarmines, or Cullen ware, are not uncommon, but glass is exceedingly rare. In all excavations in the eastern part of the College, gravel is found under the made ground, but no alluvium. The alluvium comes on under Nevile's Court.

In cutting a deep drain, in October, 1893, down the lane which runs along the south-west side of the first court of St John's College, a thick wall was crossed obliquely near the St John's Street end of the lane. The most easterly point where it was seen was at the corner of the railings which

[1] *Proc. Camb. Ant. Soc.* Vol. VIII. Oct. 23, 1893, p. 275.

[2] *Proc. Camb. Ant. Soc.* Vol. VIII. Jan. 25, 1892, pp. 41—50, p. 53.

bound St John's Street from the Front Gate of St John's to the entrance to the lane. From this corner the wall ran W.S.W. towards the 3rd and 4th buttresses of Trinity College Chapel. The lower part of the wall was of clunch to a depth of about 9 feet, and the top foot was of dark red brick. The breadth of the wall was about 6 feet. There was a square well or cesspool at the south side close to the street. Unfortunately no remains that would give any clue to the date of the made ground along or beneath the wall were preserved, so we can only guess at its age. The fact that the lower part of the wall was built wholly of clunch without any fragments of Burwell or other oolitic stone from older buildings seems to point to the antiquity of these foundations. A ditch with black silt was crossed under the highest part of the new buildings in front of the kitchens, and this may have been an old boundary. From the bottom of the made ground where it rested on the gravel at a depth of some 13 or 14 feet, several fragments of the old black cooking vessels and of dark green glazed vessels were procured. We can only conjecture that the wall was part of the Chapel of King's Hall, and that its position gave rise to the Trinity tradition that Trinity Chapel used to stand on St John's College ground[1].

Thus we find from an examination of the topography of the town, and from the sections seen in the course of excavations, that the boundaries of the old town were determined by the physical conditions of the ground and the distribution of the underground and surface waters; that the town occupied an area along interrupted spurs of gravel; that it was bounded on the east by the King's Ditch, which was taken as far as possible along natural depressions, and on the west by the lower slope of gravel which fell towards the alluvium from just beyond High Street (King's Parade); that there was an area occupied by houses at the south-east end of the King's Ditch by the King's Mill; that this small area is almost encircled by

[1] [It is quite true that part of Trinity College Chapel stands upon ground acquired from St John's College in 1511. *Arch. Hist.* II. 455—458. The wall mentioned by Professor Hughes could hardly have belonged to the Chapel of King's Hall, but more probably to one of the houses which occupied the site. *Ed.*]

colleges; that the rest of the colleges extend on made ground over the lower slope of gravel west of the High Street, and in more recent times even on made ground over the edge of the alluvium; that the distribution of the ancient monastic institutions approximately coincides with that of the colleges; and that the explanation is that the town had covered the part of the area which was dry and adapted for building houses over, and that sites were assigned to the monastic and scholastic institutions on the outskirts which were only suitable for building purposes after the ground had been raised by carting immense quantities of rubbish on to it.

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